Charles University
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Decision Makeing in Efficient Investment Contracts and Its Determinants

A theoretical approach into Law & Economics

Bachelor Thesis
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Abstract

During the last decade there has been a large upsurge in the development of the institutional and behavioural theories applied into the fields of law and economics. Most topics, which have been assumed for centuries to be purely an exclusive monopoly in one of these social and methodological streams, have become closely intertwined. Naturally, many of these new theoretical outcomes in this field are still pending their general acceptance as permanent advances in the social science. Economics of Contracts became a niche of the law-and-economics where the recent advances have been some of the most pronounced.

The research studied in this paper deals with the analysis of the less known areas of contracting. We commenced with a general model of contracts within a standard legal framework aimed to be a safeguard against contract failures. However, since the decision-making in modern societies cannot rely on conditions of perfect markets and contracts cannot but remain incomplete, we expanded the model for sub-optimal conditions of information asymmetry and rising transaction costs. Then we concentrated on a general survey of the factors influencing the behaviour of agents in such an environment, with the stress laid on securing instruments under conditions of risk aversion and risk neutrality. At the end, we tested the expanded model of imperfect contracts by cross-referencing its assumptions and conclusions with an empirical evidence from the more recent Czech legal environment.

Během poslední dekády jsme svědky expanze institucionálních a behaviorálních teorií aplikovaných na poli práva a ekonomie. Většina témat, která byla po staletí považována za výlůčný monopol některého z těchto metodologických proudů se stala interdisciplinárními. Pochopitelně mnoho vědeckých poznatků získaných na v těchto nových oblastech stále čeká na širší uznání na poli sociálních věd. Ekonomie Kontraktů je nejen zaplněním tradiční mezery mezi právem a ekonomií, ale i jednou z nejčasteji citovaných oblastí pokud jde o nejnovější vývoj sociálních věd.

Toto výzkumná práce analyzuje méně známá témata spojená s kontrakty. Nejprve modeluje obecný model kontraktování se standartními právními instrumenty zaměřenými na zajištění selhání kontraktu. Vzhledem k tomu, že v moderní společnosti mají daleko k dokonalým trhům a kontrakty zůstávají neúplnými, rozšiřujeme model na sub optimání prostředí informační asymetrie a rostoucích transakčních nákladů. Poté se zaměřujeme na analýzu faktorů ovlivňujících chování aktérů v danném prostředí s důrazem na podmínky averze k riziku a rizikové neutrality. Závěrem testujeme předpoklady a závěry rozšířeného modelu neúplných kontraktů na empirických datech získaných ze současného českého právního prostředí.

Vlastním přínostem autora ve výzkumu je vytvoření nového rozhodovacího modelu, v oblasti, která byla doposud teoretickou literaturou opomíjena. Jedná se o zpracování rozhodovacího procesu dvou subjektů v modelu, v němž se projevuje asymetrie informací, vliv dlouhého období, transakční náklady, oportunismus a smluvní pokuty. Dále je analyzováno zajišťování smluv a transfer rizika mezi subjetky s rozdílným vnímáním rizika.

Thanks Due

Prohlášení

Prohlašuji, že jsem diplomovou práci vypracoval samostatně a použil pouze uvedené prameny a literaturu

V Praze, 18. 7. 2005

Ondřej Benáček

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I take full responsibility for all I helped to build….
I take full responsibility for all I helped to break down….

Jan Otcenasek
The Little Book of Poetry

1 INTRODUCTION

Welcome reader! You are about to step into the area of a young multidisciplinary research. To give you a better understanding of the topic I will provide you with the background of the research area as well as with the research reasons and questions. After reading this introduction you should become more familiar with the research topic and be able to answer questions: What is the purpose of this research? What can I actually learn by reading it?

In the last 40 years we can see a large movement in law studies. This started with the rise of economics as an imperial science[1]. Economical analysis of law expanded economical theory into the traditional areas of the law, e.g. property, contracts, torts and criminal law. Economics have changed the nature of legal scholarship, the common understanding of legal rules and institutions, and even the practice of law[2].

This revolution started with publishing two crucial articles in particular *"The Problem of Social Costs"* by Ronald H. Coase in 1960 and *"Some Thoughts on Risk Distribution and the Tort law"* by Guido Calabresi in 1961. This led to establishment of new scientific fields such as *Law& Economics* and *The Economical Analysis of Law.*

This "movement" also has an impact on the academic community. Law journals often publish articles with economic approaches and there are several periodicals entirely devoted to the field Law & Economics. Recently an exhaustive study found that articles using the economic approach are cited in major American law journals more often than articles using any other approach[3].

The Economics of Contracting, also known as *Economic Theory of Contracting,* examine modern (and so far generally not approbated) experiments of applying the Micro-Economic Analysis for newly constructed types of contracts and negotiations[4].[1]

Recently *Economics of Contracting* is becoming very important not only for the theoreticians, but also for the practicing community. This changeover is closely associated with the movement in the business and industries, where in developed countries most of the economic values are not based on raw materials or physical human labour production , but are included in high added value – services[5] and human interaction, consent and cooperation. Cooperation and exchange of knowledge are crucial for modern businesses. All of that demands more and more contracts and contracting.

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[1] Samuelson P. A., Foundations of Economic Analysis. Cambridge, 1982.

[2] Stigler, Economics or Law, New York, 2001.
  Also Ulen T. and Cooter R., Law&Economics, Addison Wesley Longman, 2000.
[3] Williams M. Landers and Richard A. Posner, The Influence of Economics on Law: A Quantitative Study, 36 J. Law & Economics, 1993.
[4] Triska D., Law and Economics – View into the problem, CD-F, 2002.
[5] Economics of Consent by Buchanan and Tullock, at http://www.fee.org/vnews.php?nid=4840

In this thesis I have chosen one particular area of *Economics of Contracting,* the efficiency of contracts and related topics. The practical part of this research will examine the impacts of contracting policy on contracting reality and further the economic reality. Modern society, "trading" with virtual "products" is trapped in the problems of contract failures or inefficient contracts much more than it was 30 or more years before.

1.1   Research problem - questions

To establish a model of investment contracting, analyse the model and its efficiency and explore connected mechanism of securing contracts.

Q_1: Does a general model for investment contracting decisions exist?

$Q_{1,1}$ If yes, what does it look like?

$Q_{1,2}$ How does this model change in different contract term conditions and environmental influences, under the ceteris paribus condition?

Q_2: What are the mechanisms of "securing" the contracts and how should they be efficiently applied?

Q_3: Does the situation in Czechia correspond with the theory mentioned above particularly in $Q_{1,2}$ and Q_2? How does the present situation changed compared with the transformation period?

1.2   Research purpose statement

The purpose of this thesis is to explore the "unknown" areas of contracting, describe a possible model of human decision-making behaviour and provide a general analysis of the factors influencing such behaviour. The main torso of the work in first three research question.

1.3   Detailed research purpose

Stated more detailed, I want to develop a general and very basic model for "yes or no" contracting decisions. First I will describe the model as well as all the variables in it. Second I am going to mention all the important intrinsic "hardcore" conditions of contracts such as information asymmetry or long vs. short term contracting. Third I will discuss all the important intrinsic "soft" variables such as the freedom of contracts or free will of participating parties and their influence.

My second big goal is to describe the tools that are used to avoid the inefficient contract or to decrease its impact. My aim is to point out the most efficient usage of those tools according to the variables mentioned above.

The last aim of this thesis is to test the theory that will be established in the previous research.

1.4   <u>Delimitations</u>

This research will deal with the so-called **investment contract** only. It will not consider other types of contracts.

The **general model of contracting**, which will be introduced in this thesis is a **basic model** and has no ambition to describe all the variables that influence the **process of contracting** as well as all the detail the stages of contracting. The model will describe only the situation when actors bargain one particular contract. This means that their behaviour is not influenced by other possible trades (opportunities). The model is supposed to be descriptive about the human behaviour and/or decision making, not prescriptive or normative.

Since this is Law & Economics paper, the discussion of the variables of the model excludes from the financial factor mentioned in the model.

Only the main "mechanism of securing" that has connection to the model will be presented. Their efficiency will be analysed according to the model.

There will be more inferior assumptions in the analytical part.

Under certain terms the author understands the terms described in the **definitions** section.

1.5   <u>Language of the study</u>

There are two main goals that the author would like to achieve: Simplicity and brevity, as the Occam razor principle[6] requires.

The author holds a view that good work should be readable for any up-to-date "person of the street" without general problems in understanding. Using complex language or excess of Latin and technical vocabulary (which is more than common in law texts) only demonstrates the incapability of the author of the text.

However, this thesis (as well as the whole Law & Economics field) uses scientific, mathematical tools, so some parts may be difficult for the reader without deeper knowledge in this field. To avoid this completely is quite impossible since the technical/mathematical approach is what the entire contribution of economics in the field of law is often about. Each model should also (if possible) be "translated" into the intuitive verbal speech.

As the author writes about efficiency (and your time is a scarce resource), the paper should be as short as possible. Since the author is not paid for the number of pages, he believes that more text often causes more hash and ambiguity.

Finally, the author is not a native English speaker. He would like to apologize to the reader for all the mistakes and confusions that this can (and will) cause.

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[6] *Pluralitas non est ponenda sine neccesitate*" or "plurality should not be posited without necessity", William of Occam (ca. 1285-1349). In modern English probably "keep it simple".

The nail holds the horseshoe
And the horse can't go without it for long
As well as man without the horse
The castle without the man
And the land without the castle!

Psi Vojaci, The Razor Songs

2   METHODOLOGY

Before I step into my theoretical findings, this chapter will present the answers to: Why this topic? How does the author see the problem? What does the research design look like and which methods does the author use?

2.1   Choice of Topic

The author's interest for this topic has developed over many years. In spite of his human science based high school education (which included a significant amount of law studies), he has chosen to study law and very mathematically based economics parallel. After the first year of enrolment in pure economic theory, the author enrolled in a full time law program. Under the influence of those two methodologically different spiritual "streams" the synthesis in studying the *Law & Economics* was inevitable.

The knowledge area of the Economics of Contracts is highly applicable in everyday life of both a lawyer and an economist. The author believes that this research will expand his professional skills and increase his value on the labour market.

Efficiency of contracts is not a popular field of research. Even after exhaustive searches, the author found only few papers, which dealt with this topic. No literature was found that attempted to answer the same research questions.

The established models in the Economics of Contracts are still neither generally approved nor accepted. On the other hand, this area offers extensive material for applied microeconomic analyses, as well as motives for collecting empirical evidence.

2.2   Preconceptions

Maj-Britt Johansson-Lindfors argues that the researcher's preconceptions are based on the researcher's social background, education and practical experience. Theoretical preconceptions are thought to influence the research strategy.[7] In order to provide the reader with better understanding of author's background and beliefs, he would like to tell you several facts that might have shaped his preconceptions.

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[7] Maj-Britt Jahansson-Lindfors, Att utveckla kunskap; om metodologiska och andra vägval vid samhällsvetenskaplig kunskapsbildning, Lund, 1993.

Although the author will try to avoid any prejudices and limitations due to his research lenses, he understands that this pre-understanding will have an affect on the way he formulates the research question, how he approaches the theory and finally how he analyses the facts and theories.

2.3 **Scientific Ideal**

"How sad, the bottle is half empty," said the pessimist.
"No you are completely wrong, it is half full," replied the optimist.

The researchers' view of reality, what there is to be known and how the knowledge about the reality is derived, is set by the researcher's scientific ideal[8]. In a similar manner Wallén states that the different views upon how research is conducted, have created different traditions with their own different values, rules and the methodology of research. These traditions affect how the researcher perceives a problem and how the researcher chooses to study this problem[9]. Lundahl and Skärvad suggest that the positivistic and the hermeneutic scientific ideals are an appropriate limitation of social science studies[10].

Researchers with a positivistic view on knowledge struggle to keep themselves outside of the studied phenomenon, their ideal is acting purely as an observer. A positivistic researcher views the reality in "pieces" while the hermeneutics tries to see the world as a "whole". Hermeneutics have a more subjective perception of reality and they stress the importance of understanding. Researchers who are hermeneutic often use qualitative methods[11].

The author thinks it is hard to take a definite standpoint, which would concern his personal view of knowledge. He believes that the choice of scientific ideals depends on the problem formulation. Generally he tried to use the positivistic scientific ideal, but since there are more tasks (i.e. alternative hypotheses), the author claims, that the usage of different scientific ideals for each of them is possible and justifiable. There are several reasons for that:

First the general contracting model should work anywhere and upon any condition. The "world" of the model is external and objective, which makes the model independent of social constructions, institutions and subjective values[12]. Seeing this, the author defines the scientific ideal as positivistic.

In spite of this, let us consider that the author works as a purely detached theorist and approaches the first research problem in a positivistic manner, with "doors and windows" of his ivory tower closed. The second research problem causes the draft that opens the windows and faces him with everyday reality behind the shutter.
For a careful reader this should be clear after reading the Q_2 research question: "What are the mechanisms of securing the contracts…". The existence of the verb "are" shows plainly that the author has to observe reality. This brings him face to face with the hermeneutic phenomenon. By using our example with the closed room the author is forced not just to look

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[8] Ibid
[9] Göran Wallén, Vetenskapsteori och forskningsmetodik, Lund, 1996. In: Henriksson I., Managing Project Learning, Master Thesis, 2003.
[10] Ulf Lundahl and Hugo Skärvad, Utredningsmetodik för samhällsvetare och ekonomer, Lund, 1999. In: Henriksson I., Managing Project Learning, Master Thesis, 2003.
[11] Ibid
[12] Easterby Smith et. al., Management Research, UK, 1991.

from the window, but also even to open the doors, walk outside and explore reality "on his own skin".

In contrast the second part of the question, "… and how should they be efficiently applied?", allows the author to use the positivistic ideal again, even though the hermeneutic influence is significant.

As a conclusion we can say that this work including building the model and discussing its determinants is based on the positivistic scientific ideal. Only the parts observing the reality is approached hermeneutically.

Finally when looking at pluses and minuses of different approaches, the author has to state that the positivistic ideal in the first research problem will bring higher control over the relationships in the mechanism, which will be traded off by trivial questions and therefore trivial answers[13].

2.4 Scientific Approach

The choice of my scientific ideals (paradigms)[14] has affected my choice of scientific approach[15].

There are generally two ways of drawing a conclusion: inductive and deductive. Induction starts with empirical findings. Based on them the scientist creates a theory *ex post*. During the analysis, intuition is important as well as the stress on the perception of reality. Alternatively, the deductive approach starts with a theory *ex ante* (if any foundations exist) on which one appends own theoretical extensions. These are finally tested against empirical facts.

Johansson-Lindfors says that the choice of scientific approach should be based on the scientific ideal and on the research problem[16]. The author agrees, and therefore his approach will follow Lindfors' recommendations for choosing a scientific ideal.

Generally the thesis is approached deductively, however some problems are solved with a different approach.

The first problem will be approached deductively. The reason is to develop a purely theoretical foundation for this research. An important argument is that the research will be based on existing theory and not on empirical findings. The second problem will be approached by the mutual interactive empirical testing, in other words by triangulation of deductive and inductive methods. The arguments are similar with those mentioned in the previous argument about the choice of a scientific ideal for H_2. In other words the author will look first on reality, and not just on theory.

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[13] Ibid
[14] Thomas S. Kuhn, The Structure of Scientific Revolutions, University of Chicago Press, Chicago, 1962
[15] http://www.wordiq.com/definition/Scientific_method
[16] Maj-Britt Jahansson-Lindfors, Att utveckla kunskap; om metodologiska och andra vägval vid samhällsvetenskaplig kunskapsbildning, Lund, 1993.

Illustration of the author's choices can be seen on the following picture no.1:

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                    ┌──────────────┐
                    │    Result    │
                    └──────────────┘
                            ↑
        ┌───────────────────────────────────────────┐
        │                  Theory                    │
        └───────────────────────────────────────────┘
              ↑                              ↑
     ┌──────────────┐              ┌──────────────┐
     │    Model     │              │    Theory    │
     └──────────────┘              └──────────────┘
              ↑                        ↑        ↑
      Deductive            Deductive              Inductive
     ┌──────────┐         ┌──────────┐      ┌──────────┐
     │    Q1    │         │    Q2    │──────│    Q2    │
     └──────────┘         └──────────┘      └──────────┘
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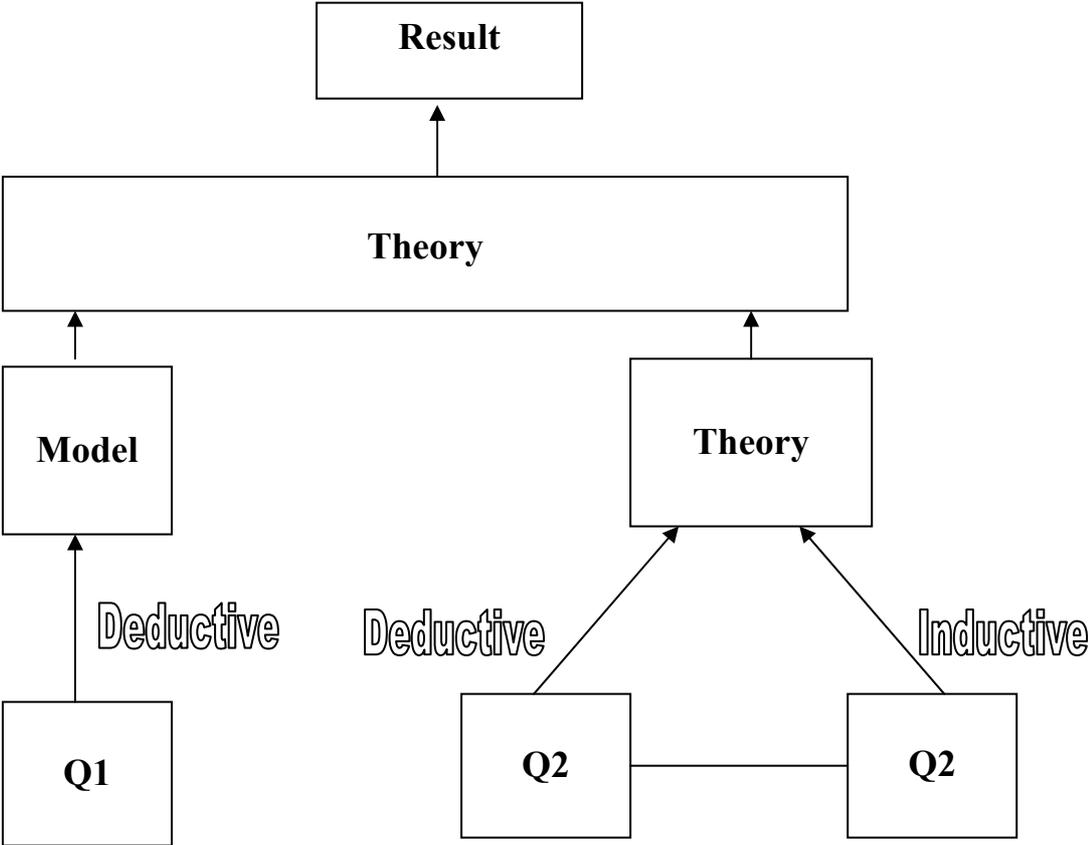
2.5   This topics Scylla and Charybdis

Being a theoretical Law & Economics paper this work lacks the everyday-business practical use of economical analysis of law as well as the mathematical elegance complexity of advance decision models in the game theory. This struggle is connected with the choice of the topic together with positivistic scientific ideal. As stated above the model is descriptive and hence its contribution is the breakdown of a situation. The author believes that description of certain problem is highly beneficial an so work contribution is in better understanding of the problem through the breakdown. The ceteris paribus analysis of the variables is chosen fist because of this research limitations, second because brings clearer view into the problem. Not only in the area of contracts common sense is often more beneficial than vast mathematical modelling and as we can seen from the historical example of Walras and Marshal often more sucessful.

2.6   Selection and Evaluation of Sources and Literature

Seek for the truth in the idea, not in decaying books.
If you want to see the moon, look on the sky, not into the puddle.

Old Persian Sayings

This chapter explains how the author selected the primary sources and literature for this research. The purpose is to give the reader an understanding of the process of literature selection and evaluation. The reader shall thereafter be able to understand the effect of this process on the research.

2.6.1 Selection of Primary Sources

Choosing the respondents to collect data is always the critical moment. The author was trapped "between Scylla and Charybdis" of an exhausting number of respondents and his limited time resources.

In finally choosing the respondents, one of the author's main criteria (after the qualification and capability to respond) was diversity of professional background and experience.

All respondents were offered anonymity. All of them have refused.

At the end, the respondents had the chance to additional comments. All the participants found the interview clear and the questions unambiguous or at least they did not lead the author to get a different impression.

2.6.2 Selection of Secondary Sources

Considering that the topic of this thesis is highly theoretical and of a universal relevance, my primary sources are the knowledge that has been collected and developed by others. This means written sources like books and articles. Those primary sources should provide me with a better understanding of the research area and they should build the baseline for my deductive research in the initial stage.

Choosing an innovative research area "off the beaten track" faces the author with a lack of relevant literature. The field of Economics of Contracts is rather recent and not covered extensively[17]; the author has therefore found a very limited number of publications covering this particular area.

On the other hand, many theories and scientific tools from other areas will be used in this research. Since a generally approbated paradigm of contract theory does not exist, it is necessary to rely on auxiliary resources.

This is the specification of the areas, which the author will use during this research: Microeconomics, Game Theory, Institutional Economics, Theory of the Law, Principal-Agent Theory, Transaction Costs Theory, Bargaining Theory, Theory of Asymmetric Information, Contracting Law Theory.

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[17] Triska, D., Law and Economics – View into the problem, CD-F, 2002.

As the observing reader probably already has recognized, some of those theories overlap. For example many economists can argue that the Transaction Costs Theory is just a part of Institutional Economics[18]. The author does not want to contribute to economic methodology discussions about this topic. What is relevant is the user value of the theory, not its current position in the textbooks.

When searching for the materials, the author has used several approaches. Several persons recommended important sources: Manfred Holler from Hamburg University, Dusan Triska from the CF-Digital in Prague and Libor Dusek from Chicago University/CERGE[ii]. However, much of the recommended literature was very general. The next logical step was to view the lists of relevant references in those books and articles.

Another important and necessary source was the Internet. Luckily, the author has access to the Kluwer Academic Publishers that provides several attractive journals, for example European Journal of Law and Economics. The author has also used the Scirius[iii] scientific engine, the Economics Bulletin[iv], Law and Economics Encyclopedia[v] and the SSRN Electronic Library[vi]. Another method was to use the commercial search engines such as Google. Contracts, incomplete contracts, efficiency, equilibrium, information asymmetry, bargaining model and the like - they all served as keywords. The results of such searches were impressive in quantity, but lacked the demanded particular focus that the author was looking for.

2.6.3   Criticism of Sources and Literature

After choosing the literature, it is important to critically evaluate what purpose the literature was written for and its contents. It is usually recommended to use sources from renowned journals to avoid being influenced by few speculative radical authors[19].

The author's problem was even more complicated as far as he used several theories in many different scientific areas. According to his time limitation, he could not evaluate many publications in every area that is stated above (in the Selection of Literature section).

In virtue of this problem, the author has chosen a trade-off solution that allows him to save time, but also should minimize the impact of being too influenced. This means in fact that he has reduced the number of publications in the generally approved and recognized areas such as Microeconomics or in very technical and undoubtful area such as Game Theory. In the remaining "literature-limited" areas, the author tried to choose respected and widely cited authors. The positive effect of this decision was that more effort could be devoted into other areas.

Another strategic choice was between the new and the old literature. The author's choice was a mixture of seminal "classics" such as Coase (1960) and the "still hot form the printer" modern articles and publications, such as Ishiguro (February 2004) or Shavell (2004). The author has also been inspired by respected founding fathers of the law and economics, such as Posner for the general and background issues, as well as by young and not so known authors for the technical analysis.

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[18] Sojka M., Dejiny Ekonomickeho Mysleni, Carolinum, Praha, 2000.

[19] U.Ecco, Jak se pise diplomova prace, Praha, 1999.

The primary sources can of cause easily be doubted. However, the author believes that most of the required principles were fulfilled. As usual in qualitative research it is important to remember that the happening can be described differently depending on whom you are talking to. The author doesn't believe that the questions, which were launched to the respondents were for them of such importance or sensitivity that they have to change formulations and content significantly.

As a weak point the author identifies the fact that all the respondents were chosen through his personal contact network. However in this case there is no way how to avoid this so far.
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3   DEFINITIONS

CONTRACT
A Contract is a type of business relation between two or more parties concerning a promise for a project that is supposed to be binding, and subject to a condition of human interaction, consent, trust, uncertainty, risk and cooperation during certain time period. The types of promises include money-for-a-promise, goods-for-a-promise, service-for-a-promise, and promise-for-a-promise[20].

INVESTMENT CONTRACT
An Investment contract is a type of business relation, which fulfils all conditions needed for "contract" and in addition includes transfers of money or scarce sources (e.g. information) from one party to another. In investment contract one party gets for a long period dependent on the will and decision of the other party. Efficient investment contracts are vitally beneficial for the society.

ACTOR
An Actor is a person, corporate body or legal entity, which enters the contract with an objective to increase his/her benefit[21].

PROJECT
A Project is any activity that is subject of a contract and has the purpose to increase the benefits of involved actors.

EFFICIENCY
Refers to the "best possible" usage of resources. This means a maximal amount of utility per given resource inputs" or as a dual task "minimal costs for given output". In a more constrained case we speak about "Pareto efficiency", where the states of allocation are efficient when their redistribution cannot increase the utility of one person without hurting the welfare of any other individual. There is no connection with any kind of redistribution or reference to any social criteria.

EFFICIENT CONTRACTS
A Contract is efficient if the actors maximise the possible benefit from a given contract (can be long-term) or realize a contract that ought to lead to maximisation of the benefits[22] or if they realise a contract that ought to lead to minimisation of costs. Under possible benefit we understand cumulatively counted values from both actors.
A contract is Pareto efficient if it is impossible to modify in a manner that raises the expected utility of both of the parties.

BASIC DECISION-MODEL

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[20] [20] Kaplov L. and Shavell S., Economic Analysis of Law, National Bureau of Economic Reseach – Working Paper 6960, 1999. At www.nber.org/parpers/w6960
[21] Some literature refers about "actor" as about "players" or sometimes (quite different meaning) as about "agents and principals".
[22] This means that the contract doesn't necessary need to be successful to be efficient. Important is expected value (benefit) of the contract!

Under the basic decision-model we understand a model of two actors only, with limited choices and options. A multi-party model will only be mentioned in the second part of the analysis and such a "multi negotiating" procedure will not be modelled.

MECHANISMS OF SECURING THE CONTRACT
Those are mechanisms that are used by actors to minimize the risk of failure of the contract, because of the breeching/appropriating of the other party.

"Very nice" said Alice, when she stopped reading," but quite puzzled."

Lewis Carroll
Alice Adventures in Wonderland

4 GENERAL INTRODUCTION TO THE CONTRACTING THEORY

This section should provide the reader with an understanding of the underlying theory. When preparing, the author was faced with a real dilemma. How to provide an understanding of a vast amount of knowledge without being involved in a detailed history of economics, law and other disciplines? This final form is a compromise offering the reader a basic insight into the areas that influenced the author as well as giving information about the sources that were particularly used by the author. The fact that some publications, stated as the author's main sources, contain a general outline of the knowledge from the area and some, on the opposite, are very specific and detailed studies of a particular problem, should not confuse the reader.

The section is divided into several parts by the course of each particular theoretical area. The reader should be aware of the fact, that the author only examines a portion of each theory, which has a connection to this thesis.

The author hopes that this review will inspire the reader to explore some of the fundamental ideas of economists of the historical period stated below.

The picture no. 2 should give an illustrative view into the problem:
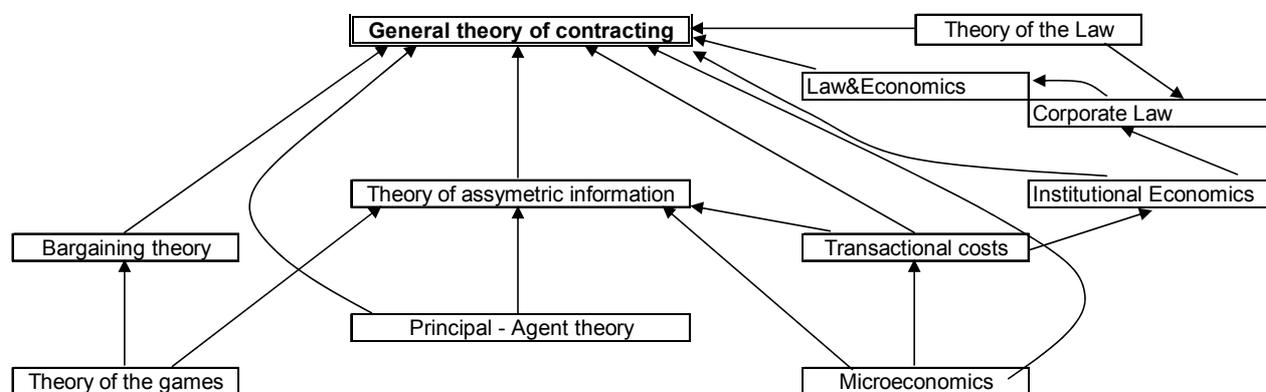
4.1 Principal –Agent Theory

The principal-agent theory is one of the few applications in microeconomics and institutional economics that found full usage in the real-life business practice and which heavily influenced the corporate governance theory. The pioneer works on this topic started in the late 1970s and early 1980s.

The standard principal-agent theory has explained the rent-seeking or inefficient outcomes of contracts when a basic tension between incentives and risk sharing in contracting environments exists and where trading partners have different risk attitudes. They choose

privately observed actions after a contract is signed.[23] In general, the efficient risk sharing and the provision of work incentives cannot be compatible with each other[24]. Other works, such as Jensen and Meckling, define the concept of agency costs and show its relation to separation and control problems. They investigate the nature of the agency costs, demonstrate who bears the costs and why, and analyses the Pareto optimality of their existence[25].

The positive agency theory was introduced by Jensen to distinguish his work and that of other economists pursuing a similar approach, from what he called a "normative agency theory". He criticized the latter for its abstract nature and its attachment to mathematical modeling. True agency theory, in Jensen's view, aimed at explaining the contract structures and actual practices of organizations and necessarily employed qualitative data that cannot be dealt with the usage of inference techniques.[26]

4.2 <u>Theory of the Law</u>

It is for sure the oldest of all the mentioned theories. Its background traces back to ancient Greece and Rome. Being for decades a part of philosophy, the first theories were more or less ethical and rhetorical recommendations[27].

During the centuries this has become a more general theoretical framework for all law processes, theories and cessions. In this thesis the connection between the law policy and the real life practice is important; as is the dependency between the demand for law and the law supply, lobbying, and finally, the dependence, which involves law efficiency and law certainty.

Boguscak sees the connection between law policy and real life practice closely associated with the law demand problem. Only the law that has a wide support can have any practical impact[28]. On the other hand, Knapp disagrees and points out that only very few and very radical groups can escape the rules of law, once those rules are enforced by the state monopoly for coercion and punishment. This belief is supported by an encompassing case study of communist repressions in the former East European block[29].

Probably the most radical opinion comes from Hayek, when discussing the difference between fundamentals (cosmos) and institutions (taxis), he affirms that in most business relations any form of regulation is futile as far as it doesn't come from the agents themselves. Any other form of regulation has only a crushing impact on the efficiency of such relations (contracts). Furthermore, most social costs will be spent on avoiding inefficient rules.[30]

As to law demand most authors believe that lawgivers do not follow or anticipate the example of evolving business informal customs and their supply is always delivered *ex post*[31]. Many

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[23] Holmström B., Moral Hazard and Observability, Bell Journal of Economics 10, 1979.

[24] Grossman, S. J. and O. Hart, An Analysis of the Principal-Agent Problem, Econometrica 51, 1983.

[25] Jensen M. C. And W. H. Meckling, Theory of the Firm; Managerial Behaviour, Agency Costs and Ownership Structure, Journal of Financial Economics 3, 1976.

[26] Ibid

[27] Cicero, Marcus Tullius: The Speeches. English Translation by N. H. Watts, London, 1931.

[28] Boguszak J., Capek J., Gerloch A.: Teorie práva. Eurolex Bohemia Press, Prague, 2001

[29] Curtois, S., Werth, N., Panné J.-L., Paczkowski, A., Bartošek, K., Margolin, J.-L.: Black Book of Communism, II. London / Paris 1999

[30]Hayek F. A.: Law, Legislation and Liberty. Routledge Kegan Paul, London, 1973 (also Czech edition of 1992)

[31] Boguszak J., Capek J.: Teorie prava. Codex Publ., Prague, 1997

authors also hold the opinion that attempts for an *ex ante* law gap filling usually end up in a catastrophe[32]. Seknicka sees the important role of ethics in the law gap filling process[33]. Knapp also sees the vital role of the courts as precedent makers. It is Williamson who states a similar opinion[34].

More or less all the authors state the importance of security against the lobbying pressures. The significance of open communication during the law creation processes is crucial[35]. In addition, some others point out the role of a wide consensus across society.

The opinions about the efficiency and certainty of law are much more heterogeneous where an ideological stance pre-determines the approaches to this topic. On one hand we have scholars who avow the maximal liberty of individuals as the only criteria for law making policies,[36] and who also predict the destructive effects of regulations[37]. On the other hand, socialist writers state that only an absolute control of the human behavior can bring prosperity for humankind, even in the economic setting of "free" trade and entrepreneurship [38]. At least all the authors share the belief that every law needs a certain period of time (*legis vacatio*) to become incorporated[39] and to get into the consciousness of the general public[40]. The rule "the more the better"[41] is another generally shared idea[42], which applies to the ideas of law simplicity, intelligibility and clarity.

Seknicka also assumes that the crucial point lies in the existence (or non-existence) of ethics, concerning the problem of gaps in law and the legal enforcement. Dealing with law efficiency, he proposes to design the law as an "armor" covering the non- abided areas of behavior.[43]

4.3 **Microeconomics**

Being the elementary "building block" of every economic theory, microeconomics explain the crucial mission of economy – how people choose to use scarce resources in attempting to satisfy their unlimited wants[44]. Models of rational behavior describe the process of decision-making, where the aims and objectives as well as the set of alternatives and constraints to the problem are known. Empirical verification is, however, not a necessary condition of this approach. Microeconomic theories are a subjective exercise of the economic logic based on mathematical modeling. It is not presumed that a microeconomic theorist has a duty to say anything about the empirics of the model, neither has the pure mathematician. Notwithstanding, many of them take the consistence between the theory and the reality as their aspiration.

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[32] Boguszak J., Capek J.: Teorie prava. Codex Publ., Prague, 1997
[33] Seknicka, Etika v Podnikani, Prague University Press, 2002.
[34] Williamson, Mechanisms of Governance. Chicago, 2002.
[35] Ibid
[36] A von Hayek, The Road to Serfdom. London,, 1944.
[37] Ibid
[38] Marx K.: Kapital. Plzen, SNTL Publ., 1957.
[39] Knapp V.: The Theory of Law. C. H. Beck Publ., Prague, 1995.
[40] Boguszak J., Capek J., Gerloch A.: The Theory of Law. Eurolex Bohemia Press, Prague, 2001.
[41] Knapp V.: The Theory of Law. C. H. Beck Publ., Prague, 1995
[42] Boguszak J., Capek J.: Teorie prava. Codex Publ., Prague, 1997.
[43] Seknicka P. et al.: Uvod do hospodarske etiky. ASPI Publ., Prague, 2001
[44] Samuelson P.: Economics. McGraw Hill, Boston, 1989, ch. 1, referring to a generally accepted definition by L. Robbins.

After the pioneering work of A. A. Cournot in 1848, it was Leon Walras and mainly Alfred Marshal, the founder of Cambridge economic school, who used mathematics as a method of explanation, thereby creating the basis of microeconomics not just as a method of empirical analysis[45]. Marshal's other research highlights were equilibrium price, demand price and marginal utility[46].

Wilfredo Pareto defined the efficiency optimum: "An equilibrium in which it is impossible to make somebody better off without making someone else worse off"[47]. This became an important concept for any negotiation modeling.

For this thesis the biggest part of the microeconomic theory is based on H. Varian's *Microeconomics and Intermediate Microeconomics*.[48] This summary contains all commonly accepted and for this thesis useful theory as well as F. A. Cowell's *Microeconomics; Principles and Analysis*[49]. Another important source is Robert Frank's *Microeconomics and Behavior*[50] and the last commonly used is Ivo Koubek's web page containing his personal research and tutorial materials[51][vii].

4.4   Theory of the Games

The mathematical Game Theory is the study of how people interact and make decisions in an environment of collusion and bluffing. This broad definition applies to most of the social sciences. The game theory applied in commercial law uses mathematics for modelling the interaction of agents, assuming that each person's behavior impacts the well being of all other participants in the game and their "decision-making space". Thus models are simplified abstractions of the real-world interactions.

The contemporary codification of the game theory is credited to John von Neumann and Oskar Morgenstern, who in 1944 published *Theory of Games and Economic Behavior*. In the early 1950s, John Nash generalized these results and provided the basis for the modern economics. A rapid rise in theoretical developments led to the founding of the first academic journal devoted to the field by Oskar Morgenstern in 1972.

The Nash equilibrium is an order in the set of strategies, one for each player, so that no player has an incentive to unilaterally change his action. Players are in equilibrium if a change in strategies by any one of them would lead to that player earning less than if he/she remained with his/her current strategy[52].

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[45] Marshal A., Principles *of Economics,* 1890.
[46] Marshal A., Money, Credit and Commerce, 1923.
[47] Parreto V., *Manuale di economia politica* 1906
[48] Varian H. R., Microeconomics,
   Varian H. R., Intermediate Microeconomics,
[49] Cowell F. A., *Microeconomics; Principles and Analysis*, London School of Economics, 2004
[50] Frank R. H.: Microeconomics and Behavior, McGraw Hill, Boston, 1994
[51] http://samba.fsv.cuni.cz/~koubek/IES-FSV%20UK/ most material at directories Kapitoly_Nove and Kapitoly_Stare; Private Property!
[52] Nash J., Dissertation work, Princeton, 1954.

Common publications used by the author were Yamada's *Efficient Equilibrium Side Contracts*[53] and *Efficient Equilibrium Contracts in Two-Player Games*[54].

4.5 Bargaining Theory

Derived from the game theory, the bargaining theory is considered to be a "little brother." It is especially derived by the game theory related to the bargaining (second) stage of Transaction Costs. The games in Bargaining Theory can be divided into several sections: Coordinative vs. Non-coordinative, with common knowledge, sequential and other.

The author's source of inspiration was: Ishiguro's, *Information Aggregation and Efficiency in Agency Contracts with Endogenous Externality*[55] *and Moral Hazard and Renegotiation whit Multiple Agents*[56].

4.6 Transaction Cost Theory

Transaction Cost is an economic category introducing the problem of costs not associated directly with production inputs but unavoidable for taking part in exchanges. The first work was the famous (and mentioned above) article of Ronald H. Coase, which started a revolution in explaining many economic activities. Coase pointed out the impact of transaction costs on negotiation[57] and property rights[58].

Transaction costs are therefore any costs that are involved in any economic transaction, except the cost of the goods itself. This means, for example, not only the costs of getting informed, but also the cost of information (which can be measured by money or by search-time): How much do I want to sacrifice for getting informed? Using markets or institutions can be quite costly.

Transaction costs can be divided into three groups by stages: First, an exchange partner has to be located. This involves finding someone who wants to buy what you are selling or sell what you want to buy. Second a bargain must be stricken between the exchange partners. A bargain is reached by successful negotiation, which may include the drafting of an agreement. Third, after a bargain has been reached, it must be enforceable. Enforcement involves monitoring and screening of the performance of the parties, and punishing the violation of the agreement.[59] The Author would like to mention that the second and the third part of such an agreement are often subject to the bargaining theory research. Probably the biggest contributor to this after Coase was Williamson[60].

4.7 Institutional Economics

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[53] Yamada A., Efficient Equilibrium Side Contracts, Economics Bulletin 3, 2003 at www.economicscbulletin.com/2003/volume3/EB-03C70004A.pdf

[54] Yamada A., Efficient Equilibrium Contracts in Two-Player Games, Kyoto, 2002.

[55] Ishiguro S., Information Aggregation and Efficiency in Agency Contracts with Endogenous Externality, Osaka, 2004.

[56] Ishiguro S. and Itoth H., Moral Hazard and Renegotiation whit Multiple Agents, Review of Economic Studies 68, 2001.

[57] Coase R. H., *The Problem of Social Costs, 1960.*

[58] Coase R. H., *The Nature of the Firm,* 1937.

[59] Ulen – beyon Coase

[60] Williamson, Mechanisms of Governance. Chicago, 2002

Even though the prestige of institutional economics was on a decline during the 20th century, at the end it became one of the most influential economic fields. The theory stresses the importance of institutions as crucial factors in explaining economic performance, as well as the evolution mechanism of those institutions.

Institutions are not physical organizations but the rules of the game in society or, more formally, they are the human-devised constraints or incentives that shape human interaction[61].

Institutional economy criticizes many segments of the neo-classic economic theory. Here are some of them: being too static, having no respect to historical time and institutions, assuming the perfect competition or the so-called "homo economicus", i.e. the super-rational economic man.

For this thesis the so-called "legal form of institutionalism" is especially important, as it is a part of the school that puts stress on formal (common) institutions. Most likely, the first scholar of this movement was John R. Commons. His main findings involved the group interest conflicts and their legal solution – the role of state and the reform of legal institutions,[62] as well as the bargaining transactions, managerial transactions (commands by legal and economic superiors to subordinates – for example from foreman to worker), rationing transactions (partitional transactions, distribution of benefits and burdens to members of a joint enterprise)[63]. His followers from the school of new institutional economics stressed the importance of property rights theory, transaction costs, institutions as rules and corporate governance. The most famous member is again R. H. Coase (see above).

The author's frequently used source was Furubotn and Richters: *Institutions and Economic Theory*, where several types of contracts according to the new institutional economics are discussed. Those are more specifically: the principal-agent model of the adverse selection type, the theory of implicit contracts, the incomplete contract model and self-enforcing agreements[64].

4.8   Theory of Asymmetric Information

For more than two decades, the theory of markets with asymmetric information has been a vital field of economic research. Today, models with imperfect information are indispensable instruments in the researcher's toolbox. George Akerlof, Michael Spence and Joseph Stiglitz established the foundations for this theory in the 1970s.[65]

The main idea behind it is that we all need information for our economic activity but it is not free and therefore costly. Among other costs we as buyers have to collect information about the price of a certain product on a certain market. We may probably have information about the prices of similar products on the market, but we will definitely not have the same information about the quality of products.

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[61] North D., *Economic Performance,* 1990.
[62] Commons J. R., *Legal Foundations of Capitalism,* 1924.
[63] Commons J. R., *Institutional Economics* 1934.
[64] Furubotn E. G. and Richter R., *Institutions and Economic Theory: The Contribution of the New Institutional Economics*, Michigan University Press, 2001.
[65] www.nobel.se/economics/laureates/2001/public.html

Akerhof's very famous and one of the most cited economic essays "The Market for Lemons" describes the problem of Adverse Selection. He shows that hypothetically, the information problem can either cause an entire market to collapse or change it into a market of inferior-quality products ("lemons") by adverse selection [66].

Spence's research examines the problem of "signaling". This means in general that any agent on a market can change the information symmetry on the same market by his/her own activity.

4.9 <u>Law & Economics</u>

The interdisciplinary field of Law & Economics applies the analytical tools of economic theory to study questions pertaining to the optimal design and application of legal rules and law enforcement policy.

As mentioned above law & economics is a young theory with roots in the early 1960s. Aaron Director, Frank Knight and Ronald Coase represented this first "old school" among others.[67] The second wave was rising in the 1970s and is typically connected with Richard Posner, currently the most influential person in the field of Law & Economics (or Economic Analysis of Law, in other words). The break-point came in 1972 together with two major events: the foundation, in 1972, of the *Journal of Legal Studies* and the first publication, of Posner's *Economic Analysis of Law*.

The contrast of 'new law' vs. economics emerging in the 1960s, whose research agenda was to apply economics to core legal doctrines and subjects, such as contract, property, tort and criminal law, was significant. The new school in law observes "its distinctive feature is the application of market economics to legal institutions, rules, and procedures which in certain areas (notably in tort and in crime) are not conventionally seen to influence market behavior, but which indeed are defined in terms of market failure".[68]

In the contract field, Law & Economics describes in particular the problems of remedies, questions concerning the enforcement of contracts, legal forms of contracts, legal obstacles and systems of legal codes and many others.
For this thesis are central the works of Posner[69], Cooter[70], Cooter and Ulen[71], Triska[72], Friedman[73], Kaplow and Shavell[74], Shavell[75] and Ayres[76].

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[66] Akerhof G. A., Market for the "Lemons": Quality Uncertainty and the Market Mechanisms, 1970.
[67] Mackaay E.,History of Law and Economics, www.encyclo.findlaw.com/0200book.pdf
[68] Rowley, Charles K. (1989b), 'Public Choice and the Economic Analysis of Law', in Nicholas Mercuro (ed.), *Law and Economics,* Boston, Kluwer Academic Publishers, 123-173.
[69] Posner R. A., *The Economical Analysis of La*w, Boston, Toronto, London, 1992.
[70] Cooter R., *The Cost of Coase*, 11 J. Legal Studies 1, 1982.
[71] Cooter R. and Ulen, T.: *Law & Economics*. 3rd ed., Addison Wesley Longman, 2000.
[72] Triska D., *Law and Economics – View into the problem*, CD-F, 2002.
[73] Friedman D. D., *Laws Order*, Princeton University Press, 2000.
[74] Kaplov L. and Shavell S., *Economic Analysis of Law*, National Bureau of Economic Reseach – Working Paper 6960, 1999. At www.nber.org/parpers/w6960
[75] Shavell S., *Foundation of Economic Analysis of Law*, Harvard University Press, 2004.
[76] Ayres and Gestner R., Strategic Contractual Inefficiency and the Optimal Choice of Legal Rules, Yale Law Journal 729, 1992.

4.10 <u>Corporate Law</u>

The author used one of the few sources about Czech corporate law, Richter's *Kuponova privatizace* research paper[77].

4.11 <u>Theory of contracting</u>

The most important background for this paper is in the authors previous work at this field: *The Efficiency of Contracts, Theoretical Approach in Law and Economics*[78]. Other source was Williamson´s *Mechanisms of Governance*[79] and *Costly Monitoring paper*[80].

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[77] Richter T., *Kupnova Privatizace a jeji vlivy na rizeni a financovani ceskych akciovych spolecnosti*, Brno, 2002.

[78] Benacek O., *Efficiency of Contracts -Theoretical Approach in Law and Economics*, Umea, 2004.

[79] Williamson, Mechanisms of Governance. Chicago, 2002.

[80] Williamson, *Costly Monitoring, Loan Contracts, and Equilibrium Credit Rationing*, Quarterly Journal of Economics, 102, 135-145, 1987

'Indeed, I have come to the position that the economic approach is a comprehensive one that is applicable to all human behaviour, be it behaviour involving money prices or imputed shadow prices, repeated or infrequent decisions, large or minor decisions, emotional or mechanical ends'

Garry Becker 1976[81]

5   DECISION MAKING MODEL

In this chapter you are supposed to find the main idea behind the thesis – the author's own analysis. This chapter should solve the questions mentioned in the introduction and provide you with a new original theory.

The first part will start with basic assumptions as well as with a general economic paradigm. Further model is built on this base by means of re-arranging the variables and adding new assumptions.

5.1   <u>Building up the Decision Model – Far in the Theory</u>

The answer to the question in question one (Q1) will be solved deductively. This means, that the author will assume that the model, which he is looking for, exists. By finding, constructing and describing this model, the author will come to the conclusion that the answer to the first part of the question Q1 is positive. If the author fails in his quest, the answer is that the first part of the question **can possibly be** rejected[82].

As stated in the definition part by the basic decision-model, we will work with a model of two actors only, with limited choices and options. The multi-party model will only be mentioned in the second part of the analysis and such a "multi negotiating" will not be modelled[83].

5.1.1   Model of two actors "one shot" contracting decision on perfectly competitive markets

Let us first have a look at the perfectly working market. Step number one is to make a few assumptions:

1) The actors are rational, and their goal is to maximise the economic benefit.
2) All actors are working with perfect information.
3) The type of competition is "the perfect competition".
4) The choice between any two alternatives must depend only on the ordering of individuals over these two alternatives, and not on their orderings over other alternatives.

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[81] This period was the rise of economics as an imperial science. The reader can think that it's funny that Garry Becker the "father" of this raise was among the economic community called (if not present) "The Imperator".

[82] The author would like to point out that this doesn't mean that the hypothesis **is** rejected!

[83] Mathematic modelling in the theory of the games can create such a model. Another option that is simpler (which the author a priory does not reject) can use the fact that one party (however big) can be cumulatively seen as the only "other" partner. The model is then a breakdown into one-versus-all game. For a more detailed description see Varian's (2003) "component goods" analysis.

5) The preferences of actors are transitive.
6) The "tastes" of consumers are non-saturated. This means, that the consumers always prefer more to less and the existence of a bliss point is excluded.
7) There are no governmental regulations, thus no taxes.
8) There are no other "threats" for the actors (this will be analysed in more detail in part 4.5).

5.1.1.1   Interpretation of assumptions

1) The actors use a classical utility function: $F(U) = p_1*u_1 + p_2*u_2+....p_n*u_n$ [84] $n \in N$. Where **p** is the probability and **u** the utility gain, for example in monetary units (in this case the relationship is purely linear). This means that they are risk neutral and have constant marginal utility of revenues (the derivation of the function is constant).
2) The actors always look for better possibilities.
3) Transaction costs are equal to zero. TC=0. The actors have perfect information. There are always other possibilities (trades).
4) If A>B than this relationship in independent of other relationships (for example B>C).
5) If A>B $\wedge$ B>C than A>C.
6) Allows the existence of a few previous axioms.

If we look at the behavior of the actors, we can assume *(the basic paradigm)* that any actor will enter the contract if her revenue (gain) will exceed the costs. This means:

If R > C than P(C) = 1
If R < C than P(C) = 0
If R = C then the actor is indifferent in his decision and P(C)=0.5.

P(C) is the probability function of the contract (not costs!). Value one means that the contract will be realised. Zero value means the opposite.

(Non Variablity Assumption): We assume that Costs are fixed.

Adding risk
Now let us add the risk (probability into our equation). This risk covers the cumulative probability (p_r) that the contract will not be realised. Right now we are not interested in why this happened, but it will be specified below.

If $p_r*R > C$ then P(C) = 1

Note: The rational subject sees the p_r*R as one value, but this description allows us to see how the decision process is shaped.

The assumptions 1-8 allow us to work with real revenues and costs. The probability **p** that will be used further down is the probability that a certain event will occur.

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[84] Example: To get 100 units with probability 0,1 plus 200 units with probability 0,2 implies to have 50 "units" already certain "in hand".

Note: Of course this is more for the comfort of the reader. If we follow for the probability rule then multi-stage risky choices can be reduced to a single-stage risky choice. It can easily be seen that: $\forall\ p_k$ and R_k, $k \in N$, $\exists\ p_x$ and R_x that: $p_x*R_x = p_1*R_1 + p_2*R_2 + \ldots + p_k*R_k$

Proof:

Time dividing assumption: Now let us assume that the contracting is "one shot", but the performance and payback takes place at time T+1 (T is the time of contract making). There is an important fact that T doesn't have to be always similar!

(Only Breach Assumption): Now let us assume that the only reason for not realising the contract is the breach from the second party. In fact this means that $(1-P_r)$ is the probability of breach (can be also labelled as P_b) and P_r the probability that breach will not happen.

Further on, we will break down the revenue part of the model:

The revenues can be divided into two parts. Those are Incomes[viii], which the actors are expected to receive if the contract is successfully fulfilled. The symbol will be **I**. The second part are damages (**D**). Damages occur when one of the actors decides to breach that means to violate the contract. These damages not only harm caused to the third party, but as well include the loss of possible future income seen as a value fixed in time. If a breach takes place the actor that caused it faces the obligation to pay a certain amount (or provide a certain remedy which can be conveyed in money). This remedy can have zero or any positive value.

Example: You (as an investor) get into a contract with a building company. The company promises to build a hotel in a certain time. Unfortunately the company breaches the contract, the hotel is not finished in time. You will not only get zero earnings because of no guests, but you may also face sues from an aggressive Law & Economics Association for foregone profits and damages, to which you already promised an accommodation for their members conference.

After this breakdown, the decision-making equation looks like this:

If $(p_i*I) - (1-p_i)*D > C$ then $P(C) = 1$

(Time delay Assumption): Now let us assume that the contracting is "one shot". It commences at time T but the performance and payback takes place at time T+1 and the damages should be compensated at time T+2 (T is the time for contract making and costs spending). For having the model "more transparent" the time gaps between different events are always the same. The important fact for the model is that the events are happening consequently.

Note: The units measuring the time period T may differ case by case. Once they can be minutes, once years. In reality between T+1 and T+2 can be bigger difference than between T+2 and T+3, but our model abstract from this argument. The important logic behind is that T+2 comes after T+1 and there is certain (not perfectly defined) value discount[85].

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[85] It might be unorthodox, but the use of discounts as dividing paramether is often very useful and comfortable as see for example (more argumentation for this approach is included) in Viaene, Veugelers and Dedene, 1999.

Also the capital (money) has different values in time notwithstanding the face nominal value of the asset. Future income has to be discounted by the interest rate (r).[86] Let's assume that the discount rate is constant across time.

(Damages Rigidity Assumption): The rate of damage is one value fixed in time.

Now our equation has been modified to this form:

$$\text{If } \frac{p_i * I}{1+r} - \frac{D*(1-p_i)}{(1+r)^2} > C \text{ then } P(C) = 1$$

After a simple rearrangement we get this elegant formula:

Proposition 1:

$$\textbf{If } \frac{\textbf{p}_i * \textbf{I}}{\textbf{1}+\textbf{r}} - \frac{\textbf{D}*(\textbf{1}-\textbf{p}_i)}{(\textbf{1}+\textbf{r})^2} - \textbf{C} > \textbf{0 then } \textbf{P(C)} = \textbf{1}$$

This is the very basic model of contract decision-making in a perfect competition economy.

Now we will add one more assumption to our model:

Existence of the remedy assumption:
Now we will assume the existence of the Remedy event. This possibility can occur if the second actor breaches the contract and causes damage to the first actor. The first actor can claim a certain remedy (compensation). Right now we are not interested in why and how this possibility exists. Please do not forget that our basic assumptions (especially no. 7 and 8) are still valid.[87]

Remedy (Re) is a financial compensation given by the breaching (defaulting) actor to the damaged actor. (Here it is the first one since the second actor caused the breach). This compensation includes also the profit lost. Remedy is defined by a fixed financial payoff and is subject to a certain probability of receiving it.

Note: The fact that a party can claim a Remedy for foregone profit (as seen by the actor who is a supra-rational subject) with a given value and probability, it does not imply that it cannot be an unlimited number (a vector) of amounts, each with a different probability. This was shown above in the case of Revenues.

Remedy will occur in time T+3. Its value is zero or positive (Re $\in$ <0,∞)).

---

[86] *Under the assumption of perfect competition the "interest rate" is equal to the marginal capital revenue (MCR). The value is naturally dependent on time(state value) .*

[87] For example the Justice of Peace can do such a binding judgement without the existence of the governmental regulation or regulative governmental. Such processes exist, for example in chambers of commerce, lawyers associations or soccer organisations. Very often they are equipped with bindings and judgements and dispose of enforceable power.

How does the model look now? :

Proposition 2:

$$\textbf{If } \frac{\textbf{p}_i * \textbf{I}}{\textbf{1}+\textbf{r}} - \frac{\textbf{D}*(\textbf{1}-\textbf{p}_i)}{(\textbf{1}+\textbf{r})^2} + \frac{(\textbf{1}-\textbf{p}_i)*\textbf{p}_{re}*\textbf{Re}}{(\textbf{1}+\textbf{r})^3} - \textbf{C} > \textbf{0 then P(C)} = \textbf{1}$$

This is the basic model of contract decision-making in a perfect competition economy, with the option of a remedy for breach.

So far we have been looking at decision-making under very special abstract and unrealistic conditions. Now we will be approaching closer to the reality.

5.1.2 Model of 2 actors "one shot" contracting decision on competitive markets:

First we have to rebuild our assumptions:

1) *The actors' rationality is bounded, i.e. it is only partly rational and their goal to maximise the economic benefit is challenged by sinking into a sub-optimality.*
2) *All actors are working in sub optimal environment that is moving away from perfect information; thus there is now creeping certain information asymmetry.*
3) *The competition is not perfect and the "competing markets" become oligopolistic. Thus they may gain certain degree of the market power.*
4) *The choice between any two alternatives must depend only on the ordering of individuals over these two alternatives, and not on their orderings over other alternatives.*
5) *The choices of actors are transitive.*
6) *The "tastes" of consumers are non-saturated. This means that the consumers always prefer more to less and the bliss point does not exist.*
7) *There are no governmental regulations, no taxes.*
8) *There are no other "threats" for the actors.*

5.1.2.1 Interpretation of new assumptions

1) The actor operates under the concept of Simon's bounded rationality. In our model this means first, that their utility function is not linear. In fact, the actors have the *Neumann-von Morgenstern utility function*[88]. Second, actors have different *time preferences*. This means that the discount rate is not equal to the *marginal capital revenue (returns)*, but it is highly influenced by other factors.
3) There exist significant positive Transaction Costs (TC). For example, the market contestability is bounded and entering the market can be very costly.

---

[88] Our assumptions allow us to refuse the Tversky- Kahneman hypothesis about irrationality of actor's utility function! Allowing this axiom would lead us to the crash in preferences and non-transitivity of choices and therefore to the crash of the whole model. For further information see: Tversky A. and Kahneman D., Judgement Under Uncertainty; Heuristic and Biases, Science, 1974 and Tversky A. and Kahneman D., The Framing of Decision and the Psychology of Choice, Science, 1981.

Note: As stated above, here we do not care why those events occur and how they might be influenced. A closer description of this will follow below.

The *Neumann-von Morgenstern utility function* describes the personal preferences of utility according to the risk and the amount of money. The final utility gain is not formulated in abstract units like "utils" but in real financial assets (money, for instance). This means it is easily quantified in the present value of income at zero risk in present time. Generally we divide the actors into three groups: Homo economicus (used above), risk averse and risk searching[89]. Before we step into further modelling, let us have a look at several illustrative figures and intuitive interpretative illustration:

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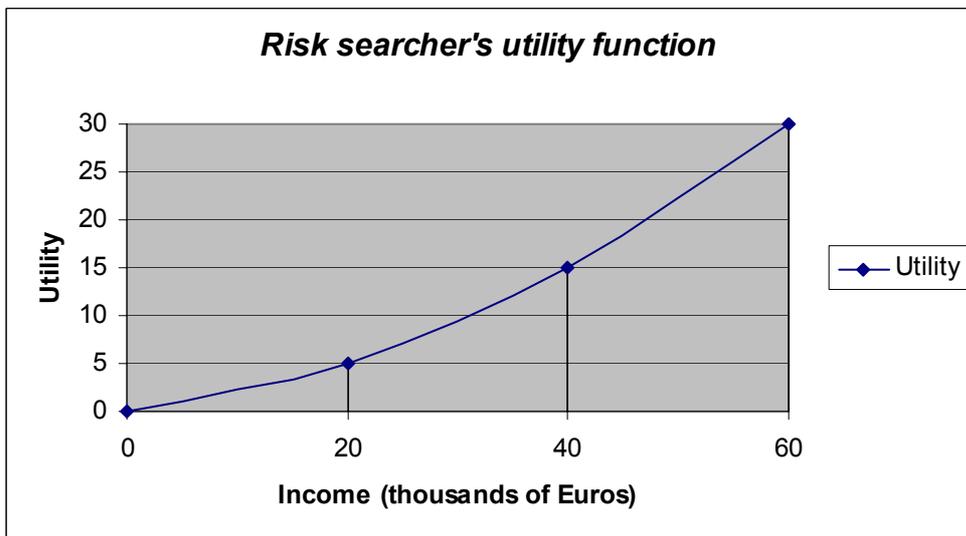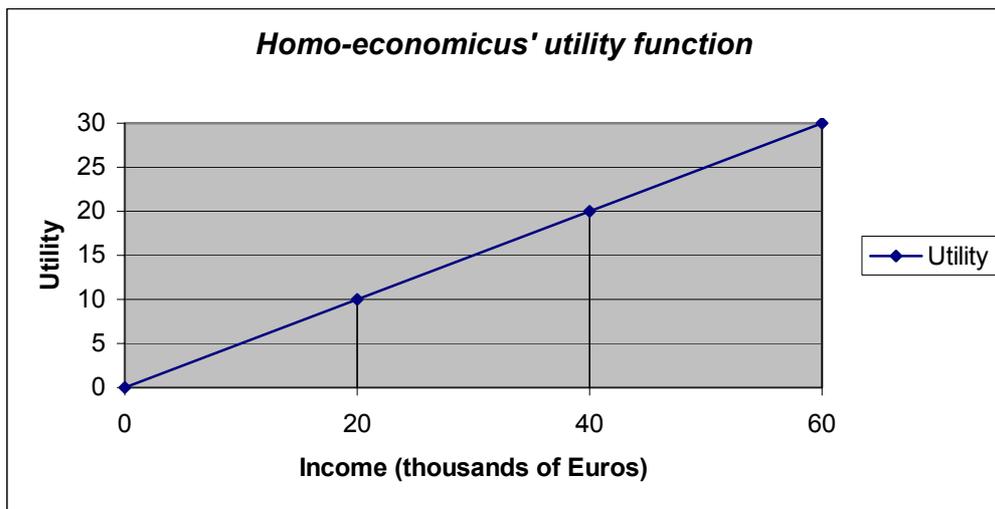
[89] Risk searching means that actor is under certain circumstances willing to play "unfair" game. For further description see Frank H., 2003.

Risk averse utility function
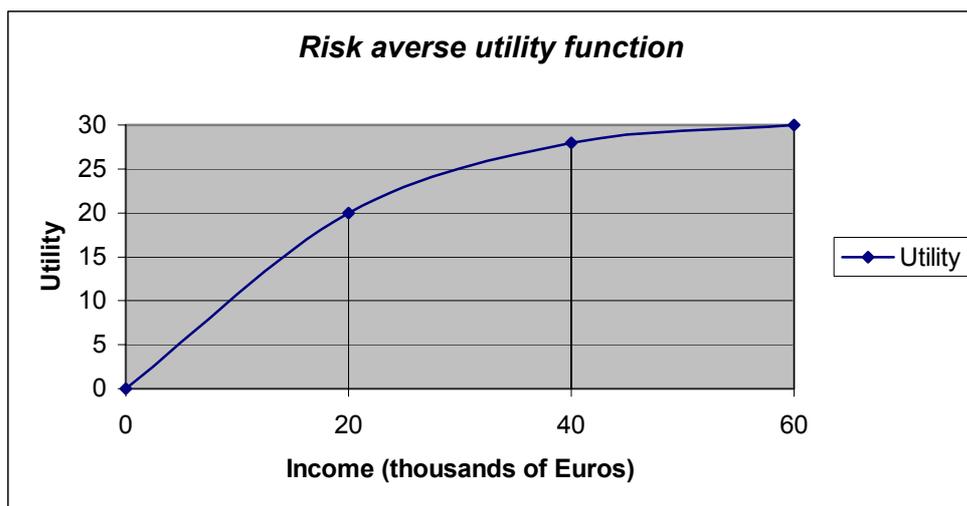
*All three figures describe utility function of a different type of person. The graph line represents the **indifference curve** a set of points (situations) with the same utility. This in other words means that actor (consumer) is similarly saturated in each point of the line (curve).*

5.1.2.1.1 Illustration no. 1

Bored Bill Gates Economy Fairy Tale (Why Shark Loans can be good for Public Welfare):

During his stay in Umeå Bill Gates gets bored to death. To entertain himself in his struggle, he invents an interesting experiment. He starts to stop people at the university, with a huge pile of money in one hand and ten-panel dice in other, offering them a deal:
"You can choose. I will give you half a million Swedish Crowns in cash or you can roll this fair dice. If you roll ten on the dice (which has a probability of 10 percent) I will give you even 10 million". On average, rolling a dice should pay 1 million. Unfortunately all the students were risk averse and preferred the first choice[90]. But then Bill met the author of this thesis. As all the other students even he was risk averse, but she had a brilliant idea. He made a phone call to an infamous loan shark and offered him this choice: "I will make a contract with you and sell you the result of my business with Gates for 750 000 Swedish Crowns. As the Loan shark was rich and used to every day high risky business (his utility function was homo economicus), he agreed and the economist chose Bill's second choice.

Note: The same result can be seen if the economist takes a high interest rate short loan and starts buying the choices from other students. If there are significantly enough persons with possessions of such proposed contracts for example Bill made the offer to the all local students of economics), the statistical law of high numbers tells us that she should be successful.

Now let us apply the *Neumann-von Morgenstern utility function* in our model[91]:

---

[90] Author had actually made simulation of such an experiment with those results. He cannot actually prove this statement because of the fact that he didn't have the real money to offer.
[91] We assume that conditions for this function are fulfilled.

$$\textbf{If } \ U\!\left(\frac{p_i * I}{1+r}\right) - U\!\left(\frac{D*(1-p_i)}{(1+r)^2}\right) + U\!\left(\frac{(1-p_i)*p_{re}*Re}{(1+r)^3}\right) - C > 0 \textbf{ then } P(C) = 1$$

As we see, partial rationality of the actor forces us to split incomes and losses into several parts and to apply utility function *per partes*.

Function[92] **U** is defined on two intervals (-∞, 0> and <0, ∞), is continuous and assume values from the interval (-∞, ∞). For any real number is limited from below as well as from above.

Time preferences show how the actors value the utility of money (or other goods) in time.

The figure below illustrates the preferences of the actor as a trade off between the current and future consumption:

Time preferences of the consumption
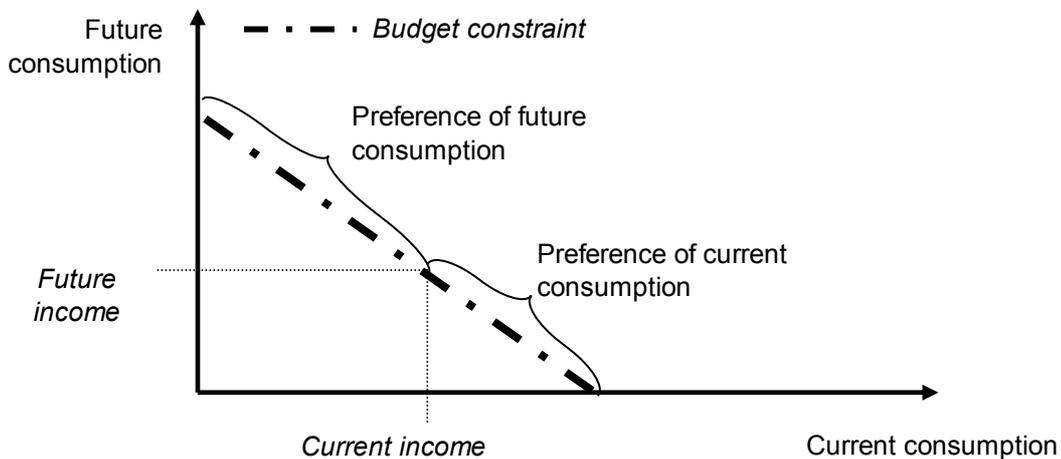
This graph shows the basic choice of preferences, we might add liquidity constrains in borrowing as well as in lending. The preferences are still heavily dependent on the real interest rate, but that in not thee only one influencing factor.

5.1.2.2   b) Illustration no. 2

Which preference function are you?

Do you have positive time preferences or negative time preferences? When it comes to food the answer is easy. Think about your last dinner, which contained two non-componential parts (for example two kinds of meat), of which you liked one more than the other. Did you eat the "better" meat first and then struggled with the other one – then your time preference function for food is positive. Did you first struggle with the gross one and then with the feeling of a winner enjoyed the delicious one? Then you have for sure negative time preferences.

---

[92] We might better talk about individuals cardinal utility function or felicity function (see Cowell, 2004), but with respect to the traditions of von Neumann and Morgenstern, lets stick to the more traditional term.

5.1.2.3 c) Illustration no. 3

The student life and the Nagano effect

Franta is a usual Czech student. He studies during the weekdays and drinks every weekend. His time preferences of Plzen beer are periodically unstable in time. He is not willing to pay too much during the weekdays, but he is able to pay a lot every weekend. Another factor is his income. Because he is studying hard, his only income is a monthly allowance being drawn from a loan from his rich grandmother. This affects of cause his time preferences. In the weekdays within first days after he gets his monthly allowance he is able to pay twice as much for a bottle of Plzen than at the end of the period. One day the Czech ice hockey team won (unexpectedly) the Olympic ice hockey tournament in Nagano. The problem is that the match was so tough that it finished at 2 am. Because of fear of British beer-tourists all clubs and shops in the centre were closed. Can you predict the "Nagano effect" on his time preferences for beer during the celebration party time? Yes, the preferences are not stable in time and depend on other events.

Second we can add the time preferences. This will not create any "visible" change in the model. But we have to understand (as seen in illustration no. 3) that the practical impact can be extensive. We will change the *Discount rate* **r** for T*ime preferences* **t**:

$$\textbf{If}\ \ U\!\left(\frac{p_i * I}{1+t}\right) - U\!\left(\frac{D * (1-p_i)}{(1+t)^2}\right) + U\!\left(\frac{(1-p_i) * p_{re} * Re}{(1+t)^3}\right) - C > 0\ \textbf{then}\ P(C) = 1$$

Finally we will project the *Transaction costs* (TC) into the model. Briefly, *Transaction costs* are costs connected with the negotiating during the contracting transaction. They will be described more detailed in the chapter 5.3.5 of this thesis.

$$\textbf{If}\ \ U\!\left(\frac{p_i * I}{1+t}\right) - U\!\left(\frac{D * (1-p_i)}{(1+t)^2}\right) + U\!\left(\frac{(1-p_i) * p_{re} * Re}{(1+t)^3}\right) - TC - C > 0\ \textbf{then}\ P(C) = 1$$

This model looks satisfying, but in fact it isn't. There is (at least) one more very logic assumption that we should take into consideration. In fact the p_{re}, probability of getting a *Remedy* is not an independent variable. More likely it is a dependent variable: dependent on the *Transaction costs*.

If you disagree with this statement, imagine the transaction costs such as costs of searching for a partner, checking his credibility, securing the contract (for example hiring the best lawyer) and finally monitoring your partner during the business process. (I may also expect that the partner does the same with me.) It is all costly and risky. I hope that the assumption is clear and acceptable for you now:

Dependency of Transaction costs assumption: p_{re} is a function of TC.

Attributes of p_{re} function: p_{re} is growing hence the first derivative is positive. p_{re} is concave hence the second derivative is negative. The limit of p_{re} in infinity is one.

Important note: We can also assume, that Transaction cost of the first actor have impact on the probability of breach of the second actor[93]. In this thesis the author exclude this possibility.

And now get our equation in this very final form:

Proposition 3:

$$\text{If } U\left(\frac{p_i * I}{1+t}\right) - U\left(\frac{D*(1-p_i)}{(1+t)^2}\right) + U\left(\frac{(1-p_i)*p_{re}(TC)*Re}{(1+t)^3}\right) - TC - C > 0 \text{ then } P(C) = 1$$

The other equations are by definition equal:

$$\text{If } U\left(\frac{p_i * I}{1+t}\right) - U\left(\frac{D*(1-p_i)}{(1+t)^2}\right) + U\left(\frac{(1-p_i)*p_{re}(TC)*Re}{(1+t)^3}\right) < 0 \text{ then } P(C) = 0$$

and

$$\text{If } U\left(\frac{p_i * I}{1+t}\right) - U\left(\frac{D*(1-p_i)}{(1+t)^2}\right) + U\left(\frac{(1-p_i)*p_{re}(TC)*Re}{(1+t)^3}\right) - TC - C = 0$$

Then the actor is indifferent in his decision about contracting.

So far we have just been analysing one part of the contract. If you still remember, this contract is supposed to be two-sided. Until now we assumed that there is no information asymmetry (except the fact that the first party does not know if the second one will breach) and the breach of the second party is the only reason for a failure of the contract.

The second actor is using a similar decision-making model as the first actor. There are few differences an in fact our new assumption:
  1) The second actor is not facing the risk of a breach of the first actor.
  2) The second actor alone can decide if he will breach or not.
  3) In case of a breach, the actor has to face the *Remedy* event.
  4) The second actor facer different utility function!!!

His decision-making model looks like this:

$$\text{If } U_b\left(\frac{R}{1+t}\right) - C' > 0 \text{ or } U_b\left(\frac{I}{(1+t)^2}\right) - C'' - U_b\left(\frac{p_{re}(TC_{first-actor})*Re}{(1+t)^3}\right) > 0$$

then $P(C) = 1$

---

[93] Which would bring the second actor into interesting optimisation choice dilemma, where the solution would be heavily dependent on his utility function (which should be closed to the first actor.).

Here we have *several assumptions*:

The second actor's total costs are transaction cost free. Only the first party bears all the transaction costs, **or** the second actor's transaction costs are implicitly included in his total costs (C' = C + TC). In another words, if I opt for being always honest and serious it implies bearing a cost burden, while it relieves the other parties from such a burden at the same time! This is costly in the short run, but in the long run he can charge others for this credit he has built, banks make their business on this credit. Nevertheless, that relief to the second party has no impact on the probability of it being forced to pay a remedy (p_{re}) (effort to make the contract not-enforceable would create certain type of economical signals[94]).

If the second agent breaches, he obtains a certain amount of money (I) and his costs C'' can, but do not have to be, different from his usual (planned) costs (C). Both, but at least one of this information have to be closed to the first actor (in case that he knows the second actor's utility-function, otherwise it is not necessary). This creates the first actor's uncertainty about the breach. If he knew those values he could easily foresee the future moves of the second player and avoid the risk of breaches by non-contracting or by optimisation of transaction (securing) costs.

Now look at the conclusion of the model:

Proposition 4:

If the first actor's

$$\text{If } \quad U\left(\frac{p_i * I}{1+t}\right) - U\left(\frac{D * (1-p_i)}{(1+t)^2}\right) + U\left(\frac{(1-p_i) * p_{re}(TC) * Re}{(1+t)^3}\right) - TC - C > 0$$

and the second actor's

$$\text{If } \quad U_b\left(\frac{R}{1+t}\right) - C' > 0 \ \text{ or } U_b\left(\frac{I}{(1+t)^2}\right) - C'' - U_b\left(\frac{p_{re}(TC_{\text{first-actor}}) * Re}{(1+t)^3}\right) > 0$$

then

P(CC) = 1

P(CC) is the function of the **contract agreement** *(shake of hands)* and the values are similar as for the P(C) function.

Now we can easily create a summary of all the possibilities of the model.

Definition: Let us label the left part of the last equation of decision-making of the first actor

$$\text{“ } U\left(\frac{p_i * I}{1+t}\right) - U\left(\frac{D * (1-p_i)}{(1+t)^2}\right) + U\left(\frac{(1-p_i) * p_{re}(TC) * Re}{(1+t)^3}\right) - TC - C \text{ ”} \quad \text{as } \underline{\textbf{LFA}}.$$

---

[94] See Asymmetric Information Theory, in particular Stiglitz

Definition: Let us label the "first" term (of the left part) of the last equation of decision-making of the second actor

" $U_b\left(\dfrac{R}{1+t}\right) - C'$ " as **LSA1**

Definition: Let us term the "second" term (of the left part) of the last equation of decision-making of the second actor "

" $U_b\left(\dfrac{I}{(1+t)^2}\right) - C'' - U_b\left(\dfrac{p_{re}(TC_{first\text{-}actor}) * Re}{(1+t)^3}\right)$ " as **LSA2**

Indefinite Decision Assumption:
One indefinite actor and one contracting actor are a sufficient condition for the contract.

Note: This assumption is based on low negotiating transaction costs and the possibility of redistributing the surplus. In case of zero transaction costs it can easily be proven that:
$\forall\, k > 0 \; (K \in R) \; \exists\, z \in R$ that $k - z > 0$

Preposition 5:

If LFA > 0 & LSA1 > 0 than P(CC) = 1 (sufficient condition)
If LFA > 0 & LSA1 = 0 than P(CC) = 1 (sufficient condition)
If LFA > 0 & LSA2 > 0 than P(CC) = 1 (sufficient condition)
If LFA > 0 & LSA2 = 0 than P(CC) = 1 (sufficient condition)
If LFA < 0 & LSA1 > 0 than P(CC) = 0 (sufficient condition)
If LFA < 0 & LSA1 = 0 than P(CC) = 0 (sufficient condition)
If LFA < 0 & LSA1 < 0 than P(CC) = 0 (sufficient condition)

If LFA = 0 & LSA1 < 0 then P(CC) = 0 (necessary condition) if also LSA2 < 0
If LFA > 0 & LSA1 < 0 than P(CC) = 0 (necessary condition) if also LSA2 < 0
If LFA > 0 & LSA2 < 0 than P(CC) = 0 (necessary condition) if also LSA1 < 0
If LFA = 0 & LSA2 < 0 then P(CC) = 0 (necessary condition) if also LSA1 < 0

If LFA = 0 & LSA1 = 0 $\vee$ LSA2 = 0 then P(CC) has no solution for the values and conditions set.

Note: For the last mentioned possibility (two zeros) we can assume that the decision will be driven by non-economical influences.

The result of preposition 5 can be more comprehensively seen in the matrix
Matrix 1:

Matrix of possible outcomes of contracting - values of function of contract agreement

Second actor

		LSA1 ≤ 0 and LSA2 > 0	LSA1 > 0 and LSA2 ≤ 0	LSA1 = 0 and LSA2 ≤ 0	LSA1 < 0 and LSA2 = 0	LSA1 < 0 and LSA2 < 0
First actor	LFA > 0	1	1	1	1	0
	LFA < 0	0	0	0	0	0
	LFA = 0	1	1	0 or indifferent	0 or indifferent	0

Now we can have a look on a more probable (and practical) example:

5.1.3 Model of two actors with "one shot" contracting decision on competitive markets with success of the project and breach as asymmetric information

(One step into the asymmetric information theory):

Assumption of project success:
The failure of the investment, which is subject of the contract, is dependent on the external environment. This probability will be the term p_f (probability of the failure). It is clear that the probability of success $p_s = (1-p_f)$.

In the model below we will assume that the contract can fail for two reasons: First, the failure of the project (as an act of higher power), second because of the breach of the second actor. Important is that both actors actually do not know if the project is going to fail or not (which is not in contrast with nearly perfect information – the parties know the probability, but not the result). This means that the second actor chooses his action (cooperate/appropriate-breach) before he knows the results of the project (they are known in time T+1, his action takes place at time T).

The second actor, of course, knows the probability of breach and for him it is equal to 1 or 0, but as well as in the previous model, it is unknown to the first actor, what creates the asymmetry in information. In fact, the first actor just assumes this probability (reasons were stated above).

If the project fails, the actor will not get the usual income I, but a new different income I_f for $I_f \in R$ [95]. Logically we can deduct that $I_f < I$. This income will appear in time T+1, the same as for the usual income I.

Now let us have a look at the model from the view of the first actor:

Preposition:

$$\text{If } U\left(\frac{(1-p_b)*(1-p_f)*I}{1+t}\right) + U\left(\frac{(1-p_b)*p_f*I_f}{(1+t)}\right) - U\left(\frac{p_b*D}{(1+t)^2}\right) + U\left(\frac{p_b*p_{re}(TC)*Re}{(1+t)^3}\right) - TC - C > 0$$

---

[95] The author would like to remind that I_f could be negative.

then P(C) = 1

From the position of the second actor we can find out several different options. Those options are dependent on the settings of the contract.

Full income for breaching assumption: First let us assume that the second actor can get **full income** from the breach anyway, independently from the failure of the project that is subject of the contract.

Then the formula has this form:

Proposition:

$$\text{If } \ U\left(\frac{I}{1+t}\right) - C' > 0 \ \text{ or } U\left(\frac{I}{(1+t)^2}\right) - C'' - U\left(\frac{p_{re}(TC_{first\text{-}actor}) * Re}{(1+t)^3}\right) > 0$$

then P(C) = 1

It is clear that:

Elegant Preposition (in three parts):

$$\text{If } \ U\left(\frac{I}{1+t}\right) - C' \ < \ U\left(\frac{I}{(1+t)^2}\right) - C'' - U\left(\frac{p_{re}(TC_{first\text{-}actor}) * Re}{(1+t)^3}\right)$$

then the second actor breaches the contract.

$$\text{If } \ U\left(\frac{I}{1+t}\right) - C' \ = \ U\left(\frac{I}{(1+t)^2}\right) - C'' - U\left(\frac{p_{re}(TC_{first\text{-}actor}) * Re}{(1+t)^3}\right)$$

then the second actor is indifferent in his choices.

Those prepositions are valid *vice versa.*

This was the very simple example with a full gain from breaching. Now let us change the conditions.

Project success dependent income for breaching assumption: The second actor gets his *income* from the breach in dependence on the failure or the success of the project that is subject to the contract.

Then his decision-model looks like this:

If $U\left(\dfrac{(1-p_f)*I}{1+t}\right) + U\left(\dfrac{p_f*I_f}{(1+t)}\right) - C' > 0$ **or** $U\left(\dfrac{(1-p_f)*I_{bs}}{(1+t)^2}\right) + U\left(\dfrac{p_f*I_{bf}}{(1+t)^2}\right) - C'' - U\left(\dfrac{p_{re}(TC_{first-actor})*Re}{(1+t)^3}\right) > 0$

then

P(C) = 1

I_{bs} is the income that the second player gains in case of breach and success of the project that was subject to the contract.

I_{bf} is the income that the second player gains in case of breach and failure of the project that was subject to the contract.

We can label two parts of the equation of the second actor similar as before then the final matrix of choices corresponds to the matrix 1.

6 Analysis of the Model – Step into the Influential Factors

So far we have seen a simple and basic model for decision-making of actors under very abstract and therefore limited conditions. However impressive the model could be in its conceptual power, its contents measured by a practical usage converge to zero if we are not able to quantifydo notits variables. The next part should fulfil the promise made in the introduction and provide the reader with an extension of the model, as well as with the description, and even more important, with the analysis of the variables.

In other words, if you found the previous part just converging to an academic schizophrenia, this should improve your mood and provide you with something that might be useful in everyday life.

6.1 The Effect of Variables

Fist we will analyse the influence of the "hardcore" stuff. This means in particular:

Information asymmetry
Transaction costs
Time period of contract
Uncertainty
Sections of contracting
Changes of contract
The size of Remedy

6.1.1 Information asymmetry

The problem of asymmetric information was introduced in the model above. Information asymmetry together with transaction costs causes the efficiency of decision making to decline sharply. Why? The reason is simple. If supplied with different information, actors cannot evaluate the events properly and make incorrect acts. Efficient coordination starts to be problematic and as a result the raise the price.

In our case the asymmetric information created "deviant" behaviour of the second actor in many moments. The worst position was when he evaluated the possibility of success of the project wrongly and acted inefficiently or even destructively. For example he underestimated the probability of a success of the project and decided to breach. Such a solution usually leads to the most inefficient equilibrium. Another problem is when the parties do not go into the contract even though the contract would otherwise create a pure beneficial surplus. This can easily happen it the fist actor has wrong information about the utility function of the second actor; consequently he/she evaluates wrongly the probability of a breach and, as a result, does not enter the contract.

The mindful reader has recognized that the model above was working under nearly perfect information. The actors know the costs, revenues, incomes and remedies exactly and in time. If we change the conditions we get into an uncertainty with two problems: the approximate value instead of an exact (one dimensional), and wrong information. The first problem can be solved with the help of a law of big numbers and an assumption of a partial rationality of the

actor. But at least the first of these assumptions can be doubted. (For this moment we do not go into unlimited number of contracts).

The second problem creates an even worse tangle. It can easily be seen that, if the revenue (income in money) of the contract is seen by each side differently, they might choose strategies, which do not fit together.

Even with the problem of just one or two variables under information asymmetry the contract faces a conflict either from breaching or from wrong evaluating. With more asymmetry the inefficiency increases exponentially. Many contracts that would be realised under perfect information will be cast off because of the high risk and therefore due to rational expectation of insufficient revenues.

6.1.2   Sources of asymmetric information

The source of asymmetric information is a different "position" of the agent on the market that is not perfectly homogenous and transparent. The market is divided into hierarchical "channels" of the information transmission and processing. In reality, every actor faces different environment and thus a different access to information. Reasons for the growing importance of asymmetric information in modern societies are the explosion of information about the differentiated products, their quality and techniques for information camuflage. The *transaction costs* of their processing have been rising exponentially in the last 100 years. Not surprisingly, that is why the information and communication technologies became the symbol of the 21st century, and a primary source of economic growth and dominance.

6.1.3   Breaching as efficient contracting activity

The existence of asymmetric information can create interesting situation when breaching is beneficial for all the parties. This can be seen on the following figure, where are contracts introduced as an agency game.

Agency game with contract and variable cooperation costs.

		Second actor (agent)		
		Performing (costs 0)	Performing (costs 1.5)	Breach & pay damages
First actor (principal)	Invest (contract)	.5 / .5	-1.0 / .5	-.5 / .5
	Don't invest (no contract)	0 / 0	0 / 0	0 / 0

Source: Cooter R. & Ulen T.

6.1.4   Solutions to the problem

6.1.4.1   Signalling as solution for asymmetric information

When economic actors are uncertain, there exists a way to provide your potential partner with information about your position or your information. For example, expensive layers wear expensive suits, bank HQs have magnificent buildings. The signalling technique uses the so-called "position goods" investment [96]. An extravagant behaviour of the agent (see below in "remedy size") or even a membership in a prestigious organisation can be another signal, similarly as the signalling by a high price[97].

d) Illustration no. 4

Why not to buy a Porsche for 1000 dollars?

Imagine that you go as a tourist to Rio de Janeiro. During your sightseeing a man in an brand new Porsche stops by and offers you a bargain by selling instantly the car for 1000 dollars in cash (usual price is one hundred thousand); all keys and legal documents included. He even offers you to sign a pre-written contract. Will you agree? What kind of signal is his behaviour giving? Would you agree with the purchase even if the price would be different? Most probably not at all. This is an inverse of the position goods signalling indicating tacitly a low quality, fraud or other future troubles.

6.1.4.2   Signalling through sunk cost as a solution of asymmetric information

Accumulation of high sunk costs (or in other words amassing high fixed costs via investments) creates an important signal about the strategic behaviour of your partner, because it reveals his/her intentions about time preferences. Such investments show that the actor does not want (or simply is not able) to close her activity after the first round of the play. In such a case her investments are so huge that she gets into a lock-in and must remain in the long term business.

6.1.4.3   Signalling through reputation as a solution of asymmetric information

A good reputation in a very valuable good, because creates signals about actors utility function. Important fact is that this effect is valid *erga omnes* without any variable costs.

6.1.4.4   Statistical discrimination as solution of asymmetric information

Often no perfect information is available or is prohibitively costly. Companies in this situation (such as insurance providers) use technique that is described as a statistical discrimination. This suggests that a partner with certain classification (for example by age) gets different default condition. This is similar with a situation described below as "reflecting the risk in income rate "[98].

---

[96] For an introduction to the "position goods" theory see Frank
[97] The author is not a marketing specialist, but when it comes to certain category of goods, people nearly always think that more expensive means higher quality.
[98] For more theory about statistical discrimination see Stiglitz.

6.1.4.5 Statistical discrimination as solution of asymmetric information

Often no perfect information is available or is prohibitively costly. Companies in this situation (such as insurance providers) use technique that is described as a statistical discrimination. This suggests that a partner with certain classification (for example by age) gets different default condition. This is similar with a situation described below as "reflecting the risk in income rate "[99].

6.1.4.6 Information liability as solution of asymmetric information

Very many analytics would argue for the existence of information liability as part of the law. Is this a real solution? The graphs below will show this problem.

Efficiency of simple discriminating regulation of information disclosure

Level of
information
disclosure
= TC

Market level of information disclosure

Area where regulation has effect and is ineficient

Compulsory level of information disclosure

Area where regulation has no effect

Point of eficiency of the regulation

Size of the contract
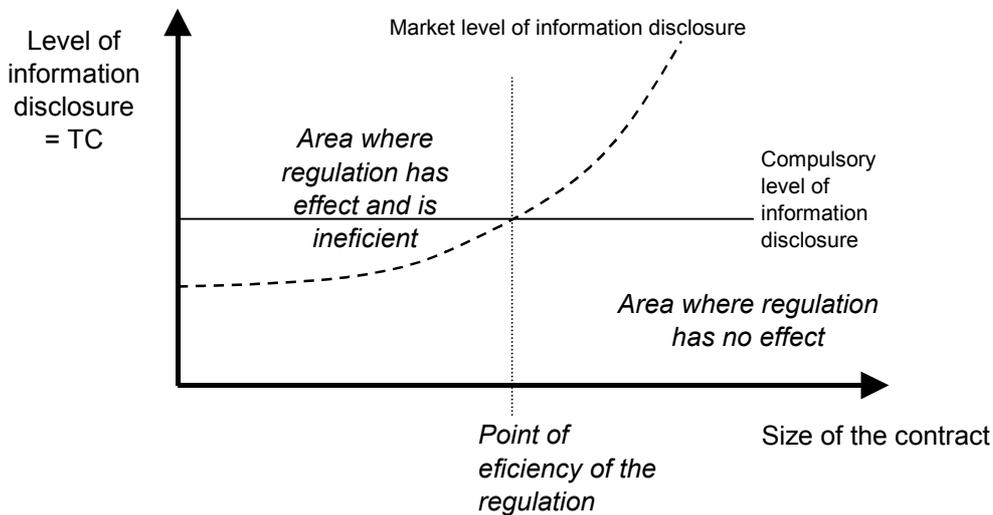
Efficiency of progressive regulation of information disclosure

Level of
information
disclosure
= TC

Ineficient level of regulation

Market level of information disclosure

Out-of-effect regulation

Size of the contract

---
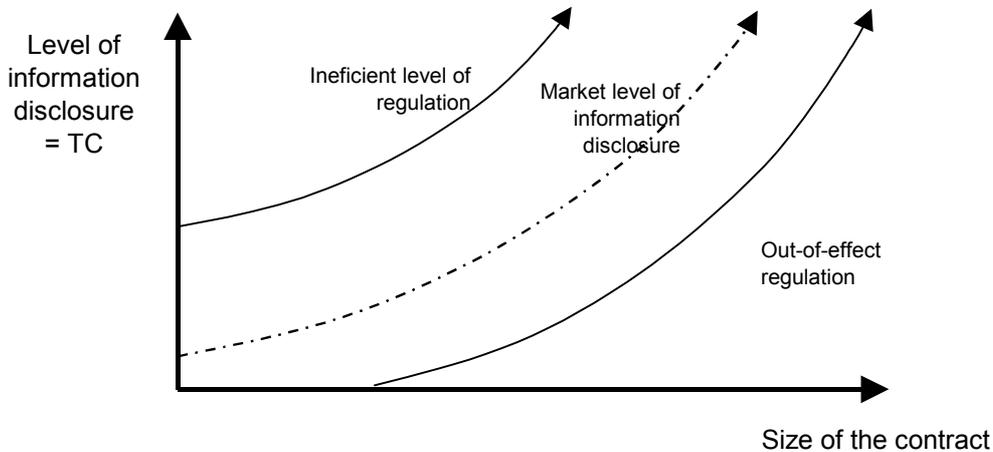
[99] For more theory about statistical discrimination see Stiglitz.

On the first figure is the compulsory level of information disclosure set as fixed and flat. Until the point of efficiency of regulation this leads to forced applying of those rules by actors on the market, but also to extensive and additional *transaction costs*. A the point of efficiency the rule corresponds to the demand of the market and therefore leads to efficient behaviour. After this point the actors disclose more information anyway and the regulation has no practical effect.

On the second figure is the level of information disclosure set as regressive (dynamic), continuous and dependent on the size of the contract. The figure brings two illustrative examples. The first is always under the market level and therefore has no effect. The second is always above the market level and has therefore effect on the forced behaviour of actors, but leads to extensive and inefficiently high *transaction costs*.

As we can see on the graphs, an invalid choice of rules can cause excessive *transaction cost*. This leads to a failure of contracting efficiency. If left over to the market powers under perfectly competitive markets, each actor will be "forced" to disclose all the necessary information. The information becomes free. If any actor has access to free information about the low production costs of a service that she wants to buy (that the second actor has to deliver) she will bargain with such information requesting a lower price. On the opposite, if the supplier is offering the service for a higher price, the contractor has to provide rational consumers with a true statement of reasons.

Those market mechanisms are only fully working only if providing of fake information is a criminal offence and subject of an adequate punishing action.

If this last condition is not fulfilled, a certain level of information liability can be beneficial as can be seen in many non-governmental corporate governance standards.

6.1.5   Transaction costs

Seen from the perspective of the perfect market decision-making, if the transaction costs are zero, an efficient decision is always reached, regardless of other factors. In fact, with zero transaction costs each actor can get perfect information about the market as well as about the partner (and consequently break the assumption of information asymmetry).

Unfortunately such a beautiful world with zero transaction costs does not exist and we have to deal with questions raised by their existence. Very often an intentional man-made existence.

Transaction costs are involved in contracts and can have many forms. First let us list the traditional categories:

- Costs of searching for the partner (getting informed about who is who)
- Bargaining costs
- Contract costs (for example legal costs)
- Monitoring and screening costs
- Enforcement costs
- Renegotiating costs (possible anytime)

6.1.6 Transaction cost as a source of incomplete contracts

Incomplete contracts are contracts in which not all conditions are specified[100]. Usually most contracts are in the incomplete form. They often operate with fuzzy legal terms like "suitable amount, acceptable period, and no significant obstacles, acting in coincidence…." Another possibility is that many contingencies are not described at all (for example the enforcement part of the contract is missing, place of delivery is missing….).

Here are the main reasons for incomplete contracts:

- Unforeseeable contingencies
- Too many contingencies to write them down
- Monitoring the contract might be costly
- Enforcing contracts involves legal costs

All those facts are reasons for extensive and often nearly unlimited *transaction costs* in case that the contracts should be complete.

An incomplete form of contract is efficient to use when the costs from a renegotiating event are lower than the *probability of the event* multiplied by the *transaction costs* connected with the event.

When seeing transaction costs and different periods of contracting, high *transaction cost* can lead to not best possible (or just undesirable) choice of partner. The sunk transaction cost can in certain situation lead to *path dependency* and rational staying with wrong or just not best partner. Such a situation is described in common saying: "*Better the devil you know.*"

6.1.7 Model contract as function of *transaction cost*

If we *ceteris paribus* fix all the other variables in the model, we can see the yes/no contract decision-making as dependent on the transaction costs. If income (which is constructed cumulatively and includes all the other factors) minus transaction costs is positive, the rational actor will try to realise the contract (Coase theorem). The Hobbes theorem (referring to Thomas Hobbes) describes the effect of transferring the transaction costs to the party that can bear them best (most efficiently).

This can easily be seen on the figure no. 10[101]:

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[100] This is a classical law scholar's definition. Economists often speak about complete contracts were all parties have set the condition for obtaining maximal possible benefit from the contract. This is actually very similar to what the author calls efficient contract.

[101] This figure is inspired by Cooter and Ulen (2000). However their analysis was applied to property rights, not to contracting.

A graphical representation of the normative Coase and Hobbes theorems
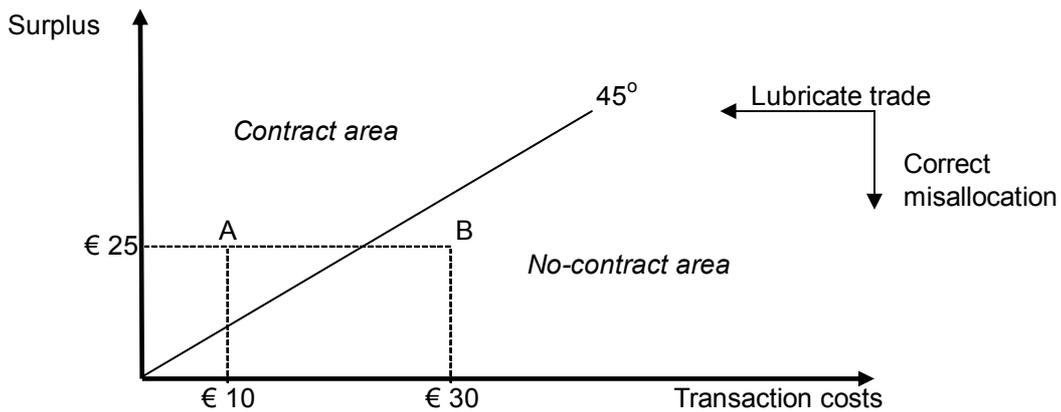
As we can see, low *transaction costs* are crucial for realising efficient contracts. This can be reached by the right choice of law instruments, especially in the business and property law. The right choice of legal instruments can work as "oil" which "lubricates" the conditions of contracts and makes them more efficient.

6.1.8   Some factors affecting Transaction Costs

Some factors affecting Transaction Costs can be seen in the following table:

LOWER TRANSACTION COSTS	HIGHER TRANSACTION COSTS
1. Standardized good or service	1. Unique good or service
2. Clear, simple rights	2. Uncertain, complex rights
3. Few parties	3. Many parties
4. Friendly parties	4. Hostile parties
5. Familiar parties	5. Unfamiliar parties
6. Reasonable behaviour	6. Unreasonable behaviour
7. Instantaneous exchange	7. Delayed exchange
8. No contingencies	8. Numerous contingencies
9. Low costs of monitoring	9. High costs of monitoring
10. Cheap punishments	10. Costly punishments

Source: *Cooter, R. and Ulen, T. (2000).*

6.1.8.1   e) Illustration no. 5

Not saving *transaction costs* as an alternative strategy. Can a man of honour be more successful than a homo economicus?

Let us assume that you can become the target of small-scale theft (for example someone wants to steal your wallet). Your loss in case of a theft is 20 Euros. Your costs for punishment easily exceed this and are worth 50 Euros (for example going to the police, assisting investigation, court costs in case of a thief's capture, plus other time costs). Being a homo economicus your rational decision is not to report the theft and to save money. Being a man of honour you will do as much as possible to catch the thief (even spending your own money and efforts in private investigations). The effect that follows is apparent: you will not become the

target of a thief (she will rather choose the homo economicus). Provided it is known you are like that.

But how do you become a recognised man of honour? The answer is given by the theory of asymmetric information. There should be your **signals**, which show that you are a man of honour. But the investment into signals must be costly enough to be clearly evident and credible, for example it should be more then proportional to the value of gains. Therefore just merely pretending to be a man of honour is not an economical strategy (for example to be known as man of honour you have to spends a vast amount of money to catch a small-scale thief).

Seen from the economic point of view, being a man of honour can also possibly be a successful strategy. But it is not cost free.

6.1.9 Time Period of Contracting

Our model was operating for the whole time with one general assumption. That was a *non-repeated game* we called in the text as *"one shot"*. However inspiring and descriptive that model is, it lacks one important aspect. It operates just "once", which means that when the contract is finished for whatever reason, the actors "go home" and will not see each other anymore.

In opposite in real life, we often contract with similar people again and again. If fact our behaviour is often aimed to contract a similar person as last time or our contract has several rounds (is repeating).

What are the impacts of such conditions? We can answer using the principal-agent theory and see contracting as an agency game. Behaving rationally, actors will change their strategies according to the cumulative benefits of the contract.

Payoffs to second player (agent) when first player (principal) plays tit-for-tat.

		Round							
		n - 1	n	n+1	n+2	n+3	n+4	n+5	n+6
Strategy of the 2nd player	**Strategy**								
	appropriate	…	1	0	0	1	0	0	…
	cooperative	…	.5	.5	.5	.5	.5	.5	…
	one-shot	…	1	x	x	x	x	x	x

The sum of the profits from the contract is always equal to 1

Description of the figure: Tit-for-tat is a type of trigger strategy usually applied to the repeated Prisoner's Dilemma in which a player responds in one period with the same action her opponent used in the last period. Here the principal punished the agent by cutting her of the income up to the benefit agent get by appropriating (two rounds). . In other words, the agent is be punished not by penalty, but by the impossibility to participate in the next round and obtain income. This should lead rational and long-term orientated agent to the choice of cooperative behaviour even without the event of possible remedy.

These findings will rapidly change the conditions for our contract. In repeated games breaching will become a losing strategy to the perpetrator and contracts will be evaluated at low risk. This will lead to an increase in concluded contracts and therefore to a huge boost of efficiency.

There are three general problems that are connected with this hypothesis. The first is the transparency of information about previous breeching of the actor (which we can see as low *transaction cost* to obtain information), certainty is second and endgame problem is the last one. Let us look on each to them.

Transparency of information about breaching: The table above assumes that the breaching (appropriating) agent will by doing so lose the chance to participate in other round. In other words, he will be punished not by penalty, but by the impossibility to participate in the next round and obtain income.

6.1.9.1

f) Illustration no. 6

Wild East - Prague Taxi Drivers

During the early 90's, Prague taxi drivers became "famous" for their special "customer" strategy. The strategy was: Wait for rich and uninformed tourists, provide them with a round trip instead of a straight ride and overcharge the shocked tourist by few hundred or thousand percent. To obtain the information about the price or the distance was very costly for the tourists, and what was the crucial condition - the taxi driver had no worry of loosing this customer for the future business! Even if every tourist used a taxi just once, there were still new uninformed tourists coming. The exchange of information between tourists is difficult and most tourists visit Prague just once during the taxi drivers "job-life period". Therefore the market mechanism failed in controlling the system. Can you find out why this "successful" middle term strategy is not working in a very long term?[ix]

Certainty: Generally cooperating strategies are successful[102] if there exist certain level of certainty[103]. This doesn't only mean a certainty of success of a contract, but also a general level of certainty in the society. For example, during the civil war or hyperinflation many transactors prefer immediate small benefit instead of bigger long-lasting ones. It is a bit drastic to realize the outcome of the Modigliani's life-cycle hypothesis that most elderly will not be interested in investing into a big contract whose benefits will come in one or two decades.

Endgame problem: It is interesting, funny looking, but a cruel observation about the repeated strategies. Imagine that your long-lasted successful cooperation with your partner is coming to the last and final round. Because of no possibility of punishment (no future contract), your rational best strategy is to appropriate and rip-off your partner. But because this is a *common*

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[102] Game Theorist would probably prefer the formulation "dominant".
[103] More about tournaments of strategies at www.gametheory.net.

knowledge[104], the other actor will consequently not enter into the last round of the contract. Consequently, this will motivate you to appropriate in the round before the last. But so far this is a common knowledge…. The practical impact of an endgame problem can lead to a mounting non-cooperation and a rising risk of a contract failure.

6.1.10 Sections of Contracting

Our model was based on an assumption about paying and performing (paying back). Firstly, the first actor paid and then he became a hostage of the second actor, being left to his will. But the settings can be different. For example, I pay partially, you perform, I pay the rest. Their impact is to decrease the level of uncertainty (that means a risk of breaching in our model), what makes the breaching for the second actor less beneficial. That means it decreases the income that the second player may obtain after breaching in our model.

6.1.11 Changes of Contract

The changes in contract during the review period are possible and they affect the certainty level in our model. We generally distinguish two types:

- Foreseeable changes

- Unforeseeable changes.

Foreseeable changes are those changes in the contract that are predictable at least by one of the parties. According to the Law&Economics theory, for alleviating the efficiency of contracts, the burden of such changes should be carried mainly by the party that had better chances to foresee (predict) them[105].

The parties can protect themselves against foreseeable changes by *complete contracts*. *Complete contracts* stipulate the obligations of each party in case of any event. Reader should realise that any complete (or close to complete) contract involves significant *transaction costs*. Therefore the behaviour of an actor can be also seen as maximizing the function of utility, which depends on the cost rate of *complete contract*. We can also see the rate of *complete contracts* as variable dependent on the *transaction costs* (this is reverse of the view stated in above in transaction cost part).

In contrast to the previous, unforeseeable changes cannot bee predicted and expected, and the probability rate of expecting any event is close to zero. This speaks *pro bono* of incomplete contracts, where there is space for negotiating and bargaining. Most actors prefer incomplete contracts especially because of the "manoeuvring space". Following the previous logic, the burden of unforeseeable changes should be carried by that party, which can most efficiently deal with it. Such an approach, together with dividing the surplus fulfils the efficiency requirements.

Note: The figure *Agency game with contract and variable cooperation cost* in chapter 5.3.3 of this thesis can provide the reader with the effect of breeching the contract as efficient solution

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[104] "*Common knowledge*" is a technical term of the game theory.
[105] Cooter, R. and Ulen, T.: Law & Economics. 3rd ed., Addison Wesley Longman, 2000

Also Posner R. A.: The Economical Analysis of Law. Boston, Toronto, London, 1992

in case of changes of contract. The reason for having the figure in that section and not here is the asymmetric information as a primary factor that caused such a situation.

6.1.12 The Size of Remedy:

Now we come to one of the crucial factors in this analysis. So far the factors required for the contract guidance have been set exogenously by the nature or by the market. Plus by the actors themselves, which is in fact also a decision making mediated by markets. But there are also the courts and their mechanism of correctness in setting the size of the remedy. Assuming that the factors mediated by markets perform on the edge of maximal possible efficiency, then the size and the probability of the remedy becomes crucial for the decision-making model.
If the remedy size is not adequate or it is generated at random, several events can happen:

- The fist actor will not enter the contract, feeling that his investment (value at risk) is not secured.

- Nor the second actor will dare entering the contract, feeling that in case of unforeseeable changes or foreseeable changes, the adjustment to which would cost a lot of money (high potential transaction costs), he might face high financial obligations.

- There are other inefficient eventualities, for example, the fist actor will create fake *signals* about the possibility to escalate the requirements of the contract and the contract revenues, so the second actor will be "trapped" in a choice between impossible (or too expensive) performance and a high remedy obligation. Such a remedy conditions create an environment for natural *adverse selection.* Action of this type (providing false information) can be qualified as a fraud and the set of legal rules (or practices) that not only tolerate, but also in fact encourage such a behaviour are purely inefficient. According to Olson, this is the difference causing that some societies (nations) are rich and some poor.[106]

6.2 The Effect of Environment

This part should provide the reader with understanding the main "soft" influences behind the "hardcore" variables and show that often they are the same, just less specific.

The author will describe all the environmental influences not independently, but just like the factors influencing the variables and settings of the model. The fact that to include most of the "soft" influences into the" hardcore" stuff is possible shows the real power of the model.

When talking about the real life contracts, we usually don't speak about the asymmetric information or transaction costs. Every day speech includes many more "soft" terms. From most of the actors the model is reach not by calculating, but intuitively.

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[106] Olson M., The Logic of Collective Action. Cambridge, Harvard Univ. Press, 1965.
Also Olson M., The Rise and Decline of Nations. Yale Univ. Press, New Haven, 1982
Also Olson M., Power and Prosperity. Outgrowing Communist and Capitalist Dictatorships. Basic Books, New
     York, 2000.

However such an intuitive, or even instinctive behaviour can be analysed by our simple model. First we have to define the set of such intuitive terms that are used in everyday contracting reality. The author will list the first ones to increase the clarity for the reader and discuss their effect later on. The main ones are those:

- ✓ ECONOMIC GROWTH
- ✓ STABILITY OF ECONOMICS
- ✓ PERSONAL PREFERENCES OF RISK
- ✓ PERSONAL PREFERENCES OF TIME
- ✓ RELIABILITY OF THE PARTNERS
- ✓ UNCERTAINTY OF THE AREA
- ✓ INFORMATIONAL TRANSPARENCY
- ✓ QUALITY OF LEGAL (WRITTEN) CONTRACTS
- ✓ QUALITY OF FORMAL LEGAL SYSTEM (LAW IN BOOKS)
- ✓ QUALITY OF LEGAL SYSTEM (INCLUDING PROSECUTION, POLICE, COURTS)
- ✓ LAW ENFORCEMENT (AFTER THE ADJUDICATION)
- ✓ CORRUPTION TOLERANCE
- ✓ CLIENTELISM
- ✓ ETHICS IN BUSINESS

As you can see, we exclude the Revenues, Incomes and Costs, these indicators are exactly known (in fact seen as numbers) and often even objective of Financial Management and Analysis or different Cost Benefit Analysis. Therefore they are not object of this analysis.

Now we shall describe each category and show with which the "hardcore" variable is connected.

Economic grow describes the long-term economic development in the economy of on partial sector of the economy. Economic grow has impact on economic expectations and therefore time preferences of the actors.

Stability of economics describes the fluctuations in economic growth. Therefore it has a similar impact as economic growth. It also influences the risk of contract.

Personal preferences of risk describe the inclination of actors for different risk sharing. They have direct impact on decision making as described in the model above. In fact there are more "hardcore" variables then soft ones. The reason for their presence in this part is the "soft" natural attitude that denies easy measuring and aggregation and especially intersubjectivity of this value.

Personal preferences of time describe the inclination of actors for different time-sharing. Otherwise they share the same stance and attitude as personal preferences of risk.[107]

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[107] The author would like to state that even such a preferences are personal there exist huge pressure of other factors. One of the main and very long-term ones can be e.g. national of social group culture. E.g. Japanese business is more long term orientated, in Africa most people will prefer immediate consumption. This means that each culture can bee see as different function of utility, time preferences and risk preferences.

Reliability of the partners influences the risk of breaching. Seeing breaching dependent on (as function of) *transaction costs*, reliability also influences this factor.

Informational transparency is in fact another word for *low information costs* and hence low *transaction costs*.

Quality of legal contract means the quality of securing the contract. This mostly means the costs for legal or other services and their quality. There are several impacts: Easily seen are transaction cost (layers are not cheap), another value is the probability of obtaining remedy. We know from the model, that the second actor's decision about breeching is dependent on this probability, so the probability of breaching is highly influenced as well. The last dependent variable is the sum, which the second actor obtains after breeching.

The Quality of the formal legal system (law in books) has prior impact on the probability of obtaining remedy; inferior direct effect is on the breeching probability (e.g. law makes the second actor easily observable). There is again an indirect effect on the breeching probability. The reason is similar as for the quality of legal contracts.

Quality of legal system including prosecution, police, courts and others affects the probability of obtaining remedy, therefore also the breeching probability.

Law enforcement after the adjudication is not included in the previous group for formal reasons – it is often provided by private companies, not by governmental bodies. The effect is similar.

Corruption tolerance is about the level of corruption in a society. It manipulates the probability of getting remedy and as a result the probability of breach. The Reader knows of cause that for this reason the transaction costs are influenced as well.

Clientelism is a softer, but not a less dangerous type of corruption. The actors use old-boys networks, services and position goods instead of money or other high-liquid goods[108]. The impact is the same as corruption.

Ethics in business is more or less about the absence of the last two mentioned trends in economy. Ethical actors will provide performance even if not bound by enforceable law. Consequently the effect is reverse to the effect of corruption and Clientelism.

We can see that there is a significant inter-correlation in most of those elements. All of those facts are under pressure of an indefinite number of other factors. On the other hand most of them can be cumulatively seen as one "business culture". None of those possible approaches is aim and goal of this thesis and the author leaves them for further research and analysis.

6.3   Other Influences on Efficient Contracting

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[108] The fact that clientelism in not of less importance than simple corruption is peak up by a lobbist, who during the meeting with the author said: „Money always have less liquidity than information".

Now we have been bargaining like civilised people for 30 minutes. Now you don't have 30 minutes, but just 30 seconds for your signature, otherwise your brain will be on the contract.

Mario Puzzo,
Godfather

This part should give a view into the hidden part of contracting. Not all real influences were included in the model. According to limited resources the author will just describe each factor and leave deeper analysis to the legal scholars. In addition this topic is well covered in the Law & Economics literature.

Unfortunately there are several other reasons for non-efficient contracting than the ones mentioned above. Some are "products" of main contracting problems like transaction costs and information asymmetry some are "products" of human cruelty and uncivilised violence. Of cause we talk about crime.

There are several main criminal acts in contracting:

- DURESS
- NECESSITY
- FRAUD
- DUTY TO DISCLOSE
- CARTEL[109]

6.3.1.1 Duress

Is originally seen as a threat of violence. It is an act where one party is under certain conditions forced to agree with contract in a form that would not be accepted without such a condition. Nice example from Mario Puzzo is on the beginning of the chapter. By a modest extension of meaning, duress can also be used to describe the use of threat of non-performance to induce a modification of contract terms. The effect of duress on the contract is the loss of legal validity. No court will find contracts made under the threat of death binding. Practically the greatest problem when dealing with duress will be the lack of evidence. Dealing with criminals brings fear greater then economists are able to calculate.

6.3.1.2 Necessity

Is a criminal act derived from duress. The common definition refers to a situation where someone else than the promisee imposes a dire constraint on the promisor. This may be e.g. a natural disaster or a third party. Classical example by Posner is a situation where one person gets lost in a snowstorm and the other offers to rescue her if she gets all her money[110]. Naturally such a contract is not binding. On the other hand the court might find certain parts valid. [111]

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[109] Exceptionally from all the other crimes, cartel is not concerned as criminal action in all the countries with the rule of law (e.g. in Switzerland). Also the differences in definitions in different countries are wider in case of cartel then in the other criminal activities stated above. Authors definition correspond most with the definition used by European Union (The Renewed Version of Treaty Establishing the European Union, 2003).

[110] Posner R. A., The Economical Analysis of Law, Boston Toronto London, 1992.

[111] The necessity situation is very similar to Monopoly. For further analysis see e.g. Johnston, J., S., Strategic Bargaining and the Economic Theory of Contract Default Rules, Yale, 2000.

6.3.1.3 Fraud

In case of fraud one actor fakes or stretches the truth and provides such information to the other party with the intention to obtain benefit from such behaviour. Consequently such a contract is not binding and enforceable and the criminal actor has to face a duty to pay potential damages.

6.3.1.4 Duty to disclose

Law often requires informed people to disclose safety information to uninformed people. In cases that are relevant for this thesis it means not to inform the other party about all constrains and problems relevant for the project. We can see parallels with duress and necessity. Such a contract can be binding, but a court might order the not disclosing party to pay eventual damages.

6.3.1.5 Cartel

Is undertaking behaviour leading to limits of free competition or free markets in order to obtain benefit form such behaviour. Cartel limits the free will of actors and their bargaining power. Agreement forming cartels are not binding and enforceable and actors have to pay concluding damages[x].

The first thing we do – let's kill all the lawyers.

William Shakespeare
Henry VI, Part II, Act IV, Scene ii

7   The Mechanism of Securing the Contract

This part should complete the exploring commitment of this study and provide the reader with knowledge about the main "tools" that are used to increase the security and therefore efficiency of contracts.

In real business there are many techniques used for avoiding the risk. Of course, they are costly and in the model above they can be seen as production costs or transaction costs (with high impact on the probability of breech), but an analysis of their efficiency is not required in this part of the thesis.

We can divide those tools into three big groups according to the time period (often overlapping):
1) The securing tools applied before the contract is accomplished.
2) Tools applied during or in progress of the contract fulfilment.
3) Tools applied during or in progress of the contract enforcement (in case of breach).

The first group refers to the following securing mechanisms:
- Test of the partner
- Audit of the partner
- Low limit on transactions
- Reflecting the risk in income rate
- High quality legal contracts (this includes high penalty fee)
- Whistle Blowers
- Exchange of hostages
- Risk sharing

The second group refers to:
- Sequential performance
- Secret agent
- Whistle Blowers
- Information liability and openness
- Mutual dependency
- Exchange of hostages
- Risk sharing

Finally, there are the following mechanisms in the third group:
- Guarantor
- Collective liability and solidarity
- Distrainment
- Gage (guarantee)
- Debt exactors
- Public dishonour

7.1.1.1 Test of the partner[112]

Refers to activities that aim to obtain more information about the partner: to get better knowledge about his capabilities, modesty and paying capacity. This knowledge is used to bring more exact values about success of the project, probability of breach (this includes e.g. partner's ability to pay necessary costs) and his capability to pay eventual remedy.

To some extent even an action, such as obtaining a strategic partner, can be seen as a "test". Significant "passing test" is e.g. the membership in professional institutions/bodies.

7.1.1.2 Audit of the partner

It is a similar activity as above, with the difference of agreement and informing of the other party. In the "audit" the partner is aware of the activities and he/she agrees. This is not a necessary condition in the "test of the partner".

7.1.1.3 Low limit on transactions

It is often used if the parties are not sure about the type of strategy, which the other partner uses (one-shot vs. long term). It is a usual procedure in case of first contract with a new partner.

7.1.1.4 Reflecting the risk

Income rating is a standard procedure used by banks. If you don't trust the partner, you increase the level of required income to his detriment. This works in case of many contracts, but unfortunately can lead to adverse selection problem[xi].

7.1.1.5 High quality legal contracts

These are the most common and "natural" ways of hedging for security and a necessary condition for many other securing mechanisms. Acceptance of such remedy can signal a commitment to take the contract (and performance) very seriously, but it can also lead to adverse selection, as shown in the previous example.

7.1.1.6 Whistle Blowers

By means of this warning mechanism we can obtain important information about the partner. It can be seen as part of obtaining general information. Very often the whistle blowers, as a sort of liaison officers, are officially exchanged and promised access to information.

7.1.1.7 Exchange of hostages

Hostage is something (or someone) that is given to the other party to prevent your breach. Hostage should have minimal value for the receiving party and maximal value for provider. Thus the provider is prevented from breaching, while the receiving party is little incentive to retain it. This consequently means that money or other high-liquidity assets are generally not suited to be used as hostages. This is in difference to the standards of a collateral.

7.1.1.8 Risk sharing

This happens by nominating a person who shares potential benefits and looses of the contract. E.g. it can be a loan shark introduced in the Illustration above.

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[112] The name is not perfect. This also means obtaining more information through classical information sources.

7.1.1.9 Sequential performance

It is a powerful tool to reduce the risk of breaching. Basically both parties do not perform at once, but divide performance into several steps. E.g. I pay, you perform, I pay, and you perform. This reduces the risk of breaching massively by decreasing the amount of money at risk that the second actor will obtain in the case of breach. The second actor has also to invest his money (or effort) to the project and create *sunk costs of investments*. E.g. the European Commission uses co-financing as an instrument of hedging in cohesion funds.

7.1.1.10 Secret agent

Brings information from the "heart" of the other party. The difference is similar as "test" and "audit". The presence of "agent" should not be known to the other party. His/her services are often on the edge of legality.

7.1.1.11 Information liability and openness

Information disclosure gives you access to monitoring the other parties' behaviour and performance. This is an often-used mechanism.

7.1.1.12 Mutual dependency

This is a frequently used technique where one party gets dependent on the other one. Sometimes it is called an exposure to holdup. E.g. Ford Motors has several contractors that supply them with very specific components. Ford is completely dependent on those components. There is no incentive for more producers to enter the market. The suppliers act as a monopoly. As a solution, the contractor is forced to use machinery that belongs to Ford.
In case of breach Ford can take back those machines and find a new partner very fast. Second, the breaching company will go to bankruptcy as its exclusive bargaining position is terminated due to the breach.

7.1.1.13 Guarantor

Guarantor is a person[113], who guarantees fully or partly the behaviour and performance of the other party or guarantees to pay damages in case of a breach. Often it can be a bank or a government institution.

7.1.1.14 Collective liability and solidarity

Is used in case that more "bodies" of other party are involved. This means that all involved pay remedy "jointly and severally". This law term means that the creditor can claim for damages by turning at any of the liable bodies involved. Subsequently this body has the right to claim obligations in full extent from other breaching actors. E.g. if three actors have obligations to pay you 9000 EURO you have the right to claim this amount from any single one of them (or even all of them, but then stop claiming after you get paid form the first one). The one who pays you the whole amount has subsequently the right to claim 3000 € from each of the other ones. A similar rule (right to claim the amount above its duty) applies if he has paid an amount above his duty, but is still not unbound from the obligation to you valued in the rest of the remedy.

7.1.1.15 Gage (guarantee)

It is a good that is given to the other or the third party as remedy to prevent a breach. The difference between the gage and the "exchange of hostages" is that gage is usually given just

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[113] That means a person, a corporate body or a legal entity.

by one party and has high liquidity. Also the main purpose is to show ability to pay remedy and increase the probability of obtaining remedy.

7.1.1.16 Debt exactors

They are providing services in the enforcement of payments. They increase your chance to obtain remedy. Often they work as buyers of debts and use their comparative advantage (know-how, size, backup) in the enforcement of law.

7.1.1.17 Public dishonour

This remedy is working in economic contacts with long-term contracting focus. A person who gets dishonoured is "excommunicated" from the business society and therefore suffers losses in the long term. Working the other way *ex post*, many subjects will rather pay a huge remedy then face dishonour campaign. The conditions for efficiency of this mechanism include a high level of ethic awareness, information transparency (and an ease to obtain and to diffuse such information), long-term contracting strategy of actors and not a very short consumption term preferences[114] [xii].

7.2 <u>General rules about securing contracts</u>

The first general rule that aggravates the efficacy in securing the contracts is the decreasing marginal efficiency (utility) of those mechanisms. E.g. it is possible to hire ten distrainers instead of one, but the services of each additional distrainer become less efficient in doing the job.

Other general rule is the discrete value of most of those mechanisms, e.g. it is hard to hire 1,5 distrainers. However, we can see it as a contiguous function if the services of distrainers are defined in money terms. Then it is possible to hire a distrainer for 1000 as well as 1500 Euros.

In addition, the "real" efficiency of each mechanism is mostly known *ex post* only. There is no reason to use the service of the "secret agent" if the partner is perfectly honest. This can be neglected if we operate with rational actors and a number of contracts, which is big enough. However, in real life actors are only partially rational and operate on various risk tolerance levels (see the comments in previous chapter on the models and their assumptions).

It is an important fact that the allocation of risk in investment contracting in often one sided and unstable in time. Generally the risk is on the side of the promisee. According to the risk aversion, the utility functions of the actors must not intersect [115]. In another words, under such risk conditions the malevolent actors will not get the business. In this moment the role of securing is crucial for the business because it can rapidly increase the cumulated expected benefit of the parties.

This moment is cardinal for the arguments of the proponents of pure *laissez faire* approach. Many investment contracts are so unique (or, in the language of institutional economics, they have high extent of *specificity*) that are actually a pure example of our one-shot contract. This, together with the asymmetric information, burdens the efficiency in allocating the risk to the best risk bearer with a significant transaction cost. The negotiation of risk allocation is too

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[114] E.g. if one actor knows well in advance that he/she is going to die. Then the "dishonour" will not work even if all the other conditions are fully fulfilled.
[115] Another type risk preferences might often lead to moral hazard.

unique and uncertain. This feature creates essential argument for governmental regulation, which in such a case increases the surplus of social benefit.

In the real life contracts are split to several sequential steps, which is consistent with our discussion above. In the usual contract: I pay advance-you perform-I-pay the rest[116], or similar is the allocation of risk on the side (actor) whose partner faces the endgame problem (choice or breach and exit). In such a case the securing follows the sequences of contract with the stress on the possible endgame exits.

As always, any secure mechanism is efficient to apply if the benefits exceed the costs.

Illustration no. 7
Diamonds are forever

During 90's in Czechia has happened interesting example of securing through the gage mechanism. A group of Russian businessmen asked IPB – one of the big Czech banks for a loan and offered seemingly valuable diamonds as a gage.
Unfortunately they never paid the loan back and the diamonds stored in the bank's vault were identified as a value-less glass and small diamond debris. The expert's affidavit was acknowledged a fake.
This means that even if a liable partner offers an additional securing, the other party should still spend certain amount of money as transaction cost to make sure that those mechanisms (e.g. gages) are correct. The amount of money spent on such a "securing of securing" are subject to the mechanisms described above.
Another and even more important conclusion that can be derived from this illustration is that even the most efficient contracting and securing mechanism might fail in the short term if some of the events mentioned in part 4.5 appear. (In this case the bank faced the fraud.) There is even higher probability of a failure of those mechanisms in the long-run; but if we apply the famous Keynes' (1936) saying: "In the long-run we are all dead", the argument for the existence of a strong and functional government surveillance and enforcement is unquestionable.

The previous axiom of securing efficiency is actually valid only if the person has a linear function of risk aversion. As in this chapter we discuss more practical aspects, we will stick to the most common utility function of risk averse persons and risk neutral utility function will be assigned to most companies (see Shavell, 2004). In such a case even an "inefficient" securing mechanism can be applied efficiently if the person is "risk averse". This can be seen on the following graph:

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[116] Shortly pay-perform-pay contract
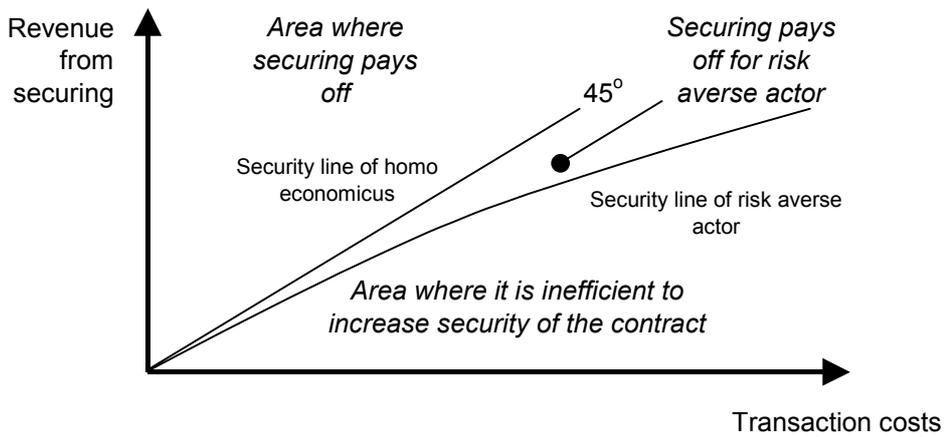
How we get the process described on the above graph might be more analytically seen on the following "graph slide show."

Money spent on securing the contract
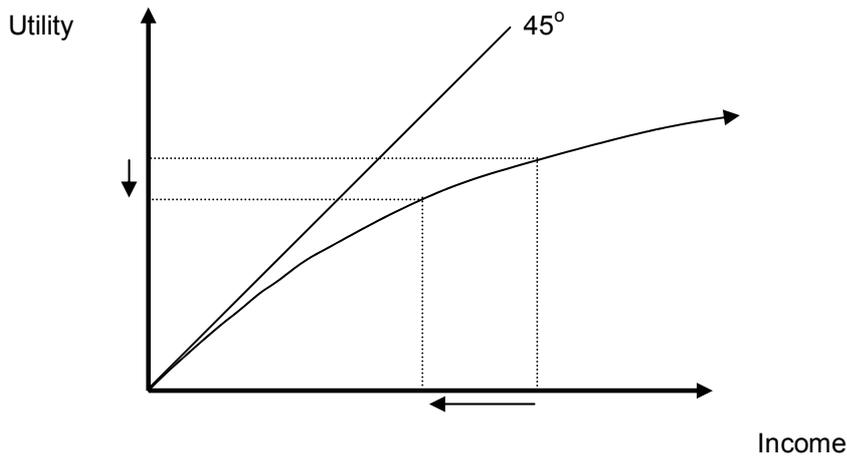
Our risk averse actor has spent one unit of money on securing (as shown on the first graph). This caused a decline of his utility because of decrease of income (money).

Effect of securing

On the second graph we see the impact of the securing expenditure on the level of risk which has dropped.

Impact of drop of level of risk on utility

Finally we see the impact of a risk decrease on the utility. In this particular case of risk averse actor there is a rise in utility caused by lower risk that is higher t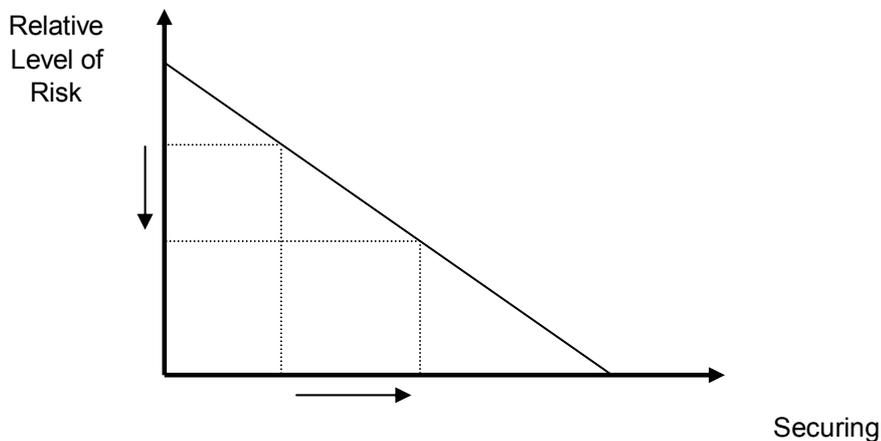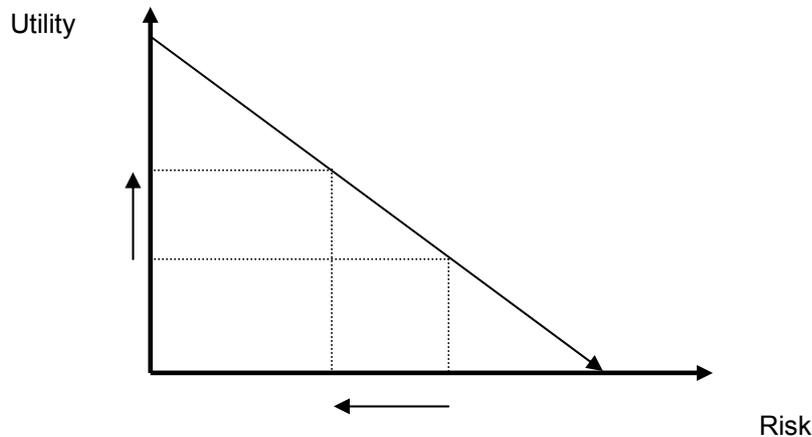han the decline in utility caused by spending money on securing. In other worlds, the actor has moved to higher indifference curve with lower income and lower risk.

As so, we might form our theorem:
Any rational risk averse actor will agree with sacrificing one unit of income (let's say one Euro) in order to decrease the level of risk, whenever the final effect on his utility function is positive.

Let's put this into equations:
U (R, I) is function of the arguments (Risk and Income). It is increasing in I and decreasing in R.
$R \in (0,1)$
$I \in (0,\infty)$ - we do not count with negative income.

As stated above, if an actor spends one unit of income of the total sum I_k, then the risk will decrease by about certain value n_k , where $k \in N$.
Now we will apply the utility function:
If: $U(R,I) < U(R- n_k, I_k -1)$
than, from the point of view of this risk averse actor, the securing payoff.

More formally holds:

IF: $\left|\dfrac{\partial U}{\partial R}\right| \succ \left|\dfrac{\partial U}{\partial I}\right|$ **than securing payoff**

This powerful model brings us closer to another important topic.

7.2.1   The sharing of risk among risk-neutral and risk-averse actors
(the Loan Shark is back in the game)

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Let us assume that we have two actors, the risk averse investor and the risk neutral Loan Shark. There exists a function of securing C(M,), where M is for money, which shows how much any subject has to pay in order to decrease the risk; the U(R, I) is a function of risk averse actor (RA) and U45^0 utility function of Loan Shark. According to the shape of C, the RA will always secure himself until it pays off and the function C is above 45^0 (one Euro spent on securing earns higher expected income). We will label this point S (rational securing pay-off point), where R is the amount of money secured. But according to his utility function RA will be securing until $\left|\dfrac{\partial U}{\partial R}\right| \succ \left|\dfrac{\partial U}{\partial I}\right|$. This might be proceeding (according to the shape of the curves), until reaching point E (equilibrium point). Like it or not, the most efficient way how to secure is tp transfer the risk to the risk averse Loan Shark (she will pay the expected income and keep the outcome of the business, be it nothing or a pile of gold). The surplus of such operation is equal to $\left|\displaystyle\int_S^E U(R, I)\right| - \left|\displaystyle\int_S^E C(M)\right|$.

We might modify the model by making it more complicated by changing the shapes of C and U function, adding a different C function for the Loan Shark (which is closer to the reality) and adding transaction costs, but the main idea is clear: the lawgiver should allow and encourage the transfers of risk by setting institutional environment, which will cut down transaction costs and create incentives for such a behavior.

7.2.1.1   What make the Loan Shark risk neutral?

It is not only about personal preferences, but as suggested above about the number of transactions. Its the diversity of her contract portfolio, which together with law of large number shapes her preferences to risk neutral. Consequently actors with one contract only are „rationally" risk avers

8 Interviews

It is the aim of this chapter to test our theoretical hypotheses by empirical observations.

All the interviews were made in June 2005, the comparison is done with seven interviews that were made in my previous research paper in June 2004[117].

Tomas Richter is partner in respected international law firm Noerr Stiefenhoefer Lutz in Prague. He is also a teacher of corporate law at the Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague. His professional interests include mergers and acquisitions, corporate governance and bankruptcy law.

Vera Sobolikova is the finance deputy director in one of the divisions of Skanska, the biggest Czech building company. She is the main person responsible for dealing with the vast number of subcontractors in unique highly specific contracts[118]. She is a former finance director of Skanska.

David Hofman works for the government as the advisor to the vice-prime minister for the economy. His main responsibility is the long term strategy of development of Czech economy, including the institutional framework.

Alex Krizek the purchasing manager for Middle and East Europe for Kimberly Clark company. His main responsibility is dealing with subcontractors in long term contracts under both standardized and specific conditions.

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[117] For more information see Benacek O.: Efficiency of Contracts; Theoretical Approach in Law and Economics, Umea, 2004.

[118] Many of these are closely related to our one-shot contracts.

„The only statistics you can trust are those you falsified yourself."

Winston Churchill

9   Test of the Theory and Its Outcome

Generally speaking, the assumptions and the conclusions of our tested theories are not in conflict vis-a-vis the empirical evidence.

In the first part of the interview survey the respondents were asked for indicating the main influential factor in the efficiency of contracts (respondents were provided with the definitions) and for the impact (importance) of those factors. The importance of costs and revenues analysis was assumed *a priory* and accepted by all respondents without any comment.

All respondents agreed with the enlisted main influential factors stated in section 6. The ones mentioned most often were asymmetric information, corruption, (non-)performance of law in practice and transaction costs. The ones that the respondents classified as most influential were again asymmetric information, corruption, clientelism, (non-)performance of law in practice, preferences of immediate benefit (utility) and transaction costs.
All those factors mentioned above were found either insufficiently developed in the present Czech environment (as to the positive events) or too large and harmful (in case of negative events, e.g. the asymmetric information).

Compared with the situation during the early stages of transformation, all those factors did improve, even though not sufficiently enough. There were two exceptions – law in books and law in practice. There were two main trends connected with the law in books. Firstly, the **accrual of quantity dissociated with quality**. And this is the reason for **increase in transaction costs** connected with the use of law. As it comes to the law in practice, all the respondents agreed on the increase in the quality of work of financial police[119] and prosecution. Agreed as well on the stagnation and the poor development of the **courts of justice**.
What concerns the present most positively evaluated factors, there were mentioned the reliability of partners in long-term contractual agreements and the stability in the economic area.

All the respondents showed understanding for correlations between certain events, e.g. between the **informational intransparency and the asymmetry of information**. Most of them instinctively divided the events into self-influencing parts, which was a statement consistent with the findings in the theory.

The second part of the interview focused on the securing of contracts. The respondents had mentioned most of the mechanisms given by the theory and accepted the existence of the other ones if asked. The most efficient tools were identified to be in the risk-sharer test of the partner, the high quality of legal contracts, distrainment and guarantee.

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[119] In the case of financial police there was a common comment in a way: ”They were so bad in the past that any change seemed to be a great improvement.”

The institute of risk-sharer was revealed to be crucial when it comes to large and unique contracts. Thus all large companies hedge themselves against such negative outcomes. This perfectly fits to our one-shot contract theory.

The biggest change in the safeguards mechanisms used during the transformation period was found to be in guarantees, gages and distrainment [120]. Even the improvements in criminal prosecution were not reflected with such a accent. As it was said during one of the interviews: "Czechia is not a Wild East any more." The legal institutions of guarantees became better interlinked with the new approach to bank governance and the gage system with a huge decline in the credit or default risks of the partners.

Another big shift was connected with the rise of professional services providing information collection. This also caused a great decline in the asymmetry of information.

Also the time and risk preferences were found different from the transformation period. "The market is cleared by disposing off the gold miners and another moral hazard actors."

Similarly, there was a change in reflecting the risk in the income volatility and payment defaults. As seen from the corporate point of view: the marginal rates are more or less the same and do not differ case by case as it was during the past: "We rather invest into collection of information about the partner or ask for credit guarantee. In this way we are more professional."

Another change is in the links between the new law and the business practice connected with the institutions of bankruptcy and distrainment. Their instruments improved in efficiency, even though respondents had doubts about the ethical dimension of these particular instruments: "It's fine to have the opportunity of a enforced debt collection, but I would not stand by the treatment of their victims. The confiscators often operate on the edge of the law and far behind the common ethics." Another mentioned fact was in the use of distrainment as a credible threat in business bargaining.

Last but not least the author would like to mention the consistence found between the theory in part 6.1.12 (redundant remedy leading to moral hazard and adverse selection) and the practical experiences: "Once we went into competition for a huge and lucrative lump-sum contract. There were two strange things: the size of the gage and the penalty, and a completely pre-written contract with no choice of modification. We had rather quit that business, but one of our smaller competitors did not. As we were suspicious about, it was a rent-seeking trap."

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[120] It might be useful to remind that the previous research of the author (Benáček, 2004), based on a larger list of respondents, the conclusions were nearly in complete accord with the present findings. There the respondents identified gage and distrainment the worst-performing mechanisms in the early stages of transition.

'The fact that one door closes means that another one has opened.'

Spanish saying

10 Conclusions

Looking back at the research proposal statement, the aim of this study was to design a model of investment contracting, to analyse the model's properties and to explore the relevant mechanisms for securing efficient contracts. In this penultimate chapter we will present the outcome and conclusions of this thesis.

If we compare the objectives of this study specified in the guidelines of research proposal with the final achievements, we see that this study gives answers to all of the intended tasks. The author has to admit the he was surprised not only by the extent of the theory finally produced, but also by the degree how it covered coherently the research area. The model approach was really a helpful instrument.

As formulated in the research objectives, the main parts of this thesis were supposed to be "descriptive about human behaviour and/or their decision making; thus neither prescriptive nor normative". The method used is consistent with such criteria and it represents a descriptive system helpful also for deriving policy recommendations.

Now let us look at the first two formulated questions –
Q_1: "**Does a general equilibrium model for investment contracting decisions exist?**" and
$Q_{1,1}$: "**If yes, how does it look like?**"
Our answer, reflecting and respecting all the important limitations, is clear, proved and significant. The statement that a general equilibrium model for investment contracting exists can be accepted. This particular model includes decision-making of two actors under a wide variety of conditions, which might have seemed rather simplified and too abstract at the beginning. Later we have extended the model.

It is more complicated to answer the second hypothesis. During his research the author started to build a model under perfect economic conditions with basic economic criteria of human behaviour – each actor behaving in the way that, she thinks, would maximize her benefits. The mentioned conditions were **incomes (revenues) and costs**, weighted by their probability and time discounting. Under those variables the basic decision making model has this particular form:

$$\text{If } \frac{p_i * I}{1+r} - \frac{D*(1-p_i)}{(1+r)^2} - C > 0 \text{ then P(C)} = 1$$

Further on we added the condition of a **remedy**, which brings this very economic thought more into the field of law and reality. After this addition the model becomes:

$$\text{If } \frac{p_i * I}{1+r} - \frac{D*(1-p_i)}{(1+r)^2} + \frac{(1-p_i)*p_{re}*Re}{(1+r)^3} - C > 0 \text{ then P(C)} = 1$$

As a second major step, we moved from the field of perfect competition to other conditions, closer to everyday reality. Our new conditions reflect partly the behaviour of rational actors and conditions on imperfectly competing markets. This leads to important changes concerning the **information asymmetry,** the addition of **transaction costs**, and an ==??? exchange nebo spíš change ???== in the **utility function** of actors, as well as in the actors' **time and risk preferences**. Further on, we have identified the crucial role of **transaction costs** as the crucial factor for securing the contract and therefore for obtaining the remedy. In this situation our model has changed into this form:

$$\textbf{If } U\left(\frac{p_i * I}{1+t}\right) - U\left(\frac{D*(1-p_i)}{(1+t)^2}\right) + U\left(\frac{(1-p_i)*p_{re}(TC)*Re}{(1+t)^3}\right) - TC - C > 0 \textbf{ then } P(C) = 1$$

then P(C) = 1

As one of the final steps in this part of the analysis, we added the condition of **risk of the project**. We then derived the second actor's decision-making model under certain assumptions. This final conclusion brought us to following system of final equilibrium equations:

$$\textbf{If } U\left(\frac{(1-p_b)*(1-p_f)*I}{1+t}\right) + U\left(\frac{(1-p_b)*p_f*I_f}{(1+t)}\right) - U\left(\frac{p_b*D}{(1+t)^2}\right) + U\left(\frac{p_b*p_{re}(TC)*Re}{(1+t)^3}\right) - TC - C > 0$$

and as for the second actor

$$\textbf{If } U\left(\frac{(1-p_f)*I}{1+t}\right) + U\left(\frac{p_f*I_f}{(1+t)}\right) - C' > 0 \textbf{ or}$$

$$U\left(\frac{(1-p_f)*I_{bs}}{(1+t)^2}\right) + U\left(\frac{p_f*I_{bf}}{(1+t)^2}\right) - C'' - U\left(\frac{p_{re}(TC_{first\text{-}actor})*Re}{(1+t)^3}\right) > 0$$

then   P(CC) = 1

These puzzling equations transformed into intuitive verbal language say approximately the following message: If the first actor after counting the risks and costs according to her personal preferences represented by her utility function, knows the **risk of appropriation** of the second actor, as well as her possible chances to obtain a **remedy**, she finds out that the expected income (revenue) exceeds the expected costs:

And

The second actor, after considering the risks and the costs of the project (according to her personal preferences represented by her utility function), assesses the associate risks with the her **breech event**. Once that is quantified, she is able to estimate whether the expected income (revenue) exceeds the expected costs either in case of her **cooperating** or, alternatively, in case of her **own breaching**.

Only then the contract, based on the free will of both participating parties, can be concluded.

The answer to the third hypothesis $Q_{1,2}$: **"How does this model change in different contract term conditions and environmental influences, under the ceteris paribus condition?"** was given at the end of each stage expanding the original model. The reader could clearly see the conditions limiting the rational decisions of the actors. All the additional conditions that were not included (or were included but not explicitly mentioned) during the modelling will be discussed later. The analysis discusses the impact of those conditions on the efficiency, and evaluates their impact on the behaviour of agents under different circumstances.

The most important factors that were analysed:

- Asymmetric information
- Transaction costs
- Time period of contracting

The very general conclusion is that any step **lowering** the asymmetric information and transaction costs, together with long-term contracting, **increases the efficiency of investment contracts**.
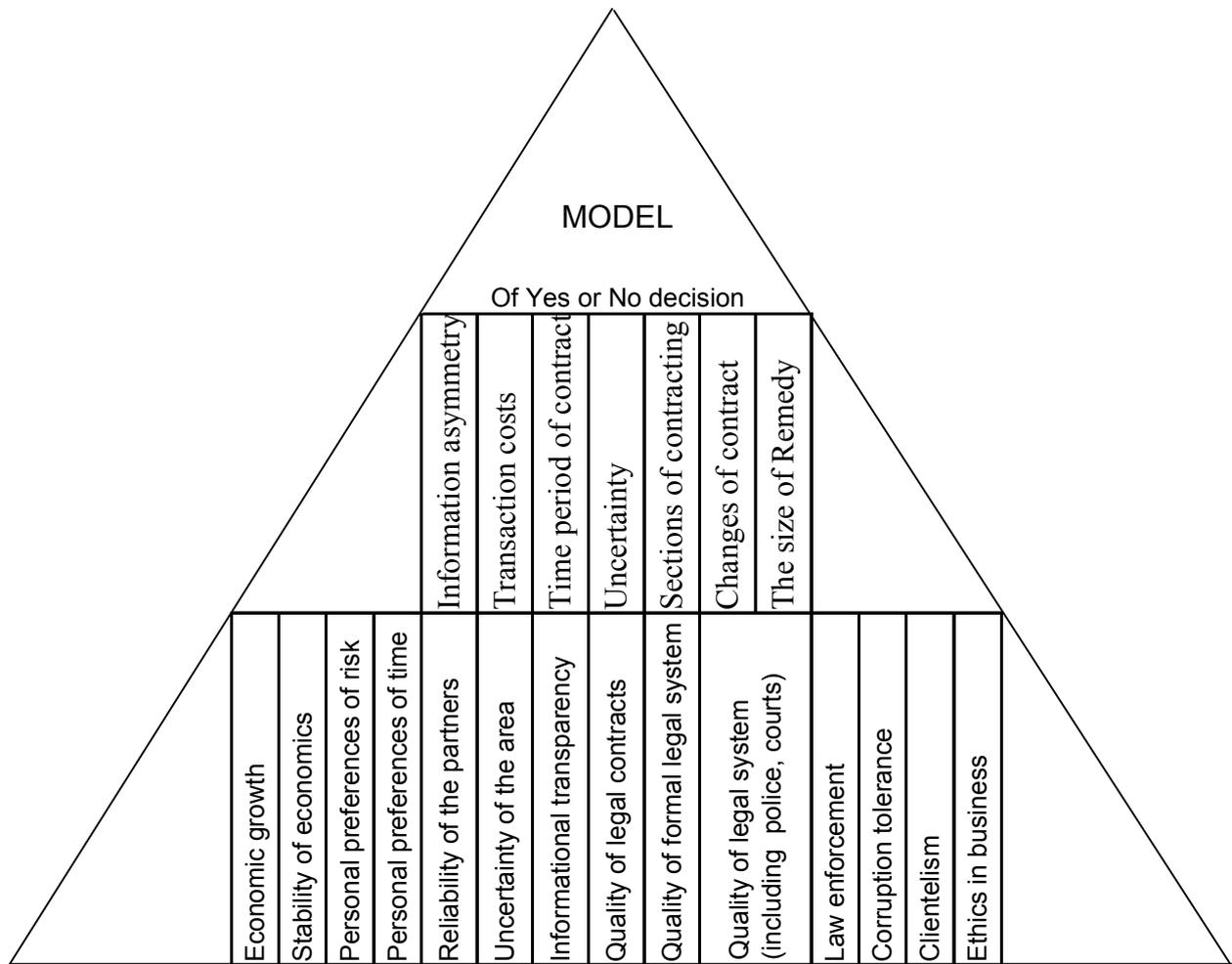
Other less important, but still not neglected, factors were:

- Uncertainty
- Sections (options) of contracting
- Changes of contract
- The size of remedy

Concerning the size of remedy, the optimal size refers to the Pareto-optimum of both parties, and, if it is chosen incorrectly, it leads to an **adverse selection bias.** The occurrence of such tendencies was proved by our empirical survey. After estimating the probability of transaction costs and risks of breach, the respective sections of the contract should be re-specified and upgraded accordingly. The conclusions about mentioned four factors are more ambiguous. According to the model, a high level of certainty together with a stable environment should bring higher contract efficiency.

Secondly, and as stated in the research guidelines more perfunctorily, our analysis dealt with so called "soft" influential factors. All such factors were identified as component parts of the "hardcore" factors. The effect of those variables was dependent on interpretation and extension of the hypotheses.

The contents of the verbal model itself (if we mean here its extension discussed in chapter 6.3) retained its intuitively outlined properties without changes, even though the particular mathematical formulae have shed a new information about their interdependences. Once it was known how the soft factors had direct effects on the hardcore settings, the efficiency of decision-making was heavily influenced. All the impacts of the different factors of efficiency were analysed and discussed in parts 6.3, 6.4 and 6.5. The model and the "basement" conditions are depicted on the following graph no. 2.:

MODEL

Of Yes or No decision

Top row (inner): Information asymmetry · Transaction costs · Time period of contract · Uncertainty · Sections of contracting · Changes of contract · The size of Remedy

Bottom row (outer): Economic growth · Stability of economics · Personal preferences of risk · Personal preferences of time · Reliability of the partners · Uncertainty of the area · Informational transparency · Quality of legal contracts · Quality of formal legal system · Quality of legal system (including police, courts) · Law enforcement · Corruption tolerance · Clientelism · Ethics in business

Graph showing the structure of our expanded model

Criminal activities are the only exception from the rules mentioned above. They jeopardize the performance by exercising heavy and exterminatory impacts on the efficiency of contracts.

The last new theory-exploring hypothesis Q_2 was: "**What are the mechanisms of "securing" the contracts and how should they be efficiently applied?**" It was answered briefly and descriptively, as mentioned in the above, by developing three groups of safeguards according to the period of applying. We have discussed their efficiency in accordance to different "hardcore" factors mentioned before.

Additionally, the author created a new model of securing according to the different utility functions of the actors. As analysed above, the final choice of securing depends on the

following terms: IF: $\left|\dfrac{\partial U}{\partial R}\right| \succ \left|\dfrac{\partial U}{\partial I}\right|$ than securing pays off.

Another interesting model was developed concerning the risk sharing. Briefly stated, the **cooperation in risk sharing** between risk averse and risk neutral actors might lead to a **surplus**, which depends of the utility function of the risk averse actor. The real existence of such outcome was supported in one interview, where it was confirmed that risk-sharing on

huge building projects is a common practice in this country. As a final outcome, we have a good reason why not to lynch all the investment bankers. The complementarity of risks may lead to a collusion.

The very last hypothesis H_3: **"Is the real situation in Czechia consistent with the theory mentioned above, particularly in $Q_{1,2}$ and Q_2? How did the present situation change compared with the transformation period?"** – was answered by assessing the data collected in surveys /interviews/ and the comparison of new answers with conclusions of the previous research.

According to interviews, the model (theory) matches the real observations, which means that the behaviour in reality agreed to the described effects of the variables in the model. The non-existence of significant conflicts between them can be to a certain extent interpreted as a proof of the author's new theory.

And what is the overall conclusion if we finally look back at the research purpose statement? We can see that this Bachelor Thesis explored some of the hidden determinants of contracting, it designed models under certain conditions, discussed the impacts of contract settings, and compared the model outcomes with the Czech reality. According to the tests, this theory is not in conflict with empirical findings.

The reader can learn about issues, which might be useful in his or her professional carrier or just in everyday life. Furthermore he could gain knowledge about factors, which are not commonly discussed by politicians as policy issues and which have been grossly neglected in the past investment contracting. The message of this study is that some institutions of the legal and judicial system are of crucial importance. Especially the safeguard clauses in contracts are essential for the healthy economic development and, actually, for the well-being of every single one of us.

11 Recommendations for further research

Considering the economics of contracts as a green field, the number of topics for further research is extensive. Therefore the recommended topics are very broad. They can be generally divided into few groups:

Mathematical modelling in the game theory:
The research in this field considers technical mathematical modelling of decision-making models under *a priori* set conditions (variables) and their behaviour under such or changed conditions. The author has developed an interesting model of contracting under the conditions of perfect monopoly (not discussed here) and is willing to cooperate on such a research.

Law & Economics analysis of the variables:
This area covers the legal impacts of the assumed economic conditions and offers the law-giver an instrument for testing the alternative options or for inding more efficient solutions under other the (non-economic) constraints. Especially interesting, and not very well explored in the literature, is the effect of the remedy on the contract.

Analysis of efficiency impacts of the government regulations:
This is actually a dual task of the previous research. It is about the economic impacts of legal regulations on acts such as freedom of contracts, information liability, duty to disclose, conditions for remedy, and many others.

Quantitative value-based research – weighting the variables in the models:
This refers to a data-searching procedure. The goal of such a future research should be to obtain the weight of variables in a *priori* set model and create the sensitivity analysis of the model.

Qualitative and Quantitative value-based research – weighting the "soft" influences in the hardcore variables:
This is very similar to the last procedure. In this case the goal of the research is to obtain the weight of soft factor attributes in chosen hardcore variables.

Developing the theory and software for computer-designed contracts instead of using standard non-parametric forms of contracts:
This is very new topic, which is also driven by commercial requirements, especially in insurance companies. Such a research is used to design software that would set contract conditions and rules that would be designed parametrically according to the actors' attributes and expectations. The parameters must be estimated from the empirical data.

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Questionnaire

According to the fact that all the respondents are Czech native speakers the questionnaire is written in Czech. If you want to discuss the questionnaire please contact the author on ondrejben@hotmail.com.

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[i] Author would like to state that Micro-economic Analysis is constituted by generally approbated models of bi- of multi- lateral negotiations, the result of which is presented as partial or comprehensive equilibrium (Triska D. and Hlavacek J., Metodologie Ekonomickych Ved, Karolinum, 1999). Economics is a theory of human behaviour and exchanges under the condition of alternative choices, which concern equilibrium of relationships (e.g. contracts) with other parties of the exchanges.

[ii] Author would like to thank all the mentioned persons.

[iii] www.scirius.com

[iv] www.economicsbulletin.com

[v] www.findlaw.com

[vi] papers.ssrn.com

[vii] The Author would like to thank to Ivo Koubek, for his enthusiasm in initiating the author into Microeconomics.

[viii] They can be more correctly called Net Revenues or Revenues', but Incomes seems to be less confusing to the reader.

[ix] Taxi drivers become so infamous, that even not only Lonely Planet mentioned them in their Baedekers. Consequently most tourists stopped using taxis in Prague. Finally the local municipality put taxi drivers under heavy control and even the drivers themselves pressed for a regulation.

[x] Interesting "to the date" case on Cartel is Cesky Mobil vs. Eurotel and T-Mobile. Cesky Mobil sues his competitor in telecommunication services for damages (1,6 billions CZK = about 52 millions EURO) that they caused by undertaking practice. Eurotel and T-Mobil were recently founded guilty and fort to pay to the Czech communication office (governmental body) as to the representant of consumers. The case is a good example on different expectation damages and fees and is still running.

[xi] During the transformation period in Czech the risk of breech was very high. This led banks to have very high interest rates, which were difficult to "carry on". Consequently only companies that planed to breach asked to obtain a loan.

Reader might find interesting, that this lead to standard *moral hazard problem*, when the bankers, trying to hide their own mistake (and escape the problems of bank stability regulations) were giving even more loans to those companies to get paid previous loans (or at least interest rates) and therefore reclassify those loans as low risk.

[xii] Very nice example is Ronald Lauder vs. Vladimir Zelezny (CNTS vs. CET21), also CNTS (Ronal Lauder vs. Czech Republic). Vladimir Zelezny worked as an agent for principal Mr. Lauder as CEO of broadcasting company in Czech. When Mr. Zelezny breached contract with Mr. Lauder, more less stole the company and Lauder's investments, Mr. Lauder sued not only Mr. Zelezny, but also the Czech Government (on the basis of international treaty for protection of investment). Mr. Lauder not only started campaigning to discredit Mr. Zelezny, but also during the visit of the Czech prime minister to the USA (business visit having the purpose of helping Czech businessmen to gain contact with and create contracts with American partners) paid for massive billboards advertising that "The Czech Republic is not a good place for investment!". More information at www.cetv-net.com/arbitration.asp