

Bargaining Power: Significance, Structure and Development

Vyjednávací síla: Význam, struktura a vývoj

JAN ČERVENKA

Abstract

In game theory, the bargaining problem is defined as an exchange of utilities between negotiators. Assumptions used in game theoretical solutions are often partially or fully not applicable in real situations. The outcome of the bargaining also depends on the parameter called bargaining power. This parameter, although usually neglected or perceived only as static, determines to a large extent on which negotiator will succeed with his idea of the distribution of utilities. Paper focuses on the identification of the elements of bargaining power, the possibilities of their exploration and development. Bargaining power is described as a combination of facts and abilities that can be variable during bargaining. The paper analyses these facts and abilities, divides them into individual parts and suggests, how to influence them both immediately and in the long run.

Keywords

game theory, bargaining problem, bargaining solution, bargaining power

JEL Codes

C70, C71, C79

Abstrakt

V teorii her je vyjednávací problém definován jako výměna užiteků mezi vyjednávacími. V řešeních nabízených teorií her nacházíme celou řadu předpokladů, které aplikaci těchto řešení v reálných situacích zcela nebo částečně neumožňují. Výsledek vyjednávání závisí také na parametru nazvaném vyjednávací síla. Tento parametr, ač obvykle opomíjený nebo vnímaný jen jako statický, v podstatné míře rozhoduje o tom, kdo z vyjednávacích prosadí svoji představu o rozdělení užiteků. Identifikaci elementů vyjednávací síly, možnostem jejich zkoumání a rozvoje se věnuje tento příspěvek. Vyjednávací síla je popsána jako kombinace faktů a schopností, která může být proměnlivá v průběhu vyjednávání. Příspěvek analyzuje tyto fakta a schopnosti, rozčleňuje je na jednotlivé části a navrhuje, jakým způsobem je ovlivnit jak okamžitě, tak v dlouhodobém horizontu.

Klíčová slova

teorie her, vyjednávací problém, vyjednávací řešení, vyjednávací síla

Introduction

Bargaining is a complex activity that can be analysed from many different angles and disciplines. The outcome of the bargaining depends on the mutual interaction of two or more subjects with their own will and usually different ideas about the outcome of the bargaining. The result of bargaining cannot be easily deduced and depends on both the starting point, the negotiator's ability and the bargaining process. The game theory system, which deals with the analysis of conflict situations and the search for appropriate strategies, is therefore a suitable tool for analysing the bargaining situation. In terms of a complex theory, it is possible to analyse the bargaining situations and, according to the chosen conditions, to identify the appropriate strategies and the optimal solution.

The combination of bargaining and game theory has been evident since the beginning of this field of study. Virtually all conflict situations require some form of bargaining. Formally, within the game theory, this issue was defined by J. Nash in his paper "The Bargaining Problem" (1950). Bargaining is understood as a way of distributing utility among bargaining parties. There is a set of all possible bargaining results (S) within which the problem is sought. Bargaining begins at the point of disagreement d , on which players are able to agree without bargaining. If there is still space for utility increase, there is bargaining on its division. To find a solution, it is necessary to determine the criteria to meet this solution. One of these criteria introduced by Nash is an axiom of symmetry, which can be interpreted as equality of bargaining power. Kalai (1977) then generalized this solution also for cases of inequality of bargaining power, but it is still based on the assumption of their known proportions.

There are a number of definitions of bargaining power – according to the Merriam-Webster Encyclopedia, bargaining power is defined as: "the relative capacity of each of the parties to a negotiation or dispute to compel or secure agreement on its own terms"¹.

Most authors in the field of game theory focus primarily on the mathematical side of the problem and therefore simplify and formalize the problem in order for it to be processed mathematically and to allow the creation of a model of the bargaining situation. This, however, undermines the importance of bargaining power as a significant and often decisive influence. The reason is that bargaining power is a combination of given and variable factors that together create a dynamic power complex. Determining the distribution of bargaining power or some bargaining power value is virtually impossible due to the complexity and mutual interaction of individual factors. We can get a certain idea only in retrospect, based on the results of concrete bargaining, or simply by selecting a factor that is known and that can be expected to have a major influence on the bargaining, such as market share, capital resources, etc.

The actual bargaining is, in reality, a dynamic process where the position of the parties can change substantially during the bargaining. Compared to model situations, the parties do not have perfect information, they may evaluate known facts differently and the way they use them depends not only on their skills and knowledge, but also on motivation,

¹ <https://www.merriam-webster.com/dictionary/bargaining%20power>

opinions, emotions and determination. It is therefore somewhat meaningless from this perspective to talk about the mathematical solution to the bargaining problem. For a successful bargaining it is all the more important to understand the meaning of the term “bargaining power” and how it can be influenced both for oneself and for other parties.

The paper aims to identify the factors that make up the bargaining power, their description and the proposal of methods to influence them in favour of the bargaining party. It is based on the expectation that, based on this analysis, it will be possible to propose recommendations for the development of bargaining power over the long term as well as immediately during the bargaining.

1 Literature review

In the literature, bargaining power is interpreted in various ways and rather marginally in many publications.

In the article that defined the bargaining problem, its conditions, and solutions corresponding to these conditions, John Nash assumes equality of bargaining power as one of the conditions for its solution (Nash, 1950, p. 159).

In their book “Theory of Games and Economic Behavior”, which is the basic literature for the study of game theory, the authors take into account the different bargaining powers, see for example (Neumann a Morgenstern, 2007, p. 18242). However, they treat the differences in bargaining power as a task parameter, rather than a specific subject of investigation, and as such they do not further specify bargaining power. The authors of the generalized Nash solution approach the distribution of bargaining power similarly (Harsanyi a Selten, 1972), taking into account the asymmetry in the bargaining.

In the paper General Theory of Bargaining (Pen, 1952, p. 27), the author promisingly states: “What are the factors that determine the results of the bargain? The answer to this question should not be a bare summing up of these factors, but the interplay between the factors and the way they influence the final result should also be made clear. The factors should be systematized in a scheme of reference that can serve as a tool in analyzing concrete bargaining processes.” Unfortunately, the author continues by focusing on constructing a form of profitable function of parties based on the risk taken by bargaining parties. On each factor, the author states the following: “The determining factors of the ophelimity² functions may be very complicated.” Despite that, there are at least three factors following from the author’s considerations that affect negotiation, namely the date by which the bargaining must be concluded, the elasticity of demand and the possibility of substitution.

The bargaining power related to the price of disagreement is developed further also by other authors. In their book Collective Bargaining, Chamberlain and Kuhn (1965, p. 170) define the bargaining power of trade unions as “management’s willingness to agree to the

2 Usefulness – <https://en.oxforddictionaries.com/definition/ophelimity>

union's terms" and, according to the authors, "management's willingness in turn depends upon the cost of disagreeing with the union terms, relative to the cost of agreeing to them." Svejnar (1986) extends the idea even further, stating: "the bargaining outcome in our model can be described for each party in terms of its disagreement utility, bargaining power, and fear of disagreement" His concept of bargaining power, however, also does not analyse its individual aspects and does not address the possibilities of direct influence.

A number of other works on bargaining theory are virtually ignorant of bargaining power, such as (Stevens, 1958), which deals in particular with the subjective interpretation of facts by the bargaining parties and the impact of this subjectivity on the bargaining.

In other sources, which even have the term "bargaining power" in the title, such as (Roson a Hubert, 2015), or (Sarkar, 2013), this power is only taken as a given attribute used for further calculations and is not further studied. It is also the case of Dlouhý and Fiala (2015), and, to a large extent, also in "Bargaining in dynamic markets" (Manea, 2017), which deals with another interesting aspect of bargaining power, namely its evolution over time, based on the results of previous bargaining. Assuming different bargaining results, the bargaining power distribution may change in the following rounds of bargaining!

Lecraw (1984) is more specific. As a source of bargaining power of international corporations compared to local firms, he shows the possibility of cost optimization in international structures, ownership of better technology, sufficient capital for investment and lower cost of capital, existing distribution channels abroad, and usually also management experience in leadership and investment. Another view in terms of the need to provide trade credit is provided by Fabbri and Klapper (2016). In their paper "Bargaining power and trade credit", they derive bargaining power of suppliers versus customers from the relative share of the customer in the supplier's turnover, information advantage, the quality of the product supported by guarantees and certificates.

Perhaps the most detailed discussion of bargaining power can be found in Spaniel (2014, p. 7). In the chapter "What Is Bargaining Power?" he lists its five sources: "(1) control over proposals, (2) patience, (3) the attractiveness of alternatives should bargaining break down, (4) knowledge of the opposition's preferences, and (5) the credibility of one's threats and promises." Even this division, however, does not affect all aspects of the bargaining power, and thus it does not allow it to be monitored and managed.

The problem of the difference in research in social and natural sciences is comprehensively discussed for example by (Ochrana, 2013). Hayek (1995, p. 28) has also dedicated a whole book, which argues in detail the differences between facts in the natural and social sciences: "Most of what social or human activity focuses on are not really 'objective facts' in that special, narrower sense of the word, in which this term is used in science, as opposed to 'opinion', and cannot be defined at all in physical terms. In terms of human activity, things are what the acting person thinks they are." The fact that the assessment and perception of reality of people is not perfect, and is usually distorted, is described by behavioral economics, for example (Kahneman, 2012).

2 Bargaining in game theory and alternative approaches

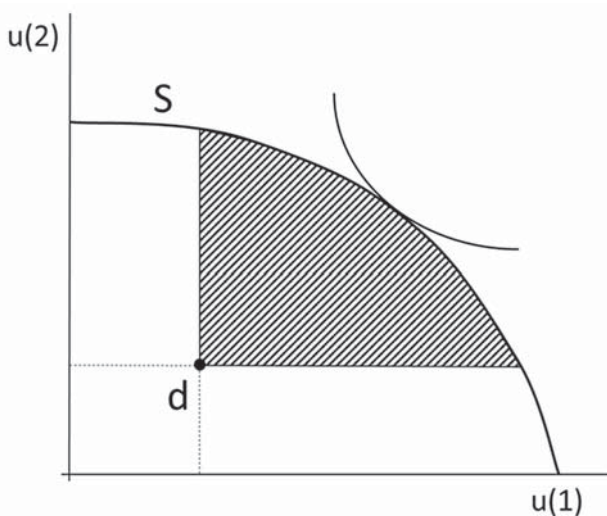
Bargaining is a complex activity present in human life in many different forms from birth to death. According to J. F. Nash (1950), bargaining is a way of exchanging utility, and from this point of view, a great deal of interpersonal interaction is a type of bargaining. There are different ways of exploring it, emphasizing various aspects of the bargaining process. The representative ones include:

2.1 Game Theory and Bargaining Problem

In game theory, which deals with the relations of independent parties with the possibility of independent decision-making and with own actions that affect other parties, bargaining is mainly the focus of the so-called “cooperative game theory”. It examines how parties can achieve additional utility, income or another advantage by mutual cooperation, and how they can then divide this additional utility.

The basis for cooperative games can be found in John F. Nash’s article “The Bargaining Problem” (1950). Here, Nash defines the bargaining problem a set S of all possible distributions of additional utility that can be gained through mutual cooperation. It also determines the point of disagreement d , from which the actual bargaining takes place – it comes from a point where there is disagreement with the way utility is distributed, or it can be placed at a zero point.

Figure 1: Nash’s bargaining problem



Source: Author, based on Nash (1950)

The utility obtained for the first party is marked $u(1)$ and $u(2)$ for the second party. Nash also defines axioms that must be met by the solution to the problem. These are: Pareto efficiency and individual rationality, symmetry, independence of scale, and independence of irrelevant alternatives. Nash proposes a solution to a bargaining problem (the so-called Nash solution) that meets these axioms as a maximum product of the additional utilities:

$$\max[u(1^*) - u(1^0)][u(2^*) - u(2^0)] \quad (1)$$

where $u(1^*)$ and $u(2^*)$ represent the utilities of the parties at the bargaining solution point, $u(1^0)$ and $u(2^0)$ represent utilities at zero point or at a point of disagreement if they agree on it.

Other authors subsequently suggested further solutions with more or less altered axioms. The most well-known ones are the so-called equilibrium solution, in which the parties share the utility equally:

$$[u(1^*) - u(1^0)] = [u(2^*) - u(2^0)] \quad (2)$$

utilitarian solution that maximizes the combined utility:

$$\max\{[u(1^*) - u(1^0)] + [u(2^*) - u(2^0)]\} \quad (3)$$

and Kalai-Smorodinsky solution, which maintains the maximal benefits ratio:

$$[u(1^*) - u(1^0)]/[u(2^*) - u(2^0)] = [\max u(1^*) - u(1^0)]/[\max u(2^*) - u(2^0)] \quad (4)$$

All these solutions, which bring different results, are based on the principle of symmetry, which can be interpreted as equal bargaining conditions and powers.

The existence of different bargaining powers is reflected in the dictator solution, where one party gains maximum utility at the expense of the other, and therefore assumes the ability of the party to enforce such a solution. However, such a form of asymmetry is quite extreme.

The different conditions of parties are also addressed by the authors of the "generalized Nash's solution" (Harsanyi a Selten, 1972), which takes into account the ration of bargaining powers:

$$\max[u(1^*) - u(1^0)]^\alpha [u(2^*) - u(2^0)]^\beta \quad (5)$$

where α and β are real numbers are greater than zero and their relative ratio determines the ratio of bargaining powers. Still, however, the ratio of these powers, which can fundamentally affect the distribution of the commonly obtained utility, is understood to be a fixed given quantity.

Another important factor that can fundamentally affect the final distribution is the point of disagreement d . All solutions are based on this point and it is therefore advisable not to underestimate its settings during bargaining. A better informed and prepared negotiator can use the setting of the point of disagreement to gain an advantageous bargaining position.

In terms of exact calculations, even the assumption of the same perception of facts is contentious. Human beings are not identical – they assess facts based on many influences such as knowledge, experiences, opinions, etc., which are created and changed throughout one's life. So the same facts for one negotiator can be an attractive opportunity, the other one will see a risky situation with an uncertain result. Subjectivity of perception is discussed by authors of the Austrian economic school as (Hayek, 1995, p. 28), or (Mises, 2006, p. 18). Through the bargaining process, it is possible to reconcile these views, at least to a certain extent, but it is completely unrealistic to eliminate the differences in perception.

For practical use, the way of expressing utility is also somewhat problematic, as it that depends on individual preferences. Utility as such is difficult to quantify. For this reason, in economic applications utility is usually replaced it by another variable, such as by yield, which can be better measured and used further. This simplification is possible, but one should be aware of it all the time. For example, an explanation of many seemingly irrational decisions can be found in the emotional impact of alternatives on the utility of the parties.

2.2 Program on Negotiation at Harvard Law School

Another approach to bargaining is represented by the Program on Negotiation at Harvard Law School. Since 1983 they have been working on the bargaining theory and its practical application. The basic principles on which the research is based are described in the book "Getting to Yes" (Fisher a Ury, 1987) – it is focusing on solutions as opposed to positional bargaining and on key principles: Separate the people from the problem, Focus on interests, not positions, Invent options for mutual gain and Insist on objective criteria. The fundamental idea Fisher and Ury introduced is the role of the BATNA (Best Alternative To a Negotiated Agreement). BATNA is related to preparation for meetings and means clarifying what alternative options the bargaining party has, i.e. what is the minimum outcome for which it is worth to bargain. Thus, BATNA largely corresponds to the point of disagreement known from cooperative games, both in importance and in the way of use.

This creates the theoretical framework and further papers and authors elaborate on these principles and develop techniques for different bargaining situations and conditions.

The principles of the Harvard Program on Negotiation are based more on the bargaining reality, where information is limited, its meaning has different interpretations, and bargaining is a way of seeking or even creating benefit for negotiators. This benefit is subjective, corresponds to economic utility, and the bargaining process aims to find creative possibilities to meet the needs of the bargaining parties.

2.3 Practical bargaining according to the FBI

Even though the Harvard Program on Negotiation is focused on practical application, it lacks in approaching subjectivity and in particular the emotional aspect of bargaining.

After becoming thoroughly acquainted with the program, Chris Voss, the former FBI chief negotiator, whose negotiating skills were developed in often extreme practical situations, says: "... no matter how we dress up our negotiations in mathematical theories, we are always an animal, always acting and reacting first and foremost from our deeply held but mostly invisible and inchoate fears, needs, perceptions, and desires. That's not how these folks at Harvard learned it, though. Their theories and techniques all had to do with intellectual power, logic... They had a script to follow, a predetermined sequence of actions, offers, and counteroffers designed in a specific order to bring about a particular outcome. It was as if they were dealing with a robot..." (Voss a Raz, 2016)

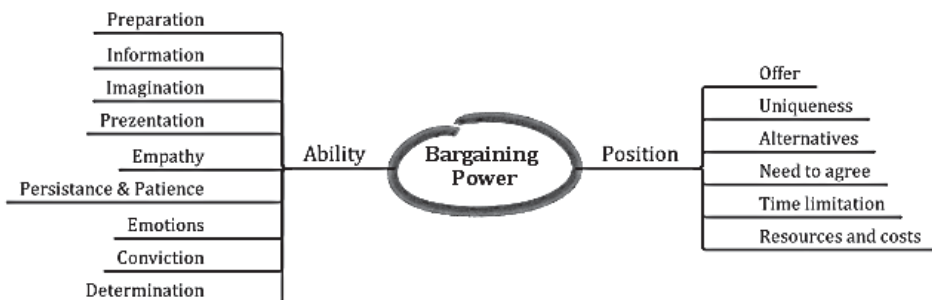
In his book "Never Split the Difference: Negotiating As If Your Life Depended On It" (2016), Voss describes practice-proven methods of working in tense situations with facts and emotions of both others and one's own. The theoretical model developed by the FBI, BCSM (Behavioral Change Starway Model), is based on the psychology of Carl Rogers and includes five phases: active listening, empathy, rapport, influence and behavioral change. Within this model, Voss describes various practice-proven techniques such as silence, mirroring, naming emotions, paraphrasing, and others contributing to a deep understanding of the situation of the other, and subsequently influencing the perception of the other side in a desirable way. At the same time, he deals with the actual emotions that affect the way a negotiator can cope with the unpleasant moments when the partner is aggressive when a lot is at stake, or when he must be unyielding and insist on achieving the best conditions.

3 Bargaining power

It follows from the above that even the best theoretical model of bargaining, based on perfect information, will be limited in practice. The outcome of bargaining depends most on the complex of facts, information and their interpretation, abilities and decisions, which can be summed up under the term "bargaining power".

To study bargaining power and to identify how bargaining power can be developed, it is first necessary to describe it and identify its essential parts. One of the possible divisions is shown in the following picture:

Figure 2: Components of bargaining power



The basic proposed division is to bargaining position, i.e. facts that are more or less given, and to bargaining ability, which can, to a large extent, influence the perception of the bargaining position and which can be substantially influenced and developed over the long term.

3.1 Bargaining position

Bargaining positions include factors describing what the party can offer and other circumstances related to this offer. These include, for example, the uniqueness of the offer, whether it is substitutable either directly or by substitutes, and whether there is interest in the offer among other parties. An important factor influencing the bargaining position is the need to agree and any time constraints. A party that needs to reach an agreement for a variety of reasons, such as a lack of funds, is much more open to concessions, as well as a person who has to conclude the bargaining by a certain point, either due to the departure of a plane or end of a period for which certain objectives are set.

A separate issue conditioning the bargaining position concerns resources available to the party and the costs incurred by the bargaining. These directly affect the need to agree, the ability to extend the bargaining and other parameters.

Although the bargaining position is seemingly objectively given, it is always a question what meaning the facts for the bargaining parties have.

3.2 Bargaining ability

The bargaining ability includes a set of abilities that fundamentally influence what can be achieved with the original bargaining position. Also important is the possibility to develop the bargaining ability both during the bargaining and in the long term. Specifically, the bargaining ability can be divided into the following components:

Preparation – includes the activities before the start of bargaining, in particular the question: “What game are we playing?“, defining tasks for the preparation of bargaining, and especially clarifying one’s BATNA (Best Alternative To A Negotiated Agreement), which contributes significantly to the advantageous setting of the point of disagreement in the bargaining problem.

Information – it is a substantial power that can lead both to strengthening and to substantially weakening one’s own positions. Getting the maximum information and providing only desirable information about oneself is therefore an important negotiator’s job. It is information about the bargaining position of the parties, as well as about their strategy, personalities, opinions, emotions, relationships in teams, etc. In particular, information about the needs and motivation of the counterparty is a necessary starting point for formulating a suitable offer.

Imagination – a very important ability of the negotiator. The ability to introduce possible scenarios and strategies, alternatives to the required one, which would meet the needs of the counterparty, etc., improves the negotiator's options.

Presentation – one thing is the facts, another thing is their interpretation. The ability to present facts in a desirable way and to persuade the counterparty about the truthfulness of this presentation is certainly desirable.

Empathy – understanding the counterparty – no real agreement can be reached without understanding. It is necessary to understand the other side and on the basis of this understanding can one then build a strategy for gaining the maximum utility.

Persistence – Many negotiations are decided mainly because of persistence or patience. It is not just about using the time constraint of the counterparty, but also about gaining time for further bargaining and convincing the counterparty, and often also about using the counterparty's loss of concentration or its fatigue, etc.

Emotion – The ability to work with emotions, both with one's own and with the counterparty's emotions, is a significant part of the bargaining power. Bargaining is a complex process that is necessarily influenced by emotions, and whoever underestimates this dimension of bargaining can be very surprised by the unexpected reactions of both the counterparty and his own.

Conviction – includes a wide range of opinions, prejudices and attitudes acquired by upbringing, experience and other ways we often are not aware of, but which can substantially influence our judgment, decision-making and behavior.

Determination – is an important aspect of bargaining, which is usually not taken into account during bargaining. It is the motivation to achieve the best or desired result. Strong determination augments all other abilities. Interestingly, for the counterparty, the negotiator's determination need not be only negative. For example, if the negotiator is convinced of the correctness of a mutually advantageous agreement, then his determination will lead to the search for ways to reach such an agreement.

These aspects of the bargaining power can be further divided, for example, what information needs to be found, what the uniqueness of the offer depends on, etc. If we have identified the key components of the bargaining power, we can express them for example as follows:

Figure 3: Complex bargaining power



3.3 Possibility to influence bargaining power

To predict and influence the outcomes of bargaining situations, the question of how much bargaining power can be influenced both during the actual bargaining and by long-term cultivation of the negotiator's bargaining power is essential. It was for this purpose that the bargaining power had to be divided into individual, definable and measurable parts. What cannot be tracked and measured is difficult to influence.

The possibility to influence results already from the actual division. The facts about the bargaining position at a given time can be influenced only minimally, but with the help of bargaining ability it is possible to influence their perceptions, by extending the bargaining we can achieve a change of situation, or by understanding the counterparty we can change the bargaining conditions so that they better suit the negotiator and at the same time satisfy the counterparty. The main part of influencing the bargaining power leads through bargaining abilities, both through their use in bargaining and by their long-term development.

The possibilities of long-term development of one's own bargaining powers are obvious. Like all abilities, it is possible to develop these as well. The breakdown of bargaining abilities

allows both a specific development for individual areas and a general overview allowing to prevent deficiencies in one of the areas, which could lead to failures. For example, a negotiator who does not manage his own emotions can, at one moment of anger, waste weeks of work and bargaining he has done so far. The ways of developing abilities will vary in different areas. From simple education for understanding the bargaining process, through practical training with feedback to profound psychological work with emotions, beliefs, etc.

To immediately influence the bargaining power, it is necessary to realize that the ratio of bargaining powers is not a static variable but a dynamic one. Any further information can bring about change, each further bargaining is an opportunity for a better understanding of the other party and its motivations. A committed negotiator usually has a variety of tools to tilt the odds to his advantage. From this point of view, persistence is associated with a firm belief that an advantageous agreement can be reached is a rational assumption that contributes to improving the negotiator's results.

At the same time, attention to the bargaining power and its individual parts is likely to lead the negotiator to being better able to identify, what bargaining situations are worth entering, and thus reduce the risk of unsuccessful attempts.

To a certain extent, shortcomings in the bargaining abilities can be compensated. One option is to set up a negotiating team involving members with different strengths, complementing each other appropriately. In such a case, it is necessary to lay down clear rules and thus work as a team. With poor coordination, mutual rivalry, and lack of communication in the team, this strategy may further weaken the bargaining position.

Another option is procedural – based on an analysis of best practices, one can develop for each bargaining area a description of best practices and appropriate questions, which can partly offset the experience and ensure that some important steps are not omitted. They can take the form of simple lists or forms, so they will be practically usable. It is not possible to completely influence all areas in this way, for example emotional stability, but in others such as preparation or presentation it can ensure that the required procedures and a suitable structure are maintained.

Conclusions

The work using different bargaining approaches explores bargaining power, the possibility to monitor, measure and manage it. It is based on the game theory, it points to some aspects that are limiting for practical use and compares it with other approaches. In game theory, the bargaining problem and its solution was defined by J. Nash (1950). Other scientists subsequently identified other possible solutions for different conditions. These are mathematical models with different assumptions, the adherence to which is unrealistic in real bargaining. The usefulness of these models is to illustrate aspects of bargaining and understanding the effects of some tendencies, but they are not usually appropriate for predicting and influencing the outcome of bargaining. The Program on Negotiation

at Harvard Law School is another scientific approach, which identifies key aspects and bargaining strategies. It is a practical approach which, however, is excessively based on rational evaluation and negotiation and omits subjective, emotional and unconscious aspects. These aspects were studied by Chris Voss, a former FBI negotiator and owner of a negotiation consultancy firm.

After comparing these approaches, we can conclude that the key factor in bargaining is a complex of facts and abilities referred to as bargaining power. Ultimately, it decides who will be more successful with his idea of the distribution of utility, revenues or other bargaining items. In the literature, bargaining power is usually neglected or a constant balance of bargaining power is considered.

The paper presents an identification of the key aspects of bargaining power. It allows measurement and development of these aspects. Analysis of the bargaining power provides an important understanding of its effect. The division of bargaining power into bargaining position and bargaining ability together with a deeper look into the possibility of influencing the seemingly invariant bargaining position provides a tool for creative bargaining even in a seemingly clear or resolved situation. The effect of bargaining power is dynamic and hence the power dynamics of the bargaining parties can change rapidly. Bargaining power can be understood primarily as a comprehensive competence.

Further research will involve the determination of benchmarks for individual areas and the specification of the possibilities to develop individual aspects of bargaining power. Technological developments can be expected to allow for better measurement of the different behavioral aspects and thus provide better feedback.

The paper has achieved its objectives. It presents an analysis of the factors that make up bargaining power, their description and the proposal of methods to influence them in favour of the bargaining party.

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Contact address

Ing. Jan Červenka

University of Finance and Administration / Vysoká škola finanční a správní, doktorské studium

(jan.cervenka@hotmail.com)