Banking risk in the Middle Ages and modern society

A social systems approach to banking risk

Master Thesis
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Abstract

The concept of risk has today become a ubiquitous concept within the banking sector ranging from financial risk to liquidity risk and reputational risk. The concept of risk saturates the entire banking sector but leaves an ambiguity about what the concept really means behind. The ambiguity concerns how the concept of risk, on the one hand, involves reining the uncertainty of the future as best as possible while, on the other hand, involves profitable and high-yielding possibilities.

The focus of this thesis is to explore and understand the concept of risk in the banking sector in order to grasp the meaning of the concept and discern the particular emphasis on the concept in the banking sector. Through the use of systems theory, the thesis investigates the origination and development of risk in the banking sector in the Middle ages and in modern society. The thesis investigates how risk is handled in the social communication of the two periods and analyses how the concept of risk performs a function in banking communication in periods of a new and changing environment of economic activities.

The argument brought forward is that the concept of risk in the banking sector embeds a particular economic meaningfulness about how to handle the future. In the modern banking sector, decisions about the future are decided against the background of complex economic contingency and, at the same time, on a confidence in the ability of probabilistic techniques to uncover the reduction of risk. Thus, the current emphasis on risk in the banking sector concerns not so much whether there is more banking risk today than in previous times but more that the banking sector today increasingly communicates about the future and thus risk.
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Introduction

“As a key component of the financial system, banks allocate funds from savers to borrowers in an efficient manner. They provide specialized financial services, which reduce the cost of obtaining information about both savings and borrowing opportunities” – Federal Reserve Bank of San Francisco.1

“The fact is that bankers are in the business of managing risk. Pure and simple, that is the business of banking. As long as a bank keeps its risks within its risk-taking capabilities, it survives; and if it doesn't, it dies” – Walter Wriston, former chairman, Citicorp.2

Risk stands today as a pervasive and unavoidable concept within the banking sector extending from general market and credit risks to operational, performance and reputational risks. Nevertheless, a curious confusion about the concept is detectable. A recent report from the Danish Ministry of Business and Growth outlines the causes of the financial crisis in Denmark and points to a complex web of factors. Among other things, high growth, economic optimism, financial deregulation, bad organizational management and risk seeking credit institutions (Erhvervs- og vækstministeriet, 2013:15) are highlighted as contributing factors. Here, the qualities of risk are attributed negative consequences. However, looking at the first page of a banking risk management textbook reveals how risk management tools ”enhance considerably the views on risks and provide the ability to control them” (Bessis, 2002: ix). Here, risks qualities are attributed potentially positive consequences. Hence, the concept of risk seems to have a Janus-faced character that spurs confusion about what essentially characterizes risk.

Confusion about what the concept of risk is and whether it is profitable or not is evident. On the one hand, risk seems designated towards the uncertainty of ”tomorrow's potential losses” (Ibid.:ix) within an intangible form that cannot be categorized under costs. On the other hand, risk is considered a profitable tool that “can improve returns to shareholders and reduce the cost of capital“ (Belmont, 2004:1). An interview with Andreas Jessen, Senior Quantitative Analyst at Nordea,

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1 Federal Reserve Bank of San Francisco, 2001
2 The Economist, 1987: 2
sums up the confusion. When asked about what risk is he replied: “hmm, well, I don’t know. I have never thought about that […] we are exposed to things because we have not covered all risks. But the point is not to remove them. The point is to identify them and price them into our contracts” (Appendix 1:2:02-2:50). The confusion seems to arise from an inherent ambiguity in the concept. Since the uncertainty of tomorrow’s losses must be identified and curbed but simultaneously may result in high-yielding possibilities, the ambiguity lies in an actualization of the concept that demands austerity and pursuit of profit at the same time. But how can a concept appear so widespread and yet so unclear within a sector conventionally known for principles of accuracy and exactitude to manage profit margins? The elusive and Janus-faced concept of risk stands at the forefront of a dubiety in the banking sector that will be addressed in this thesis.

The report from the Ministry of Business and Growth alludes to the fact that the international banking sector in recent times has undergone a transformation (Erhvervs- og vækstministeriet, 2013:59) whereby characteristics of a bank solely managing interest margins no longer suffice. Conventionally, the function of banks is considered to be the efficient allocation of liquid resources from savers to borrowers (Allen and Santomero, 2001:173) where risk can arise from a mismatch between deposits and loans. However, this definition stands in contrast to the distinct emphasis on risk by Walter Wriston quoted above. This raises some questions. Does the simultaneous emphasis and confusion about risk arise from a change in the constitutive character of banking, which thereby cannot be adequately described by pigeonholing the function to resource allocation? Has the function of banks changed over time and has risk always been coupled to this function? Is the banking sector describing itself in a new way, which does not have a definite form yet? In light of these questions, it seems relevant to take a step back and observe the appearance of the thematization (Andersen, 1999:10) of risk in the banking sector.

Most economic approaches deal with risk management models as a purely technical matter. These mainly focus on technical quantifications and probability calculations of risk based on scenario models (Bessis, 2002). Other approaches focus on

3 My translation from original statement: “Øh, ja, det ved jeg sgu ikke. Det har jeg aldrig tænkt over […] vi er udsat for at der kan ske nogle ting fordi vi ikke har afdækket alle vores risici. Men pointen er heller ikke at fjerne dem. Pointen er at være klar over dem og prise dem med ind i vores kontrakter”.
institutional transformations in the banking sector, e.g. power shifts through the Basel process from public authority risk supervision to private markets (Wigan, 2010). Along similar lines, critique has been raised concerning neoliberal modes of governance epitomizing an endemic preference for markets over the state. Increasing self-regulation through risk analysis is criticised for being used as templates for the control and organization of banking entities in which risk governance is a defensive strategy against litigation and an opportunity of new ways of making money (Power, 2007).

Given these approaches it is not novel to state that risk is an ambiguous and contested concept. However, these approaches mainly focus on risk management developments from around the 1970s and forward. To the knowledge of this author, very little literature has investigated how the concept arose, how it is connected to banking and how it is connected to transformations in banking functions in history. This is what this thesis intends to do with the help of Niklas Luhmann’s system theory. Using systems theory, this thesis will investigate the issue of risk in banking as a social and communicative phenomenon. This approach is not critical nor explains technicalities but inquires through unsentimental observations of the advent of concepts and how these are given a particular meaningfulness in different periods of time (Andersen, 1999:9-22).

Systems theory offers a different and more complete way of looking at things compared to other approaches. This does not mean that it comprehends society in its totality or allows for predictions in contemporary history. On the contrary, to fathom society in its totality is impossible in systems theory. It is complete in the way it seeks to identify possible spaces of communicative practices over time. It is a way of opening the actualized empirical sociality to explore cracks, fissures and shifts in the communication within the social bounds of possibilities. As a result, the central purpose is to diagnose how spaces of possibility and action are opened with risk in the banking sector. Taking a long-term view on things, this thesis seeks to challenge the way a social practice observes in order not to see something else but to observe with new observations. It seeks to observe blind spots in observations in order to offer alternative self-descriptions for communicative practices (Andersen, 2006:20-35).
The main purpose of this thesis is to analyse the conceptual history of risk in the banking sector to observe the origin and transformation of risk in concrete banking communication within two time periods. Observing how risk in the banking sector is actualized over time is analytically potent as a means to cast light on the equivocal concept of risk and the current befuddlement of its function within the banking sector. The point is to observe how the origin of risk crystallizes a particular conceptual significance in connection with a new kind of economic experience for banks in the societal context of the Middle Ages and how the transformation of risk communication over time crystallizes a particular significance of risk today against the background of a new economic experience in modern society.

Accordingly, the thesis will focus on the following research question: 

*Drawing on Niklas Luhmann’s systems theory, the thesis will analyse how the origin and transformation of risk within the banking sector historically has been coupled to economic problems against the background of broader societal developments?*

The argument brought forward is that the concept of risk in the banking sector is understood and articulated differently over time according to changes in society. Risk in the banking sector can be understood as a way of dealing with economic problems in society in which risk is given a particular meaningfulness according to the particular problem. As such, it concerns the issue of how to protect the anticipated normality in society when changes occur. The reason why risk arose in the Middle Ages was due to a new situation of increasing economic activity while the recent emphasis on the concept today is due to a new and changing environment of economic activities. It is hard to say whether it was more risky to engage in banking in the Middle Ages but it is evident that the banking sector communicates differently about risk today and gives it a central position in banking operations. Risks do not exist independently but only to the extent that they are observed (Luhmann, 2008:6). Hence, what can be said is that the banking sector observes the world with a particular risk semantic. This risk semantic is a form of communication, which structures and stabilises expectations.
Analytical procedure

This paper’s analytical modus operandi will look at risk in the aforementioned periods with a twofold objective: First, I wish to trace the origin of the concept of risk in order to ask how it came into existence in the banking sector and compare that to observations of how it is used presently by banks. Secondly, I wish to analyse the background of political, philosophical and economic conditions against which the concept of risk came about and against which it is actualized today. These objectives will serve as analytical cornerstones in order to answer the research question in a concise manner. To do so, two concepts from the system theory must be emphasized: semantic distinctions and contingency formulas. These will be explained more in depth later on and are only briefly outlined here.

The starting point for the analysis is that the concept of risk does not have a definite meaning but contains a plurality of distinctions (Luhmann, 2008:16). Hence, risk is not an object amenable to scientific measurement but a concept that can change according to a given state of affairs. Therefore, the analysis does not attempt to answer what the concept of risk is in itself but how it appears in relation to other concepts. This will be done by the use of distinctions in order to mark one side of the distinction and not the other (Luhmann, 1994:130). Hence, understanding the concept of risk requires an observation of concepts tied to it in order to see how it is differentiated from these concepts and how this installs a particular meaningfulness of structural expectation in the concept. The analysis will follow Luhmann’s distinction between danger and risk in which danger is a possible loss contributed to an external cause, while risk is a potential loss attributed to a decision (Luhmann, 2008:21-22). However, this will only be a guiding distinction within a plurality of distinctions analysed in the banking sector.

In order to specify the societal context against which risk is analysed, I will inquire with the help of contingency formulas. A contingency formula covers deeply sedimented ideas in society whose legitimacy stands uncontested. These ideas can be e.g. God, democracy and markets (Thyssen, 2012:687). The particular legitimacy of a societal order determines the boundaries for what is considered possible or not in society. Thereby, the thought that something else is possible is disabled and
contingencies in the societal order are curbed. Analysing risk against the background of different contingency formulas has the advantage of establishing a rigorous reference point for the illustration and emphasis of how risk and certain concept relating to risk appear within a framework that constructs a distinctly embedded conceptual significance and how this can change according to changes in society.

Answering the research question will be done in three stages:

1) In the first stage, I will observe how risk comes to use in the banking sector as changes in societal formations shape new problems that cannot be adequately solved with the existing vocabulary such as danger, transcendence, chance and venture. Notably, risk arises in relation to the commencement of distant trading ventures by Italian merchant bankers from around 1100-1200. This marks the initial development of a fully integrated economy wherein a particular meaningfulness of risk is embedded.

2) The second stage will observe some general characteristics of the economic system and seek to establish some common links between the economy starting in the Middle Ages and the modern economy. This serves the purpose of demonstrating changing formations in the economy to demonstrate how developments in the economy change the analytical meaning formations and to show how the function of risk semantics has to deal with both similar and different problems in the two periods respectively.

3) The last stage will observe risk communication by banks from the early 1970s and onwards. This seeks to analyse a particular condensation of risk in a banking sector undergoing a fundamental functional transformation in the economy. Here, the concept of risk comes to play a significant role in reprogramming the function of banks to cope with economic conditions of uncertainty and instability.
Analytical strategy
The introduction presented the research question of the thesis within the scope of social systems and the following will delineate the theoretical scope to structure the analysis accordingly. In general, systems theory aims to describe the complexity of modern society (Luhmann, 1995:xlvii-liii). Luhmann’s project is to analyse how society reduces complexity in order to function. To do so he operates by a method that differentiates society into social systems. The basic element in these social systems is communication (Ibid.:138) and by analysing communication in social systems, Luhmann seeks to grasp the complex and contingent conditions of modern society. In essence, the method of systems theory is to observe problems and solutions in relations of communication (Ibid.:52-53)

Consistent with my research question, the purpose of this thesis is to generate an analysis of risk communication of banks by drawing on systems theory. The intention is to apply parts of systems theory to generate further analysis of social system communication within the specified area of banking risk communication. As a consequence, I will in the following not give a fully comprehensive portrayal of systems theory but present selective parts that serve the purpose of answering the research question. To facilitate a strong affinity between theory and analysis the analytical strategy is supplemented with examples from the analysis. The aim is to simplify abstract theoretical concepts and streamline these to the analytical proceedings. Most concepts in systems theory interrelate in a circular and self-referential fashion, which makes a presentation of only selected parts analytically knotty. To present the theory in the best way possible, the analytical strategy has three analytical objectives of outlining what, how and when observations in the thesis are made. The three objectives aim to condition the analytical observations of selected theoretical concepts and establish a strong affinity with the analysis.

First, it will outline what social systems are by introducing central concepts such as structure and event, self-referential formation of communication and autopoiesis. Secondly, it will outline how observations are conducted in the semantic analysis and societal analysis. Here, additional concepts such as semantics, meaning formations of concepts and contingency formulas are introduced. The focus is how the analysis
proceeds and the research question is therefore divided into two sections; one that observes the origin and transformation of risk semantics in the banking sector and one that observes the contemporary conditions in which risk is observed. The analysis will throughout the thesis observe back and fourth between analysing risk in the banking sector and the societal formation, and the strategy will outline how these observations points are analysed. Thirdly, the strategy will outline when the analysis is zooming in on the semantic analysis and the societal analysis and explain the analytical connection between the two. Additionally, before going into the analysis, a brief description of how the research process is operationalized is presented.

**Structure and event**

Systems theory finds its main inspirational source in evolutionary theory. Since evolution produces itself, the theory does not give information about how social systems originate but simply observe the formation and changes of their structures (Luhmann, 2007:294-295). As a result, Luhmann starts his main book on systems theory by simply stating that there are systems (Luhmann, 1995:12). The basic operation of social systems is communication, which is composed of elements in the form of events. Elements are punctuated events in time that disappear as quickly as they arrive and they must therefore constantly be connected in order for the communication to be reproduced. Consequently, social systems form structures that are capable of connecting events by specifying how elements form relations over time in a recursive network of regular connections (Ibid.:12-41). Thus, structures are actualized by linking communication to communication and thereby "order the actions of a social system" (Ibid.:282).

A condition for the formation of structure is that the elements can vary in character and can be replaced by other elements without changing the identity and distinctiveness of the structure. The structure is thus a selective formation of plural combinatory possibilities in which the selection of elements ensures a coherent disintegration of combinatory formation of elements and reproduction of new elements. Therefore, a structure consists in "how permissible relations are constrained within the system" (Ibid.:283). Thus, a structure is not a relation between elements but a conditioning of possible elements. The conditioning ensures a selection and constraint of combinatorial possibilities (Ibid.:278-289).
Social systems

Analytically, the difference between structure and event means that systems are only identifiable through their structures (Ibid:345). What can be identified in the communication of systems are structures that condition what is possible or not in the communication. By conditioning communication, structures establish connection capacity for the succeeding communication. The connection capacity can be explained by the concept of self-reference in the system, which means that systems refer to themselves in the constitution of their elements and their operations (Ibid.:9). The process is an internal self-organization and can be explained by the concept of autopoiesis. Autopoiesis refers to how structures are actualized through a stabilizing connection capacity between previous and new elements whereby “[r]eproduction that is self-referential, “autopoietic” on the level of its elements, must adhere to the type of element that the system defines” (Ibid.:35).

The systemic operations cannot interfere or operate in other systems but refer only to themselves. A system describes and delimits itself from everything else by a continuing self-reference in order to qualify elements capable of linking communication to communication. Thereby, a social system never ceases or continues with the same operation but arises when communication develops from communication (Luhmann, 2007:76). An example of an autopoietic system in the analysis is the economic system described by Adam Smith. Smith observes a system able to describe itself by referring to its own operations through a systemic trajectory of production and trade continually sustained by economic activities in civil society. Thereby, the system reproduces itself in a self-referential form of economic communication closed around the circulation of commodities and exchanges. Through an invisible hand, the pursuit of self-interest of each person forms a recursive network of economic operations that is continually reproduced through each person.

From stratified differentiation to functional system differentiation

Self-referential autopoietic systems evolve through social evolution and the illustration above is an example of a development of an economic function system. According to Luhmann, a shift in the societal formation took place in wake of
modernity characterized by a move from stratified differentiation to a functional 
differentiation. By and large, it is a shift from hierarchical societal communication 
towards a separation of communication into function systems in which 
communication varies according to the system activated in the communication. 
Function systems decouple themselves from other systems by determining the context 
of communication. To do so, a function system delimits the connection capacity of 
elements by operating through a singular distinction with a positive or negative value 
that enables recognition of the system. This makes some forms of communication in 
the system possible while other forms are excluded. The list of function systems 
includes the economic system, the legal system, the political system, the religious 
system and the scientific system (Esmark et al., 2005:233; Andersen, 1999:136-137, 

In systems theory, modern society is a highly complex configuration of socially 
differentiated function systems. This is an increasingly complex society and the main 
performance of function systems is the drastically simplified communication 
connections they avail by operating through distinctions of positive or negative values 
(Thyssen, 2012:195). In the economic system, the positive or negative value takes the 
form of a binary code: pay/non-pay or have/not have (Luhmann, 2008:65). The 
operation of the code relates to the formation of systems through structures and events. 
In the economic system, a structure actualizes connection capacity for transactions 
depending on whether a price is paid or not paid. The two possibilities condition a 
structural constraint of combinatorial communication possibilities, which means that 
the succeeding communication will proceed as either pay or not pay. This way, the 
economic system delimits itself from other systems by only allowing communication 
that couples with its code. This makes only a particular communication possible while 
everything else is rejected. When money is on the table, the communicative 
possibilities are reduced and expectations are stabilized.

Function systems evolve as attractors for problems and solutions and not according to 
a central plan (Thyssen, 2012:195). By analysing how problems of communication in 
the banking sector arise in terms of risk, the analysis follows the movement from the 
rudimentary development of the economic function system in the Middle Ages and 
forward. Thereby, the analysis demonstrates how risk in the banking sector originates
as society starts to communicate in economic terms. A particular communication of banking risk is possible in the stratified society of the Middle Ages where economic communication hinges on religious communication while the development of the economic system from Adam Smith and onwards reveals another form of banking risk communication in the functionally differentiated society. Here the economic system is detached from moral and religion and observes according to the simplistic code of pay/non-pay. Hence, observing banking risk in both the Middle Ages and modern society involves following the development of the economic system from stratified differentiation to functional differentiation. Leaving the stable society of tradition behind, new problems of economic variance arise and a new form of economic communication avail itself to solve the problem.

**The economic system and banks**

Given that banks are main operators in the economy there is a constant reference to the economic system throughout the thesis. Since both banks and the economy are important points of observation, a distinction between the two is required. Banks are organizational systems and not function systems. Organizational systems can act and make decisions. Function systems do not “do” anything but solely orient communication according to problems and solutions. However, a function system can have core organisations attached that solely operate under the specialized activities of the system. Banks are core organisations of the economic system. Their operations are formed through coupling with the economic code buy/not buy, which is a stable and constant reference point of communication through which banks describe and programme themselves (Thyssen, 2012:195; Andersen and Born, 2003:183-184).

In the thesis, the distinction between organizational systems and function systems will be of minor significance. The aim is not to observe inside the organizational structures of banks and analyse how the decision-making processes between alternatives come about but to observe how banks communicate about risk and how that connects to their operations within the economic system in two periods. Therefore, the thesis will observe banks as dynamic structures performing a pivotal function in the economic system and observe how that relates to their risk communication. This is a strategic choice justified by the fact that Luhmann sums up the function of banks as “a concentration of the function of the economic system per
“se” (Luhmann, 2008:180), and thereby places banks at the heart of the economic system.

The semantic analysis

The preceding has introduced some of the fundamental concepts applied in the analysis. Important concepts such as semantics, meaning formations, concepts and contingency formulas still need explanation, but focus is now directed towards explaining how the analytical proceedings are conducted in the thesis. For strategic purposes, the research question is here divided into two. The semantic analysis will observe risk in the banking sector while an analysis of societal formations is outlined afterwards. Therefore, the following presents how an observation of risk semantics in the banking sector through systems theory is achievable by analysing semantic concepts and meaning formations. The semantic analysis observes through a distinction between semantic meaning. The purpose of the semantic analysis is to ask how meaning and expectations are embedded in the concept of risk and form condensed reservoirs of meaning available for banking communication in the two periods analysed (Andersen, 2010:163). But first, the formation of meaning and semantics in systems is presented.

As explained, systems are formed through a self-referential nexus of communication. Within this process, meaning arises as a distinction between actuality and potentiality. In the communication process something actualized presents itself as central in relation to something potential (Luhmann, 1995:60). The actualized can continue either in the actualized meaning or continue through a formation of the potential meaning. Since any actualization is accompanied by a horizon of potential expectations meaning is forced to selection and instability. This way, a new meaning always couples with the actualized or actualizes something that before was potential. The indeterminacy processes a continual arrangement of contingent meaning. Meaning is thus open but at the same time kept within bounds since the self-reference effectuates that new meaning formations always refer recursively to meaning (Ibid.:59-66; Luhmann, 2007:211-217; Andersen, 2010:163-165).

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4 See page 11-12
While meaning refers to specific situations of actualization, semantics refers to condensed form of meaning available to communication. Luhmann defines semantics as structures “[t]o the extent that they hold ready forms of meaning that communication treats as worth preserving” (Luhmann, 1995:282). As such, semantics refers to condensed forms of meaning in communication that, in the progression of communication, is reproduced through a stock of themes characterized either as culture or semantics (Ibid.:163). As a consequence, the operation between actuality and potentiality contributes to the limitation of meaning in stocks of themes worth preserving. In the difference between actualization and potentiality, identities like words, types and concepts “serve as a probe to sound out what proves its worth in distinction from something else, and, of course, to retain and reproduce what proves its worth” (Ibid.:75).

As a result, the distinction of the semantic analysis becomes concept[meaning]. The focus is therefore how condensed form of meaning formations and expectations are condensed into concepts. The analysis considers risk in the banking sector as a historically evolved and cultivated concept forming part of a semantic reservoir available for banking communication. The thesis focuses on how a particular meaning is condensed in the concept of risk and how a particular meaning formation of expectations is embedded in the risk communication of banks. Since a concept is never readily definable but can embed a variety of different expectations (Andersen, 2010:165) the analysis observes how risk actualizes a particular meaningfulness in banking communication over time. As the analysis reveals, the concept of risk is used in different contexts of communication and can condense various structural expectations depending on the specific communication.

Due to the multiplicity of meaning within risk, a counter concept is necessary to lock in and set restrictions to the concept. Thereby, the meaning condensed into the counter concept of risk sets restrictions to the meaning formation of risk. The distinction between concept and counter concept is visible in the following form:

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5 Ibid.:165-166
In the thesis, the guiding distinction between concept and counter concept will follow Luhmann’s distinction between risk and danger. Luhmann contends that society often distinguishes between security and risk. This, however, is an empty distinction. Security refers to the non-occurrence of future disadvantages (Luhmann, 1997a:158), which evidently cannot be securitized. Instead, Luhmann draws a distinction between risk and danger. If a possible loss is attributed an external cause in the environment it is a danger, while if a possible loss is attributed a decision it is a risk (Luhmann, 2008:21-22).

This distinction is the guiding distinction throughout the thesis. However, while Luhmann observes risk at a general societal level through the schema of risk and danger, the purpose of this thesis is to observe risk in the banking sector. As the banking sector is coupled to the economic system, an economic distinction is used to analyse banking risk. Luhmann points to Frank Knight’s distinction between risk and uncertainty in the economy (Ibid.:1) in which risk refers to situations where the distribution of probabilities of alternative outcomes can be inferred with reasonable accuracy while uncertainty refers to situations where probabilities of alternative outcomes cannot be accurately detected (Knight, 1921:233). Thus, while economic in approach, the distinction between risk and uncertainty follows a similar logic of attribution as risk and danger. Available alternatives with reasonable accuracy allows for economic decisions while inaccurately determined alternatives are subject to the uncertainty of externalities. However, since a fully developed economic system had not developed in the Middle Ages, I will use the distinction risk/danger in this period, while the distinction risk/uncertainty will be utilized in the fully developed modern economy.
The three meaning dimensions

In order to analyse meaning formations in concepts, systems theory decomposes meaning in three meaning dimensions; the fact dimension, the temporal dimension and the social dimension (Luhmann, 1995:74-75). The dimensions enable in-depth analyses of a semantic field and are in the thesis used to observe meaning formation of banking risk in factual, temporal and social forms. The semantic analysis of the thesis reveals that banking risk is, in both the Middle Ages and the modern society, communicated through economic contracts. Therefore, the analysis will observe how a conceptual significance of risk relates to the contractual specifications through the three meaning dimensions of what (fact), when (time) and whom (sociality).

The three meaning dimensions will be outlined below and each dimension will distinguish between the theoretical decomposition of meaning formation in both the Middle Ages and modern society. In each dimension a shift in the conceptualisations of what, when and whom between the two periods will be underlined. The shift is by Luhmann conceptualized as double contingency. Briefly stated, the term covers a development of double horizons within the three meaning dimensions. Double contingency is a condition arising from the societal evolutionary developments such as science, the printing press and higher degree of societal reflexivity whereby communication is increasingly detached from the dependence on physical things, timely presence and social presence. This entails that meaning is not determined within a final authority of religious justification but can be determined in the various contexts in which communication is actualized.

Within this development, an increasing differentiation between the three meaning dimensions is detectable, which relates to the increasing differentiation of society into function systems (Ibid.:74-92). In the analysis, an example of double contingency is detectable in the difference between the meaning dimensions of the contract in the two periods. In the economy, the developments of money, statistics and economic models change the structural conditions and expectations of risk and alter the meaning and structural expectations of the economic contract.
The fact dimension

The fact dimension considers events in the world such as things, theories, meanings etc. It relates to what can and cannot be expected in a system. Luhmann contends that up until modernity, society observed through a distinction of physical and non-physical things (res corporales and res incorporales). This was an epistemologically solidified schema, in which the world was considered a natural totality of things (Ibid.:63-64). However, in the development towards modernity, the epistemological achievements of science replace God as the determining horizon in which things can be designated. Instead, a horizon of double contingency is established.

In the fact dimension, double contingency is identifiable as a primary disjunction between an internal and external horizon of orientation in which something can be determined in terms of what it is or what it is not. The internal and external horizons are doubled and “the world trails off into the endlessly large and the endlessly small” (Ibid.:90). The division between internal and external allows an identification of things in new ways. It is possible to analyse an object in terms of what it consists of, divide it into smaller parts, classify it against other objects and relate it to other investigations (Luhmann, 2007:219-220). Hence, the framework for designating things in the world is in the modern context no longer determined by God and instead a meaning formation of objects that refer to each other is established. The process leads to the “dissolution of all natural points of support and then to recombinatory acquisitions of meaning that have to lend themselves stability” (Luhmann, 1995:91). Within the double horizon of facts, meaning refers to further meaning by offering constraints on, and orientations points to, how facts, things and experiences can be combined, classified and fixed in relation to the world.

The temporal dimension

The temporal dimension relates to when something is taking place. Luhmann points out that the old European tradition coped with problems of time through a division of the world in presence/absence and close/distant. In the Middle Ages, a divinatory hierarchy of eternity and time is formed in which time derives from the eternity of God who “provides for all things and arranges them in temporal succession”
The architecture of a divinatory conceptuality of time provides a religious expectation of security. Should a divination practices disappoint it is assumed that the future will bring the truth to light (Ibid.:574). Here, the temporal schema is present/absent, near/far (Ibid.:517). The present is a marginal zone between the distant past and the distant future (Luhmann, 2007:193) inside which time events are illuminated and fixed. Within the short extension of time between the past and the future, time is coupled to the immediate experience while the affinity to the past and the future is related to distance. The present can only see the distant past and future in the margins of the accessible world.

The reflection structure of time changes in modernity. In modern society, the presence is the point where the past and the future are different (Ibid.:193). Time becomes an autonomous dimension detached from and neutral in relation to presence and absence, which makes it possible to "separate temporal-point sequences from past/present/future relationships and to relate the sequences to these relationships" (Luhmann, 1995:78). In this structure, two presents can be differentiated in the form of double differences between punctuated and irreversible present events (like a clock, a sound or a movement) and a present that lasts and symbolizes reversibility (for example that a chair is where you left it). This effectuates an oscillation between change and continuity and enables that the past becomes present and "a future already visible in a lasting present to become present" (Ibid.:79).

The differentiation of time enables a doubling of past and future horizons in the form of presents localized temporally in relation to their own time horizons. As "every temporal point has its own past and future" (Ibid.:89) the difference between the past and the future is re-entered in each present as past present, future present, present future and even in triple forms as future presents in the present future (Luhmann, 2007:195). In this sense, time is reflected in itself and this self-reference effectuates that "an endless iteration of time arises within time" (Luhmann, 1995:90). Due to the difference between past and future, modern society assumes that the future will be different from the past. As a consequence, time is themed according to considerations and planning of the appropriate future. The present is a moment of

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6 Note 89
7 Note 88
8 Note 45
change according to distinctions between a plurality of temporal relations where decisions concern the present in relation to the future (Luhmann, 2007:192-195).

The social dimension
The social dimension deals with whom. Luhmann explains the social dimension through a constellation of ego/alter in which the perspective of ego always exists in relation to one or more alter perspectives. Meaning refers to the social in the sense that others can always experience something otherwise. In earlier times, the social dimension stood in relation to morality and norms. These established conditions for reciprocal restriction and stabilized expectations in a form of continual recognition of communication (Luhmann, 1995:81-82; Luhmann, 2008:53-57). This way, unanimous expectations and observations of things instituted as consensus of expectations.

In modern society, moral is pluralized and cannot function as a stabilizing factor. Instead, a double horizon is instituted where ego’s observations observe a plurality of alter perspectives that observe the observations of ego (Luhmann, 2007:220). The two horizons construct a reduplication of interpretative possibilities, which are bound together in meaningful references of either consensus or dissent. The process of reciprocal formations of relations “enables a constantly accompanying comparison with what others can or would experience and how others could position their actions” (Luhmann, 1995:81). In this way, the double horizon includes the double contingent condition that other observers can observe what oneself is observing and interpret their observations based on what others observe (Ibid.:80-82; Luhmann, 2007:220).

Contingency formulas
Having explained the semantic analysis, I now turn to the second observation part of the research question concerning the societal conditions of the two periods. To distinguish between the two periods, the analytical concept contingency formula is used. Analysing contingency formulas establishes an analytical orientation point that helps analyse how the concept of risk arises and sediments in particular societal semantics in different historical periods. As such, the contingency formulas are analytical tools to diagnose the possible spaces of communicative practices over time.
Contingency formulas refer to the structural connection capacity within systems. Due to the selective association between structure and elements of communication there is always an enormous surplus of non-selected possibilities. Systems theory refers to this as contingency, which designates that the relation between elements is “also being possible otherwise” (Luhmann, 1995:25) Hence, anything can always also be otherwise and this condition gives rise to a systemic complexity of a semantic surplus of possibilities. Throughout the historical semantics of society the systemic complexity has been handled through various contingency formulas. By providing a formula through indurated and secured communicative expression, society reacts to a problematic and complex situation (Luhmann, 2006:202-205).

In the thesis, I analyse two contingency formulas. In the Middle Ages as well as in modern society, society establishes a contingency formula that handles societal contingency by legitimizing and naturalizing a particular social order. Through indurated and secured formulations (Ibid.:202) a communicatively sedimented contingency formula restrains possibilities, establishes a firm ground for the thought and allows a legitimate description of a society without further justification (Thyssen, 2012:687). A contingency formula functions as a sponge that absorbs all insecurities that arise due to contingency and justifies an evidently natural societal order. The contingency formula in the Middle Ages and modern society respectively are “God” and “democracy and the market economy” and will be briefly outlined below.

In the Middle Ages, society is observed through God as a universal observer that encompasses a stable horizon of condensated meaning in society. God functions as a contingency formula (Luhmann, 2006:203) and is in the thesis observed in the writings of Thomas Aquinas. Through Aquinas’ observations, God closes the space of contingency by establishing an all-encompassing religious semantics that regulates everything from political to economic relations (Thyssen, 2012:173-194). In the modern context, Francis Fukuyama’s description of society (Fukuyama, 1992) functions as a contingency formula. Within this formula, democracy and market economy function as descriptions of a societal world order. The contingency formula of modern society differs from the Middle Ages in that it establishes a transitory stability. There is no final observer such as God. Instead, democracy and market function as meta-stabilities (Thyssen, 2012:696) upon inherent instabilities. For
instance, the market economy is a stable form within which an unstable horizon of production possibilities constantly alters according to changing economic circumstances. As such, the market observes through economic decisions of the contingent conditions of the economy.

**Semantics of risk, contingency formulas and the economic system**

Having explained how the analysis proceeds, the analytical strategy now turns to *when* observations are done and how they relate to each other. In systems theory, society cannot be understood in its entirety but must be observed through distinctions. One can observe something and not something else while the observation can change to observe what was left out before. In the analysis, a distinction is drawn between two major observation points: semantics of banking risk and contingency formulas. The merit of drawing a distinction between the two is the ability to conduct in-depth and concise observations of social empirical facts such as words, concepts, numbers, themes and descriptions while leaving aside what lies behind those facts until observing the other side (Luhmann, 1994:127-132).

In the first and the last section, the analysis starts by observing the contingency formula. Here, the factual communication of societal descriptions is observed while the semantic analysis of risk in the banking sector lies behind. Afterwards, the observation point shifts to the semantic analysis of factual banking risk communication while the societal description lies behind. Importantly, the systemic reference of both the semantic analysis of risk as well as the societal descriptions of the first and last section is the economic system. Therefore, the economy is in focus throughout the analysis and the observation of the economic system in the middle section follows the economic developments to bridge the economic analysis between the two periods. Thus, in the middle section, the economic system is observed while banking risk and the societal formation lie behind.

The distinction between semantic risk formations in banks and societal formations raises the question of whether there is a causal relationship between the two. However, in systems theory, risk only exists in the systems that observe them. The outside world does not know risk “*unless self-produced by observer systems in the environment of other systems*” (Luhmann, 2008:6). Thus, causes are not something
given but depend on how observations are made. A particular semantic is decided at societal level (Esmark et al., 2005:248) and can change over time according to how society observes. Depending on the different observations that designate the possible space of communicative practices, the distinction risk/danger and risk/uncertainty is restructured over time.

Analysing contingency formulas are relevant to the analysis of risk since they reveal how society observes. The analysis diagnoses how the economy is observed through a religious semantics of God in the Middle Ages while modern society observes the economy through a semantics of technological decisions. The observations refer to the distinction between risk and danger. Luhmann contends that older societies tended to mark the danger side of the distinction while modern society marks the risk side of the distinction (Luhmann, 2008:24-25). Consistently, my analysis reveals that the banking sector of the Middle Ages mainly marks the danger side of the distinction but slowly and fragmentarily starts to mark the risk side of the distinction. In modern society, the analysis reveals that the banking sector clearly and distinctly marks the risk side of the distinction. The difference between which side of the distinction is marked reflects the way society observes and structures the social bounds of possible communicative practices.

**Operational mode of the research process**

Guided by Luhmann’s investigations of the concept of risk in history, I initiate my investigation in the medieval Europe where the concept of risk first appears (Luhmann, 2008:8-9) and follows the development of the modern economy. As such, the analysis of risk communication by banks is limited to modern developed economies of continental Europe and the United States. Within these economies, I observe actual, concrete and visible risk communication by banks in the form of words, expressions, economic models, numbers, and transactions. Risk communication by banks is not straightforwardly detectable through public disclosures of policy statements, shareholder briefings and public communication in general. Therefore, in the search for risk communication by banks, I have investigated different types of material where risk communication could be expected. I have started by reading books that deal with risk in the economy at a general level (e.g. Bernstein, 1998; Esposito, 2011) and worked my way through their sources to find
material useful for my investigation. The selection of material has therefore not been a straightforward research process but an explorative search to find out how banking risk communication is conceptualized.

In order to get additional risk communication, I have asked the two largest banks in Denmark, Danske Bank and Nordea, to participate in an interview. The purpose was to get in-depths insights into the logics concerning risk by banks that have a prominent role in today’s banking environment in order to supplement and enlarge on the risk communication excavated from my investigations. Only Nordea was willing to participate and I had a personal conversation interview with Senior Quantitative Analyst, Andreas Winther Jessen (Appendix 1). The interview is the only primary source that I use and only parts from the interview are chosen to support my analytical arguments.

Throughout the thesis, I analyse the original writings of various theorists such as, Thomas Aquinas, Leonardo Pisano, Frank Knight, Friedrich Hayek, John Maynard Keynes and Francis Fukuyama and only supplement with secondary literature when necessary. The purpose of bringing in these writers is to bring depth and conciseness to the analysis and to observe the actual sociality of the contemporary communication in which banking risk communication is analysed. I consider these writers as part of the social communication in the periods analysed and they are taken as expressions of communicative practices of what is actualized. The writings of these authors have been selected as I have gone through the literature on the subjects of this thesis and are in this way chosen based on their importance considered by other writers.

Regarding the use of systems theory, I will not discuss any insufficiencies of the theory. Given the strong emphasis on the three meaning dimensions in the thesis it is important to stress that the lack of space in Luhmann’s three meaning dimensions will not be discussed. Luhmann states that, at some point, without any justification or rationale, he started to distinguish between meaning dimensions of fact, time and sociality. Admitting to have considered space as a possible meaning dimension he argues that space cannot be a meaning dimension since it cannot be entirely distinguished from the fact dimension (Luhmann, 2007:218). Accordingly, the theoretical analysis of this thesis will include the three dimensions of fact, time and
sociality without further justification.

Having outlined how the analysis of the thesis is going to unfold, I will now turn to the first section of the analysis. The analysis will start by observations of the contingency formula of the Middle Ages and will then proceed to an analysis of banking risk communication.
First section: Banking in the Middle Ages

Introduction
The Middle Ages is a difficult period to pigeonhole. The period envelops a societal transition from observations of a traditional, stable and socially stratified society towards observations of dynamic and variable economic undertakings. The transition is not clear-cut but a slow and rudimentary process in which entangled observations of religion and economy oscillate. The ambivalence can be summed up in an epigraph from a Renaissance Florentine business account books: “To the Glory of God and profit” (McLean and Padgett, 2004:196). Central to the following observations of the period is the friction between the sphere of God and the sphere of the market as central point of legitimacy. For analytical purposes the analysis will clarify the ambivalence between God and market by drawing a distinction (Luhmann, 1994:130) between Thomas Aquinas’ transcendental world order and the rudimentary appearance of an economic function system.

The transition between observations can be observed through the schema of risk and danger. In the Middle Ages God is a contingency formula (Luhmann, 2006:203) that establishes a framework for observing and describing society. Within these observations, the danger side of the distinction is marked (Luhmann, 2008:24) in which misfortune and accidents are attributed to divinatory powers. Against this background, various political, philosophical and economic changes take place and slowly a shift towards economic observations starts to take place. The change can be observed through scattered places within the banking and trading sectors that start to mark the risk side of the distinction. Notably, risk is marked in the form of the contract as a means to deal with a new situation of economic possibilities. This did not happen overnight and the following will only adumbrate the most general tendencies. This, however, will suffice in order to observe a shift of observations whereby the initial decoupling of the economic system and a transition towards a functionally differentiated society is initiated.

The absent Europe
Around the year 1000 Europe, as known today, did not exist. The disintegration of the Roman Empire had left Europe in an intensely fragmented condition. Sovereignty was
scattered amongst small and isolated kings and lordships that ruled over small jurisdictions mainly populated by peasants. The power structure of the jurisdictions was fragile and uncertain as adversaries often sought to mobilize military forces against the ruler. This established an incoherent power structure of shifting ruler but the incoherence did not dissolve the communities. Stability prevailed at the bottom echelons, where small agricultural communities were bound together by norms and customs. Observations of society in the form of tradition, authority and religion provided a model of an inward-pulling and economically interdependent entity with a collective conscience of norms and division of labour. The lord supplied the protection of the sword while the peasants supplied labour (Tilly, 1992:4-5, 39-40; Landreth and Colander, 2002:35-39; Lopez, 1971:22-55).

In the agricultural communities, the tradition of religion supplied a foundational structure for observations. Agrarian and religious lives dovetail in a belief of circularity where the seasonal withering and rejuvenation couple with the life and death of human existence. Just as a grain is put into the soil and rises again, so is human life resurrected in the hereafter (Sløk, 1969:71). Nature cannot be controlled and while the farmer can cultivate, plant and harvest he is abandoned to its forces. The perpetual association with and dependence on the surrounding nature engenders a religious mentality of acceptance and resignation (Sløk, 1989:18-19; Thyssen, 2012:194). Everything from success and failure to “if a monk who had lost his voice recovered it in time for the Christmas services” (Moore, 2000:24) is inscribed in an enchanted system of divinatory intervention.

The contingency formula of God
The above depicts a social order that is politically fragmented but where a cardinal point for observation still exists. Against the background of an incoherent political order, the church is the only universal figure. At a time where most lords and kings were uneducated (Thyssen, 2012:193) the ecclesiastical regiment was endowed with the power of the word to describe the world. Thereby, religious observations formed a contingency formula where a reservoir of indurated and secured formulations described how God has created the world in fixed forms (Luhmann, 2006:202-203).
The religious description provides an all-encompassing system that legitimates the regulation of all relationships within a religious semantic (Thyssen, 2012:194). Furnished by the clarity of the religious word, Thomas Aquinas encompasses all differences into the fixed forms created by God. Here, the divine law “is made up partly of things that are just by nature although men do not know this, and partly of things that are just because God has commanded them” (Aquinas, 1988:67). The precepts of divine law enable a variation over differences in society. For instance, in social relations it is good for a slave to have a master and visa versa and it is appropriate for property to be owned by one man and not another in order for it to be cultivated. (Ibid.:68). Thereby, differences are evened out and dualisms are neutralized through cosmological universalities. The church perforates the world and establishes a condensed meaning of hierarchy in which everyone has a place and task ordered under a king inserted by God (Ibid.:26-28).

The economy is also subject to religious observations. God rules over everything and things are therefore not naturally subject to private property. However, men can possess private property “added to natural law” (Ibid.:72) but not as something natural in itself. Man does not by himself possess power over things but is created in God’s image to rule over the fish in the sea. Since God grants all things and necessities, the division of property by human law cannot be appropriated in cases of urgent necessity. The needs of those in need transgress the human law and theft is in urgent cases not considered robbery. The divisions of God outrank the divisions of men.

Observing business exchanges, Aquinas considers these legitimate to the extent that they are “natural and necessary” (Ibid.:73). Exchanges that surpass what is needed for life and aim solely at profit are condemned. Greed for money “tends to increase to infinity” (Ibid.:73) and has a characteristic of baseness. Trade can, however, pertain legitimate and honourable goals if purposely directed at the necessities of life of a household or the public welfare in general. Aquinas is ambivalent towards usury and rents. The function of money is to facilitate exchanges and not to receive payments for loans. Interest is a double taxation on both the thing and the utility of the thing and is therefore an evil and a sinful charge. However, although morally condemned, they
are allowed for practical reasons “to avoid interferences with the useful activities of many people” (Ibid.:75).

Through the observations of Aquinas, religion establishes a place for everyone in the world. In God’s cosmos where not a single sparrow “shall fall on the ground without your Father” (Aquinas, 1947:part two, chapter 6, paragraph 5) neutralizes the space of contingency. Political and economic expectations are kept within bounds and moderated by an inward-pulling and transcendental order that sanctions and validates what is natural and necessary. The distinctions of God between good and bad, natural and unnatural, honourable or vicious supersede the distinctions of human law. Although Aquinas sanctions useful economic activities, these are still encased within a field of expectations tightly coupled to a religious semantics of sin, moral, honour and virtue. Profit for the sake of profit is condemned.

The semantic reservoir of risk in the Middle Ages
The distinction made at the beginning of this chapter demarcated an ambiguity between religious and market observations. The observations of Aquinas do not involve any ambiguity towards the market where the pursuit of profit beyond what is necessary is ignoble. However, the following will show how new observations emerge. It is a shift from transcendental observations of an enchanted world where everything is a sign from God to observations of a commercial society with an open horizon of variable possibilities. It is a transition “from agrarian balance to commercial restlessness” (Lopez, 1971:56) where a dynamic market society with multiple careers originates and Aquinas’ framework slowly starts to dissolve. With the new observations, the concept of risk originates.

The appearance of risk in the banking sector in the Middle Ages can be summed up in a figure of concepts and counter concepts in which a plurality of distinctions surround the origin of the concept:

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9 Andersen, 2010:166
The above figure demonstrates a condensation of new concepts that form a stock of themes available for communication. The world is no longer described in a singular language and observations start to gravitate away from the religious center. A reservoir of opportunity, adventure, possibility and profit starts to coagulate and with it a semantic of economic risk starts to emerge. Aquinas’ biblical manual where a sparrow is neatly situated in God’s cosmos is substituted with a merchant banker manual observing exchange opportunities as “a passing bird which, if not caught as it lights for a moment, will fly away and be gone forever” (Roover, 1963:122). The sparrow is no longer neatly situated in a Godly determined world but is a temporally passing bird of opportunity.

The transition does not happen over night. But even though it is still “profits which God by His grace will grant” (Lopez and Raymond, 1955:207) and rent taking is considered abominable, an economic language is slowly “cleansed” and detached from other observations. It is a starting development of an economic function system that does not ask whether profits are morally right but whether they are economically beneficial. The system observes fast, effectively and in a simplified manner, which helps to solve problems in a dynamic market (Thyssen, 2012:194-197).

The new observations towards economic activities involve a new situation for the merchant banks. In the reprogramming of their operational procedures, the concept of risk avails itself as a functional solution. The rising business activities and extension of trading routes in the Mediterranean area from around 1250 involved undertakings in which profits could be gained but the possibility of losses due to unforeseen circumstances was a factor of consideration. Risk is here actualized in contractual
overseas trading agreements where “certain advantages are to be gained only if something is at stake” (Luhmann, 2008:11). When something can be gained completely by one’s own actions there is a risk that it can also go wrong. Losses and fault can be attributed to the decision maker. The type of contractual agreements will be analysed below. However, first the developments towards the expansion of trade and commerce will be outlined.

**Commencing integration of trade and commerce**

From the disintegration of the Roman Empire until around the tenth century, Europe was trapped in an economic depression of low population growth, low production and low consumption. But from around the tenth century, the seeds of a beginning economic outlook begin to germinate due to growth in population, extended areas of agricultural production and technical innovations. Gradually, cities became more populated and a shift in the social configuration took place in which the distinction between the noble and the peasant shifted towards a distinction between townsmen and countrymen.

The small towns of Italy marked such a shift. During the tenth and eleventh century, a shift of economic centrality from the Byzantine to the Italian coastline started to progress. The seaports of Italy differed from other cities in that the majority of the people engaged in trade and crafts of textiles for the exchange of western and eastern commodities. In these cities the people “do not plough, sow, or gather vintage...They come with their merchandise and buy grain and wine in every market place” (Lopez, 1971:64). The growth of the Italian cities hallmark the beginning development of a system of commerce existing side by side with agricultural production (Lopez, 1971:27-70).

**Circulation of money, currencies and mathematical knowledge**

Alongside the development of commerce, a system of mathematical knowledge coupled to economic proceedings arised. Payments in kind became rare and the usage of coinage increased. Coinage was imported from the Byzantine and Muslim world, which accelerated exchanges and increased prices (Lopez, 1971:70-71). The political fragmentation at the time was reflected in a multitude of currencies. Currencies were debased and re-valued with no central government to organize a standard currency.
value and high concentration of currencies thus fluctuated relative to each other (Goetzmann, 2004:19). The use of the Abacus and the Roman number system was general practice and did not facilitate calculation (Bernstein, 1998:xli-xlvi) and merchants were thus left without standard principles for trading in different currencies.

Leonardo Pisano (Fibonacci) introduced the numerical method to Europe in 1202. It took years for the method to become standard use, but the method solved many of the problems of currencies and unknown values in an increasingly complex commercial system. Fibonacci advanced an abstract mathematical practice of determining the unknown price in a quantity of merchandise “of which three are known and one is left truly unknown” (Pisano, 2002:127). This unfolds a mathematical level of abstraction in which knowledge of present quantities and prices can be extended to unknown prices in order to express the relationship between price and quantity across numerous goods (Ibid.:127-184).

Fibonacci also pays attention to banking problems. Through problems of travelling merchants, business questions of distance and time are raised: ”a man proceeding to Lucca on business to make a profit doubled his money, and he spent there 12 denari. He then left and went through Florence; he there doubled his money, and he spent 12 denari. [...] It is sought how much he had at the beginning” (Ibid.:372). Other types of mathematical illustrations revolving around series of assorted unknown elements are presented ranging from time series of returns in banking situations to the calculation of the rate of interest and compound growth calculation of infinite numerical series (Ibid.:372-392).

The many methods of calculation established by Fibonacci precipitate the developments of trade, commerce and banking in Europe. The examples illustrate the beginning of a commercial communication in which commerce is aimed solely at profit for the sake of profit in a language cleansed of religious connotations and instead based on rational techniques. Quantities, interest and compound growth are calculated mathematically through unknown factors and infinite series that allow money to mushroom into the future. It is a technical language where money is a means of payment for commodities but also a commodity in itself that can be traded in an indefinite circular system.
Merchant banking: risk contracts

During the period from around 1275 to 1325 a transition had taken place with a decline in travelling caravan trade and the rise of the sedentary merchant (Roover, 1945:173). This gave rise to a new situation of expanded international trade. Big banks started to conduct both local and international merchandise trade and exchange against the background of an expanding scale of enterprises and economic growth. Bankers were not specialized but operated by combining trade, banking and undertaking (Ibid.:177). One of the most prominent banks was the Medici bank whose articles of association stipulated that the purpose of the bank and its partnerships was “to deal in exchange and in merchandise with the help of God and good fortune” (Roover, 1948:31).

The accelerated scope and speed of business presented merchants with the problem of controlling the distant trading, which was sought remedied by functional trading solutions, such as double-entry bookkeeping and contractual agreements. Luca Pacioli facilitated both lending and exchange with the invention of double-entry bookkeeping where money could be transferred through account books: “if your creditor, without withdrawing cash, orders payment to another party, in your journal you debit that depositor and credit the assignee” (Mueller, 1997:5). By acting as a fiduciary and allowing money on account alleviated long-distance trade of the burdensome transfer of money face-to-face. As transactions could be credited and debited in books alongside transactions, the merchants no longer had to travel with the investments.

Another functional solution was contractual agreements establishing a division of labour between the sedentary merchants, the carriers and the agents abroad by attributing responsibility of goods at the place of shipment, in transit or at destination (Spufford, 2002:19-30). Trading endeavours could go well or wrong and to mitigate losses the contract was installed as a robust design to stabilize expectations and distributes responsibility. Here, a semantic of risk starts to emerge inherently formed by the idea that “certain advantages are to be gained only if something is at stake” (Luhmann, 2008:11). Major banks organized accordingly through internal and external contractual agreements. Internally, partnership agreements were the usual form. The organization of various branches across Europe gave rise to juridical
structures internally and was exemplified by the decentralized organization of the Medici bank (Appendix 2). The Medici bank was organized similarly to a holding company in which each branch was a separate legal entity but with the Medici family holding at least 50% of the capital (Roover, 1948:7). Externally, goods were secured by maritime insurance and joint venture contracts.

By and large, what can be observed is a transition of observations towards market orientation. Increasingly, a language of venturesome pursuit of profit, capitalistic acquisitiveness (Roover, 1963:7) and technical calculation starts to separate itself from religious and moral couplings. For banks, a new situation of expanding scale of commerce is initiated and an operational reprogramming is detectable in the increasing use of contractual agreements. A shift in trading practices takes place from travelling to sedentary merchants where trade increasingly is coordinated through contracts such as partnership agreements, joint ventures and maritime insurance.

**Partnership agreements**
For major banks, the increasing volume of foreign trade involved the opening of trade offices abroad (Appendix 2). The distance of economic activities required the main office to ascertain the correct proceedings of branches streamlined to the overall structure. The partnership agreements stipulated the obligations between the main office and the branches, demarcated and regimented expectations of operations and business conduct and articulated the division of capital and profits. The contract encased the manager of the branch in a field of trading expectations within which he could conduct the branch and where the risk of operations were kept within bounds.

An example of the use of partnership agreements by the Medici bank is illustrated in an agreement from July 25, 1455, which lays out the conditions of a four-year partnership deal between the Medici head office and the manager of the Bruges branch. The contract prescribes the manager to conduct the affairs of the branch “with good mercantile custom, and to all orders and instructions of said Medici and Pigli, engaging in legitimate trade [and in] licit and honest contracts and exchange [dealings]” (Lopez and Raymond, 1955:206-207). Specifications of business conduct are determined. For example, to whom and whom not to extend credit or deal with, allowances of business trips, shipments of goods on consignment and procedures
regarding insurance of goods. Merchandise sent by sea are to be fully insured with the exception of shipments by Florentine or Venetian galleys where the manager “may take a risk up to £60 groat in each galley and no more” (Ibid.:210). In addition, the manager can choose to insure goods transported over land but “without risking, however, more than the sum of £300 groat on any one trip, this, of course, in value of merchandise” (Ibid.:210).

Joint ventures
Trading in the Middle Ages was a venturesome undertaking. Before placing an order buyers wanted to inspect the goods, which left sellers with the burden of seeking out outlets for their merchandise. Before exchanges could take place, the merchant had to make a decision to venture or not based on scarce and incomplete market information where he risked to send a shipment supplying an already excessively supplied market. Since merchants had to assume risk when trading, they sought to diversify (Roover, 1948:40-42). The Medici’s sought to do that by trading in various commodities and embark on venture trading accompanied by other banks or traders. The joint venture contract dealt with risk and distribution of expenses between business partners in business ventures.

An example of this is found in the ledger of the Bruges account of the Medici Company in 1441. It is a detailed list of items and charges between the three partners in the joint venture: “[o]ne hundred bales of almonds belonging for one-third to Piero del Fede, for another third to us, and for the rest to Giovanni Ventura and Ricardo Davanzati and Company of Barcelona and to Bosco di Giovanni of Valencia” (Ibid.:90) was noted. The expenses reveal the troublesome and laborious procedures of shipping arrangements, hiring warehouses, paying customs etc. Furthermore, the notes also reveal expenses “for damages to water-soaked bales” (Ibid.:87) as well as the expenses “for carrying 11 water-soaked bales upstairs [to an attic?] to dry” (Ibid.:87).

Maritime insurance
As international trade expanded, words like “securitas”, “assurances”, “surities”, “rischio” and “risico” were conceived and cultivated amongst traders and merchant bankers (Roover, 1945:180-180). The increase in long-distance trading involved
significant capital outlays and merchants sought to mitigate risks by establishing partnership contracts with different merchants travelling on different ships. Thereby, they could share the burden of a loss with others and diversify risk through several shipments. These contracts allowed a division of risks but not a transfer of risk. The lacking ability to transfer risk instigated the sea loan. In this contract, a credit transaction and a sea risk insurance was established in which a lender facilitated a loan only to be repaid if the ship returned “safely to port” (Ibid:175). Thus, the lender was not a commercial partner but a provider of capital to cover the sea risk while the borrower could keep the profit that the loan had facilitated (Ibid.:175).

As the expansion of trade increased, the division of risk took new forms. Merchants invented the insurance loan in which a division of the risk of the ship and the risk of the goods enabled a separation of risk into various components insured by various lenders. In this form, the insured (borrower) remained on land, the goods travelled unaccompanied and the loan was repaid not when the ship arrived “safely to port” but when the goods arrived safely from the “risk of the sea and men of war”\(^{10}\) (Ibid.:178). One of the earliest examples of such a contract a buyer and a seller agree to take, respectively, two thirds and one third of the risk from transporting a quantity of wine from Palermo to Tunis. At arrival, the buyer takes over all the risks. Simultaneously, the buyer and the owner of the transporting vessel agree to freight charges of 300 units of gold payable on the safe arrival of the ship. Furthermore, a loan of 320 units of gold is given to the shipper as a loan subject to the “risk of the sea and men of war”\(^{11}\) (Ibid.:179). The loan and the freight charges were repayable ten days after ship arrival. This would also release the cargo of wine, which was kept as security until the fulfilment of the contract. (Ibid.:179).

Several examples of entries in account books demonstrate the use of “rischio”, “pro securitate et risico”, “pro qua securitate” and “omni risicum” arising from “the act of God or of men and from the perils of the sea”\(^{12}\) (Ibid.:180-183) and in general the concept spreads and becomes standardized in trading activities, for instance in the way rates of insurance premiums altered according to distances, bad news on travel routes or the quality of the vessels (Ibid.:190-192). The account books of a Florentine

\(^{10}\) mutuum ad riscicum maris et gentium  
\(^{11}\) ex causa mutui ad riscicum maris et gentium  
\(^{12}\) omni riscicum, periculum et fortunam Dei, maris et gentium
merchant banker reveal that French galleys from Alexandria to Porto Pisano had significantly lower rates than Baleniera of the duke of Burgundy from Barcelona to Sluys (Bruges) (Appendix 3). Also, risk became standardized in the contractual insurance form. Florentine and Pisan brokers utilized a standard form, which demanded the insurer to take the risks which “are of God, of the sea, of men of war, of fire, of jettison, of detention by princes, by cities, or by any other person, of reprisals, of arrest, of whatever loss, peril, misfortune, impediment or sinister that might occur, with the exception of packing (stiva) and customs” (Ibid.:188-189).

The meaning dimensions
The above has outlined a development from a contingency formula of religious observations where everything is determined according to God’s plan towards the beginning of economic observations of market possibilities. Within these observations, merchant banks slowly start to utilize the concept of risk in their economic proceedings and the following will outline the meaning formation of risk in terms of the fact, temporal and social dimension: What is exchanged is specified, when it is exchange is determined and between whom is designated and risk is distributed accordingly.

The fact dimension
The transition from religious to economic observations marks a shift in societal orientation. Even though semantics of moral and religion still couples to profits, rents and loans13, the expansion and progress of trade is increasingly observed in a language of economic possibilities and profits. Ventures with the purpose of profit for the sake of profit can be increasingly observed in regular economic affairs. For merchant banks, the new observations enable possibilities but also problems. The increasing use of mathematical accounting techniques, decline in face-to-face transactions and long-distance trading, abstract the commercial procedures from the immediate experience of the merchant bankers and alter the commercial playing field increasingly amenable to the contingency of a multitude of economic observations. The actualization of economic communication actualizes a horizon of economic possibilities in which the problem of how to secure long-term expectations arises.

13 See page 27-31, 34, 37
The communication of risk through the maritime contract, the joint venture contract and the partnership contract is a solution to the problem. Within a disconcerting environment where unforeseen event can upset the normal schemas and regular affairs, the risk contracts stabilize the communicative expectations and allow the merchant banks to the pursuit of profit. It is not a guarantee that things can or will not go wrong but only a compensation of money if they do (Esposito, 2011:38). Thus, dangers do not disappear or turn into safety but are translated into economic risks that compensate for endeavouuring into an obscure and unknown future with (seen in retrospect) a bad outcome. With the insurance contract, it is specified what is enveloped within the scope of the contract. Through specifying limits to risk taking for subsidiary managers or what is ensured on a venture, risk is sliced and responsibility is distributed amongst economic observers. As can be seen from Appendix 3, risk is increasingly standardized and expressed in economic values where some things or places are more risky than others. Risk is articulated in differences of opportunities and a market is established around the risk contract in which transactions are placed in robust and fixed forms.

Thereby, risk is form of a convergence technology that defines and maps out expectations for the future behaviour of the agents of the contract. A centre is inaugurated that shapes an anchored sphere of possibilities in which certain common tracks are established. In a world of possibilities abstracted from the immediate experience of face-to-face relations, the risk contract facilitates connection capacity and speed advantages of commercial communication but coupling risk to common expectations of business conduct, transactions costs and compensation schemes. Buyers, sellers, agents and underwrites are all prescribed roles and functions whereby the risk contract orders a field of economic self-organization that closes the space of contingency by stabilizing expectations that communication can couple with. The risk contract forms a connection capacity of both profit and security by conditioning the future to limit the surplus of possibilities and establish long-term expectations. After the risk contract, not all possibilities are possible.
The temporal dimension

The religious semantics of time involve a unity of past and future. The contingency formula of religion is an institutional anchor where decisions about the future are superfluous. Time belongs to God (Munro, 203:509) and temporal contingency is neutralized by a natural order of transcendental stability (Esposito, 2011:40-42). Here, time concerns the immediate presence and experience and economic transactions are tied to natural necessities of livelihood. Making money with money is condemned since it “tends to increase to infinity” (Aquinas, 1988:73).

However, with the transition towards economic observations the religiously anchored cosmos starts to evaporate and “the difference between the past and the future takes control over time semantics” (Luhmann, 2008:38). The increasing use of mathematical accounting techniques, distant commercial activities and risk insurance functions direct observations towards the future and establish the present as a point for decision making. Future orders, payments and receivables can be debited or credited accounting books before these are due, instructions about future management procedures in subsidiaries are outlined, future shipping arrangements, renting of warehouses, custom expenses are outlined and the transpiring of unfortunate events are anticipated in arrangements made in the present.

When economic activities are directed towards the future, a horizon of multiple future possibilities is actualized alongside. The open horizon of surplus possibilities is stabilized through the risk contract that articulates communicative expectations. The contract is oriented towards converting future consequences into the present in order to formalize and structure an economic scope for communication. The formalized concern with the future induces a semantic of risk where the future is mapped out as either future gains or loses. Decisions can then be communicated through the binary code of the economic system of whether to pay for a contract or not pay for a contract.

A maritime venture might not even be considered if no contract is there. The trip might be considered too dangerous compared to the possible profits. But if a contract stipulates responsibilities and ensures an underwriter to take some of the risks, the future might be considered less risky and more profitable. The decision of the contract itself cannot be altered and things might turn out in a way that, seen in retrospect,
would have been better if they had turned out differently. But the function of the contract is to bind time by limiting the space in which the future is actualized (Luhmann, 1997a:169). The future contingency of the open horizon before the contract is encapsulated in a fixed contingency after the contract. Risk communication establishes a structural stability for communication to proceed on and new possibilities of the future can be identified as involving profits, risks and losses.

The social dimension

With the transition from religious to economic observations, the social configuration is untied from the regimentation of God’s provisions and actualized against the background of observations of economic mobility. The dynamics of the market demolishes the static and fixed agricultural society where social norms are aligned and the relationship between God and man is slowly replaced by a commercial relationship between man and man. Here, a structure of uncertain reciprocity emerges. Meaning formations of economic reciprocity observations are enveloped within a horizon of possibilities where the experience and observations of others is taken into account (Luhmann, 1995:113).

For merchant banks, the risk contract stabilizes expectations between economic observers. For instance, the internal organization of the Medici bank (see Appendix 2) is decentralized into a combination of partnerships (Roover, 1948:6) distributed across Europe from Rome and Milan to Geneva and London. Internally, the partnership contract distributes responsibilities and duties between the principal and the agent. Future expectations are fixed through codification of corporate behaviour, demarcation of power and overseeing of employees. This way, the principal can limit the agent’s possibilities of action and ensure the correct proceedings.

Similarly, the observations of others are also taken into account in joint venture agreements and maritime contracts. Since the expansion of trade involves the inclusion of more people at distances far away, ventures are tightly regimented and responsibilities coordinated. The increasing division of risk between agents in the two contracts requires a more aggregated trade organization of agents home and abroad taking care of shipments, orders and collection of payments. Through the risk contract, the market is organized and allows communication to proceed on the basis of
expectations about economic behaviour. Risk can be distributed and more economic observers can enter agreements as underwriters, owners or distributors of ships, goods etc. depending on how much risk they are willing to take. The risk contract restricts communication to what is possible or not within the contract and stabilizes the observations of others. Risk is encased within a field determined by the interconnectedness of economic observers whereby the distribution of risk can circulate amongst those willing to take big risks and those willing to take less.

**Conclusion**

What this section has observed is a transition from religious to economic observations. Aquinas’ religious observation of the world is a semantic lubricant that establishes a balance and makes it possible to handle the surplus of possibilities. Not all possibilities are possible when everything is according to God’s plan. And neither are risky opportunities. With the transition towards economic observations, the concept of risk originates between merchant banks. In this context, risk refers to the economic opportunities arising with the economic orientation and the inevitable possibilities of losses in terms of storms, shipwrecks, damaged goods, lack of demand at the time of arrival of the shipment etc. To mitigate the uncertainties of profitable endeavours, the establishment of contracts streamline economic proceedings by elaborating expectations of unexpected circumstances. The risk contract initiates an economically ordered field of expectations by allocating resources and distributing responsibilities towards the future. The complexity and strain of considering possible outcomes is reduced by the contract where transactions costs are simplified and reduced and economic proceedings can accelerate at a faster pace. The economic communication is stabilized in a fixed structure that facilitates the continuance of economic proceedings. The communication of economic proceedings will be analysed in depth in the next section.
Second section: The economic system

Introduction
The purpose of this section is to trace the development of the increase in economic observations from the Middle Ages to the present. As such, the section will not focus on risk semantics of banks but trace the development of the economic function system through the writings of economic theorists from Adam Smith to Frank Knight, Friedrich Hayek and John Maynard Keynes. Tracing the development of economic communication serves the purpose of delineating some essential characteristics of the economic system in order to illustrate the changing conditions of economic observations between the Middle Ages and modern society. What is observed is how a different configuration of the factual, temporal and social dimensions takes place alongside the increasing differentiation of economic communication. Increasingly, economic observations take place within a complex system of aggregated economic observations directed towards the future.

Within this development, four cardinal observations will be emphasized. First, the establishment of an autopoietic economic system is outlined. Secondly, the development of economic differentiation is observed. Within this process it is demonstrated how the factual, temporal and social dimensions are increasingly differentiated and established as separate horizons for economic observations. Thirdly, the economic developments are analysed within a modern economic context in which a system of economic observations increasingly is tied to scientific rationality in order to direct the economy and plan ahead. The fourth point will outline this development further by illustrating the rationales of economic probability forecasting in markets. However, before turning to these points, the function of banks is modern society is outlined.

The function of banks in modern society
As argued\textsuperscript{14}, banking in the Middle Ages extended to various activities from commodity trading to insurance underwriting. However, in the modern economy, banks function in a more differentiated form predominantly “reallocating the

\textsuperscript{14} See page 34
resources of economic units with surplus funds (savers) to economic units with funding needs (borrowers)” (Allen and Santomero, 2001:273). Due to their specialized function, banks can gain privileged information into asset evaluation and diversification and thereby intermediate promises to pay between households and companies by receiving deposits and granting loans. The collected deposits can be granted as loans and banks profit from lending at higher rates than the cost of money they lend. (Allen and Santomero, 1998:1462-1463). Overall, the economic system deals with the risk that anticipated payments are not made. Within this system, banks distribute and balance out risks by taking payments, paying promises and allowing for promises of future payments to ensure liquidity in the system. Thus, by reallocating funds and transferring illiquid assets into assets banks assist in sustaining the network of payments that is reproduced through trading activities in the economic system (Luhmann, 2008:175-186). The main function of banks in the economy is thus the orchestration and planning of future payments.

The autopoietic economic system
The above description of the economy as a network of payments can be described as an autopoietic system (Luhmann, 2008:181), which was briefly outlined in the analytical strategy15. The analysis of the Middle Ages observed a shift from religious to economic observations. This marks the beginning of the differentiation of the economic system wherein prices no longer are considered “just” (Luhmann, 1995:51) but are decoupled from a unified essence of religious justification and “cleansed” into a semantics of economic operations (Thyssen, 2012:194-197). This development takes place against the background of the Enlightenment project that elevates ideas of scientific reason, freedom, and individualism (Ibid.:352) and places the individual against a universe of cause and effect without any purpose or direction (Ibid.:198). Society is no longer observed as a religious unity but as an economic unity in which unbridled desire for profit is replaced by enlightened self-interest (Ibid.:313-314).

The development is detectable in the autopoietic economy described by Adam Smith. Contrary to Thomas Aquinas, Smith has a positive view on economic exchanges, which he considers in the interest of each individual and of society. Opposite to

15 See page 12
Aquinas, Smith embarks on differences and argues that it is the difference of each person’s self-interest that propels the mechanism of production and trade. Engaging in exchanges renders the propensity to truck, barter and exchange useful (Smith, 2007:9-16). The individual seeks out an employment, which is advantageous to himself, which thereby “*naturally, or rather necessarily leads him to prefer that employment which is most advantageous to the society*” (Ibid.:292). To contribute to the wealth of society the individual can and must only consider his own advantage. As such, it is as if he is automatically “*led by an invisible hand to promote an end which was no part of his intention*” (Ibid.:293).

Thereby, Smith establishes a language and vocabulary of a self-equilibrating autopoietic (Luhmann, 1995:34-36) economic system of mechanical forces. A “*simple system of natural liberty establishes itself of its own accord*” (Smith, 2007:444) through impersonal laws of supply and demand, which cannot be superintended by any authority. It is autopoietic since the system has a natural trajectory of production and trade, which is produced and sustained by the economic activities within civil society. The system forms an autopoietic closure around the abstract circulation of money through exchanges of commodities, which are decoupled from their original value and relations among persons. This establishes a recursive network with connection capacity of exchanges through prices. The system is autopoietic at its core but needs, in order to be reproduced and stabilized, certain aiding functions by the government such as a judicial system and maintenance of institutions etc. (Ibid.:451-529).

The emphasis on the individual by Smith does not exclude a social dimension. In a division of labour, the supply of work and demand of commodities of others is required and economic observations have therefore a constant reference to others. In fact, it is the observation of others in the market that gives a commodity value. The value of a commodity is priced based on its scarcity and thus what market participants demand for a given quantity. According to Smith, the real value of a thing is determined by the labour put into it but since this cannot be measured accurately, value is instead determined by money. Through the “*abstract notion*” (Ibid.:21) of money, goods can be compared by quantification. This facilitates measurement and provides freedom in exchanges (Ibid. 20-24).
The observations of others in the economic processes of supply and demand extend to temporal observations. Value is not in stable equilibrium but can fluctuate between two positions of actual prices and natural prices. The natural price refers to the price expressing the actual labour put into a commodity while the actual price refers to the monetary valuation. The actual price can fluctuate below, above or equal the natural price depending on disturbances between supply and demand. The instabilities between equilibriums can cause problems since market participants observe the fluctuating actual prices and not the inherent value of things. Particular situations may keep the actual price above the natural price for a long period of time. Thus, forecasts of prices are inhibited by the opaqueness of the interplay between demand and supply conditions (Ibid.:36-42) and only by judging “the average and ordinary price” (Ibid.:39) over a time period of a year, a stable reference point is discernible between fluctuating periods.

Thus, what can be observed from the increasing differentiation and autopoietic closure of the economic system is that economic observations embed a structure of economic variance in the social and temporal dimensions. By observing values in the system through the interplay between supply and demand over time, the autopoietic reproduction of economic communication is directed towards future exchanges. The market place is thus a place of inherent uncertainty. Nevertheless, a stable link for the continuance of economic communication is conditioned through the impersonal forces of the market in which economic behaviour between individuals is regimented. The invisible hand establishes a natural course towards the “central price, to which the prices of all commodities are continually gravitating” (Ibid.:38) within the chaotic dynamic of self-interested barter and exchange.

**Economic differentiation and double contingency**

The above describes a formation of an autonomous economic system of communication in which a concomitant development of simplicity and complexity is detectable. The complexity stems from the amalgamation of economic observations in which transactions between individuals programme themselves through the medium of monetary values. Prices are determined abstractly in the market of supply and demand, where economic observers are invisible to each other and guided by the
invisible hand of the system. This establishes a systemic complexity in which economic observations are guided by other observers towards future supply and demand conditions. At the same time, a simplistic form of communication avails itself through the binary code pay/non-pay. The system is freed from moral connotations of “just” or “natural” prices and closes around itself guided by its own criteria for success and failure. The system rejects to pay attention to other differences than self-interested pursuit of profit.

This development demonstrates an increasing differentiation of the economic function system and marks the shift from stratified to functional differentiation (Luhmann, 1995:312). The characteristic of function systems is an orientation through binary codings that enables recognition of the systemic network of observation. The positive side of the value allows for the capacity of connectability, while the “option for the respective countervalue reflects the pertinent conditions, engenders contingency, and thus keeps the future open” (Luhmann, 2008:77). The openness towards the future can be exemplified by the above description of economic observations within the autopoietic economy. Observations of supply and demand conditions are dependent upon the open and contingent conditions of the future behaviour of others and communication about buying/non-buying depends on these conditions. Social and temporal instabilities are a permanent condition in the economy.

Concomitantly with the decoupling of the economic function system a new orientation towards rational calculation and statistics takes place in the 16th century in which society increasingly orient communication towards security versus insecurity (Luhmann, 1995:312; Luhmann, 1997a:191). This process can be illustrated with an example. Smith notes how the insecurity of the fluctuating periods between actual and natural price equilibrium can be estimated by judging “the average and ordinary price” (Smith, 2007:39) over a time period of a year. Thus, although the economic system embeds variation of price movements, a stable reference point can be secured through calculations of average movements. The autopoietic system is regarded as a self-equilibrating machinery of trade relationships with its own natural laws that can be scientifically discerned.
Within the analytical framework of this thesis (the factual, temporal and social dimensions) a different configuration of the dimensions takes place with the increasing societal differentiation. Luhmann characterizes this development as the increasing “independence of the double horizon” (Luhmann, 1995:87). This means that the determination of meaning in the three dimensions is established not within a singular societal structure of religious justification but within a meaning formation of double contingency. As such, the three dimensions become more differentiated and reflexively configured and establish their own horizons for communication (Ibid.:86-92). The above example of price determination in the economy is a good illustration of double contingency. In the factual dimension, actualized prices can be extended into potential average prices and “judged” according to this. In the temporal dimension, it is observable how the present price determination between supply and demand influences the level of future prices while in the social dimension it is observable how the influence of the observations of other economic actors influence the price.

Thereby, economic transactions are actualized together with a horizon of possible expectations since each transaction is placed in a web of transactions that together form the general supply and demand conditions. These conditions cannot be grasped in their entirety but can only be estimated by judging average possibilities over a time sequence. What the above illustrates is how the pervasiveness of economic observations changes the conditions of economic operations. The autopoietic economy creates its own temporality and sociality, which gives rise to issues of directing and planning economic activities. By and large, the temporal and social changes arise from the fact that the autopoietic economy marks a difference between the past and the future and alters social economic structures.

Essentially, the economic observations communicate about unforeseeable social situations that are attempted discerned with rationality. Within this development, the concept of risk is associated with expectations of rational calculation. The attachment of risk to rationality is based on the idea of maximizing security to avoid losses as much as possible. In order to facilitate this, “a controlled extension of rational action”

16 See page 18-21
(Luhmann, 2008:13-14) applies utility functions and probabilistic distributions to areas of risk. Knowledge and measurement techniques are installed in the concept (Ibid.: 13-14; Luhmann, 1997a:160). As will be illustrated below, this development marks the characteristic ideas of economic analysis in the modern economy.

**The modern economy: social and temporal uncertainty**

The above observation of the development of the economic system illustrates how a meaning formation of economic observations communicates about unforeseeable social situations in which observations of the future behaviour of others are increasingly taken into account. Within the modern economy, the social uncertainty of the open future concerns the issues of planning and foresight. Economic theorists such as Frank Knight, Friedrich Hayek and John Maynard Keynes discuss these issues. The matter revolves around the issue of the central price (Smith, 2007:38) equilibrium, which to Smith came about through spontaneous exchanges of individuals acting in their own self-interest. With the development of the autopietic economy and the empirical sciences, the pertinent question comes to concern whether it is possible to determine a discernible regularity of economic behaviour and thereby making it possible to plan according to future values.

The belief in rationality came to a halt after the First World War where economist such as Knight, Hayek and Keynes contested the idea that methods from the natural sciences could be readily applied to the social sciences (Bernstein, 1998:232-236). The issues mainly concern how to determine price equilibrium through economic exchanges between self-interested individuals. The cardinal problems concern the knowledge and anticipations guiding these individuals in order to forecast and plan ahead (Hayek, 1949:33-34; Keynes, 1960:147). Thus, the issues revolve around rationality and risk in the social and time dimensions.

In the social dimension, the economic theorists contest whether the simultaneous expectations of independent individuals dovetail over a period. Hayek argues that perfect equilibrium assumes data to be equally given to all and does not take into account that “*the plans of the one contain exactly those actions which form the data for the plans of the other*” (Hayek, 1949:38). Since all data cannot be known to all, Hayek draws a distinction between objective data observed by economists and a
decentralized subjective data experienced by different persons who mainly gather the relevant knowledge for a particular situation (Ibid.:34-50). To Hayek, the modern economy is made up of “dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess” (Ibid.:77). Within this heterarchy of knowledge, the pivotal function is the price mechanism that expresses “quantitative indices (or “values”) in which all the relevant information is concentrated” (Ibid.:85). The economy as such cannot be grasped by a single mind, but finds a rational basis at a second order level where operators coordinate according to numerical indexes. The economy functions although there is no direction or human design behind (Ibid.:77-91) and is coordinated through simplified and aggregated exchanges expressed in numerical terms.

Furthermore, the economic theorists point to how the problems in the social dimension extend to the time dimension. Economic analysis of foresight concerns “a state of equilibrium at a point in time” (Ibid.:41), which less concerns stationary processes and more intertemporal price relationships due to changes in expectations (Ibid.:40-41). For Keynes, expectations about prospective yields are based partly on existing facts and forecasts. However, expectations are liable to constant changes since any given time has to deal with the overlapping expectations “due to various past states of expectations” (Keynes, 1960:50). Similar to Hayek, Keynes notes that operators lack sufficient knowledge and must base their decisions on a certain confidence level (Ibid.:147 and 46-48). Thus, the economy is a patchwork of past and present projections in which a confidence level of future expectations shifts in each present. To deal with the uncertainty of shifting equilibriums “the properties of money as a link between the present and the future must enter into our calculations” (Ibid.:294).

**The future as probability**

In the open-ended economy of disperse knowledge aggregated in numerical indexes, the problem of forecasting the direction of resources is dealt with through statistical aggregates and probability (Hayek, 1949:82-83). Here, the guiding distinction of the thesis between risk and uncertainty is observable. Knight draws a distinction between “the measurable uncertainty and an unmeasurable one we may use the term “risk” to designate the former and the term “uncertainty” for the latter” (Knight, 1921:233). In
the case of risk, a discernable regularity between objects is detectable while uncertainty cannot be measured. However, risk is not identical with certainty and Knight notes how uncertainties of knowledge and probability estimations run into a paradox. Probability computes chances on general principles of homogeneous classification of identical instances, i.e. the chance of throwing a dice and getting a six is one in six regardless of what happens in a number of throws. But completely homogenous classifications cannot be achieved in the real world. If they could, there would be no use of probability. Hence, the essence of the utility of probability is that in order to judging something as probable or improbable the factors have to be unknowable (Ibid.:214 -224). The actual basis of knowledge in society is founded on the idea that the nature of things determine the course of action but “[t]he logic which we actually use, however, assumes that the result is really indeterminate, that the unknowable forces actually follow a law of indifference” (Ibid.:219).

Thus, the logic of calculating aggregated economic indexes through probability base the constancy of distribution at an abstract level where prices are determined according to random and incomprehensible factors. These abstracted notions or market calculation laid the ground for random walk hypothesis (RWH) developed around the 1900, which argued that efficient markets follow an undirected randomness. If all market observers have the available information simultaneously only unpredictable price changes can come about (Esposito, 2011:64-65). The randomness effectuates that events cannot be extrapolated from one period to another whereby “the series of price changes has no memory, that is, the past cannot be used to predict the future in any meaningful way” (Fama, 1970:34).

Paradoxically, exactly the randomness of the market came to render the future meaningful and formed a foundation for modern risk management. Since prices follow an indifferent random walk they are unknowable and thus able to be calculated through probability. This was the reasoning of the Black and Scholes model of 1973, which was an important breakthrough for modern risk management (Esposito, 2011:114). The theory argues that it is not necessary to know the future value of the underlying asset of an option. Instead, under the assumption that the variance of the return of the underlying asset is constant (average volatility) and the stock price follows “a random walk in continuous time” (Black and Scholes, 1973:640), the price
is determined by the price of the underlying asset and maturity of the option. Thus, the random market enables probability calculations to project current prices into the future. Thereby, the probable alternatives assumed to follow a normal distribution enabled forecasting prices within distribution intervals (Esposito, 2011:142; Goede, 2001:155-156). These rationales became the foundational principles behind the risk management strategies of banks from the 1970s and onwards.

**Conclusion**

Generally, what have been observed in this section are the structural changes of economic conditions between the Middle Ages and modern society in which an increasingly self-governing and complex economy is sought controlled through abstract and simplified models. Through the concept of the invisible hand, Smith moves the physical marketplace to an abstracted sphere of exchange, which changes the conditions of the social and temporal dimensions. Transactions between economic observers settle supply and demand conditions and determine the future price level whereby the economy proceeds by the self-regulation process of economic expectations of price movements.

The self-regulating process of economic observations continues up to the modern period where principles of rational calculation increasingly seek to curb the social and temporal uncertainties. Increasingly, observations of economic behaviour are detached from the world and economic risks are calculated based on probabilities of homogeneous, isolated and virtualized economic variables. Establishing approximations of the world by abstracting the process of exchanges in numerical indexes allow future price movements to be calculated based on probabilities. Through approximations of uncertainties in numerical indexes in the social and temporal dimensions, the counter-intuitive logic of calculation of randomness encapsulates the contingencies of the two dimensions and establishes a transitional safety that enables temporal projections. The following section will analyse banking risk communication within the increasingly complex economic system based on instability within temporal stability. This will be observed through Knight’s distinction between risk and uncertainty.
Third section: Modern day banking

Introduction

The following will observe a semantic of risk in the banking sector roughly from the beginning of the 1970s to the beginning of the 2000s. Whereas the analysis of the Middle Ages analysed the origin of the concept of risk and the beginning of an economic function system, this section will analyse the concept of risk within a fully developed economic function system. Due to the focus of observations within the economic system, the conceptualizations of risk is observed within Frank Knight’s schema of risk and uncertainty in which risks are quantifiable and calculable within reasonable accuracy while uncertainty is unquantifiable (Knight, 1921:233).

What will be observed from the 1970s and forward is a changing structure of economic conditions where a certain meaning formation of risk is embedded within a two-sided form (Luhmann, 1994:131) of risk and uncertainty. The form indicates a paradox of a simultaneous development of, on the one hand, increasing uncertainty and volatility in financial markets and, on the other hand, an abstract scientific development of risk management tools. This forms a paradoxical situation in which the banking sector operates against the background of both complex economic uncertainty and a strong emphasis on technical risk tools to curb the uncertainty.

The major orientation point of this section is an outline of how meaning formations of risk management are embedded in the risk concept as a means to reprogram the competitiveness of banks in a new environment. Here, risk is marked in the form of technical risk tools as a means to deal with a new situation in which new possibilities but also new uncertainties arise. The analysis will be structured by a semantic analysis that addresses the issue of how the paradoxical problem came about and how the issue is coped with in the meaning dimensions. To outline this development, observations will revolve around general characteristics of economic uncertainty and focus on three major interrelated risk management tools: Risk-Adjusted-Rate-Of-Return (RAROC), Value-at-Risk (VaR) and derivatives. These will serve as cardinal points of orientation around which a semantic of risk is sedimented. Before going in to the analysis of risk, observations of the banking environment leading up to the 1970s as
well as a description of the contingency formula of modern society will serve as a
starting point for the analysis.

The banking environment of the 1950s and 1960s
The banking environment leading up to the 1970s followed a classical bank schema in
which risk was allocated “to either the bank (risk of bad debt) or the customer
(deposit risk)” (Luhmann, 2008:185). Due to the separation of the banking and the
financial industry by the Glass-Steagall Act of 1933 (Federal Reserve Bank of New
York, 1933:25) the banking sector was tightly regulated, relieved of competitive
pressures and primarily based on long-term relationships with clients. Mainly, banks
and clients were connected through a one-to-one link where the close affinity gave
banks first-hand information about the solvency of clients. Within this framework,
banks were mostly concerned with liquidity risk and credit risk (Angepoulos and

Generally, a stable framework encased the patterns of both commodity and monetary
markets in the post-war period. The commodity markets were fragmented and
characterized by scant competition due to tariffs, quotas, product standard restrictions
and government regulation. This facilitated long-term relationships between
manufacturers, distributors and suppliers and created an environment of low
competition and low risk for local and multinational corporations (Ibid.:52). Through
the Bretton Woods System and the International Monetary Fund, a design of an
international monetary system of fixed exchange rates to ensure price stability and
full employment was sought. Members of the Bretton Woods system fixed their
exchange rates against the US dollar to cushion international trade from speculative
instability (Krugman and Obstfeld, 2006:499). Consequently, fluctuations in foreign
exchange rates and interest rates were curbed “and contained them to one country or
region only” (Angepoulos and Mourdoukoutas, 2001:2).

The contingency formula of modern society: democracy and market
The above depicts a general condition of tightly regulated markets in advanced
economies. However, with the demolition of the Bretton Woods System, the declining
ascendancy of centrally planned economies of communist regimes and the increasing
integration of competitive world markets the economic conditions changed from the
1970s and forward. Against this background, Francis Fukuyama articulates a contingency formula of liberal democracy, understood as “the productivity of market-oriented economics and the freedom of democratic politics” (Fukuyama, 1992:31). Fukuyama describes a long process of political and economic struggle at its end-point at the end of the 20th century and inserts liberal democracy as a universal and perpetually functional formula of general consensus of competitive markets in the economic realm and democracy in the political realm (Ibid.:89-108, 190).

The description of a universal form for the best possible society stabilizes a contingency formula through indurated and secured expressions (Luhmann, 2006:202) where “we cannot picture to ourselves a world that is essentially different from the present one, and at the same time better” (Fukuyama, 1992:46). In this societal order there are no “contradictions” able to crumble the legitimacy of the system per se. There are no privileged perspectives upon which the truth can be established, which makes liberal societies elastic enough to absorb problems within the system (Ibid.:196-307). Society is disconnected from traditional authority and religious values and the progression of society is instead determined based on rational principles and consensus.

Similar to the economic development and principles of rationality described by Adam Smith17, Fukuyama observes a concomitant development of economic and modern science from around 1700 to the present. The logic of the development is a “Mechanism” (Ibid.:71) of cumulative scientific endeavour and principles of economic efficiency that organizes and “regulates the direction of economic development by establishing a constantly changing horizon of production possibilities” (Ibid.:77). The market is based on technical principles of scientific logic calibrated to the constantly changing conditions of supply and demand. This forms a distribution mechanism in which utility and value are based on “the marketplace’s valuation of it as expressed in a price” (Ibid.:136). Contrary to centralized economies, the competitive liberal market is flexible enough to absorb the fluctuating conditions of the dynamic and complex high-tech post-industrial economy. By constantly calibrating to price-determined market mechanisms, the rational market embeds an

17 See page 45-50
inherent elasticity. Information is not centrally coordinated but distributed throughout the system whereby “managers receive adequate information on the effects of their decisions, in the form of market-determined prices” (Ibid.:93).

In the market, no absolute or eternal truths can be established. It is simply a horizon of rational market principles that determine who wins or looses. The market can go up or go down but the market remains. The market is thus a fixed form of meta-stability (Thyssen, 2012:696) in which variation is structurally embedded. The contingency formula of the market is a meta-stability of underlying instabilities, which by Luhmann is described as a formula “for legitimating transitoriness” (Esposito, 2011:68). The economy is a transitional safety vehicle in which the market conditions are subject to constant fluctuations. It establishes a ubiquitous and fixed form of stability that acts as a reference to the constant flux of unstable market conditions. Through rational principles of calculation free of political ideology the instabilities are digested and absorbed within the system.

The observations of the market illustrate the workings of the economic function system. The economic communication is directed towards an open and mobile future that is determined through the binary logic of buy/not-buy within the fluctuating discontinuities of supply and demand processes. Contrary to the contingency formula of God in the Middle Ages, the contingency formula of the market does not close the space of contingency. Rather, it opens the space of possibilities by observing the market economy simply as the future horizon of altering production conditions. Within these economic observations, the market is both advantageous and uncertain. What the following analysis reveals is how an emphasis on risk is coupled to the contingent conditions of the economy where “certain advantages are to be gained only if something is at stake” (Luhmann, 2008:11). Before going into an analysis of the specific semantics the various concepts relating to risk will be outlined.

**The semantic reservoir of risk in modern banking**

Similar to banking in the Middle Ages, the concept of risk in modern banking is complexly localized within a plurality of distinctions with various concepts and contra-concepts tied to it (Luhmann, 2008:16). The most common concepts and
contra-concepts that create a condensation of meaning around risk can be summed up in the following figure:\(^\text{18}\).

<table>
<thead>
<tr>
<th>Concept</th>
<th>Contra-concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>risk</td>
<td>uncertainty</td>
</tr>
<tr>
<td>probable</td>
<td>improbable</td>
</tr>
<tr>
<td>change</td>
<td>status quo</td>
</tr>
<tr>
<td>advantage</td>
<td>disadvantage</td>
</tr>
<tr>
<td>management tools</td>
<td>economic ignorance</td>
</tr>
</tbody>
</table>

The figure illustrates a two-sided form of risk and uncertainty in which a semantic reservoir of meaning is embedded in the concept of risk. Through words, numbers and models the analysis will reveal how the concept of risk and the concepts tied to it are coupled with the notion of rational control as a means to make profit. Uncertainty exists on the other side of the distinction as something opposite to risk whereby a meaning formation and conceptualization of risk is communicated as an uncertainty reducing function. The concept of risk is tied to stabilizing management tools such as (RAROC), (VaR) and derivatives that directs the future through probability. In a market of fluctuating conditions, the risk management tools stabilize economic expectations by structurally conditioning possibilities in the economy.

For banks, the concept of risk is emphasized as a solution to a problematic new situation where an increasingly integrated, competitive and complex world economy gives rise to uncertain conditions of economic proceedings. In the form of probability models and derivative contracts, a meaning formation of rational control for future orientation is installed in the concept of risk. Within an environment of uncertainty, risk communication enables banks to reprogramme their operations and ensure the continuing liquidity to the system. Risk tools such as derivatives enable packaging and dividing risk to those willing to take it whereby the continuous flow of payments in a complex and uncertain economy is secured.

\(^\text{18}\) Andersen, 2010:166
1975-2012: Commodity banking

Before analysing the function of the risk instruments, the analysis will turn to the semantics of risk and uncertainty within modern banking. This serves the purpose of outlining how a paradoxical situation of risk and uncertainty arises and to see how it is solved through reliance on risk instruments. The period is characterized by complex market condition of new and international actors, more fluctuating market movements and complex new management tools. The distinction between risk and uncertainty is a cardinal point throughout the analysis that serves to outline the problematic condition for banks in the economy and how this is dealt with.

Market uncertainty

A new situation for markets and banks was inaugurated with the breakdown of the Bretton Woods system, which allowed interest rates and currencies to float unanchored on the global markets. The abandonment meant the disappearance of an external reference for the markets, which hereafter had to steer themselves (Esposito, 2011:116). With floating exchange rates markets experienced “a gradual uptrend in volatility” (Shiller, 1988:3) as commodity prices, interest rates and inflation recorded increased fluctuations (see Appendix 4). The dissolution of stable economic balancing and the amalgamation of the global markets led to a condition of perplexing opacity. Chairman of The Federal Reserve, Paul Volcker stated in 1979 that “we're face to face with economic difficulties really unique in our experience. And we've lost that euphoria that we had 15 years ago, that we knew all the answers to managing the economy” (Volcker, 1979).

Against this background, markets experienced a surge in bank failures and financial crises (see Appendix 5 and 6). Increased competition from more profitable investment outlets and more volatile market conditions shrunk lending margins and market shares, which put pressures on banks to restructure their operations to boost profit margins and maintain market positions. The high inflation and interest rate ceilings put pressure on the traditional banking structure. These conditions led to several financial deregulation initiatives throughout the 1980s and 1990s in order to facilitate the competitiveness of banks. Overall, the deregulation blurred the former distinction between financial intermediaries and nonfinancial firms established by the Glass-Steagall Act. As a result, financial firms entered parts of the activities previously
reserved for banks while banks engaged more and more in financial service activities (Angepoulos and Mourdoukoutas, 2001:63-66).

**Opportunities and risks**

Against the background of increasing uncertainty, a semantic of risk management starts to germinate. On the other side of the two-sided form, uncertainty is not eliminated but takes on a problematic form similar to the notion of risk in the banking sector of the Middle Ages. That is, the central issue revolving around risk is that advantages are obtainable only to the extent that there is something at stake (Luhmann, 2008:11). Banker Edward E. Furash epitomizes this by arguing how “banks make money by taking risks and lose money by not managing risks effectively. To produce superior shareholder returns in current markets, banks must take on higher levels of risk than in the past” (Angepoulos and Mourdoukoutas, 2001:1). Similarly, Charles Sanford from Bankers Trust considers uncertainty and unpredictability unavoidable elements of banking. However, Sanford emphasizes how “risk is an advantage to be used” (Sanford, 1989). To Sanford, dealing with uncertainty and change is about adapting to this condition (Sanford, 1989). In order to do this, Sanford underlines the “new power of risk management” (Sanford and Borge, 1994).

At the heart of Sanford’s risk management conception lies the RAROC model developed by Bankers Trust in the 1970s. Driven by the environment of high volatility and competitive pressures, Bankers Trust developed a “risk capital” methodology to estimate each individual transaction relative to the potential loss (and thereby risk). Sanford contends that “[w]hat is needed is a way of allocating capital along our product lines that is consistent with the risk of each activity” (Guill, 2009:10-11). Market risk is changes in market values, which can never be calculated completely. But modelling risk capital through RAROC sought to estimate the necessary capital buffer against loss of a particular business or transaction. (Ibid.:9-13).

RAROC was later on refined and in the early 1990s applied as a probability based risk measurement (Ibid.:16). This followed an increasing industry trend to use probability measures to assess the riskiness of portfolios on a daily basis. At JP Morgan, a “RiskMetrics” system was developed to model several hundred risk factors. The
system quickly expanded throughout the industry due to the scope of the model, which was found applicable to the complex market risk trading increasingly performed by the industry (Holton, 2002:20). In 1993, probability based risk assessment was aggregated to a general level of the banking sector. A study group of bankers suggested a common framework for dealing with derivatives where a VaR measure was established as a common denominator across derivatives to make “aggregation, comparison, and risk control easier” (Global Derivatives Study Group, 1993:11).

The incorporation of RAROC and VaR led Bankers Trust to shift their lending business towards commercial banking. Foreign exchange rate and trading business was considered less risky with the aid of RAROC and Bankers Trust moved from a “buy and hold” to an “underwrite and distribute” model earning fees from underwriting and distributing commercial papers to investors. As Sanford put it: “[u]nderwriting risk is brief, more easily hedged, and simpler to liquidate than loans. No bank failure ever stemmed from underwriting securities” (Guill, 2009:30). Thus, by modelling transactions relative to risk, Bankers Trust pioneers a competitive strategy of measuring, underwriting and distributing risk in a sector with a large number of banks going belly up due to the uncertainties of the new environment. This strategy characterizes the overall development of the banking sector in the 1980s and 1990s reflecting a “commoditization” of banking (Angepoulos and Mourdoukoutas, 2001:67). Generally (see Appendix 6), a shift in activities is detectable from the 1970s and forward where banks increasingly restructure their business from traditional intermediation to fee and trading operations (Allen and Santomero, 2001:274-282). Concepts developed through RAROC, such as internal ratings on borrowers and risk capital, became integral parts of the Basel Accord of 1988 and Basell II and VaR was elevated to a common industry practice (Guill, 2009:14 and 18; Holton, 2002:18).

1990s to 2000s: derivatives trading

The shift towards underwriting risk is epitomized in the increasing use of derivative contracts. The function of derivatives will be outlined in detail below, but generally they can be categorized as contractual risk tools that seek to hedge against exchange rate, interest rate and market price fluctuations. For instance, an airline company exposed to fluctuations of oil prices can hedge against the fluctuations through
derivatives. As such, derivatives are “[a]nalytical tools can help us break down blocks of risk into discrete risk attributes, such as French Interest Rates, Japanese stock prices, wheat prices, German inflation and rainfall in Iowa. We can then deal with such risk attributes one by one” (Sanford and Borge, 1994).

Offsetting risk through derivatives became a pervasive banking feature throughout the 1980s and standardized by the establishment of the International Monetary Market, London International Financial Futures Exchange and Tokyo Futures Exchange (Allen and Santomero, 1998:1468-1470). In the 1990s derivatives moved into mainstream banking and the global markets saw a surge in exchange-trade derivatives and Over-The-Counter (OTC) contracts (Appendix 7) traded by intermediaries (Appendix 8). The global trade of OTC derivatives continued to increase and the Bank for International Settlements estimates that the global notional amount of OTC contracts stood at $47,530 trillion in 1995, $72,143 trillion in 1998, $220,070 trillion in 2004 and $632,579 trillion in 2012 (Appendix 9, 10 and 11). The numbers reflect an increase use of risk management in the form of derivatives in the banking sector. As Senior Quantitative Analyst from Nordea, Andreas Jessen states: “derivatives are brilliant. It is a really, really effective and efficient way of moving risk” (Appendix 1:19:30).

Types of derivatives and how they deal with risk
The name “derivative” is a denomination of a heterogeneous set of financial products that “derive” their value from the value of underlying assets. The key features of derivatives are that they utilize information technology to transfer or hedge against the risk of fluctuations in the market value of the underlying assets (Arnoldi, 2004:24-25). Derivatives are mostly classified according to the type of the contract, the type of the underlying asset or whether the derivative is traded on the exchange or traded on the over-the-counter (OTC) market. There are four cardinal types of derivatives; forwards, futures, options and swaps. Due to the complexity of the various types, the analysis will limit the explanations to forwards, futures and options, which are the most common.

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19 My translation from original statement: “derivater er jo geniale. For det er en rigtig, rigtig god og effektiv og efficient måde at flytte risiko på”.
A forward contract is an agreement between two parties to exchange an underlying interest such as a currency or a commodity at a specified future date and price. The advantage of the contract is that the parties bind a future transaction price in the present (Esposito, 2011:109). Banks can enter a forward with a customer and thus act as either buyer or seller. A futures contract is a standardized forward contract that can be exchanged and is not sold on the OTC market. Thus, it is an exchange between two parties of an interest rate futures, a foreign currency futures, a debt instrument futures etc. at a future day and price. The futures contract can be seen as a “bet” on the direction of the price of the underlying interest within a certain time frame. The seller of a futures contract “bets” on the price of the underlying interest to fall, while the buyer “bets” on the price of the underlying interest price to rise. An option is a contract that provides the holder the right but not the obligation to either buy (call option) or sell (put option) an underlying interest at a specified price for a specified period of time. Options can both be traded on exchange and OTC traded. (Angepoulos and Mourdoukoutas, 2001:73-92; Arnoldi, 2004:25-26).

Risk and uncertainty
The above has outlined how the distinction between risk and uncertainty forms a semantic configuration of meaning in the banking sector from the 1970s and forward. Alan Greenspan summed up the distinction in 1988 where he characterized the banking sector as a form with two sides. On the one side, uncertainty threatened the profitability of banks leaving them to engage in new and riskier activities while, on the other side, the ability to underwrite risk enabled opportunity seeking in risky activities through prudent management calculation of adequate capital (Greenspan, 1988:1-11).

Banking risk management seeks to reduce uncertainty to obtain opportunities by using economic tools “to identify and measure risks; to shed unwanted risks; to acquire attractive risks” (Sanford and Borge, 1994). Through advanced mathematical probability measures the sphere of risk is ascribed to rationality (Luhmann, 1997a:179) around which a particular meaning formation of controllability is embedded. Rationality advances the possibility to manage the expansion of decision possibilities by expanding the field of rational calculation and inscribes a meaning of
risk relative to value. Calculated economic values are marked against their riskiness through tools RAROC, VaR and derivatives that attempt to “conquer (or at least tame) many illiquid, unusual or complex risks that previously defied solution” (Sanford and Borge, 1994).

**Risk, uncertainty and double contingency**

The development of the economic function system and the contingency formula of Fukuyama display a change in society’s self-description from the Middle Ages to modern society. Increasingly, economic observations are directed towards the observations of others and the future without any stable reference point of traditional or religious justification. The market is a communicative structure wherein economic observations only observe a complex of constantly changing production possibilities stabilized through the meta-stability of the market. The market is a lubricant wherein economic communication can form temporarily stable structures amenable to change. The conditions of such transitional stability stem from the openness of the binary codification buy/not-buy wherein the other side is always also possible. That way, a space of contingency in economic communication is always open.

The complex market form of stability with embedded instability characterizes systems theory’s description of modern society as stabilized upon instabilities. Modern society is based on complex structures without any natural ethical, political and religious orientations points and is instead based on bottomless constructions and probable improbabilities (Luhmann, 1995:69-90) that are temporarily stabilized through transitional safety vehicles. This can be illustrated with the two-sided form outlined above in which a semantic of banking risk attempts to stabilize the volatile market conditions through probability methods and risk distribution. However, as the uncertainty can never be reduced, the function of risk communication is not to remove uncertainty but to stabilize economic proceedings. In the economy, the rationality of probabilistic calculation becomes a stabilizing function where risk installs a transitional meaningfulness of command and foreseeability through the indexical power of economic logic, which structures and directs expectations about the future. Risk binds time and gives events structural value due to the close affinity between risk and rationality. The structural value of risk stems from how risk through the form probable/improbable binds time and thereby generates structures of economic
proceedings. These structures sustain the autopoietic process of self-renewal of the economic system (Luhmann, 2008:53, 71-72) through the binary coding buy/not buy.

In the economy, there is no final authority upon which uncertainty can be offloaded but only meaning formations of risk differentiated through distinctions, contingency and uncertainty (Ibid.:70-71). These differentiations of risk will be analysed below in the three meaning dimensions and will demonstrate the condition of double horizons of meaning (Luhmann, 1995:87) within economic observations. In the factual dimension, a double horizon of uncertainty and risk is detectable where risk probability estimates fix points of future possibilities that reduce arbitrariness of economic proceedings. In the temporal dimension, a double horizon of aggregated data from the past and the present establish a horizon for the future presents. And in the social dimension, a double horizon is detectable between observations of risk positions against economic observations in the market. Meaning formations of risk are thus stabilizing probabilities wherein the uncertainty of the future behaviour of others are encapsulated as transitional safety points for economic communication. As the analysis below will reveal, the derivative contract is such a transitional safety.

Both in the Middle Ages and in modern society, risk is handled through a contractual agreement. Hence, the form is the same but a modification of the contract is detectable. Between the two periods, a shift takes place in the conditions underlying contractual agreements regarding the bearing of risk. Societal and economic observations observe in new ways whereby a qualitative change in the meaning dimensions of the modern period is detectable. This can be briefly summed up as: *What* is exchanged is not specified as a given quantity at a given price but is abstracted to a price value derived from an estimate of the movement of underlying aggregated products. *When* it is exchanged is under constant change as a contract can be traded at different prices at different points in time within the time frame of the contract. Accordingly, to *whom* it is exchanged can alternate within the period of the contract depending on who is willing to hold a given risk at a given price.

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20 See page 18-21

21 Due to the many types of derivatives, I will exemplify by futures and options since these are the main form of contracts (Esposito, 2011: 109).
The fact dimension

In the fact dimension, a double horizon of "this" and "something else" is constituted in which the other horizon "is always represented together with the object" (Luhmann, 1995:77). The horizon is evident from the simultaneous existence of market insecurities (see Appendix 3-5) and risk management derivatives (see Appendix 7-11) where the actualization of a meaning horizon of risk organizes a difference between derivatives as an internal horizon and uncertainties in the market as an external horizon. The uncertainties are not eliminated through risk management but are non-actualized until they are identified. As Jessen emphasises, a bank is exposed to uncontrollable market fluctuations and risk management is about identifying potential risks, "being aware of them and price them into our contracts"22 (Appendix 1: 2:46). Hence, the double horizon of uncertainty and risk is in the banking sector expressed in a connectedness of derivatives and risk. The one reduces the other while they are simultaneously represented against market uncertainties (Sanford and Borge, 1994).

The uncertainty derivatives deal with is the fundamental instability embedded in the contingency formula of the market economy. To underpin the economic proceedings, contractual agreements through derivatives seek to reduce market uncertainties. The evolution of the autopoietic money economy facilitates rational economic forethought by allowing economic indexes of the past to serve as guidelines for future production conditions. But this form of prognostication is never accurate and must continually correct itself. This forms a highly tenuous economic structure with no external reference or natural orientation point. Aggregated data from the past is just one sequence of events in the economy and not an infinite amount of random numbers that can be calculated and centered based on normal distribution (Bernstein, 1998:360). Economic data is unstable and contingent and the economy is thus a transitional structure that continually must correct itself in order to sustain its operations.

However, the double horizon of risk and uncertainty embeds a paradox. While derivatives are created in order to reduce risks, the valuation of a derivative is itself determined based on instability. As discussed23, assumptions about randomness are an

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22 My translation from original statement: "være klar over dem og prise dem ind i vores kontrakter".
23 See page 51-53
underlying condition for the pricing of derivatives through probabilistic calculation (Goede, 2001:156; Black and Scholes, 1973:640). Derivatives are, on the one hand, priced on probability and thus contingent while they, on the other hand, determine the direction of the economy by allowing operators to buy and sell risk. That is, by allowing the distribution of risk to those willing to take it, derivatives facilitate the continuance of transactions against an uncertain future. They establish a transitional horizon of stability in which decisions about the future can be made.

That way, the economy forms a self-referential structure that seeks to tame the embedded contingency with probability calculation that in itself is contingent. As Knight notes, probability only measures a fictional reality of measurable uncertainty that cannot account for the real world (Knight, 1921:230-231). As a consequence, the paradox of uncertainty and risk is unfolded in a particular meaning structure of instability and virtuality. It is instable and virtual in that probabilistic knowledge based on randomness cannot determine actual economic trajectories but calculates generalized and decontextualized probable trajectories. It is a form of estimated knowledge about future price movements that makes it possible to conceptualize and operationalize future risks (Arnoldi, 2004:30-36). This establishes a reflexive form of reasoning based not on certitudes but on probabilities. Due to a horizon of aggregated economic possibilities, the difference between actuality and possibility leads to ”a virtualization of the potentialities that could be connected up with it” (Luhmann, 1995:65). As such, in the form of derivatives, randomness and contingency are fathomable as a field of expectations.

The virtualization stems from the way uncertainty of future price movements is made calculable without complete determination. In a derivative contract, the data of the underlying goods (and thus the price of the contract) is based on contingent expectations. A transaction of an oil derivative is not a transaction on oil itself, but on supply and demand determined transactions that settle the movements of oil prices. These transactions are based on expectations about an increase or decrease in price. Holding an oil derivative only earns if the value moves according to one’s expectation. That is, an oil derivative brought to protect against an increase in oil price only earns if the oil price actually rises.
This is valuable under conditions of uncertainty. The benefit stems from the possibility to trade risk of an asset without having to buy the asset itself. Through derivatives, operators can leverage against future market variations based on present expectations. Thereby, they stabilize an economic self-reference at a second-order level where operators can bet “against” the market expectations. Derivatives “vary on the basis of variation, not in reference to the world” (Esposito, 2011:108). By virtue of estimated economic indexes not deriving their value specifically from what is exchanged but from the underlying price movements of what is exchanged, the economy deals with the market uncertainties within the market itself. This does not mean security since expectations can always change but it enables risk to be distributed amongst more or less risk averse operators. This ensures stability within the instability and enables continued liquidity within the system (Ibid.:108-114).

This way, derivatives standardize economic expectations and simplify proceedings. At the rudimentary stage of derivatives trading in the early 1970s, companies with opposite risk profiles would form contracts. But with the increase in derivatives trading, banks started to take the risk and establish a price for it (Bernstein, 1998:347). This simplifies economic operations by establishing a trustworthy and effective connection capacity of economic transactions where risk can be classified and channelled efficiently without the burden of having to find matching risk profiles. This way, risk is a convergence technology that aggregates market expectations into easily quantified entities that can circulate fast from investor to investor. In the form of abstracted contracts, risk simplifies and accelerates economic transactions by establishing connection capacity for the channelling of risk throughout the system. By enhancing the distribution of risk and ensuring speed advantages between transactions, risk sustains the continuing distribution of liquidity within an uncertain economic environment. These transactions, however, are all directed toward expectations about the future and time is therefore a central component of risk management.

The temporal dimension
Luhmann contends that modern society “represents the future as risk” (Luhmann, 2008:37). In the banking sector, the emphasis on time related to risk is an evident feature of the RAROC and VaR models and derivatives. With the help of probability models and derivatives, banks utilize the capaciousness of time to deal with risk. The
models establish a double horizon of time wherein double classifications such as past presents and present futures represent the future in a probability form based on what has happened in the past. For instance, the RAROC model provides an estimate of the potential loss of a position (risk capital), which is calculated as a function of the maximum time required to exit a position (liquidity risk) and the maximum decline in price during the liquidity period (price risk). The model initially valued a position based on post-World War II markets and compared this to assumptions about maximum loses in the future. The model was later on changed to VaR that estimates future values based not post-war historical data but on a defined probability distribution of a random variable (Guill, 2009:12-16; Holton, 2002:6).

The double horizon is observable in the way that the data of the past is utilized to anticipate how the future might turn out. In the RAROC model, a quantified past present is projected into a potential present future in which the present valuation assumes that the future maximum loss will take the form of the maximum loss of the past present. In the VaR model, a valuation is less dependent on a particular present past but is abstracted to a composite of a multitude of present pasts aggregated across disparate categories and economic contexts that project the variation of the past into the present future. For instance, the worldwide standard for measuring market risk (the marking-to-market method) introduced common confidence intervals and time horizons in order to reduce the complexity of the risk being managed (Global Derivatives Study Group, 1993:11).

The models are forms of knowledge in which data from the past can be assembled, classified and arranged according to type, class and variety in the markets. The probabilistic knowledge links to the difference between actuality and virtuality. For instance, the VaR method aggregates the various components into a single measure that assigns value to a portfolio based on the expected potential loss within a specified time horizon (Hendricks, 1996:39). The abstraction and decontextualization of data allows a reflection of time between the past and the future. As such, it is a measure of controllability that encases risk within an expected field of variance projected into present futures i.e. tomorrow, one month, one year etc. in which each present future

24 See page 68
value is a random value based on a probabilistic distribution (Holton, 2002:2, Guill, 2009:16). The probabilistic virtuality enables banks to take advantage of the uncertain future by making it knowable in terms of probable quantifications.

Derivatives also deal with the future. The denomination of “futures”, “forwards” and “options” indicates a contractual form dealing with temporal and contingent matters. In the fact dimension\textsuperscript{25}, it was described how derivatives deal with expected price movements. Focusing on price movements necessitates time since what is exchanged is the possibility of future exchanges depending on the actual price development in the future. The fact dimension cannot specify the particular quantity of risk in a contract since risk concerns future price variations. As such, the way derivatives deal with the uncertainty of the unknown future is by conditioning a horizon that structures the possibilities for future exchanges. The given risk of a contract depends on \textit{when} the future exchange is effectuated. The conditioning sets a constraint that both proceeds from the present past to the future by setting a price based on probability measures while simultaneously setting a constraint from the future to the present in that the present knows everything can always change. Hence, the contract can be seen as a program to condition the settlement of prices of exchanges.

The conditioning is visible with the oil derivative example described in the fact dimension\textsuperscript{26}. The oil derivative conditions the future through a punctuated purchase that establishes a certain price interval in which risk is encased. The contract protects against the risk of the price transcending the interval. A similar yet different time form is seen with an option. An option contract has a “time value”, which is the volatility of the underlying until expiry of the option (Global Derivatives Study Group, 1993:33). With an option, the bearer can choose to exercise the option before expiry date depending on whether one has an option to buy or sell. For instance, holding an option to buy (a call option) is profitable only if option’s contract price (strike price) is lower than the market price while the opposite is the case with an option to sell (put option). The price of an option is higher the longer away the expiration date is since the gap leaves a space open for contingency. The closer an option gets to expiry, the smaller the margin of potential profits gets, and thus the option becomes less valuable.

\textsuperscript{25} See page 68-69
\textsuperscript{26} See page 68-69
The option allows market participants to exploit the future while maintaining the possibility of retrospectively deciding to exercise the option or not based on the price developments in the wake of the initial purchase. This structures the future as open but not arbitrary (Ibid.:22-28). For instance, the form of the option has the advantage that the binary coding have/not have can be extended into the future after the initial purchase. Since buying something entails the opportunity cost of not buying something else, the option avoids the risk of foregoing an opportunity by enabling the possibility to sell the option again. Should the expectations about the movement of the option change, risky option can be sold to more risk willing operators. Conditioning the future this way enables a structural flexibility that allows, although at a different price, a shift from the one side (have) to the other side (not have) of the binary coding. Thus, what gives the option value is the fact that time is scrolled forward to condition the space of contingency by forming the future present as a platform that can be acted on. The possibility of delay gives the observer the convenience of flexibility without having to take the risk of loss should the underlying asset decline in value.

On the whole, the structural value of risk in the time dimension derives from the risk models and the derivatives that bind time and thereby enable the continuance of economic transactions. The future is bound by the probabilistic image of the future risk created in the present (Ibid.:34). The difference between the present and the future is connected through probability models and derivatives in the form of probable/improbable. This form operationalizes the future by conditioning as set of events that appear likely to happen based on what has happened. It is a way of activating the inactuality of the past and the future in order to grant the present freedom of choice. The transitional and fictitious form of probable/improbable keeps the future determined and indetermined at the same time. This way, risk is oriented towards the future in terms of present expectations. The expectations are not determined but conditioned, which binds time without closing the space of contingency. Risk sustains the liquidity of the system by directing expectations towards the possibilities of buying or selling future risk. When and at what price it is traded depends on the expectations of price movements of other observers and is therefore guided by a reference to the social dimension.
The social dimension

The analysis of the development of the autopoietic economy\textsuperscript{27} revealed how individuals in the economy do not operate alone. Prices are set based on the demand and supply of others (Smith, 2007:36-42) whereby financial transactions take their starting point in both the needs and investments of other people. Given the non-transparency of others, economic data cannot be collected in advance but must be observed through the behaviour of other observers (Esposito, 2011:12-14). The uncertainty of the behaviour of others establishes a double horizon in the economy in which meaning formation always includes that “one can ask for any meaning how it is experienced and processed by others” (Luhmann, 1995:113).

The temporal extension of the future in the form of probable/improbable outlined in the time dimension\textsuperscript{28} inaugurates from the social dimension. For instance, the theoretical underpinning of RAROC and VaR is that probability can define a future distribution of a position with a known market value. The present known market value is anchored in a mark-to-market valuation of market prices, which determine the economic value of a position (Guill, 2009:12-16). As such, a known market value is based on how others observe the market. Any risk arising in the market is a consequence of changes in market values and thus a change in how observers observe the market. Explaining the RAROC system, Sanford notes how “the system is built on potential changes in value and on the actual risk positions that produce changes in value…” (Ibid.:18). Thus, observations of others both establish the market and interrupt the market since observations of others establish market valuations but other observers’ position or risk taking can also produce changes in the market. This conditions a mutual interconnectedness between market observers where “the observation of observation of the market is guided more and more by the prognoses of others and not only by the form in which it calculates its own business results” (Luhmann, 2008:185). Market prices thus depend on how observers observe the market and consider the volatility of temporal shifts between buy/not buy in the future.

\textsuperscript{27} See page 45-47
\textsuperscript{28} see page 72. See also page 52-53
The mutual interconnectedness is observable in the form of derivatives. Banks consider derivatives brilliant tools for breaking up and transferring risk efficiently (Appendix 1:19:30; Sanford and Borge, 1994). As explained\(^\text{29}\), derivatives set a constraint for later decisions about buying/not buying. The constraint (the price of the derivative) is determined based on what operators expect about the future volatility of the asset. Furthermore, the profitability of e.g. futures and options depend on observations about prices. The price movements of the underlying assets determine the price at which a derivative is exercised. In case of both futures and options, the risk can be transferred to others after the initial purchase. With futures, one can sell the right to buy to others while options allow one to wait and observe how others react to the purchase and the market circumstances it produces (Esposito, 2011:109-115). Thus, derivatives speculate in the speculations of the market. The risk of possessing an asset can be bought and sold depending on what buyers and sellers believe other observers to expect. This goes for both the risk of long and short positions in the market (Arnoldi, 2004:25-38). For instance, a buyer of an oil forward contract speculates that market observers will expect an increase in oil prices while a seller expects a fall. Hence, if the price of the underlying asset is higher than the contract price at maturity, the buyer profits from a forward contract while the opposite is the case for the seller.

Banks make money from acting either as buyer or seller of derivatives and trade derivatives with each other in the interbank market. The system of trading derivatives allows banks to offset the loss of a contract with the profit of another (Appendix 1:19:00-33:00). The amalgamation of observers and cooperation between banks forms a systemic heterarchy in which information and transactions circulate between operators (Luhmann, 2008:185). Derivatives place a price on risk, which can be decentralized and traded in a circulation from bank to bank. This forms a self-referential circuit where market prices are established between observer in the system and not in reference to the world (Esposito, 2011:108). The system forms an opaque structure in which market risks arise due to the economic transactions of other operators. Thereby, a highly complex system is established in which actualisation of risk in the market is dependent on a concatenation of events between observers. The

\(^{29}\) See page 71-72
variability of prices due to the interconnectedness of observers makes economic behaviour attributable to decisions and thus to risk (Luhmann, 2008:45-47).

Overall, the structural value of risk in the social dimension emanates from the interconnectedness between operators through risk. Due to risk models and derivatives, risk is encased within an expected field of variance that allows operators to determine their willingness to risk within this variation. Through derivatives, risk is quantified and simplified in numerical indexes. This places a price on risk which enables an economic circuit of trading agreements where risk averse operators can off-load risk to less risk averse operators and where the loss of a risk position can be offset by the profit of another. By determining the price of derivatives (and thus risk) through the market, information of the specific risk is observable to all operators. Hence, the market functions as a pool of detectable risk positions that are tradable and priced against how observers expect the market to perform. Thereby, the trading of risk ensures and sustains a circulation of transactions that underpins the structural conditions for the continuance of liquidity in the system.

**Conclusion**

What has been analysed in this section is the banking sector from the 1970s and forward where the integration of world markets led to a new situation that banks had to deal with. The development has been observed through a two-sided form of risk and uncertainty within which banks mark the risk side wherein a meaning formation of rational and technical controllability is embedded. Risk avails itself as a functional solution to a new economic condition whereby banks can reprogramme their operations and secure their continuing operation within the system. Within an increasingly complex economy, risk reduces complexity through abstractly quantified monetary values and prognosticated probabilities. This allows risk methods to observe temporal contingencies and encase risk within a time horizon of expected losses. The quantification gives risk a price, which can be traded through derivatives in order to distribute risk amongst economic observers.

Thus, banks undertake the function of facilitating effective channels to classify, arrange and distribute risk to ensure that anticipated payments in the future are made. Banks ensure connection capacity between economic operations by coupling risk to
contractual agreements to ensure the continuance of liquidity in the system. Placed against a surplus of dispersed knowledge and economic possibilities, the market must reflect the economic complexity in simplifications. The sluggishness of peddling barter and exchanges between economic observers is relieved by the convergence technology of risk methods and derivatives. By linking up markets that fast and effectively can measure and trade risk, they alleviate the strain and inconvenience of assessing the market, liquidity and credit risk of each transaction for economic observers.
Conclusion

The introduction of the thesis raised a question concerning the equivocal characteristics of risk in the banking sector. The ambivalence of risk stems from its conceptualization as a distinction between profit and losses without clearly pointing to either side of the distinction. On the one hand, risk points to the avoidance of losses through technical controllability while, on the other hand, risk is a lucrative undertaking in which profits are obtainable. Drawing on systems theory, the thesis has analysed the ambiguity of risk by observing the origin and transformation of risk as a social and communicative phenomenon in the history of banks. Guided by the difference between risk/danger and risk/uncertainty, the thesis has observed how banks observe risk and how different conceptualizations appear in the communicative expectations within the Middle Ages and modern society. The observations have been placed against the background of communicative descriptions of societal formations in order to diagnose the possible spaces of communicative practices over time that arise from new observations of society and the economy. In both periods, changes in societal observations of the economy inaugurate a new and problematic situation that banks need to cope with. Within this process, the concept of risk plays a pivotal function in reprogramming and calibrating banking functions to the new situation.

Systems theory implies observing risk through second-order observations. Thus, the thesis has presented observations of risk within the meaning dimensions of facts, time and sociality. This approach differs from more commonplace technical and critical approaches to risk and has enabled new observations that place risk within a historical sociality. Through systems theory, it is possible to point to how the strong emphasis on risk in the banking sector today not necessarily mean that there is more risk in today’s banking sector that in the Middle Ages. Instead, the fundamental conclusion of the thesis is the fact that observations of economic risk rather than risk in itself have increased. The future today is no more certain than it was in previous times, but due to the present emphasis on technical capabilities for designating the future based on the past, economic observations today are increasingly directed towards future alternatives and thus risk. Within the economic system, observations are increasingly directed towards the future through the assessment of probable alternatives. This gives decision making a strong foothold and absolves the fact that probabilities are
not certain but probable. Therefore, the emphasis on risk in banking can be understood as economic expectations of a relationship between past and future economic data where the past can be extrapolated into the future through rational control. This allows banks to extend the present into the future and stabilize the circulation of liquidity and payments in the economic system.

During the Middle Ages, the concept of risk originated in a communicative transition from one societal observation to another. I used the concept contingency formula to demonstrate how the clarity of the religious word by Thomas Aquinas organized a cosmological order that slowly started to dissolve as rudimentary developments of urbanization, increasing trade and money techniques began to germinate. The transition entailed that economic observations became the central point of communication. For banks, the economic observations constituted a problem of controlling expectations regarding distant trading procedures and risk originated in the communication of banks as a solution to this problem. Within the new situation, the concept of risk was linked to the operational reprogramming of banks towards expanded international trade through contractual agreements that assessed future economic events. The contract determined the boundaries for the future course of economic events and established unanimous expectations and business procedures of economic undertakings.

In the second section, I traced the development of economic observations and the evolution of the economic system. Through the economic observations of society by Adam Smith, an economic system unfolded through a division of labour and closed around itself by operating through its own logic. This development changed the conditions of the economy and gives rise to an increasing complexity within the system. The increasing autonomy and complexity of economic observations continued towards modern society, where the economy was increasingly perceived as processes of abstraction and self-referential expectations in which an overload of dispersed economic knowledge could be simplified for economic analysis. To deal with the systemic complexity, economic analysis proceeded on theories of abstracted, isolated and homogeneous variables expressed in monetary indexes and grasped through probabilistic analysis. This development continued up to the 1970s and onwards.
In the third section, I analysed the development of integrated world markets of dispersed economic knowledge, interest and exchange rate fluctuations and new economic actors from the 1970s and forward. Against this background, I analysed the contingency formula of the modern market economy in which the fluctuating market prices organized around a changing economic horizon of production possibilities is a permanent condition. The economy was observed as a nexus between capricious conditions of demand and supply transactions and abstracted market principles amenable to gross convergence analysis. Here, economic observations were oriented towards technical probability distributions guided by principles of rational efficiency. Within this context, the concept of risk was linked to the operational reprogramming of banks towards a future oriented economy of integrated markets and dispersed knowledge. Here, risk was conceptualized as a functional technology of technical control and objective market observance. Through risk models and derivatives, risk was encased within a field of variance and could thus be priced and traded amongst economic observers.

By and large, banks in the Middle Ages and in modern society communicate about risk through the logic of the economic contract as a means to assess future events. By following the societal evolution from stratified to functional differentiation, it has been observed how conceptualizations of risk within the factual, temporal and social dimensions are unfolded within different structural horizons. The changes in societal observations and the development of an economic function system structure a greater interrelationship of transactions between economic operators and a stronger expectational dependency concerning future exchanges. The analysis of risk in the three dimensions demonstrate how particularly the temporal and social dimensions are affected by the increase in economic observations in society. Economic observations directed towards the future behaviour of others augment an expectational instability of economic proceedings in which neither the behaviour of others nor the future can be known.

By analysing two periods within the development towards an increasing differentiation of the economy, it is detectable how risk avails itself as a means to communicate about future transactions under increasingly complex and contingent
conditions. By and large, what can be observed by the origin and development of risk in the economic system is how the increasing economic complexity is simplified through factual strategies of communication with functional and intelligible goals for observations. In both periods analysed, the functional solution to the economic complexity faced by banks is detectable in the use of the risk contract. The contract appears a communicative technology for converging and coordinating expectations of economic transactions, which thereby singles out a distinct structure of orientation and expectation upon which economic decisions can be founded. This way, economic proceedings are coordinated and structured unidirectionally. After the contract, not all possibilities are possible and, depending on whether a risky endeavour is profitable or not, there is a price to pay or a profit to receive. That way, risk reflects a communicative economic functionality.

Accordingly, the main question of the thesis concerning how the origin and transformation of risk within the history of the banking sector is coupled to contemporary conditions can be answered through systems theory by pointing to the fact that meaning formations of risk depend on observations. By analysing contingency formulas, the thesis has illustrated how communicative observations in society change and how risk appear over time within different observations wherein a particular meaningfulness is embedded. The thesis has demonstrated how banks communicate about risk to deal with situations of changing economic environments. As such, in the evolution of the economic function system from the Middle Ages to present times, risk is observable as a semantic function of stabilizing communicative expectations continuing banking operations under conditions of change and uncertainty.

In present times, the contingency formula of the market is a communicative structure of transitory economic conditions. As such, banks in the modern market economy operate under unstable conditions wherein decisions about the economic future increasingly are taking into account. As such, the concept of risk couples to the contingent economic conditions by assessing future events in order to deal with the uncertainty of the economic future. In an economy of interconnected observations directed towards the future, risk is articulated within meaning formations of control and assessment techniques. Risk is thus tied to administrative expectations about the
future. The concept of risk condenses expectations of objective market observance and establishes a stable structure of factual, social and temporal economic expectations for communication to couple with. Through risk methodologies and derivatives, risk can be grasped within the scope of probabilistic capability, which, against the uncertainty of the market, processes transactions based on presumed factual expectations directed towards the future. Under contingent conditions, risk stabilizes expectations within a fixed future time horizon. This structures connection capacity between transactional communications and ensures the continuing liquidity in the economic system.

Observing risk within the communication of the economic function system, it is possible to observe how the concept of risk performs a semantic function stabilizing expectations under the contingent conditions in which banks operate. The distinction between risk/danger and risk/uncertainty depends on observations. In modern society, observations are not directed towards transcendental explanations but are directed towards the immanent conditions of economic observations directed towards the future. As such, modern economic observations mark the risk side of the distinction since expectations about the future are encased within expectations of administrative control. Observations about the future are represented as risk that can be attributed decisions. But these observations are blind to the fact that risk is not conversion of uncertainty into certainty but a selection of alternatives with reasonable accuracy in which losses can always occur. For instance, derivatives are founded on abstracted probabilities of expectations but since expectations can always change, derivatives do not protect against the future. Holding and oil derivative only earns if the value of oil moves according to what is expected. Future price movements concern an unknown future in which prices can go up and down and present transactions can only protect against prices rising above or below a certain interval. Expectations of reasonable accuracy can encase price volatility within a probable interval but the future interval is a probability and not certitude. If the future were certain there would be no use of probability and risky opportunities would not be profitable.

Therefore, the ambiguity of risk in the banking sector today problematized in the introduction can be explained by observing an orientation towards a contingent future that is sought controlled through assessment techniques but nevertheless cannot be
known. With the increase in observations of risk as a tool for controlled extension of economic capability, risk is attributed decisions. The form probable/improbable avails a simplified form for the future that establishes communicative consensus between more or less accurate alternatives, which can be labelled risky and not uncertain. But risky choices can still result in losses and when they do, decisions can be attributed. The future cannot be known and the fundamental feature of risk is that profits are obtainable only to the extent that something is at stake. Therefore, the current befuddlement of the concept risk can be explained from the fact that risk is a paradox of the distinction between profits and losses. Risk is a conceptual threshold of “both and” in the sense that both sides of the distinction simultaneously condition risk as a concept. Risk involves choosing degrees between probable profits and improbable losses in which neither can be known. It is only through the proceeding of time that it becomes clear which side of the distinction between profits and losses is actualized.

Having concluded that banking risk is a communicative function of market observance, a question concerns whether the market expectations today can proceed similarly to the 1990s and early 2000s. In the modern contingency formula, the horizon of economic production possibilities established a basis for rational control without the interference of political programs or social conflicts. However, it is still uncertain whether the economic impacts of the financial crisis are subdued and whether economic expectations have stabilized within a specific horizon. Thus, a further study could attempt to outline a new contingency formula for the economic conditions after the financial crisis and analyse how banks communicate about economic risk in this environment. For instance, if banks through derivatives value risk more than assets themselves, it is possible to question for how long a valuation of risk can continue if the fundamental conditions of the movements of assets change. If expectations of economic data change to a degree where discernable regularities become more unlikely, it is questionable whether encasing risk within a field of variance is possible and thus whether the trading of derivatives can continue to the extent that it has been done so far.

Furthermore, having observed how the concept of risk entails an ambiguity of both austerity and pursuit of profit, questions arise about the possibilities to regulate risk. Luhmann points to the fact that although the political system is capable of collective
organization and binding decisions, the functional differentiation of society puts limits to central steering. Political decisions can create conditions that impact economic programmes e.g. by prohibitions or creating costs, but political programmes cannot influence the economic code of pay/not-pay that results from the complex self-steering autopoietic economy (Luhmann, 1997b).

Thus, what can be extrapolated from the thesis is that the current emphasis of banking risk points to a complex condition of economic uncertainty in the economic system in which banks play a pivotal role. In the functionally differentiated society, the emphasis on economic risk points to the increasing orientation to the future of the self-governing economic system that is left to its own operations without any external references of natural, religious or political character. As such, the thesis has pointed to risk within money markets that are founded on self-referential circuits of future expectations. Contributing to an understanding of the money markets in which banks operate, the conclusions of the thesis thus emphasizes a distinction between the functionally differentiated economic and political systems in which self-validating risk management approaches function as substitutes to state guidance. The new circuits of risk exchanges and the quality of their assessments imply both political and economic discussions regarding the dynamics of the markets and problems of stabilizing the anticipated normality under temporary and uncertain conditions in the future. The continuance of anticipated payments, the competitiveness of the banking sector in the international environment and the ability to attract investments are all concerns for both the political and economic system in the future.
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Interview with Andreas Winther Jessen, Senior Quantitative Analyst at Nordea. For the complete interview, see the attached CD.
Appendix 2 – Internal organization of the Medici Bank

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Roover, 1948: 12
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<tr>
<td>Five Zealand nef</td>
<td>London</td>
<td>Zeeland</td>
<td>5.0</td>
<td>February 4 1455</td>
</tr>
<tr>
<td>Portugusen nef carrying mulmezy*</td>
<td>Madeira</td>
<td>Flanders</td>
<td>11.0</td>
<td>October 21 1472</td>
</tr>
<tr>
<td>Net named San Cristofano</td>
<td>Oporto</td>
<td>Porto Piazza</td>
<td>5.0</td>
<td>June 23 1470</td>
</tr>
<tr>
<td>Small vessel (navigo) of Pescara</td>
<td>Pescara</td>
<td>Constantinople</td>
<td>10.0</td>
<td>May 15 1472</td>
</tr>
<tr>
<td>French sailors</td>
<td>Porto Piazza</td>
<td>Alvine Morten</td>
<td>8.0</td>
<td>February 4 1455</td>
</tr>
</tbody>
</table>

31 Roover, 1945: 192
Appendix 4 – Economic volatility variables


Notes: For each year, the standard deviation of month to month percentage changes is shown for the following data series: stock prices (as in Chart 1), commodity prices (raw industrials), exchange rate (U$4£), and long-term bond yields (Moody’s Aaa). The estimated standard deviation is based on twelve monthly observations for each year. See Appendix for source of data.

Volatility of Background Economic Variables, 1948–1987

Notes: For each year, the standard deviation of month to month percentage changes is shown for the following data series: industrial production, short term interest rates (commercial paper), price-level (PPI), and housing starts. The estimated standard deviation is based on twelve monthly observations for each year. See Appendix for source of data.

32 Shiller, 1988:4 and 6
Appendix 5 – Bank failures

BANK FAILURES
1960-94

Number

250

200

150

100

50

0

1960 65 70 75 80 85 90 94

Sources: Federal Deposit Insurance Corporation, 1993 Annual Report and Quarterly Banking Profile.

33 Edwards and Mishkin, 1995:33
## Appendix 6 – Frequency of bank crises

### Table 1 – Frequency of crises over time

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Average per year</td>
<td>Total</td>
</tr>
<tr>
<td>Balance-of-payments</td>
<td>76</td>
<td>2.92</td>
<td>26</td>
</tr>
<tr>
<td>Twin</td>
<td>19</td>
<td>0.73</td>
<td>1</td>
</tr>
<tr>
<td>Single</td>
<td>57</td>
<td>2.19</td>
<td>25</td>
</tr>
<tr>
<td>Banking</td>
<td>26</td>
<td>1.00</td>
<td>3</td>
</tr>
</tbody>
</table>

*Note: Episodes in which the beginning of a banking crisis is followed by a balance-of-payments crisis within 48 months are classified as twin crises.*

---

34 Kaminsky and Reinhart, 1999:477
Appendix 7 – Noninterest income as a per cent of financial sector GDP\textsuperscript{35}

![Graph showing noninterest income as a percent of financial sector GDP from 1977 to 1997.](image)

Fig. 10. Noninterest income as a percent of financial sector GDP (Source: Survey of Current Business; and Federal Deposit Insurance Company, Historical Statistics on Banking, 1997).

\textsuperscript{35} Allen and Santomero, 2001:281
### Appendix 8 – Global markets for exchange traded and OTC derivatives

<table>
<thead>
<tr>
<th></th>
<th>Notional amounts outstanding as of March 31, 1995</th>
<th>Gross market values</th>
<th>Average daily turnover of notional amounts in April 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(US $ billions)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>A. OTC contracts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total OTC Contracts</td>
<td>40714 (100)</td>
<td>1745 (100)</td>
<td>839 (100)</td>
</tr>
<tr>
<td>Foreign exchange</td>
<td>13153 (32)</td>
<td>1021 (59)</td>
<td>688 (82)</td>
</tr>
<tr>
<td>Forwards and swaps</td>
<td>8742 (21)</td>
<td>602 (34)</td>
<td>643 (77)</td>
</tr>
<tr>
<td>Currency swaps</td>
<td>1974 (5)</td>
<td>345 (20)</td>
<td>4 (0)</td>
</tr>
<tr>
<td>Options</td>
<td>2375 (6)</td>
<td>69 (4)</td>
<td>40 (5)</td>
</tr>
<tr>
<td>Interest rates</td>
<td>26645 (65)</td>
<td>646 (37)</td>
<td>151 (18)</td>
</tr>
<tr>
<td>FRAs</td>
<td>4597 (11)</td>
<td>18 (1)</td>
<td>66 (8)</td>
</tr>
<tr>
<td>Swaps</td>
<td>18283 (45)</td>
<td>560 (32)</td>
<td>63 (8)</td>
</tr>
<tr>
<td>Options</td>
<td>3548 (9)</td>
<td>60 (3)</td>
<td>21 (3)</td>
</tr>
<tr>
<td><strong>B. Exchange-traded derivatives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16581 (100)</td>
<td>1136 (100)</td>
<td></td>
</tr>
<tr>
<td>Interest rate contracts</td>
<td>15674 (95)</td>
<td>1121 (99)</td>
<td></td>
</tr>
</tbody>
</table>

Figures in parentheses are percentage share.


---

36 Allen and Santomero, 1998:1472
Appendix 9 – Notional outstanding of OTC derivatives

Fig. 5. Notional amounts outstanding of OTC derivatives.

Allen and Santomero, 1998:1472
## Table C-4

Global positions in OTC derivatives markets and estimated gaps in reporting

*Amounts outstanding in billions of US dollars*

<table>
<thead>
<tr>
<th></th>
<th>Positions at end-March 1995&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Positions at end-June 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Foreign exchange</td>
</tr>
<tr>
<td><strong>Notional amounts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reported global positions</td>
<td>63,763</td>
<td>20,217</td>
</tr>
<tr>
<td>Adjustment for double-counting&lt;sup&gt;3&lt;/sup&gt;</td>
<td>-23,125</td>
<td>-7,121</td>
</tr>
<tr>
<td>Adjusted global positions</td>
<td>40,637</td>
<td>13,095</td>
</tr>
<tr>
<td>Estimated gaps in reporting</td>
<td>6,893</td>
<td>4,605</td>
</tr>
<tr>
<td>Estimated global positions</td>
<td>47,530</td>
<td>17,700</td>
</tr>
</tbody>
</table>

<sup>1</sup> Bank For International Settlements, 1999:21
## Appendix 11 – Global positions in OTC derivatives 2001-2004

### Global positions in OTC derivatives markets by type of instrument

In billions of US dollars

<table>
<thead>
<tr>
<th>Type of Instrument</th>
<th>Positions at end-June 2001</th>
<th>Positions at end-June 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Notional amounts</td>
<td>Gross market values</td>
</tr>
<tr>
<td>Foreign exchange contracts</td>
<td>20,435</td>
<td>967</td>
</tr>
<tr>
<td>Outright forwards and forex swaps</td>
<td>13,275</td>
<td>548</td>
</tr>
<tr>
<td>Currency swaps</td>
<td>4,302</td>
<td>339</td>
</tr>
<tr>
<td>Options</td>
<td>2,824</td>
<td>80</td>
</tr>
<tr>
<td>Other</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td><strong>Memo:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exchange-traded currency contracts³</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td>Interest rate contracts²</td>
<td>75,813</td>
<td>1,749</td>
</tr>
<tr>
<td>FRAs</td>
<td>7,678</td>
<td>32</td>
</tr>
<tr>
<td>Swaps</td>
<td>57,220</td>
<td>1,631</td>
</tr>
<tr>
<td>Options</td>
<td>10,913</td>
<td>185</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Memo:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exchange-traded interest rate contracts³</td>
<td>17,515</td>
<td></td>
</tr>
<tr>
<td>Equity-linked contracts</td>
<td>2,039</td>
<td>220</td>
</tr>
<tr>
<td>Forwards and swaps</td>
<td>373</td>
<td>55</td>
</tr>
<tr>
<td>Options</td>
<td>1,066</td>
<td>164</td>
</tr>
<tr>
<td><strong>Memo:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exchange-traded equity index contracts³</td>
<td>1,912</td>
<td></td>
</tr>
<tr>
<td>Commodity contracts</td>
<td>674</td>
<td>88</td>
</tr>
<tr>
<td>Gold</td>
<td>278</td>
<td>25</td>
</tr>
<tr>
<td>Other</td>
<td>386</td>
<td>63</td>
</tr>
<tr>
<td>Forwards and swaps</td>
<td>235</td>
<td></td>
</tr>
<tr>
<td>Options</td>
<td>162</td>
<td></td>
</tr>
<tr>
<td>Credit-linked and other contracts</td>
<td>698</td>
<td>22</td>
</tr>
<tr>
<td><strong>Total contracts</strong></td>
<td>99,659</td>
<td>3,042</td>
</tr>
</tbody>
</table>

1 Adjusted for inter-dealer double-counting.  
2 Gross market values as a percentage of notional amounts.  
3 Sources: FOW TRADEdata; Futures Industry Association; various futures and options exchanges.  
4 Single currency contracts only.

---

³ Bank For International Settlements, 2005:22
Appendix 12 – Global positions in OTC derivatives 2011-2012

<table>
<thead>
<tr>
<th>Global OTC derivatives market(^1)</th>
<th>Amounts outstanding in billions of US dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Notional amounts outstanding</td>
</tr>
<tr>
<td>A. Foreign exchange contracts</td>
<td></td>
</tr>
<tr>
<td>Outright forwards</td>
<td>64.498</td>
</tr>
<tr>
<td>and forex swaps</td>
<td>31.113</td>
</tr>
<tr>
<td>Options</td>
<td>11.358</td>
</tr>
<tr>
<td>Memo: Exchange-traded contracts(^2)</td>
<td>.589</td>
</tr>
<tr>
<td>B. Interest rate contracts(^3)</td>
<td>553.240</td>
</tr>
<tr>
<td>FRAs</td>
<td>55.747</td>
</tr>
<tr>
<td>Swaps</td>
<td>441.701</td>
</tr>
<tr>
<td>Options</td>
<td>56.291</td>
</tr>
<tr>
<td>Memo: Exchange-traded contracts(^2)</td>
<td>.765</td>
</tr>
</tbody>
</table>

---

\(^1\) Bank for International Settlements, 2013:12