**Charles University, Prague**
**Institute of Economic Studies of the Faculty of Social Sciences**

# Diploma Thesis

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# Power Models with A Priori Unions: Application on the Czech Chamber of Deputies

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I would like to express thanks to my consultant
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for his counsels and enthusiasm, which has been my best motivation.

I declare, I wrote this diploma thesis named "Power Models with A Priori Unions: Application on the Czech Chamber of Deputies" by myself. I list my sources in the back of the thesis.

In Prague on the 14th May 2003

# ABSTRACT


## In English

The thesis deals with modelling of voting power of political parties or single deputies in the Lower House of the Parliament of the Czech Republic with aim on coalition formation. The thesis is apart from the Introduction and the Conclusion divided to five chapters. In the first one methodology basics of measuring of voting power and the model with a priori unions are introduced. The second chapter provides characteristics of the Czech parliamentary system. In the chapter three the power model with a priori unions is applied to electoral results to the Czech Chamber of Deputies. The chapters four and five are the author's own contributions to the power-modelling field. The fourth chapter brings the model of coalition formation on the Czech political stage and the fifth chapter introduces the power model with probabilistic coalition formation applied on the Lower House of the Czech Parliament.

## In Czech

Práce se zabývá modelováním hlasovací moci politických stran či jednotlivých poslanců v Dolní sněmovně Parlamentu České republiky se zaměřením na tvorbu koalic. Práce je kromě úvodu a závěru členěna na pět kapitol. V první je představena základní metodologie měření hlasovací moci a model s a priori koalicemi. Druhá kapitola charakterizuje český parlamentní systém. V kapitole tři je model hlasovací moci s a priori koalicemi aplikován na volební výsledky do české Poslanecké sněmovny. Čtvrtá a pátá kapitola jsou vlastním přínosem autorky. Čtvrtá kapitola přináší model formování koalic na české politické scéně a pátá kapitola představuje model hlasovací moci s pravděpodobnostním formováním koalic aplikovaný na Dolní sněmovnu českého Parlamentu.

# CONTENT

# LIST OF ABBREVIATIONS

| | |
|---|---|
| Chamber | Chamber of Deputies of the Parliament of the Czech Republic |
| CHP = $\Pi^{CHP}$ | Composite Holler-Packel power index |
| CPB = $\Pi^{CPB}$ | Composite Penrose-Banzhaf power index |
| CSS = $\Pi^{CSS}$ | Composite Shapley-Shubik power index |
| ČSSD | Czech Social Democratic Party |
| HM | Mrs. Hana Marvanová (present member of US-DEU) |
| HP = $\Pi^{HP}(\gamma,\omega)$ | Unconstrained Holler-Packel power index |
| HPAU = $\Pi^{HP}(\gamma,\omega,T)$ | Constrained Holler-Packel power index with consideration of a priori union structure |
| HSD-SMS | Movement for Autonomous Democracy- League for Moravia and Silesia |
| KDU-ČSL | Christian Democratic Union - Czechoslovak People's Party |
| KSČM | The Communist Party of Bohemia and Moravia |
| KSČM-LB | Coalition of Left bloc (The Communist Party of Bohemia and Moravia and Democratic Left of CSFR) |
| LSU | Liberal Social Union |
| N | Independent (unclassified) deputies |
| ODA | Civic Democratic Alliance |
| ODS | Civic Democratic Party |
| ODS-KDS | Coalition of Civic Democratic Party and Christian Democratic Party |
| PB = $\Pi^{PB}(\gamma,\omega)$ | Unconstrained Penrose-Banzhaf power index |
| PBAU = $\Pi^{PB}(\gamma,\omega,T)$ | Constrained Penrose-Banzhaf power index with consideration of a priori union structure |
| SPR-RSČ | Association for Republic-Czechoslovak Republican Party |
| SS = $\Pi^{SS}(\gamma,\omega)$ | Unconstrained Shapley-Shubik power index |
| SSAU = $\Pi^{SS}(\gamma,\omega,T)$ | Constrained Shapley-Shubik power index with consideration of a priori union structure |
| US | The Freedom Union |
| US-DEU | The Freedom Union – Democratic Union |

# 1. INTRODUCTION

In this thesis I follow Duncan Black's idea that "Economics and Political Science are the same in kind: that when we do eventually obtain a "satisfactory" Political Science, it will have the same distinguishing marks as Walras' Elements or Pareto's Manuel, or perhaps Marshall's Principles, with the admixture of the rigorously formal and the descriptive treatment – rather than those of the existing texts in Politics. And the core of the treatment, we hold, will consists of a set of formal or mathematical propositions".[1] The methodology of the economic sciences could be applied to the study of political processes. In this particular case I am applying game-theoretical methodology of measuring influence (or power) in committee systems to empirical analysis of distribution of power in the Lower House of the Czech Parliament and to models of government coalitions formation.

## 1.1. Evolution of Power Measuring

The history of measuring of power reaches back to the epoch of the Renaissance where in the various republics and city-states in Italy weighted voting had been very common. It fell into oblivion during the following period and experienced its revival in modern democracies of the 20th century. The European Union institutions and its decision-making process inspired a more detailed research in the field of weighted voting and attracted the interest of researchers.

The model of weighted voting can be certainly marked as a basic measure of power, but it is understood and widely agreed that in many cases the voting weight cannot stand for an estimate of the impact that various decision-makers have on the outcome[2]. Many researchers therefore introduced various indices to describe and measure the power of single members of various decisive institutions. Among the most frequently quoted power indices belong the Shapley-Shubik[3], the Penrose-Banzhaf[4], the Holler-Packel[5], the Johnston[6] or the Deegan-Packel power index. A full description and

[1] Quoted from: Black, D. (1998), p.360

[2] For example Banzhaf (1965)

[3] Shapley, Shubik (1954)

[4] Penrose (1946), Banzhaf (1965)

[5] Holler, Packel (1983)

interpretation of these indices I provide in Chapter 2. Even though some new indices have been introduced as well, recent works build mostly on these already existing indices, make their reinterpretations, and try to improve their accuracy and to find some kinds of new applications.

With the growing number of indices there appeared discussions about what measures are adequate and what properties gauge that an index should be or cannot be used as a measure of power. The most accepted property to separate the "adequate" from "inadequate" measures[7] is probably monotonicity. There however exist many concepts of monotonicity and their relationship is not always hierarchical. Turnovec[8] discusses various indices on the basis of different concepts of monotonicity applied to weighted voting games. The main result of his study is that while the Banzhaf-Coleman index satisfies only the local monotonicity property, the Holler-Packel index[9] (i.e. Public Good index) does not satisfy any of the local and global monotonicity properties, the Shapley-Shubik index satisfies both of them. This led me to concentrate more deeply on the Shapley-Shubik power index further in my work.

Axiomatization of measures seems to be also important for finding the "right index"[10]. Axioms and properties are however often close substitutes and therefore by judging those power indices, which are based on axioms or satisfy various monotonicity properties, we have to take into account the fact that they don't always determine the adequate index.

The discussion about what properties single power indices should have caused also a revival of the probabilistic interpretation of power indices based on the Owen's[11] concept of multilinear extension of the characteristic function form of coalition games.

Another view of power measures understands power as a theoretical concept that explains the relationship of the decision situation and the outcome. It is trying to find out what power is or how important it is comparing to factors like influence, luck,

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[6] Johnston (1978)

[7] Felsenthal, Machover (1995), Machover (2000)

[8] Turnovec (1998)

[9] the nonmonotonicity of the PGI results from considering only the strict minimum winning coalitions where each member has the potential to turn the winning coalition into a losing one

[10] Holler, Packel (1983)

[11] Owen (1975)

skills, information and such[12]. This view sets up so called theoretical power indices. Power could be also interpreted as the ability to influence outcomes[13] no matter what they are. Power here becomes independent of utility. Also interesting is the distinction between power and success[14]. One decision-maker can be very successful being satisfied with decision outcomes, but if he wants to change something by himself he has actually no power to do it.

Discussions are led also about what do the power indices express or should express and what do they actually measure. One very popular view is that a power index represents a reasonable expectation of a collective decision-making outcome. In other words if a decision-making body can be described by a model of weighted voting, which consists of a decision rule and a distribution of votes, the power index can determine the probability that one particular member of the body is decisive for the outcome. If there is no further information about the voter's preferences, voting and the way of coalition formations, the index is called unconstrained. If the indices incorporate some additional information about preferences etc. they become so called constrained[15]. Such indices have more adequate probability estimates than the unconstrained ones, but on the other hand they require a deeper knowledge of conditions in the particular decision-making body and a danger that the necessary real-world data are not available.

Turnovec[16] refers about three alternative ways of introducing constraints to the original power indices, which include preferences and restrictions on the voting power analysis:

- **A priori union approach**[17] – modifies the Shapley-Shubik and Penrose-Banzhaf power indices into models, which take into consideration a priori union structure. A priori unions are such ensembles, whose members made a priori commitment to act in concord.

[12] Miller (1982)

[13] Allingham (1975)

[14] Barry (1980)

[15] Turnovec (1997a), Turnovec (2000)

[16] Turnovec (2000)

[17] Owen (1977), Owen (1982)

- **Spatial power indices**[18] – broaden the use of the Shapley-Shubik power index for situations, in which committee members are placed in a one-dimensional space and only connected voting is allowed.
- **Conflicting configuration structures**[19] - broaden the use of the Shapley-Shubik power index for situations where exists a set of members, who do not want to join a configuration with any another member from this set. As a consequence of this condition a list of unfeasible configurations is assembled.

My work will concentrate to the a priori union approach.

## 1.2. Short Description of Thesis Structure

This thesis represents an analysis of power decomposition in the Lower House of the Parliament of the Czech Republic with a focus on coalition creation. Since the Czech Republic as an independent country arose on the January 1st 1993 the electoral history is short till now. It is however quite rich and offers many real and potential variants of power decomposition. During the second electoral period came about eight changes in the Lower House makeup, one early election took place in 1998, one unusual kind of coalition was created for the third electoral period and one pre-electoral coalition fell apart once it become part of government coalition for the fourth period. Since the Czech democracy began to form only in the fall of 1989, quite a large number of political parties arose. Especially for the 1992 elections many different parties ran and eight of them finally gained mandates to the Czech Lower House for the first electoral period.

My thesis comprises of five main chapters. The first chapter "Theory of Power Models" gives the theoretical background of the thesis. It provides definitions and explanations of voting power in committees and on the basis of definitions of original power indices, Turnovec's unconstrained indices[20], the definitions and explanations of power indices with a priori unions as one type of constrained indices. This chapter is closed by an example of power calculation of the three most commonly used power

[18] Edelman (1997)

[19] Kilogour (1974)

[20] Turnovec (2000)

indices Shapley-Shubik, Penrose-Banzhaf and Holler-Packel, which play a pivotal role in my work.

The second chapter "Czech Parliamentary System" briefly describes the History of Czech Parliamentarism and Constitutionality. It goes further into the characterisation of the present Czech parliamentary system and gives an overview of its electoral and voting rules.

Essential data for my thesis are contained in the third chapter "Electoral history of the Czech Lower House since 1990". On their basis the final part of this chapter and the two following chapters are going to get build. In the final part of this chapter I will with the use of the power models with a priori unions examine the power of single political parties as they were elected for the four electoral periods of the Czech Chamber of Deputies and examine the power changes during the transfers of deputies in the second electoral period. On the examples of some hypothetical configurations of the Chamber I will show assets of power evaluation for single parties or even deputies by their deciding about coalition participation.

For evaluation of voting power I will use computer programs developed by PhD. Peter Silázsky during his PhD studies at CERGE of Charles University in Prague. These programs are able to calculate the original Shapley-Shubik, Penrose-Banzhaf and Holler-Packel power indices and also the Shapley-Shubik power index with a priori unions. I would like to express my thanks to Mr. Silázsky, since his programs will be a great help for me by the numerous power evaluations in this thesis.

In the fourth chapter "Model of the Czech Coalition Formation" I will construct a model of coalition formation for the Lower House of the Parliament of the Czech Republic. The model will be constructed on the basis of power models with a priori unions and will take into account specifics of the Czech political stage. The model will serve to test the hypothesis that the Czech political parties tend to create the most stable and powerful coalition as possible. Since there will be two variants of the model, I will interpret the results of each of them and try to find the better fitting one, which corresponds more to the conventions on the Czech political stage.

The fifth chapter "Model of Voting Game with Probabilistic A Priori Union Structure" is built on the hypothesis that some coalitions do not work for 100%. This can be caused partly by the character of the coalition agreement and partly by the internal inconsistency in single political parties. I will construct a model based on power indices with a priori unions, which incorporates the probabilities that single deputies on

the Czech political stage will be a disciplined part of their party and the percentages of coalition congruity. I will use the model to test the hypothesis that Czech potential coalition partners need to take into account not only the amount of mandates gained, but also the character or in other words the discipline of single partnering and opposition parties. Party discipline should be taken into account when choosing the character of coalition agreements. I will test if it was the case of the only agreement from the short Czech electoral history, which was not supposed to work for 100%, the Opposition Agreement and how well the character of the present government coalition agreement was chosen.

I will estimate the coalition congruity and the discipline of single parties from the voting data of the Czech Chamber of Deputies, which I obtained directly from the Chamber as a result of a very helpful email correspondence with Mgr. Václav Sklenář from the Informatics Department, whom I reached through the backward linkage from the web pages of the Chamber[21]. I would like to express my thanks to Mgr. Sklenář on this place for his helpfulness and compliance to my requests about the data structure.

[21] http://www.psp.cz

# 2. MODELS OF COMMITTEES AND MEASURES OF POWER

## 2.1. Voting Power in Committees

In this chapter I am going to introduce some basic definitions[22] and relations needed for calculation and interpretation of quantitative evaluation of voting power in committees, so called power indices.

### 2.1.1. Committee

By committee we mean a body that makes decisions by voting. In this sense committee might be a parliament, a government, a city council, a board of a company etc. Committee is composed of members. Each member has one or more votes at his disposal and the number of votes for a proposal to be approved is specified.

Each committee has some power, which is always further divided among its members. Any committee can be positively described by the set N of its members, by distribution of votes of its members $\omega$ (weights) and by the voting rule $\gamma$ indicating minimal number of votes (weights) to approve a proposal. Specifics $\rho$ like personal preferences, manners of coalition forming etc. do further specify the character of each committee. **Model of a committee** is defined as

$$[\gamma, \omega, \rho] = [\gamma, \omega_1, \omega_2, ..., \omega_n, \rho]$$

such that we assume relative weights $\sum_{i \in N} \omega_i = 1, \omega_i \geq 0$ and $0 \leq \gamma \leq 1, \rho \subseteq 2^N$

with following list of explications:

| | |
|---|---|
| Set of members ***N*** | $N = \{1, \ldots, n\}$ |
| **Weight of the i-th member** $\omega_i$ | $\omega_i (i = 1, ..., n)$ with $\sum_{i \in N} \omega_i = 1, \omega_i \geq 0$ |
| ▪ real and non negative | |
| **Quota** $\gamma$ | $0 \leq \gamma \leq 1$ |
| ▪ real number | |
| **Voting configuration** $S$ | $S \subseteq N$ |
| ▪ non-empty subset | |

[22] terminology introduced in Turnovec (1997a)

**Winning voting configuration** $\sum_{i \in S} \omega_i \geq \gamma$

- subset of all committee members where the total weight of all members is at least equal to quota – has a required majority

**Losing voting configuration** $\sum_{i \in S} \omega_i \prec \gamma$

**Power set of *N*** $2^N$

- set of all possible voting configurations in the committee framework

**Set of feasible voting configurations** $\rho$ $\rho \subseteq 2^N$

- voting configurations that express some preferences of committee members, formally possible situations that can matter in real situations

## 2.1.2. Power Index

On these grounds it is possible to define a **power index.** $\pi$ as a vector-valued function, which is mapping from the space of all committees into the unit simplex:

$$\pi : \Gamma(\rho) \to E$$

Power index can be interpreted as a reasonable expectation of the share on decisional power of committee each of its members has. The size of the share reflects the member's ability to contribute to formations of winning voting configurations. **Power index of the i-th member** is than defined as the share of power that the power index $\pi$ grants to the i-th member of a committee with weight allocation $\omega$, quota $\gamma$ and the set $\rho$

$$\pi_i(\gamma, \omega, \rho)$$

Following explanatory definitions are related to the power index setting:

**Space of all committees** $[\gamma, \omega, \rho]$ $\Gamma(\rho) = \left\{ (\gamma, \omega) \in R_{n+1} : \sum_{i=1}^{n} \omega_i = 1, \omega_i \geq 0, 0 \leq \gamma \leq 1 \right\}$

- of the size *n* with the set $\rho \subseteq 2^N$ of feasible voting configurations

**Unit simplex** $E = \left\{ e \in R_n : \sum_{i \in N} e_i = 1, e_i \geq 0 (i = 1, \ldots, n) \right\}$

**Permutation of the committee** $[\gamma, \omega, \rho]$ $[\gamma, \sigma\omega, \sigma\rho]$

- ordered list of members of the committee
- permutation mapping $\sigma$ $\sigma : N \to N$
- index for committee and it's **permutation** $\pi_{\sigma(i)}(\gamma, \sigma\omega, \sigma\rho) = \pi_i(\gamma, \omega, \rho)$

**Dummy members** $\sum_{k \in S} \omega_i \geq \gamma \to \sum_{k \in S - \{i\}} \omega_i \geq \gamma$ for any winning configuration *S*

- member i of committee, who can not benefit any feasible voting configuration by joining it

- index for a **dummy** member *i* $\pi_i(\gamma,\omega,\rho)=0$

**Symmetric members** $\sum_{k\in S\cup\{i\}}\omega_i \geq \gamma \leftrightarrow \sum_{k\in S\cup\{j\}}\omega_i \geq \gamma$

- distinct members i and j of a committee, who's benefit to any feasible voting configuration is the same
- index for **symmetric** distinct *i* and *j* $\pi_i(\gamma,\omega,\rho)=\pi_j(\gamma,\omega,\rho)$

In order to determine the decisive members of single configurations in committees, which is often important for indices calculation, we need to define marginality and types of winning configurations:

**Marginal members** $\sum_{k\in S}\omega_k \geq \gamma$ and $\sum_{k\in S-\{i\}}\omega_k \prec \gamma$

- member *i* of a committee $[\gamma,\omega,\rho]$ with respect to a configuration $S\in\rho, i\in S$

**Critical winning configuration (CWC)**

- voting configuration $S\in\rho$ where at least one member of the committee is marginal with respect to *S*
- **set of all CWC** in the committee $C(\gamma,\omega,\rho)$
- **set of all CWC** the member $i\in N$ is marginal with respect to $C_i(\gamma,\omega,\rho)$, $C(\gamma,\omega,\rho)=\bigcup_{i\in N}C_i(\gamma,\omega,\rho)$
- **set of all CWC of the size s** the member $i\in N$ is marginal with respect to $C_{is}(\gamma,\omega,\rho)$, $C_i(\gamma,\omega,\rho)=\bigcup_{s=1}^{n}C_{is}(\gamma,\omega,\rho)$
- **set of all CWC having exactly s marginal members** the member $i\in N$ is marginal with respect to $P_{is}(\gamma,\omega,\rho)$

**Minimal critical winning configuration (MCWC)** $\sum_{k\in S}\omega_k \geq \gamma$ and $\sum_{k\in T}\omega_k \prec \gamma$ for any $T\subseteq S$

- **set of all MCWC** in the committee $M(\gamma,\omega,\rho)$

Calculation of power indices is derived from the number of winning configurations. This number is marked cardinality (card). Following lemmas top up characteristics of dummy and symmetric members of a committee and permutation of committees from the cardinality point of view.

**Lemmas:**

- **dummy** member *i* $cardC_{is}(\gamma,\omega,\rho)=0$, $cardM_{is}(\gamma,\omega,\rho)=0$
- **symmetric** distinct members $k,r\in N$ $cardC_{ks}(\gamma,\omega,\rho)=cardC_{rs}(\gamma,\omega,\rho)$, $cardM_{ks}(\gamma,\omega,\rho)=cardM_{rs}(\gamma,\omega,\rho)$

- committee and it's **permutation** $cardC_{\sigma(i)s}(\gamma,\sigma\omega,\sigma\rho) = cardC_{is}(\gamma,\omega,\rho)$
  $cardM_{\sigma(i)s}(\gamma,\sigma\omega,\sigma\rho) = cardM_{is}(\gamma,\omega,\rho)$

## 2.2. Unconstrained Power Indices

The unconstrained power analysis is the traditional one. The collective decision-making can be described by a model of weighted voting, which consists of a decision rule given by quota and of a distribution of votes in the committee. On the basis of these information power expresses the probability that a committee member is decisive for the outcome.

As it was said in the Introduction, the best known and most used power indices are the Shapley-Shubik, the Penrose-Banzhaf, the Holler-Packel, the Johnston and the Deegan-Packel power index. I introduce all of them in following subchapters, but taking into account their character I chose to work only with the first three of them in the later power calculation chapters.

The set of feasible voting configurations $\rho$ of unconstrained indices is $2^N$.

### 2.2.1. Shapley-Shubik Power Index (SS)

$$\Pi_i^{SS}(\gamma,\omega) = \sum_{s=1}^{n} \frac{(s-1)!\,(n-s)!}{n!} cardC_{is}(\gamma,\omega)$$

- Introduced by Shapley and Shubik in 1954 in "A Method for Evaluating the Distribution of power in a Committee System"
- Expresses probability that the relevant member is in a pivotal position
- Member on a pivotal position has the power to convert a loosing configuration (permutation) of members into a winning one by entering it
- Each member of a committee has a share o power proportional to the number of those configurations of members in which he is pivotal

### 2.2.2. Penrose-Banzhaf Power Index (PB)

$$\Pi_i^{PB}(\gamma,\omega) = \frac{\sum_{s=1}^{n} cardC_{is}(\gamma,\omega)}{\sum_{r=1}^{n}\sum_{k\in N} cardC_{kr}(\gamma,\omega)}$$

- Introduced by Banzhaf in 1965 in "Weighted Voting doesn't Work: a Mathematical Analysis" on the basis of Penrose and his "The Elementary Statistics of Majority Voting" published in 1946
- Expresses probability that the relevant member has a swing
- Concept of swing is based on the idea, each member of a committee has a share o power proportional to the number of critical winning configurations for which he is marginal
- Marginal member has the power to convert a loosing combination of members into a winning one by entering it

### 2.2.3. Holler-Packel Power Index (HP)

$$\Pi_i^{HP}(\gamma,\omega) = \frac{\sum_{s=1}^{n} cardM_{is}(\gamma,\omega)}{\sum_{k=1}^{n}\sum_{r=1}^{n} cardM_{kr}(\gamma,\omega)}$$

- Suggested by Holler in 1978 in "A priori Party Power and Government Formation" and axiomatized by Holler and Packel in 1983 in "Power, Luck and the Right Index"
- Each member of a committee has a share o power proportional to the number of minimal critical winning configurations he is a member of

### 2.2.4. Johnston Power Index (J)

$$\Pi_i^{J}(\gamma,\omega) = \frac{\sum_{s=1}^{n} \frac{1}{s} cardP_{is}(\gamma,\omega)}{\sum_{v=1}^{n} \frac{1}{v} \sum_{k\in N} cardP_{kv}(\gamma,\omega)}$$

- Introduced by Johnston in 1978 in "On the Measurements of Power: Some Reactions to Laver"
- Each member of a committee has a share o power proportional to the normalised weighted average of the number of cases when he is marginal with respect to a critical winning configuration

### 2.2.5. Deegan-Packel Power Index (DP)

$$\Pi_i^{DP}(\gamma,\omega) = \frac{\sum_{s=1}^{n} \frac{1}{s} cardM_{is}(\gamma,\omega)}{\sum_{v=1}^{n} \frac{1}{v} \sum_{k \in N} cardM_{ks}(\gamma,\omega)}$$

- Introduced by Deegan and Packel in 1978 in "A New Index of Power for Simple n-Person Games"
- Each member of a committee has a share o power proportional to the normalised weighted average of the number of minimal critical winning coalitions he is a member of

## 2.3. Constrained Power Indices

As I mentioned above, the original power indices build only on a decision rule and a distribution of votes concerning no further information about voters, voting or coalition forming, which are usually very important for the actual power decomposition. Accuracy of such indices is therefore considerably limited.

In order to add these conditions to the power index methodology, the equal probability assumption of the original indices needs to be relaxed. In his work Turnovec (2000) named the adjusted indices as constrained since they contain constraints, which relax the equal probability assumption[23]. Constraints can get introduced by the three in the Introduction described ways:

- A priori union approach (Owen 1977, 1982)
- Spatial power indices (Edelman 1997)
- Conflicting configuration structures (Kilgour 1974)

Constrained power indices introduce a new element into the traditional model in the form of additional behavioural assumptions about formation of voting configurations. Therefore they provide more adequate probability estimates than the unconstrained ones, but they also include a danger that the real-world data about coalition formation that are being added to the theories might not be available. Despite of this, all the three approaches to introduction of constrains are improving power index methodology demonstrating that indices don't have to ignore preferences of decision makers nor provide too simplified tool for voting outcomes explanations.

[23] Turnovec (2000)

Constrained power indices are defined over the feasible sets of voting configurations $\rho$, which doesn't equal $2^N$.

### 2.3.1. Power Indices with A priori Unions

"A priori unions are configurations, which in some sense made a priori commitment to cooperate."[24] The a priori union structure ***T*** arises from adding all of the a priori unions $T_1, T_2, ..., T_m$ a committee contains together. The structure than represents the additional information about voter's preferences and coalition forming, which is being added to the original power indices. **A priori union structure *T*** in the committee $[\gamma, \omega]$ is defined as a partition of the members

$$T = \{T_1, T_2, ..., T_m\} \text{ with } \bigcup_{i=1}^{m} T_i = N$$

where $T_k \cap T_r = \emptyset$ for any $r, k = 1, 2, \ldots, m$ and $r \neq k$

There are two basic levels on which the indices with a priori union are counted. On the first level each union selects its representative to act for the union in bargaining with other unions. On this level is under way the search for the total power of the whole union $T_j$, which is called **total weight of the union** $\tau_j$ and defined as

$$\tau_j = \sum_{k=n_{j-1}+1}^{n_j} \omega_k$$

The **power index of the j-th union** is than set as $\Pi_j[\gamma, \tau]$.

On the second level the total power of the union is decomposed among its individual members. **Internal distribution of weights in the union** $T_j$, which can be put down as $T_j = (n_{j-1}+1, n_{j-1}+2, ..., n_{j-1}+t_j = n_j)$, where $n_j = \sum_{k=1}^{j} t_k$ is the number of committee members in the union $T_j$, is defined as

$$\omega^j = (\omega_{n_{j-1}+1}, \omega_{n_{j-1}+2}, ..., \omega_{n_j})$$

[24] Quoted from: Turnovec, 2000, p.181

There can be of course more levels, which are always connected the same way as the first two. The **power index of the i-th member of the committee on the j-th** level is set as $\Pi_{ij}\left[\gamma,\tau,\omega^j\right]$. Composing all levels together we get the **power index of the i-th member of the union** $T_j \in T$ in a committee with a priori union structure $T$ defined as

$$\Pi_i[\gamma,\omega,T] = \Pi_j[\gamma,\tau]\frac{\Pi_j^i\left[\gamma,\tau,\omega^j\right]}{\sum_{k\in T_j}\Pi_k^j\left[\gamma,\tau,\omega^j\right]}$$

where $t_j$ is the cardinality of the union $T_j$.

The a priori union structure approach can be implemented for any power index satisfying the higher defined conditions of committee modelling. The five unconstrained power indices introduced in the previous Chapter (2.2.) modified into the **<u>constrained power indices</u>** will now look the following way:

**Shapley-Shubik power index (SS)**

$$\Pi_i^{SS}(\gamma,\omega,T) = \frac{\sum_{s=1}^{m}(s-1)!\,(m-s)!\cdot cardC_{js}(\gamma,\tau)\cdot\sum_{s=1}^{m}(l-1)!\,(m-1+t_j-l)!\cdot cardC_{il}\left(\gamma,\tau,\omega^j\right)}{m!\cdot\sum_{k=n_{j-1}+1}^{n_j}\sum_{r=1}^{m-1+t_j}(r-1)!\,(m-1+t_j-r)!\cdot cardC_{kr}\left(\gamma,\tau,\omega^j\right)}$$

**Penrose-Banzhaf power index (PB)**

$$\Pi_i^{PB}(\gamma,\omega,T) = \frac{\sum_{s}^{n}cardC_{js}(\gamma,\tau)\sum_{l}^{m-1+t_j}cardC_{il}\left(\gamma,\tau\omega^j\right)}{\sum_{j=1}^{m}\sum_{v=1}^{m}cardC_{jv}(\gamma,\tau)\cdot\sum_{k=n_{j-1}+1}^{n_j}\sum_{r=1}^{m-1+t_j}cardC_{kr}\left(\gamma,\tau,\omega^j\right)}$$

**Holler-Packel power index (HP)**

$$\Pi_i^{HP}(\gamma,\omega,T) = \frac{\sum_{s}^{n}cardM_{js}(\gamma,\tau)\sum_{l}^{m-1+t_j}cardM_{il}\left(\gamma,\tau\omega^j\right)}{\sum_{j=1}^{m}\sum_{v=1}^{m}cardM_{jv}(\gamma,\tau)\cdot\sum_{k=n_{j-1}+1}^{n_j}\sum_{r=1}^{m-1+t_j}cardM_{kr}\left(\gamma,\tau,\omega^j\right)}$$

**Johnston power index (J)**

$$\Pi_i^J(\gamma,\omega,T)=\frac{\sum_{s=1}^{n}\frac{1}{s}cardP_{js}(\gamma,\tau)\sum_{l}^{m-1+t_j}\frac{1}{l}cardP_{il}(\gamma,\tau,\omega^j)}{\sum_{v=1}^{n}\frac{1}{v}\sum_{j=1}^{m}cardP_{jv}(\gamma,\tau)\sum_{r=1}^{m-1+t_j}\frac{1}{r}\sum_{k=n_{j-1}+1}^{n_j}cardP_{kr}(\gamma,\tau,\omega^j)}$$

**Deegan-Packel power index (DP)**

$$\Pi_i^{DP}(\gamma,\omega,T)=\frac{\sum_{s=1}^{n}\frac{1}{s}cardM_{js}(\gamma,\tau)\sum_{l}^{m-1+t_j}\frac{1}{l}cardM_{il}(\gamma,\tau,\omega^j)}{\sum_{v=1}^{n}\frac{1}{v}\sum_{j=1}^{m}cardM_{jv}(\gamma,\tau)\sum_{r=1}^{m-1+t_j}\frac{1}{r}\sum_{k=n_{j-1}+1}^{n_j}cardP_{kr}(\gamma,\tau,\omega^j)}$$

A priori union approach is an improvement, which moves the accuracy of indices closer to reality, but "an index which is "right"[25] per se does not exist"[26] and it is valid even for those, which consider the a priori union structures. To determine, which index is adequate for any specific problem of power measurement, an intimate knowledge of background and a high degree of flexibility is needed. There are even such indices, which don't satisfy either the axioms, or the monotonicity properties, or the probabilistic interpretation but which are able to interpret results of committee voting.

Even though we cannot choose any best index or reject any of indices for sure by testing their single attributes, I decided to apply the criteria suggested by Laruelle[27] and Turnovec[28] to see, if some of the indices is at least more likely to be more authoritative.

As evaluation of power decomposition can differ quite widely among various indices, Laruelle and many others considered it as an interesting problem. She therefore tested the indices using three different approaches:

a) axiomatic approach
b) approach based on postulates
c) probabilistic approach

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[25] Holler, Packel (1983)

[26] quoted from Holler, Owen (2001) p.8

[27] Laurelle (1999)

[28] Turnovec (1998)

Laruelle found the third approach as the main saying that "as far as the decision-making process to study presents some characteristics that meet the assumptions of some model, then choice of a power index appears clearly and the chosen index can be precisely interpreted."[29] She concluded that the Holler-Packel index has no compelling probabilistic interpretation, but both the Shapley-Shubik and the Penrose-Banzhaf indices do have such an interpretation (see Chapters 2.2.1. and 2.2.2.) Even including criteria of the other approaches these indices seem to come out as more authoritative of Laruelle's testing. (Tables of Laruelle's results of the first two approaches are listed in the Attachment No.6). I found that the indices with a priori unions adopted all the tested qualities of the original indices they are based on.

Turnovec's testing[30] is aimed on different kinds of monotonicities indices satisfy. As I already mentioned in the Introduction the main result of his study was that the Shapley-Shubik index satisfies both the local and global monotonicity properties. The Penrose-Banzhaf index satisfies only the local monotonicity property and the Holler-Packel index does not satisfy any of them. The Shapley-Shubik power index therefore seems to be the most authoritative one of the three I'm using in my thesis. Here again the power indices, which consider a priori unions, take over the monotonicity qualities of their parent indices. Therefore, since the indices with a priori unions are improvements of the original power indices, the most accurate of these testing seems to come out the Shapley-Shubik power index with a priori unions.

In the following Chapter 2.4. I will illustrate the a priori union power indices calculation and interpretation on the example of coalitions in the Lower House of the Czech Parliament.

## 2.4. Detailed Calculation of A priori Power Indices

I will use the following unconstrained and constrained Shapley-Shubik $\Pi_i^{SS}$, Penrose-Banzhaf $\Pi_i^{PB}$ and Holler-Packel $\Pi_i^{HP}$ power indices in this example. It will provide a detailed computation of voting power of single political subjects in the Czech Chamber of Deputies based on the real 2002 electoral results:

1. Political group Czech Social Democratic Party (CSSD) (70)

[29] quoted from Laurelle (1999), p.20

[30] Turnovec (1998)

2. Political group Civic Democratic Party (ODS) (58)
3. Political group Communist Party of Bohemia and Moravia (KSCM) (41)
4. Political group Christian Democratic Union - Czechoslovak People's Party (KDU-CSL) (21)
5. Political group Freedom Union - Democratic Union (US-DEU) (10)

The goal of this example is to show the comparison of power of single parties that crossed the quota to get to Chamber of Deputies with and without the existence of Coalition agreement.

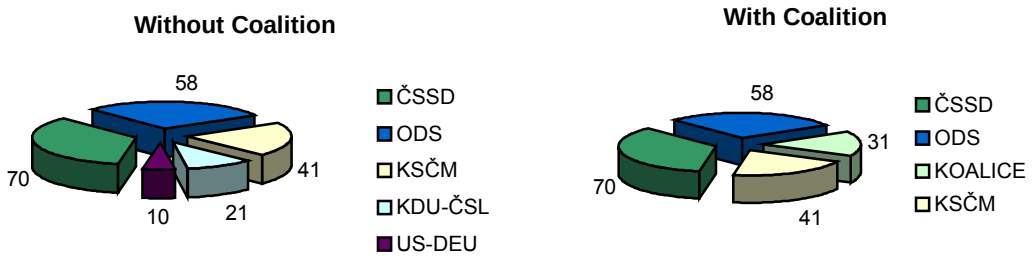


**Figure 2.1.** Division of mandates among single subjects after the 2002 elections

| Political party | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Nr. of members | 70 | 58 | 41 | 21 | 10 |

We suppose that members of each political party always vote in common, so we have actually **5 members of the Chamber of Deputies**, where $m_1 = \{1-70\}$, $m_2 = \{71-128\}$, $m_3 = \{129-169\}$, $m_4 = \{170-190\}$, $m_5 = \{191-200\}$

### 2.4.1. A priori Union Structure

Lets consider the Coalition (Koalice: Political group Christian Democratic Union - Czechoslovak People's Party (KDU-CSL) and Political group Freedom Union (US)) to be a priori union. We have now **a priori union structure** $T = \{T_1, T_2, T_3, T_4\}$ where $T_1 = \{1-70\}$, $T_2 = \{71-128\}$, $T_3 = \{129-169\}$, $T_4 = \{170-200\}$

in the committee $[\gamma,\omega]=\left[{}^{101}\!/_{200};{}^{70}\!/_{200},{}^{58}\!/_{200},{}^{41}\!/_{200},{}^{21}\!/_{200},{}^{10}\!/_{200}\right]$, where size of quota $\gamma={}^{101}\!/_{200}$ represents that the 200 members of Chamber of Deputies of the Czech Parliament is regularly acting on the simple majority basis.

**Total weight of the unions** $\tau=\left({}^{70}\!/_{200},{}^{58}\!/_{200},{}^{41}\!/_{200},{}^{31}\!/_{200}\right)$ and **internal distribution of weights in the unions** $\omega_1={}^{70}\!/_{200}$, $\omega_2={}^{58}\!/_{200}$, $\omega_3={}^{41}\!/_{200}$, $\omega_3={}^{31}\!/_{200}$

## 2.4.2. The Unconstrained Power Indices = Second Level Sub-game

We need to calculate values of $\sigma$ to be able to use the **Shapley-Shubik power index (SS)** for calculations: $\sigma(1,n)={}^{1}\!/_{n}$ and for the ease of computations is helpful following rule that $\sigma(s+1,n)=\sigma(s,n)\,{}^{s}\!/_{n-s}$ for $s = 1,\ldots,n-1$

We also need to find out the **number of marginalities** of each party in winning configurations of different sizes (we mark them by * and put the sum of them into the following table).

**<u>List of winning configurations</u> (WC):**

| | |
|---|---|
| Of the size 1 | No single party can create a winning configuration |
| Of the size 2 | $\{1^*,2^*\},\{1^*,3^*\}$ |
| Of the size 3 | $\{1^*,2,3\},\{1^*,2^*,4\},\{1^*,2^*,5\},\{1^*,3^*,4\},\{1^*,3^*,5\},\{1^*,4^*,5^*\},$ $\{2^*,3^*,4^*\},\{2^*,3^*,5^*\}$ |
| Of the size 4 | $\{1,2,3,4\},\{1,2,3,5\},\{1^*,2,4,5\},\{1^*,3,4,5\},\{2^*,3^*,4,5\}$ |
| Of the size 5 | $\{1,2,3,4,5\}$ |

**<u>Table of critical winning configurations</u> (CWC):**

| s = size of configuration | 1 | 2 | 3 | 4 | 5 | $\sigma$ | $\sum$ |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 1/5 | 0 |
| 2 | 2 | 1 | 1 | 0 | 0 | 1/20 | 4 |
| 3 | 6 | 4 | 4 | 2 | 2 | 1/30 | 18 |
| 4 | 2 | 1 | 1 | 0 | 0 | 1/20 | 4 |
| 5 | 0 | 0 | 0 | 0 | 0 | 1/5 | 0 |
| $\sum$ | 10 | 6 | 6 | 2 | 2 | | 26 |

**Shapley-Shubik power index (SS)** for single parties

$$\Pi_i^{SS}(\gamma,\omega)=\sum_{s=1}^{n}\frac{(s-1)!\,(n-s)!}{n!}cardC_{is}(\gamma,\omega)$$

$$\Pi_1^{SS}(\gamma,\omega)=0\,{}^{1}\!/_{5}+2\,{}^{1}\!/_{20}+6\,{}^{1}\!/_{30}+2\,{}^{1}\!/_{20}+0\,{}^{1}\!/_{5}={}^{2}\!/_{5}$$

$$\Pi_2^{SS}(\gamma,\omega)=0\,{}^{1}\!/_{5}+1\,{}^{1}\!/_{20}+4\,{}^{1}\!/_{30}+1\,{}^{1}\!/_{20}+0\,{}^{1}\!/_{5}={}^{7}\!/_{30}$$

$$\Pi_3^{SS}(\gamma,\omega)=0\,{}^{1}\!/_{5}+1\,{}^{1}\!/_{20}+4\,{}^{1}\!/_{30}+1\,{}^{1}\!/_{20}+0\,{}^{1}\!/_{5}={}^{7}\!/_{30}$$

$$\Pi_4^{SS}(\gamma,\omega)=0\,{}^{1}\!/_{5}+0\,{}^{1}\!/_{20}+2\,{}^{1}\!/_{30}+0\,{}^{1}\!/_{20}+0\,{}^{1}\!/_{5}={}^{1}\!/_{15}$$

$$\Pi_5^{SS}(\gamma,\omega)=0\,{}^{1}\!/_{5}+0\,{}^{1}\!/_{20}+2\,{}^{1}\!/_{30}+0\,{}^{1}\!/_{20}+0\,{}^{1}\!/_{5}={}^{1}\!/_{15}$$

**Penrose-Banzhaf power index (PB)** for single parties

$$\Pi_i^{PB}(\gamma,\omega)=\frac{\sum_{s=1}^{n}cardC_{is}(\gamma,\omega)}{\sum_{r=1}^{n}\sum_{k\in N}cardC_{kr}(\gamma,\omega)}$$

$$\Pi_1^{PB}(\gamma,\omega)=\frac{10}{26}=\frac{5}{13}$$

$$\Pi_2^{PB}(\gamma,\omega)=\frac{6}{26}=\frac{3}{13}$$

$$\Pi_3^{PB}(\gamma,\omega)=\frac{6}{26}=\frac{3}{13}$$

$$\Pi_4^{PB}(\gamma,\omega)=\frac{2}{26}=\frac{1}{13}$$

$$\Pi_5^{PB}(\gamma,\omega)=\frac{2}{26}=\frac{1}{13}$$

**<u>List of minimal critical winning configurations</u> (MCWC):**

Of the size 2 $\{1^*,2^*\};\{1^*,3^*\}$

Of the size 3 $\{1^*,4^*,5^*\},\{2^*,3^*,4^*\},\{2^*,3^*,5^*\}$

**Table of MCWC:**

| s = size of configuration | 1 | 2 | 3 | 4 | 5 | $\sum$ |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 2 | 1 | 1 | 0 | 0 | 4 |
| 3 | 1 | 2 | 2 | 2 | 2 | 9 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\sum$ | 3 | 3 | 3 | 2 | 2 | 13 |

**Holler-Packel power index (HP)** for single parties

$$\Pi_i^{HP}(\gamma,\omega) = \frac{\sum_{s=1}^{n} cardM_{is}(\gamma,\omega)}{\sum_{k=1}^{n}\sum_{r=1}^{n} cardM_{kr}(\gamma,\omega)}$$

$$\Pi_1^{HP}(\gamma,\omega) = \frac{3}{13}$$

$$\Pi_2^{HP}(\gamma,\omega) = \frac{3}{13}$$

$$\Pi_3^{HP}(\gamma,\omega) = \frac{3}{13}$$

$$\Pi_4^{HP}(\gamma,\omega) = \frac{2}{13}$$

$$\Pi_5^{HP}(\gamma,\omega) = \frac{2}{13}$$

## 2.4.3. The Constrained Power Indices = First Level Union Game

As well as in the second level sub game we need to find out the **number of marginalities** of each priory union in winning configurations of different sizes and the values of $\sigma$. We mark them by * and put the sum of them into the table again.

**List of winning configurations (WC):**

| | |
|---|---|
| Of the size 1 | No single union can create a winning configuration |
| Of the size 2 | $\{1^*,2^*\},\{1^*,3^*\},\{1^*,4^*\}$ |
| Of the size 3 | $\{1^*,2,3\},\{1^*,2,4\},\{1^*,3,4\},\{2^*,3^*,4^*\}$ |
| Of the size 4 | $\{1,2,3,4\}$ |

**Table of critical winning configurations (CWC):**

| s = size of configuration | $T_1=\{1\}$ | $T_2=\{2\}$ | $T_3=\{3\}$ | $T_4=\{4,5\}$ | $\sigma$ | $\sum$ |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 1/4 | 0 |
| 2 | 3 | 1 | 1 | 1 | 1/12 | 6 |
| 3 | 3 | 1 | 1 | 1 | 1/12 | 6 |
| 4 | 0 | 0 | 0 | 0 | 1/4 | 0 |
| $\sum$ | 6 | 2 | 2 | 2 | | 12 |

Then we calculate the **Shapley-Shubik power index (SS)** for single unions

$$\Pi_i^{SS}(\gamma,\tau)=\sum_{s=1}^{n}\frac{(s-1)!\,(n-s)!}{n!}cardC_{is}(\gamma,\tau)$$

$$\Pi_1^{SS}(\gamma,\tau)=0\,1/4+3\,1/12+3\,1/12+0\,1/4=1/2$$

$$\Pi_2^{SS}(\gamma,\tau)=0\,1/4+1\,1/12+1\,1/12+0\,1/4=1/6$$

$$\Pi_3^{SS}(\gamma,\tau)=0\,1/4+1\,1/12+1\,1/12+0\,1/4=1/6$$

$$\Pi_4^{SS}(\gamma,\tau)=0\,1/4+1\,1/12+1\,1/12+0\,1/4=1/6$$

**Penrose-Banzhaf power index (PB)** for single unions

$$\Pi_i^{PB}(\gamma,\omega)=\frac{\sum_{s=1}^{n}cardC_{is}(\gamma,\omega)}{\sum_{r=1}^{n}\sum_{k\in N}cardC_{kr}(\gamma,\omega)}$$

$$\Pi_1^{PB}(\gamma,\omega)=\frac{6}{12}=\frac{1}{2}$$

$$\Pi_2^{PB}(\gamma,\omega)=\frac{2}{12}=\frac{1}{6}$$

$$\Pi_3^{PB}(\gamma,\omega)=\frac{2}{12}=\frac{1}{6}$$

$$\Pi_4^{PB}(\gamma,\omega)=\frac{2}{12}=\frac{1}{6}$$

**List of minimal critical winning configurations (MCWC):**

Of the size 2 $\{1*,2*\},\{1*,3*\},\{1*,4*\}$

Of the size 3 $\{2*,3*,4*\}$

**Table of MCWC:**

| s = size of configuration | $T_1=\{1\}$ | $T_2=\{2\}$ | $T_3=\{3\}$ | $T_4=\{4,5\}$ | $\sum$ |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |
| 2 | 3 | 1 | 1 | 1 | 6 |
| 3 | 0 | 1 | 1 | 1 | 3 |
| 4 | 0 | 0 | 0 | 0 | 0 |
| $\sum$ | 3 | 2 | 2 | 2 | 9 |

**Holler-Packel power index (HP)** for single unions

$$\Pi_i^{HP}(\gamma,\omega)=\frac{\sum_{s=1}^{n} cardM_{is}(\gamma,\omega)}{\sum_{k=1}^{n}\sum_{r=1}^{n} cardM_{kr}(\gamma,\omega)}$$

$$\Pi_1^{HP}(\gamma,\omega)=\frac{3}{9}=\frac{1}{3}$$

$$\Pi_2^{HP}(\gamma,\omega)=\frac{2}{9}$$

$$\Pi_3^{HP}(\gamma,\omega)=\frac{2}{9}$$

$$\Pi_4^{HP}(\gamma,\omega)=\frac{2}{9}$$

The **vectors of indices for the unions** are:

$$\Pi^{SS}(\gamma,\tau)=\left(\frac{1}{2},\frac{1}{6},\frac{1}{6},\frac{1}{6}\right)=\Pi^{PB}(\gamma,\tau)$$

$$\Pi^{HP}(\gamma,\tau)=\left(\frac{1}{3},\frac{2}{9},\frac{2}{9},\frac{2}{9}\right)$$

Using the power indices we now put down the vectors of the second level sub game indices of union $T=\{T_1,T_2,T_3,T_4\}$, which are identical to the unconstrained power indices:

$$\Pi_4^{SS}(\gamma,\tau,\omega^4)=\left(\frac{2}{5},\frac{7}{30},\frac{7}{30},\frac{1}{15},\frac{1}{15}\right)$$

$$\Pi_4^{PB}(\gamma,\tau,\omega^4)=\left(\frac{5}{13},\frac{3}{13},\frac{3}{13},\frac{1}{13},\frac{1}{13}\right)$$

$$\Pi_4^{HP}(\gamma,\tau,\omega^4)=\left(\frac{3}{13},\frac{3}{13},\frac{3}{13},\frac{2}{13},\frac{2}{13}\right)$$

Finally we calculate the power indices in the committee with the given **a priori union structure** $T=\{T_1,T_2,T_3,T_4\}$, using the

**Shapley-Shubik power index (SS)**

$$\Pi_i^{SS}(\gamma,\omega,T)=\frac{\sum_{s=1}^{m}(s-1)!\,(m-s)!\cdot cardC_{js}(\gamma,\tau)\cdot\sum_{s=1}^{m}(l-1)!\,(m-1+t_j-l)!\cdot cardC_{il}(\gamma,\tau,\omega^j)}{m!\cdot\sum_{k=n_{j-1}+1}^{n_j}\sum_{r=1}^{m-1+t_j}(r-1)!\,(m-1+t_j-r)!\cdot cardC_{kr}(\gamma,\tau,\omega^j)}$$

$$\Pi_1^{SS}(\gamma,\omega,T)=\Pi_1^{SS}(\gamma,\tau)\frac{\Pi_{11}^{SS}(\gamma,\tau,\omega^3)}{\sum_{k=1}^{1}\Pi_{k1}^{SS}(\gamma,\tau,\omega^3)}=\frac{1}{2}\frac{2/5}{2/5}=\frac{1}{2}$$

$$\Pi_2^{SS}(\gamma,\omega,T)=\Pi_2^{SS}(\gamma,\tau)\frac{\Pi_{22}^{SS}(\gamma,\tau,\omega^3)}{\sum_{k=2}^{2}\Pi_{k2}^{SS}(\gamma,\tau,\omega^3)}=\frac{1}{6}\frac{7/30}{7/30}=\frac{1}{6}$$

$$\Pi_3^{SS}(\gamma,\omega,T)=\Pi_3^{SS}(\gamma,\tau)\frac{\Pi_{33}^{SS}(\gamma,\tau,\omega^3)}{\sum_{k=3}^{5}\Pi_{k3}^{SS}(\gamma,\tau,\omega^3)}=\frac{1}{6}\frac{7/30}{7/30}=\frac{1}{6}$$

$$\Pi_4^{SS}(\gamma,\omega,T)=\Pi_3^{SS}(\gamma,\tau)\frac{\Pi_{43}^{SS}(\gamma,\tau,\omega^3)}{\sum_{k=3}^{5}\Pi_{k3}^{SS}(\gamma,\tau,\omega^3)}=\frac{1}{6}\frac{1/15}{1/15+1/15}=\frac{1}{12}$$

$$\Pi_5^{SS}(\gamma,\omega,T)=\Pi_3^{SS}(\gamma,\tau)\frac{\Pi_{53}^{SS}(\gamma,\tau,\omega^3)}{\sum_{k=3}^{5}\Pi_{k3}^{SS}(\gamma,\tau,\omega^3)}=\frac{1}{6}\frac{1/15}{1/15+1/15}=\frac{1}{12}$$

**Penrose-Banzhaf power index (PB)**

$$\Pi_i^{PB}(\gamma,\omega,T)=\frac{\sum_{s}^{n}cardC_{js}(\gamma,\tau)\sum_{l}^{m-1+t_j}cardC_{il}(\gamma,\tau\omega^j)}{\sum_{j=1}^{m}\sum_{v=1}^{m}cardC_{jv}(\gamma,\tau)\cdot\sum_{k=n_{j-1}+1}^{n_j}\sum_{r=1}^{m-1+t_j}cardC_{kr}(\gamma,\tau,\omega^j)}$$

$$\Pi_1^{PB}(\gamma,\omega,T)=\frac{1}{2}\frac{5/13}{5/13}=\frac{1}{2}$$

$$\Pi_2^{PB}(\gamma,\omega,T)=\frac{1}{6}\frac{3/13}{3/13}=\frac{1}{6}$$

$$\Pi_3^{PB}(\gamma,\omega,T)=\frac{1}{6}\frac{3/13}{3/13}=\frac{1}{6}$$

$$\Pi_4^{PB}(\gamma,\omega,T)=\frac{1}{6}\frac{1/13}{1/13+1/13}=\frac{1}{12}$$

$$\Pi_5^{PB}(\gamma,\omega,T)=\frac{1}{6}\frac{1/13}{1/13+1/13}=\frac{1}{12}$$

**Holler-Packel power index (HP)**

$$\Pi_i^{HP}(\gamma,\omega,T)=\frac{\sum_{s}^{n} cardM_{js}(\gamma,\tau)\sum_{l}^{m-1+t_j} cardM_{il}(\gamma,\tau\omega^j)}{\sum_{j=1}^{m}\sum_{v=1}^{m} cardM_{jv}(\gamma,\tau)\cdot\sum_{k=n_{j-1}+1}^{n_j}\sum_{r=1}^{m-1+t_j} cardM_{kr}(\gamma,\tau,\omega^j)}$$

$$\Pi_1^{HP}(\gamma,\omega,T)=\frac{1}{3}\frac{3/13}{3/13}=\frac{1}{3}$$

$$\Pi_2^{HP}(\gamma,\omega,T)=\frac{2}{9}\frac{3/13}{3/13}=\frac{2}{9}$$

$$\Pi_3^{HP}(\gamma,\omega,T)=\frac{2}{9}\frac{3/13}{3/13}=\frac{2}{9}$$

$$\Pi_4^{HP}(\gamma,\omega,T)=\frac{2}{9}\frac{2/13}{2/13+2/13}=\frac{1}{9}$$

$$\Pi_5^{HP}(\gamma,\omega,T)=\frac{2}{9}\frac{2/13}{2/13+2/13}=\frac{1}{9}$$

## 2.4.4. Results and Conclusions

From the results it is obvious, that the distribution of power significantly changes while we take into account the existence of Coalition (by introducing constrains):

**Shapley-Shubik power index (SS)**

$$\Pi_1^{SS}(\gamma,\omega) = 2/5 = 0{,}4 \quad \rightarrow \quad \Pi_1^{SS}(\gamma,\omega,T) = 1/2 = 0{,}5$$
$$\Pi_2^{SS}(\gamma,\omega) = 7/30 = 0{,}233 \quad \rightarrow \quad \Pi_2^{SS}(\gamma,\omega,T) = 1/6 = 0{,}166$$
$$\Pi_3^{SS}(\gamma,\omega) = 7/30 = 0{,}233 \quad \rightarrow \quad \Pi_3^{SS}(\gamma,\omega,T) = 1/6 = 0{,}166$$
$$\Pi_4^{SS}(\gamma,\omega) = 1/15 = 0{,}066 \quad \rightarrow \quad \Pi_4^{SS}(\gamma,\omega,T) = 1/12 = 0{,}0833$$
$$\Pi_5^{SS}(\gamma,\omega) = 1/15 = 0{,}066 \quad \rightarrow \quad \Pi_5^{SS}(\gamma,\omega,T) = 1/12 = 0{,}0833$$

**Penrose-Banzhaf power index (PB)**

$$\Pi_1^{PB}(\gamma,\omega) = \frac{5}{13} = 0{,}384 \quad \rightarrow \quad \Pi_1^{PB}(\gamma,\omega,T) = \frac{1}{2} = 0{,}5$$
$$\Pi_2^{PB}(\gamma,\omega) = \frac{3}{13} = 0{,}23 \quad \rightarrow \quad \Pi_2^{PB}(\gamma,\omega,T) = \frac{1}{6} = 0{,}166$$
$$\Pi_3^{PB}(\gamma,\omega) = \frac{3}{13} = 0{,}23 \quad \rightarrow \quad \Pi_3^{PB}(\gamma,\omega,T) = \frac{1}{6} = 0{,}166$$
$$\Pi_4^{PB}(\gamma,\omega) = \frac{1}{13} = 0{,}075 \quad \rightarrow \quad \Pi_4^{PB}(\gamma,\omega,T) = \frac{1}{12} = 0{,}0833$$
$$\Pi_5^{PB}(\gamma,\omega) = \frac{1}{13} = 0{,}075 \quad \rightarrow \quad \Pi_5^{PB}(\gamma,\omega,T) = \frac{1}{12} = 0{,}0833$$

**Holler-Packel power index (HP)**

$$\Pi_1^{HP}(\gamma,\omega) = \frac{3}{13} = 0{,}23 \quad \rightarrow \quad \Pi_1^{HP}(\gamma,\omega,T) = \frac{1}{3} = 0{,}333$$
$$\Pi_2^{HP}(\gamma,\omega) = \frac{3}{13} = 0{,}23 \quad \rightarrow \quad \Pi_2^{HP}(\gamma,\omega,T) = \frac{2}{9} = 0{,}222$$
$$\Pi_3^{HP}(\gamma,\omega) = \frac{3}{13} = 0{,}23 \quad \rightarrow \quad \Pi_3^{HP}(\gamma,\omega,T) = \frac{2}{9} = 0{,}222$$
$$\Pi_4^{HP}(\gamma,\omega) = \frac{2}{13} = 0{,}153 \quad \rightarrow \quad \Pi_4^{HP}(\gamma,\omega,T) = \frac{1}{9} = 0{,}111$$
$$\Pi_5^{HP}(\gamma,\omega) = \frac{2}{13} = 0{,}153 \quad \rightarrow \quad \Pi_5^{HP}(\gamma,\omega,T) = \frac{1}{9} = 0{,}111$$

It is interesting that the results from Shapley-Shubik and Penrose-Banzhaf power indices turned out quite similar, but the result from Holler-Packel power index shows significantly different results and therefore conclusions as well.

Shapley-Shubik and Penrose-Banzhaf power indices suggest that the Coalition parties (Political group Christian Democratic Union - Czechoslovak People's Party and Political group Freedom Union) gained some power from creating a priori union, but much smaller comparing to a significant profit of the Political group Czech Social

Democratic Party. On the other hand this new structure meant quite a harm in the sense of voting power for both the Political group Civic Democratic Party and the Political group Communist Party of Bohemia and Moravia, which are both “political enemies” of Coalition.

Holler-Packel power index however suggests that Coalition actually looses some power and its „enemies“ didn’t loose at all. It agrees on the significant gain of the Political group Czech Social Democratic Party. The overall conclusion on the basis of this index is, that creating the Coalition was not a profitable step.

# 3. CZECH PARLIAMENTARY SYSTEM

## 3.1. History of Czech Parliamentarism and Constitutionality

The history of Czech constitutionality reaches back to the 13th century when in 1212 the document commonly called the "Golden Bull of Sicily" was issued[31]. This document from the Holy Roman Emperor and Frederick II., the King of Sicily's charter, who gave it in Basle on the 26th of September 1212 to the Czech ruler Přemysl the I. Otakar[32], entitled Přemysl and his successors to use the title of king and prescribed the laws and duties of the Czech kings. It was the first important historical document related to the self-government of the Bohemian Lands. A subsequent very important act was, that Charles IV.[33] as a Roman emperor validated all the privileges accorded to the Czech kings by the Roman kings and emperors in Prague on the 7th of April 1348.

Almost two hundred years later at the General Assembly in Prague on the 31st of July 1619 the estates of the Czech Crown approved the Constitution of the Czech State[34], which became a confederation of Bohemia, Moravia, Silesia and Upper and Lower Lusatia. The State Records of the Czech Kingdom, which were kept by the regional high courts, provide evidence that there already existed one of the three components of modern state power, the judicial power. They were official books kept by the court of the Czech lands. The oldest one of them comes from the middle of the 13th century, the last one originates in the middle of the 19th century.

The Czech Representative Board was part of the political system even during the following centuries when the Czech Lands were part of the Hapsburg monarchy and since the 29th of February 1920 in a newly constituted Czechoslovak Republic it acquired two-chamber form for the first time[35]. It is quite obvious according to these historical sources that the history of Czech parliamentarism and constitutionality is of a distinctly older date than the establishment of the sovereign Czech State in 1993[36].

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[31] "Dějiny zemí koruny české I." (1992), p.69

[32] Czech ruler from 1197 to 1230

[33] Czech ruler from 1346 to 1378, "Dějiny zemí koruny české I." (1992), p.113

[34] http://www.psp.cz

[35] "Dějiny zemí koruny české II." (1992), p.168, "Kronika lidstva" (1992), p.878 and 886

[36] "Kronika lidstva" (1992), p.1130

Many of the laws still valid have certain marks of the rich history of Czech statehood, which reaches back to the early middle ages.

## 3.2. Present Design of Czech Parliamentarism and Constitutionality

The new electoral system of the Parliament of the Czech Republic is founded on proportional representation and was approved in the former Czechoslovak Republic after the political changeover in November 1989 close before the first free elections took place in June 1990. The system was nearly identical for all the three federative Parliaments of the federative republic (Federal Assembly, Czech National Council and Slovak National Council).

The original electoral law was slightly changed before the elections in 1992. On the 16th of December 1992 because of the separation of the Czech and Slovak Republics the Czech National Council approved the Constitution of the Czech Republic[37]. It is the first Constitution in the thousand-year history of Czech statehood, which was accepted in the Czech Republic as a sovereign and independent state. The Czech Constitution came into force on the 1st of January 1993 with the constitution of the Czech Republic.

In 1995 a new electoral law[38] was accepted, which includes arrangements for election to the Chamber of Deputies and the Senate. The first election to the Senate took place during the 15th and 16th and the 22nd and 23rd of November 1996.

### 3.2.1. Parliament of the Czech Republic

The legislative power in the Czech Republic belongs to the Parliament. It is comprised of two houses, the Lower House called the Chamber of Deputies and the Upper House called the Senate. The Chamber of Deputies has 200 deputies, who are elected for four-year periods. The Senate has 81 senators, who are elected for six-year periods and every second year one-third of senators gets re-elected. Both chambers are able to vote by the presence of at least one third of its members. To pass a bill is necessary a simple majority of the senators or deputies, who are present. A

[37] Act No.1/1993 Coll. Constitution of the Czech Republic

[38] Act No.247/1995 Coll. about the election to Parliament of the Czech Republic and about changes and replenishment of some acts

constitutional law must be passed by a three-fifths majority of all deputies and a three-fifths majority of senators present.

A legislative initiative can be presented by a deputy or a group of deputies, the Senate, the Government of the Czech Republic or the local authority of a higher administrative unit. Proposals are handed to the Chamber of Deputies. International agreements, which require the approval of Parliament, get approved the same way as law proposals.

As well as the legislative function the Parliament has also some other powers like to give approval to some international agreements[39], to elect the President of the Czech Republic[40], the Chamber of Deputies can also pronounce confidence of non-confidence in the Government of the Czech Republic[41] and announce election to local authorities.

The Houses of the Parliament of the Czech Republic usually act separately. A conjunct meeting of both parliamentary Houses assembles the chairperson of the Chamber of Deputies and for such a meeting are applied working rules of the Chamber of Deputies. The conjunct meeting is laid down only for the election of the President of the Czech Republic[42] and for the acceptance of the vow of the president-elect[43].

The Senate is constructed as a counterbalance to the Chamber of Deputies, as a component that generates conditions for a higher quality of legislative process and as a component of parliamentary continuity in cases when the Chamber of Deputies is dismissed. The Czech Senate cannot be dissolved and therefore becomes the guarantor of stability and continuous legislative power

### 3.2.2. Election to the Parliament of the Czech Republic

Parliamentary elections are run on the basis of secret voting under the universal, equal and direct voting law. The election to the Chamber of Deputies is run according to the principle of proportional representation and to the Senate according to

[39] clause No.49 of the Constitution of Czech Republic

[40] clause No.54 of the Constitution of Czech Republic

[41] clause No.68 and clause Nr.72 of the Constitution of Czech Republic

[42] clause No.54 of the Constitution of Czech Republic

[43] clause No.59 of the Constitution of Czech Republic

the principle of majority system[44]. Any Czech citizen who has reached the age of 18 is entitled to vote, unless he was deprived of his legal capacity. As a member of the Chamber of Deputies can be elected any citizen of the Czech Republic who is over 21 and enjoys full voting rights and to become a member of the Senate the age over 40 is essential. Every second year one third of Senators is re-elected, which in other words means that the Senate is a permanent institution, which because of the impossibility of being dissolved goes on doing its job continuously. More details about the Senate are contained in the Attachment No.4.

Regular elections to the Chamber of Deputies take place every four years. The Czech Republic is divided into 14 electoral districts, which are identical with higher administrative units. List of candidates must be handed in at least 66 days before the announced day of elections and each party or coalition has to deposit in all districts, where they present their list of candidates, a 15 000 CZK fee for the electoral costs.

Mandates are divided among those parties that exceed the 5% limit of the total number of the delivered valid votes on the national level. For coalitions of political parties are valid the following rules: coalition of 2 parties has to collect at least 10%, coalition of 3 parties has to collect at least 15% and a coalition of 4 and more parties has to collect at east 20% of valid votes. Mandates are divided among those political subjects who exceeded the given threshold on the basis of d´Hondt system. In this system the number of acquired votes of each political party or coalition are step by step divided by numbers 1; 2; 3; 4; …. n, where n exceeds by one the number of allocated mandates in the particular electoral district. The results of these divisions are arranged according to size until the number of allocated mandates in each voting district is reached. Single parties get the number of mandates according to how many times their result appeared in the compared row.

The number of seats in each of the 14 electoral districts is proportional to the total number of valid votes in the district. Votes of those parties, that didn't reach the given threshold are redistributed to those parties that exceeded this threshold. The redistribution is also proportional to the received number of votes.

It is not possible to be a member of both chambers of the Parliament of the Czech Republic at the same time. Deputies and Senators are not allowed to perform the

[44]According to clause No.18 of the Constitution of Czech Republic, another conditions of electoral law are set by Parliamentary elections act

function of President of the Czech Republic or the function of a judge. A deputy who is a member of the government cannot be either the chairperson or the vice chairperson of the Chamber of Deputies or the Senate, nor can he or she be a member of parliamentary committees and commissions.

### 3.2.3. Evolution of Czech Electoral Legislation

The first election to the Czech National Council after the change of political conditions in the fall 1989 were run under the Act Nr.54 of the Czech National Council from March 9th 1990 and they were announced for the 8th and 9th of June 1990. (Detailed results of all elections to the Czech Lower House since 1990, which contain the full English and Czech names of parties, their Czech abbreviations used as captions in figures and tables in the thesis, are listed in Attachment No.2. They took place only on in territory of the Czech Republic and electoral districts were set in municipalities such that each covered around 1000 voters. There was an irregular law provision by which the validity of mandates got reduced from the usual four to only two years.

During the 5th and 6th of June 1992 another election to the Czech National Council took place. It was run under the same electoral law[45] as the election of 1990, but the office term was regular four-year this time. Until the end of the year 1992 the Czech National Council worked as a legislative authority in the things, which were under the autonomous potency of the Czech Republic as a part of the Czech and Slovak Federative Republic. The Federal Assembly[46] represented legislative power of the whole republic

After the autonomous Czech Republic[47] arose on the January 1st 1993 the mandates from the 1992 election to the Czech National Council remained valid for the Chamber of Deputies of the Czech Republic that was established according to the new Constitution of Czech Republic Act No.1/1993 Coll..

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[45] Partial novels of the electoral law were contained in the Czech National Council Acts No.435/1991 Coll. and No.94/1992 Coll. and in the provision of presidium of the Czech National Council No.221/1990 Coll.

[46] Federal Assembly of the Czech Republic was assembled of the House of Peoples and the House of Nations

[47] corresponding to the agreement of crucial Czech and Slovak political parties from the 23rd of July 1992 and on the basis of the Federal Assembly resolution from the 25th of November 1992

The next election took place after the four-year term during the 31st of May and the 1st of June 1996, which was modified by the Act No.247/1995 Coll. about parliamentary election and changes and replenishments of some other acts. The election as well as the previous ones took place only in the territory of the Czech Republic. Eight permanent electoral districts were newly established according to §8 of the Act No.152/1994 Coll. about the election to local authorities in municipalities.

The collapse of the government coalition accompanied by fragmentation of the largest government party led to an early election to the Chamber of Deputies during the 19th and 20th of June 1998. This election enabled the constitutional act No.69/1998 Coll. about mandates abridgement of the Chamber of Deputies elected in 1996.

The number of electoral districts for this election arose to 14 corresponding to the 14 regional administrative units of the Czech Republic established by the Constitutional Act No.347/1997 Coll. about the creation of higher administrative units and about the change of the Constitutional Act No.1/1993 Coll.

The 2002 election to the Chamber of Deputies took place during the 14$^{th}$ and 15$^{th}$ of June 2002 according to the revised Constitution of the Czech Republic Acts No.448/2001 Coll., and No.395/2001 Coll.. This time even Czech nationals living or being abroad could participate in this election. The participation of these nationals was however rather low as a result of the small number of electoral rooms set up abroad and the difficulties in gaining voter passes, which often required of potential voters not only to travel thousands of kilometres to the closest electoral room but even to do it twice.

# 4. ELECTORAL HISTORY OF THE CZECH LOWER HOUSE SINCE 1990

## 4.1. Distribution of Votes in the Czech Chamber of Deputies

The first election to the Czech National Council (the patent chamber of the later Czech Chamber of Deputies, which was born together with the separate Czech Republic in 1993) after the change of political conditions in fall 1989 took place in June 1990 (see Chapter 3.2.3.).

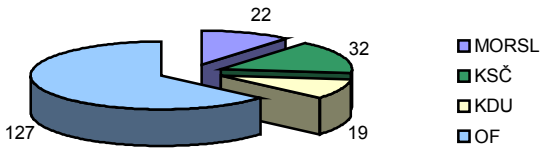


**Figure 4.1.** The 1990 Elections to the Czech National Council (number of mandates)

Concerning the result of these elections, there was nothing surprising. The Civil Forum, which was not a political party but rather a joint movement of people, who were willing to bring the country to democracy as soon as possible, positively won the election (Table 4.1.). Since the Forum concentrated individuals with a wide spectrum of opinions, it was dissolved before the next election in June 1992.

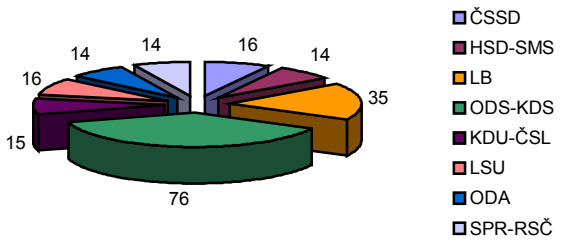


**Figure 4.2.** The 1992 Elections to the Czech National Council (number of mandates)

The result of the 1992 election was rather clear too. The winning civil democrats created government coalition with the two ideologically closest parties, the Civic Democratic Alliance and the Christian Democratic Union - Czechoslovak

People's Party (Characteristics of the most significant parties on the Czech political stage, which applied for the 2002 election, is given in the Attachment No.1).

Yet the 1996 electoral result was rather surprising. According to the pre-electoral inquiries a higher percentage of votes delivered to the social democrats were predicted, but the victory of the existing government coalition[48] was expected. The electoral result was however much more dramatic.

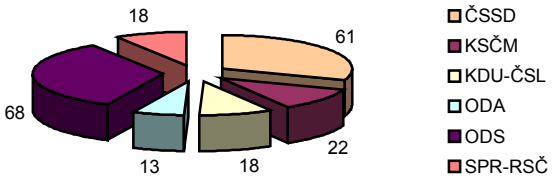


**Figure 4.3.** The 1996 Elections to the Chamber of Deputies of the Czech Republic (number of mandates)

The civil democrats actually won the election, but the social democrats almost caught up. The difference among them was mere 3,18 per cent points (Figure 4.3.). In the new Chamber of Deputies the former government coalition reached only 99 deputies out of total 200 and could therefore assemble only a minority government. After very difficult talks the new government assembled of the last-period government coalition parties was formed and gained the trust of the Chamber of Deputies.

These fragile political conditions hand in hand with an unfavourable economic course[49] and many problems that showed up in the Civil Democratic Party financing led to the government resignation on the 29th of November 1997. President Havel entrusted the leader of the Christian Democratic Union - Czechoslovak People's Party Josef Lux to manage the talks about a new government out of which a new so called "expert" government arose on the 28th of January 1998.

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[48] Civic Democratic Party, Civic Democratic Alliance and Christian Democratic Union - Czechoslovak People's Party

[49] Czech government tried for a radical rectification by a group of concrete steps that became known as "package of economic remedies". This heal program asked for budget cuts, reduction of wages growth in state sector, push of pension valorisation, acceleration of privatisation of companies, which are still state owned, import obstructions, tightening of rules of financial capital market and such.

This course got also reflected in a record number of changes of memberships in single political groups in the Chamber of Deputies during this period. The changes are graphed in the Figure 4.4. There is also remarkable the establishment of a new party on the 20th of January 1998 called Freedom Union, which was founded mainly by former members of the Civil Democratic Party, who wanted to disavow from the higher mentioned problems. (Attachment No.5)

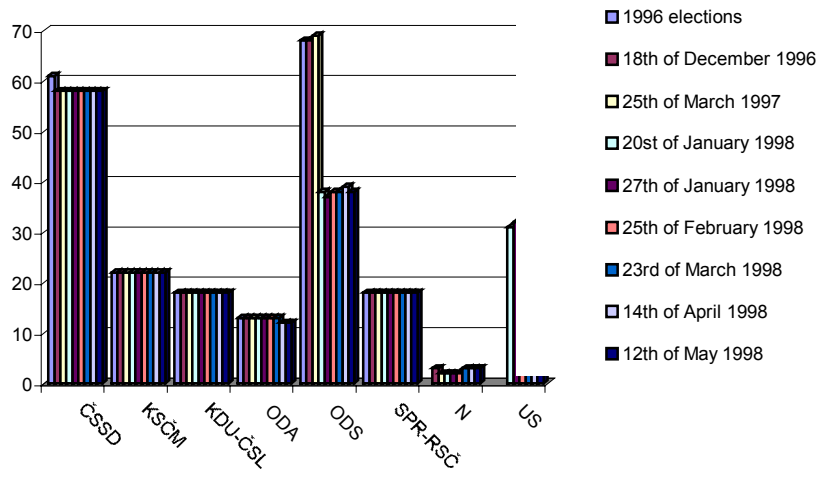


**Figure 4.4.** Changes in the Chamber of Deputies during the second electoral period

Later in June of this year another election to Chamber of Deputies took place. According to pre-electoral inquiries the Czech Social Democratic Party won the 1998 elections followed by civil democrats and communists (Figure 4.5.). The government composition however showed up to be quite difficult again. The problem was mainly on the side of the Union of Freedom that showed a resistance to get into coalition with the social democrats and also a coalition with the civil democrats had no chance to be composed because of a strong animosity of party leaders. This led to an unexpected way out of this stalemate situation, when on the 22nd of July 1998 the two strongest parties concluded a so-called "Opposition Agreement". In this agreement the civil democrats undertook to tolerate the minority government of social democrats in order to ensure stable conditions on the Czech political stage.

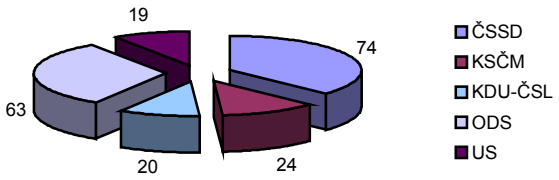


**Figure 4.5.** The 1998 Elections to the Chamber of Deputies of the Czech Republic (number of mandates)

Concerning the 2002 election, pre-electoral inquiries estimated the actual result very well this time. The only possibly surprising outcome of these elections was quite a substantial strengthening of communists (Figure 4.6.) and the fact that for the first time since the velvet revolution they gained one of the top parliamentary offices.

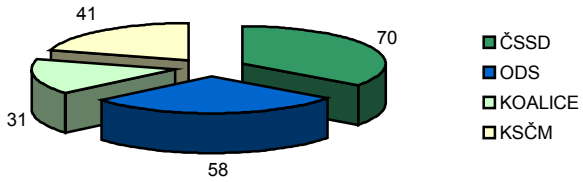


**Figure 4.6.** The 2002 Elections to the Chamber of Deputies of the Czech Republic (number of mandates)

The winning Czech Social Democratic Party settled on government formation with the Coalition parties, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union. The only problem during the talks concerned some programmatic differences between unionists and social democrats and was solved by changing of the leader of the Freedom Union.

## 4.2. Distribution of Power in the Czech Chamber of Deputies: Application of Methodology of Power Indices with A priori Unions

In this chapter I will calculate the power of single parties of the Chamber of Deputies on the basis of the Czech electoral results using the Shapley-Shubik (SS),

Penrose-Banzhaf (PB) and Holler-Packel (HP) indices, which take into account the a priori union structure of the Chamber. These results of the three indices with a priori unions will serve for the comparison with the results of indices introduced later in this thesis, searching for those, which seem to describe the reality better.

The Czech Chamber of Deputies works on two principles, the simple majority and the three-fifth majority qualified basis, depending on whether it is approving a regular act or a constitutional act (see Chapter 3.2.1.). I am going to watch the differences of power distribution depending on the size of quota.

### 4.2.1. Election of 1992

The result of the 1992 election ended up in favour of the Coalition of Civic Democratic Party and Christian Democratic Party. Civil democrats gained 38% of mandates and had no problem to create government coalition with their two ideologically closest parties, the Civic Democratic Alliance and the Christian Democratic Union - Czechoslovak People's Party. Their government coalition had 105 mandates, which allowed it to generate a stable majority government.

| Czech | Mandates | | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| abbreviation | abs. | % | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | 16 | 8 | 5,95 | 0 | 5,32 | 0 | 12,5 | 0 | 7,3 | 6,67 | 8,08 | 2,5 | 12,5 | 11,11 |
| HSD-SMS | 14 | 7 | 5,95 | 0 | 5,32 | 0 | 12,5 | 0 | 4,52 | 1,67 | 4,04 | 2,5 | 10 | 11,11 |
| KSČM-LB | 35 | 18 | 10,71 | 0 | 7,45 | 0 | 8,43 | 0 | 14,29 | 6,67 | 16,16 | 7,5 | 8,75 | 11,11 |
| ODS-KDS | 76 | 38 | 53,57 | 68,89 | 40,64 | 79,25 | 19,28 | 44,44 | 50 | 59,44 | 47,47 | 61,73 | 23,75 | 22,82 |
| KDU-ČSL | 15 | 7,5 | 5,95 | 15,56 | 5,32 | 10,37 | 12,05 | 27,77 | 7,38 | 10,28 | 8,08 | 10,5 | 12,5 | 12,01 |
| LSU | 16 | 8 | 5,95 | 0 | 5,32 | 0 | 12,05 | 0 | 7,38 | 6,67 | 8,08 | 7,5 | 12,5 | 11,11 |
| ODA | 14 | 7 | 5,95 | 15,56 | 5,32 | 10,37 | 12,05 | 27,77 | 4,52 | 6,94 | 4,04 | 5,25 | 10 | 9,61 |
| SPR-RSČ | 14 | 7 | 5,95 | 0 | 5,32 | 0 | 12,05 | 0 | 4,52 | 1,67 | 4,04 | 2,5 | 10 | 11,11 |

**Table 4.1.** Distribution of power in the 1992 elected Chamber of Deputies calculated by unconstrained and constrained Shapley-Shubik (SS), Penrose-Banzhaf (PB) and Holler-Packel (HP) indices considering a priori union of Coalition of Civic Democratic Party and Christian Democratic Party, the Civic Democratic Alliance and the Christian Democratic Union - Czechoslovak People's Party.

All indices except of the Holler-Packel index calculated for the case of 3/5 majority voting rule, which even evaluated the power of the Civic Democratic Alliance lower than the power of any of the non-government parties, agree on the fact that creating coalition has brought the government parties some power. The most significant gains under both voting rules shows the Penrose-Banzhaf index. All indices also agree that the non-government parties have no power in regular voting with the 50% quorum.

They seem to have some rather marginal power by voting where the 3/5 majority is required.

All indices impute the Civil Democratic Party the highest power and except of the HP index for the 3/5 quorum, they show the highest gains of power for this party as a result of coalition formation. Another word creating the coalition has been the highest asset for the civil democrats.

On the end it is possible to declare, that the calculated results seem to correspond to the reality in the sense, that the government was stable during this electoral period and had no particular problems pushing their drafts and bills. As they didn't have difficulties even by the state budget negotiations, for whose passing the 3/5 majority is required, the Holler-Packel index doesn't seem to describe the reality very well.

### 4.2.2. Election of 1996

In the 1996 elections the civil democrats gained the highest number of votes, but their victory wasn't actually as large as it had been expected before the election. Quite a surprise became the significantly higher amount of mandates, which gained the social democrats that stayed behind the civil democrats only about 3,18 percent points. This caused a stalemate situation where the potential and actually the only political feasible government coalition of the Civil Democratic Party, the Civic Democratic Alliance and the Christian Democratic Union - Czechoslovak People's Party collected only 49,5% of mandates and wasn't therefore able to assemble a majority government. On the end these parties formed a minority government.

| Czech | Mandates | | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| abbreviation | abs. | % | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | 61 | 31 | 26,67 | 16,67 | 25 | 16,66 | 16,67 | 22,22 | 26,67 | 16,67 | 28,26 | 22,22 | 10,53 | 25 |
| KSČM | 22 | 11 | 16,67 | 16,67 | 17,86 | 16,66 | 20,83 | 22,22 | 11,67 | 16,67 | 10,87 | 22,22 | 21,05 | 25 |
| KDU-ČSL | 18 | 9 | 10 | 11,11 | 10,71 | 11,54 | 16,67 | 12,13 | 6,67 | 8,33 | 6,52 | 6,67 | 15,79 | 15 |
| ODA | 13 | 6,5 | 3,33 | 2,78 | 3,57 | 3,85 | 8,33 | 6,06 | 6,67 | 8,33 | 6,52 | 6,67 | 15,79 | 15 |
| ODS | 68 | 34 | 33,33 | 36,11 | 32,14 | 34,62 | 20,83 | 15,15 | 41,67 | 50 | 41,3 | 42,22 | 21,05 | 20 |
| SPR-RSČ | 18 | 9 | 10 | 16,67 | 10,71 | 16,66 | 16,67 | 22,22 | 6,67 | 0 | 6,52 | 0 | 12,79 | 0 |

**Table 4.2.** Distribution of power in the 1996 elected Chamber of Deputies calculated by unconstrained and constrained Shapley-Shubik (SS), Penrose-Banzhaf (PB) and Holler-Packel (HP) indices considering a priori union of the Civil Democratic Party, the Civic Democratic Alliance and the Christian Democratic Union - Czechoslovak People's Party.

The Shapley-Shubik and Penrose-Banzhaf indices on one side and the Holler-Packel index on the other disagree on the judgements of the profit from coalition formation for the coalition parties. HP index positively show, that these parties loose their power once they start to cooperate. The SS index and the PB index both agree that these parties gain a certain amount of power, but this amount is not significant.

More interesting seems to be the gains and looses of the non-government parties, especially the results of the Association for Republic-Czechoslovak Republican Party demonstrate interesting movements. Owing to the coalition emergence this party achieves a significant growth of power during voting according to the majority rule, but if it is voted on the 3/5-majority basis the coalition emergence brigs to this party a zero power. It should be also noticed that the power of social democrats, even thought they gained the second highest number of mandates and this number is almost twice as big as the number of mandates gained by the other two non-government parties, comes out the same as the power of the Communist Party of Bohemia and Moravia with only 22 deputies and in cases when only the absolute majority is required also as the power of the Association for Republic-Czechoslovak Republican Party. Another words the existence of such government coalition harmed the Czech Social Democratic Party the most.

In this case can be said that even thought the Holler-Packel index shows in some cases a different results from the other two indices, it might be right. The minority government felt after one year of it's existence and even thought it seems that it decomposed from the inside maybe the incapability to push the constitutional acts, which require the 3/5 majority, actually caused the failure of the government.

Without interest are also not the numerous changes of party affiliation in the Chamber of Deputies (listed in the Attachment No.5 or plotted in the Figure 4.4.), that appeared during this electoral period. This period experienced eight of such transfers and I found interesting to check how did these transfer influenced the power decomposition in the Lower House. In favour of better lucidity I chose only three of these changes to illustrate the transfers.

As the first change I chose the 18$^{th}$ of December 1996 when three of the social democratic deputies left their political group and became non-included. This event had no influence on the established government coalition. One of the three non-included deputies lately entered the civil democratic group.

The most remarkable change happened on the 20th of January 1998, which I chose as the second examined state. To this date not only the government coalition collapsed, but also the Civil Democratic Party felt apart. Almost half of the civil democratic deputies left the party and formed a new political party called the Freedom Union. There actually remained some kind of coalition, which formed the Christian Democratic Union - Czechoslovak People's Party, the Civic Democratic Alliance and the Freedom Union.

Couple of minor exchanges of deputies between the civil democratic group, the unionist's group, alliance group and the non-included took place lately and I chose the one of the 14th of April 1998 as the last for the illustration. For calculation of power I'll use only the unconstrained and constrained Shapley-Shubik indices in this case since it came out of the Turnovec's[50] and Laruell's testing of attributes as possibly better than the other two indices I use in this thesis (see Chapter 2.3.1.) and more indices would extend the Table 4.3. into a confusing level.

| Czech abbreviation | Mandates | | | | Power index for absolute majority | | | | | | | | Power index for 3/5 majority | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | abs. | | | | SS | | | | SSAU | | | | SS | | | | SSAU | | | |
| ČSSD | 61 | 58 | 58 | 58 | 26,67 | 21,75 | 31,75 | 32,02 | 16,67 | 8,33 | 27,38 | 35,6 | 26,67 | 26,67 | 33,41 | 32,94 | 16,67 | 16,67 | 31,67 | 31,67 |
| KSČM | 22 | 22 | 22 | 22 | 16,67 | 11,75 | 8,41 | 8,93 | 16,67 | 8,33 | 9,05 | 2,26 | 11,67 | 11,67 | 10,79 | 12,14 | 16,67 | 16,67 | 15 | 15 |
| KDU-ČSL | 18 | 18 | 18 | 18 | 10 | 9,48 | 8,06 | 8,06 | 11,11 | 16,43 | 9,88 | 8,45 | 6,67 | 6,67 | 7,1 | 6,87 | 8,33 | 8,33 | 6,67 | 6,67 |
| ODA | 13 | 13 | 13 | 12 | 3,33 | 7,22 | 7,7 | 6,79 | 2,78 | 15,95 | 7,38 | 7,14 | 6,67 | 6,67 | 6,75 | 5,6 | 8,33 | 8,33 | 16,67 | 4,46 |
| ODS | 68 | 68 | 38 | 39 | 33,33 | 37,22 | 17,7 | 17,34 | 36,11 | 42,62 | 20 | 20,83 | 41,67 | 41,67 | 17,46 | 18,81 | 50 | 50 | 6,19 | 18,87 |
| SPR-RSČ | 18 | 18 | 18 | 18 | 10 | 9,48 | 8,06 | 8,06 | 16,67 | 8,33 | 9,05 | 2,26 | 6,67 | 6,67 | 7,1 | 6,87 | 0 | 0 | 17,14 | 6,67 |
| US | | | 31 | 30 | | | 17,7 | 16,79 | | | 15,83 | 19,52 | | | 16,75 | 15,6 | | | 6,67 | 16,67 |
| N1 | | 1 | 1 | 1 | | 1,03 | 0,32 | 0,67 | | 0 | 0,71 | 1,31 | | 0 | 0,32 | 0,4 | | 0 | 0 | 0 |
| N2 | | 1 | 1 | 1 | | 1,03 | 0,32 | 0,67 | | 0 | 0,71 | 1,31 | | 0 | 0,32 | 0,4 | | 0 | 0 | 0 |
| N3 | | 1 | | 1 | | 1,03 | | 0,67 | | 0 | | 1,31 | | 0 | | 0,4 | | 0 | | 0 |
| Date of Change | Election 1996 | 18th of December 1996 | 20th of January 1998 | 14th of April 1998 | Election 1996 | 18th of December 1996 | 20th of January 1998 | 14th of April 1998 | Election 1996 | 18th of December 1996 | 20th of January 1998 | 14th of April 1998 | Election 1996 | 18th of December 1996 | 20th of January 1998 | 14th of April 1998 | Election 1996 | 18th of December 1996 | 20th of January 1998 | 14th of April 1998 |

**Table 4.3.** Changes of distribution of power in Chamber of Deputies during the 1996-98 electoral period calculated by unconstrained and constrained Shapley-Shubik power indices (SS).

As a most surprising result o these power calculations is that the Christian Democratic Union - Czechoslovak People's Party even as a part of the new coalition with the Civic Democratic Alliance and the Freedom Union lost quite a significant

[50] Turnovec (1998)

amount of power after the break-up of the government coalition no matter the voting rule. The other member of the broken coalition, the Civic Democratic Alliance, gained some power for cases of 3/5-majority voting, but lost for cases of absolute majority voting as well as the Christian democrats. This loss is in the case of the Alliance caused by the huge power increase in reaction to the abandonment of the three social democratic deputies from their political group in December 1996. The relatively high increase of power the Alliance experienced after the government fall for the voting requiring the 3/5 majority was obviously very fragile since it's steep decline was managed by transfer of only one deputy of this party.

The other outcomes from these calculations are quite self-explanatory. The Czech Social Democratic Party lost some power after some of their deputies left it and gained a huge amount of power once the government coalition and it's largest opponent, the Civil Democratic Party, felt apart. Surprising can be only the amounts of power the party lost because of loosing only three of its 61 deputies. The results for the civil democrats are quite clear as well. They gained power once the social democratic deputies left their party and lost a huge amount of power when the coalition and the party itself broke apart. In this case can be surprising only the size of the remaining power the party had after those breaks for the 3/5-majority voting cases and how much the power for such voting arose only because one alliance deputy decided to came to their political group.

### 4.2.3. Election of 1998

The result of the 1998 election was widely expected. The Czech Social Democratic Party won with 37% of mandates these elections with margin of 5 percent points on the Civic Democratic Party. To create a government coalition with the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union seemed to be a clear choice for the social democrats as it would have 113 mandates to it's disposal, but the coalition talks didn't turn out well. The final cooperation of the two inconsistent and opposing parties, the Czech Social Democratic Party and the Civic Democratic Party, was rather surprising and their "Opposition" Agreement represented some kind of a quasi-coalition agreement.

Since the two parties didn't assemble a common government, since the agreement lead to a minority social democratic government silently supported by civil

democrats, it is rather questionable to consider them as a coalition in the sense of a priori union. I will however calculate the power shares as if it was the real coalition, just to show the consequences.

| Czech abbreviation | Mandates | | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | abs. | % | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | 74 | 37 | 30 | 50 | 28,57 | 50 | 20 | 50 | 35 | 50 | 36,36 | 50 | 20 | 50 |
| KSČM | 24 | 12 | 13,33 | 0 | 14,29 | 0 | 20 | 0 | 10 | 0 | 9,09 | 0 | 20 | 0 |
| KDU-ČSL | 20 | 10 | 13,33 | 0 | 14,29 | 0 | 20 | 0 | 10 | 0 | 9,09 | 0 | 20 | 0 |
| ODS | 63 | 32 | 30 | 50 | 28,57 | 50 | 20 | 50 | 35 | 50 | 36,36 | 50 | 20 | 50 |
| US | 19 | 9,5 | 13,33 | 0 | 14,29 | 0 | 20 | 0 | 10 | 0 | 9,09 | 0 | 20 | 0 |

**Table 4.4.** Distribution of power in the 1998 elected Chamber of Deputies calculated by unconstrained and constrained Shapley-Shubik (SS), Penrose-Banzhaf (PB) and Holler-Packel (HP) indices considering a priori union of the Czech Social Democratic Party and the Civic Democratic Party.

As it could have been expected, the results of all indices for both voting quotas show, that if the social democrats combine with the civil democrats into a coalition, no other party would have any influence on the legislative process in the Chamber of Deputies. The reality however didn't seem to support the hypothesis that these parties were so strong to push through any act they agreed on. These parties planed to change the Constitution of the Czech Republic by changing the Czech electoral rule, but they didn't succeed. There of course emerges a question whether it was really because of their insufficient power or if it was because such an act wouldn't have been passed by the Senate, whose composition was different from the one of Chamber of Deputies and whose members don't tend to vote in common according to their political membership as much as the Lower House members.

We might therefore rather favour the results of indices, which consider a priori unions in the Chamber of Deputies. These indices admit some power of the non-coalition parties, which seem to too look more probable. Interesting are in this case the results of the Holler-Packel power index that divides power equally among all political parties despite the huge differences in numbers of mandates amount single parties.

### 4.2.4. Election of 2002

The 2002 election won as it was expected the Czech Social Democratic Party, which settled on formation of government coalition with the Coalition. The Coalition however felt apart shortly after the election into the two main parties, which initially

created it for these elections, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union. Since they stood for the election as one unit and after the election they led the coalition talks with social democrats separately, I will calculate power decompositions for both cases to see, the break down caused any difference for some political party.

I will first calculate the state shortly after the election considering the Coalition to be a single political subject, which created coalition with the Czech Social Democratic Party.

| Czech abbreviation | Mandates | | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | abs. | % | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | 70 | 35 | 50 | 66,67 | 60 | 78,26 | 33,33 | 60 | 33,33 | 41,67 | 33,33 | 33,33 | 25 | 25 |
| ODS | 58 | 29 | 16,67 | 0 | 16,67 | 0 | 22,22 | 0 | 33,33 | 16,67 | 33,33 | 25 | 25 | 25 |
| KOALICE | 31 | 16 | 16,67 | 33,33 | 16,67 | 21,74 | 22,22 | 40 | 16,67 | 25 | 16,67 | 16,67 | 25 | 25 |
| KSČM | 41 | 21 | 16,67 | 0 | 16,67 | 0 | 22,22 | 0 | 16,67 | 16,67 | 16,67 | 25 | 25 | 25 |

**Table 4.5.** Distribution of power in the 2002 elected Chamber of Deputies calculated by unconstrained and constrained Shapley-Shubik (SS), Penrose-Banzhaf (PB) and Holler-Packel (HP) indices considering a priori union of the Czech Social Democratic Party and the Coalition.

All indices show that in the usual voting on the basis of absolute majority the non-coalition parties have no power at all and the two coalition subjects divide their power quite proportionally to their numbers of deputies. Considering the 3/5 majority voting the indices differ in opinions on the power decomposition. While the Holler-Packel index grants to all parties the same amount of power, the Shapley-Shubik power index gives to both coalition subjects higher power than to the remaining ones and the Penrose-Banzhaf evaluates the power of the non-coalition parties higher than the power of the Coalition, but lower than o ft he Czech Social Democratic Party.

The real post-electoral state in 2002 however considers the Christian Democratic Union - Czechoslovak People's Party and The Freedom Union - Democratic Union as separate political subjects.

| Czech abbreviation | Mandates | | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | abs. | % | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | 70 | 35 | 40 | 74,99 | 38,46 | 71,96 | 23,08 | 42,86 | 41,67 | 47,62 | 41,67 | 35,72 | 25 | 21,43 |
| ODS | 58 | 29 | 23,33 | 0 | 23,08 | 0 | 23,08 | 0 | 25 | 16,67 | 25 | 25 | 16,67 | 25 |
| KDU-ČSL | 21 | 11 | 6,67 | 12,5 | 7,49 | 14,02 | 15,38 | 28,57 | 8,33 | 9,52 | 8,33 | 7,14 | 16,67 | 14,27 |
| US-DEU | 10 | 5 | 6,67 | 12,5 | 7,49 | 14,02 | 15,38 | 28,57 | 8,33 | 9,52 | 8,33 | 7,14 | 16,67 | 14,27 |
| KSČM | 41 | 21 | 23,33 | 0 | 23,08 | 0 | 23,08 | 0 | 16,67 | 16,67 | 16,67 | 25 | 25 | 25 |

**Table 4.6.** Adjusted-to-reality distribution of power in the 2002 elected Chamber of Deputies, as it changed shortly after the election, calculated by unconstrained and constrained Shapley-Shubik (SS), Penrose-Banzhaf

(PB) and Holler-Packel (HP) indices considering a priori union of the Czech Social Democratic Party, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union.

In the case of the absolute majority voting the situation is similar to the previous case. All indices show that the whole voting power is divided among the coalition parties. The numerical results however differ. While the Shapley-Shubik claims that the break up of the Coalition was in favour of social democrats, the other two indices say that it was at its expense. In voting requiring the 3/5-majority remained the power of the non-government parties exactly the same as in the case with Coalition, but among the coalition parties occurred a slight redistribution. Indices again differ in whose favour it was, Holler-Packel power index argues that it was at the expense of the social democrats, but the other two indices promote that it was in it's favour.

It is possible to conclude that in is quite unclear for which one of the government parties was better or worse that the Coalition split into the original parties. It is however clear from all indices that for the absolute majority voting, which is more frequent, this event finished in favour of opposition parties. The most beaten seems to be the Christian Democratic Union - Czechoslovak People's Party turns out to gain always the same amount of power like the Freedom Union - Democratic Union, which has less than one half of the mandates than the Christian democrats.

## 4.3. Hypothetical Configurations of the Czech Chamber of Deputies

The Czech electoral history suggests many hypothetical coalition configurations, which even though they didn't happen are interesting and instructive. I calculated the power distribution (using only the unconstrained and constrained Shapley-Shubik indices, for substantiation see Chapter 4.2.2.) in the Chamber of Deputies for two of those related to the present electoral period.

The first hypothetical configuration would appear if Mrs. Hana Marvanová, the former leader of the Freedom Union - Democratic Union, who abdicated on her office during the post-electoral talks for her opinion differences with the party majority, became an independent (unclassified) deputy.

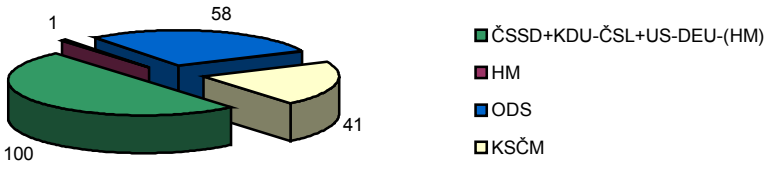


**Figure 4.7.** Disjunction of Hana Marvanová from the 2002 government coalition

Since the present government coalition has a very close absolute majority of mandates in the Chamber, Mrs. Marvanová would become a very important deputy during the voting requiring an absolute majority of votes.

| Czech abbreviation | Mandates | | | | Power index for absolute majority | | | | Power index for 3/5 majority | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Abs. | | % | | SS | | SSAU | | SS | | SSAU | |
| ČSSD | 70 | 70 | 35 | 35 | 38.33 | 40 | 47,22 | 0,75 | 36,67 | 41,67 | 44,44 | 0,24 |
| ODS | 58 | 58 | 29 | 29 | 25 | 23,33 | 8,33 | 0 | 28,33 | 25 | 16,67 | 0,17 |
| KDU-ČSL | 21 | 21 | 10,5 | 10,5 | 5 | 6,67 | 13,89 | 0,13 | 11,67 | 8,33 | 19,44 | 0,05 |
| US-DEU | 9 | 10 | 4,5 | 5 | 5 | 6,67 | 13,89 | 0,13 | 3,33 | 8,33 | 2,78 | 0,05 |
| HM | 1 | | 0,5 | | 1,67 | | 8,33 | | 3,33 | | 0 | |
| KSČM | 41 | 41 | 20,5 | 20,5 | 25 | 23,33 | 8,33 | 0 | 16,67 | 16,67 | 16,67 | 0,17 |

**Table 4.7.** Distribution of power in the 2002 elected Chamber of Deputies after hypothetical disjunction of Hana Marvanová from the government coalition calculated by unconstrained and constrained Shapley-Shubik power indices

Considering that the government coalition remained the same after the disjunction of Mrs. Marvanová, she being an only person would have the same amount of power like each of the two opposition parties by the voting according to the absolute majority rule. On the other hand she would have no power by the 3/5-majotiry voting. It is interesting, that if there was mo coalition at all, she would have some power under both voting rules and by the 3/5-majority rule, she would have the same amount of power like her "former" party.

This way or the other, if Mrs. Marvanová thought mainly about her personal power during this electoral period, she should leave the Freedom Union - Democratic Union anyway.

The second hypothetical configuration would appear if the whole Freedom Union - Democratic Union would leave the present government coalition.

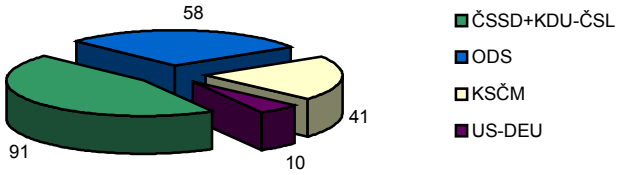


**Figure 4.8.** Expulsion of The Christian Democratic Union - Czechoslovak People's Party from the 2002 government coalition

In this case more variants could appear. The Christian Democratic Union - Czechoslovak People's Party could either stay in the government coalition with the Czech Social Democratic Party (Figure 4.8.) or it could leave the government as well as the unionists and maybe create the Coalition again maybe not.

| Czech | Mandates | | Power index for absolute majority | | | | Power index for 3/5 majority | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| abbreviation | Abs. | % | SS | SSAU(1) | SSAU(2) | SSAU(3) | SS | SSAU(1) | SSAU(2) | SSAU(3) |
| ČSSD | 70 | 35 | 40 | 75 | 41,67 | 50 | 41,67 | 47,62 | 50 | 33,33 |
| ODS | 58 | 29 | 23,33 | 0 | 16,67 | 16,66 | 25 | 16,67 | 16,67 | 33,33 |
| KDU-ČSL | 21 | 10,5 | 6,67 | 12,5 | 8,33 | 8,33 | 8,33 | 9,52 | 16,67 | 8,33 |
| US-DEU | 10 | 5 | 6,67 | 12,5 | 16,67 | 8,33 | 8,33 | 9,52 | 0 | 8,33 |
| KSČM | 41 | 20,5 | 23,33 | 0 | 16,67 | 16,66 | 16,67 | 16,67 | 16,67 | 16,67 |
| Coalition | | | No coalition | ČSSD + KDU-ČSL + US-DEU | ČSSD + KDU-ČSL | KDU-ČSL + US-DEU | No coalition | ČSSD + KDU-ČSL + US-DEU | ČSSD + KDU-ČSL | KDU-ČSL + US-DEU |

**Table 4.8.** Distribution of power in the 2002 elected Chamber of Deputies after hypothetical expulsion of the Freedom Union - Democratic Union from the government coalition calculated by unconstrained and constrained Shapley-Shubik power indices

If both, the Christian Democratic Union - Czechoslovak People's Party and The Christian Democratic Union - Czechoslovak People's Party, leave the government, it would harm the social democrats the most. It would however harm these two parties as well even if they recreate the Coalition, so it is highly improbable. Except of power of the unionists by absolute majority voting rule and power of the Christian democrats by 3/5-majority voting rule if the unionists are independent, both smaller government parties have the highest amount of power as a part of the government coalition. This may actually magnify the probability of coalition congruity during this period and improve the negotiation position of social democrats inside the government coalition.

# 5. MODEL OF CZECH COALITION FORMATION

In the Czech political environment there are some specific features of formation of government coalitions. Proportional electoral system in the Czech Republic (see Chapter 3.2.) leads to appearance of more than two political parties in the Chamber of Deputies, none of which gets more than one half of all mandates. After the election the president of the republic usually authorises the leader of the winning party to assemble the government. Even before this authorisation the coalition talks start.

## 5.1. Characterisation of the Model

I found five things that influence the coalition formation on the Czech political stage. The first three are more or less usual in all democratic countries:

1. number of votes obtained in the election
2. personal sympathies and antipathies of single leaders of political parties
3. electoral programs and aiming of single parties (characteristics of the currently most important parties of the Czech political landscape is given in the Attachment No.1)

but the order of their importance differs from the traditional western democracies. It seems that every political subject is trying to get to the government no matter how different the political programs are. The most important for establishment of coalition partnership is the number of mandates, so that the future coalition parties can form a majority government. Important are also the sympathies and antipathies of party leaders, which once already prevented one possible coalition from being formed[51] and once contributed to break-up of a government coalition[52]. This difference as well as the fourth condition of the Czech coalition formation can be considered as an inheritance or consequence of the forty years of communist rule. The fourth lets say imperative says:

4. the Communist Party of the Czech and Moravia is not acceptable as a partner of coalition talks since it claims continuity with the former Communist Party

[51] Possible coalition of the unionists, Christian democrats and the civil democrats (or maybe the social democrats) after the 1998 election

[52] Government resignation in 1997

of the Czechoslovakia, professes to its heritage and is not therefore being considered to be a democratic party

These four conditions influence the political acceptance of government coalitions in the Czech Republic and should ensure the coalition stability. There is also another suggestion for creation of stable coalitions and that is

5. picking as small as possible number of its members, since each party has at least slightly different political program than any of the others, so with growing number of coalition members is increasing the possibility of quarrelling and instability.

On the basis of the five observations and using the common left-right ordering of parties on the Czech political stage, I will try to find all at least a bit possible coalitions for single electoral results since 1992. I will then count the power of single parties and coalitions trying to find the most stable coalition and compare the computed results to the reality. My goal is to find out if it is enough for the Czech parties to look only for the total number of mandates each possible coalition has or if they should rather compare their power indices and make their conclusions on this basis.

## 5.2. Case Studies

### 5.2.1. Election of 1992

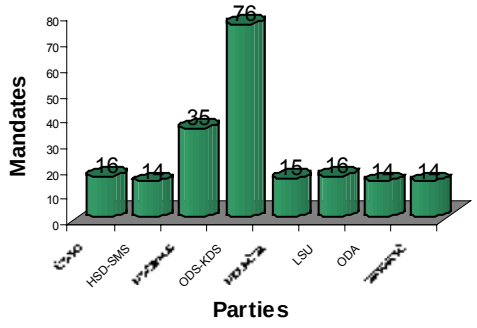


**Figure 5.1.** Result of the 1992 election

I have composed a table of attitudes of single political parties to compose a coalition with the other ones according to the five mentioned observations and understanding of their political programs and aiming illustrated by the left-right political profile of the Czech Chamber of Deputies listed in Attachment No.3. I have ordered the parties according to this profile in the Table 5.1. and tried to find the best fitting rule

that would model the range of parties from which a party on the Czech political stage picks its partners for a potential coalition.

I have decided to test two types of ranges and compare the results to each other and to the reality.

1. The first one is based on a hypothesis that only so called connected coalitions are possible, which means that parties are picking partners only from their direct neighbours on the left-right axis. This range however seemed to me too narrow as it doesn't allow skipping any party in the ordered line. In the Czech reality it is quite difficult to order parties as it heavily depends on the criteria or ordering. Therefore I decided to include into consideration even the parties next to their neighbouring parties, which should still ensure the opinion consensus of the coalition.
2. The other rule is based not directly on the positions of single parties, but on the positions of the opinion groups they belong to[53]. To ensure the consensus possibility the range should now cover only the direct neighbours on the left-right axis. This method is less dependent on the exact left-right ordering, which is quite tricky to determine in the Czech reality.

I will follow these rules by thinking about possible coalitions, exclude those influenced by personal antipathies and emphasise those influenced by personal sympathies.

| | | C | A | F | B | E | G | D | H |
|---|---|---|---|---|---|---|---|---|---|
| Party | Mark | KSČM-LB | ČSSD | LSU | HSD-SMS | KDU-ČSL | ODA | ODS-KDS | SPR-RSČ |
| KSČM-LB | C | 0 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| ČSSD | A | | 0 | 2 | 2 | 1 | 3 | 3 | 3 |
| LSU | F | | | 0 | 2 | 1 | 2 | 2 | 3 |
| HSD-SMS | B | | | | 0 | 2 | 2 | 2 | 3 |
| KDU-ČSL | E | | | | | 0 | 1 | 1 | 3 |
| ODA | G | | | | | | 0 | 1 | 3 |
| ODS-KDS | D | | | | | | | 0 | 3 |
| SPR-RSČ | H | | | | | | | | 0 |

**Table 5.1.** Evaluation of partnership potential after the 1992 election, where

| evaluation | coalition agreement |
|---|---|
| 0 | already exists |
| 1 | is likely |
| 2 | might be possible |
| 3 | is unlikely |

[53] extreme left, left, centre (also left and right), right and extreme right

For following lists I picked all feasible coalitions suggested by the Table 5.1. As feasible I considered only coalitions of those parties whose evaluation of other members of the coalition is 2 or less. It in other words means that they either like the idea or at least take into accounts the possibility of entering the coalition with the other parties.

List of feasible coalitions according to the 1st rule

| FC | Mandates | FC | Mandates | FC | Mandates | FC | Mandates |
|---|---|---|---|---|---|---|---|
| (AB) | 30 | (DE) | 91 | (ABE) | 45 | (ABEF) | 61 |
| (AE) | 31 | (DG) | 90 | (ABF) | 46 | (BEFG) | 59 |
| (AF) | 32 | (EF) | 31 | (AEF) | 47 | | |
| (BE) | 29 | (EG) | 29 | (BEF) | 45 | | |
| (BF) | 30 | (FG) | 30 | (BEG) | 43 | | |
| (BG) | 28 | | | (BFG) | 44 | | |
| | | | | (DEG) | 105 | | |
| | | | | (EFG) | 45 | | |

List of feasible coalitions according to the 2nd rule

| FC | Mandates | FC | Mandates | FC | Mandates |
|---|---|---|---|---|---|
| (AB) | 30 | (ABE) | 45 | (ABEF) | 61 |
| (AE) | 31 | (ABF) | 46 | (BDEF) | 121 |
| (AF) | 32 | (AEF) | 47 | (BDEG) | 119 |
| (BD) | 90 | (BDE) | 105 | (BDFG) | 120 |
| (BE) | 29 | (BDF) | 106 | (BEFG) | 59 |
| (BF) | 30 | (BDG) | 104 | (DEFG) | 121 |
| (BG) | 28 | (BEF) | 45 | | |
| (DE) | 91 | (BEG) | 43 | | |
| (DF) | 92 | (BFG) | 44 | (BDEFG) | 135 |
| (DG) | 90 | (DEF) | 107 | | |
| (EF) | 31 | (DEG) | 105 | | |
| (EG) | 29 | (DFG) | 106 | | |
| (FG) | 30 | (EFG) | 45 | | |

In order to simplify the power calculations, it is possible to omit those theoretical coalitions, which do not extend the basic decision rule on which the decision body works. In the case of the Czech Chamber of Deputies it is the simple majority rule, which presents at least 101 of deputies. I marked the chosen ones orange.

For calculations of power I chose the Shapley-Shubik power index as well as in the Chapter 4.2.2. where is also the substantiation for this choice.

| | Czech abbreviation | Mandates | | Power index for absolute majority | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | abs. | % | SS | SSAU | SSAU | SSAU | SSAU | SSAU | SSAU | SSAU | SSAU | SSAU | SSAU | SSAU |
| A | ČSSD | 16 | 8 | 5,95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| B | HSD-SMS | 14 | 7 | 5,95 | 15,56 | 15,56 | 15,56 | 0 | 0 | 0 | 9,17 | 9,17 | 9,17 | 0 | 6,67 |
| C | KSČM-LB | 35 | 17,5 | 10,71 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| D | ODS-KDS | 76 | 38 | 53,57 | 68,89 | 68,98 | 68,98 | 68,89 | 68,89 | 68,89 | 72,5 | 72,5 | 72,5 | 72,5 | 73,33 |
| E | KDU-ČSL | 15 | 7,5 | 5,95 | 15,56 | 0 | 0 | 15,56 | 15,56 | 0 | 9,17 | 9,17 | 0 | 9,17 | 6,67 |
| F | LSU | 16 | 8 | 5,95 | 0 | 15,56 | 0 | 15,56 | 0 | 15,56 | 9,17 | 0 | 9,17 | 9,17 | 6,67 |
| G | ODA | 14 | 7 | 5,95 | 0 | 0 | 15,56 | 0 | 15,56 | 15,56 | 0 | 9,17 | 9,17 | 9,17 | 6,67 |
| H | SPR-RSČ | 14 | 7 | 5,95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | NONE | (BDE) | (BDF) | (BDG) | (DEF) | (DEG) | (DFG) | (BDEF) | (BDEG) | (BDFG) | (DEFG) | (BDEFG) |

| | Power index for 3/5 majority | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SS | SSAU | SSAU | SSAU | SSAU | SSAU | SSAU | SSAU | SSAU | SSAU | SSAU | SSAU |
| A | 7,3 | 6,67 | 6,67 | 5 | 3,33 | 6,67 | 6,67 | 0 | 5 | 5 | 0 | 0 |
| B | 4,52 | 6,94 | 6,94 | 5,83 | 3,33 | 1,67 | 1,67 | 8,89 | 5 | 5 | 0 | 4,58 |
| C | 14,29 | 6,67 | 6,67 | 10 | 3,33 | 6,67 | 6,67 | 0 | 5 | 5 | 0 | 0 |
| D | 50 | 59,44 | 59,44 | 58,33 | 60,56 | 59,44 | 59,44 | 64,44 | 60,56 | 60,56 | 64,44 | 65 |
| E | 7,38 | 10,28 | 6,67 | 5 | 11,39 | 10,28 | 6,67 | 13,33 | 9,44 | 5 | 13,33 | 12,92 |
| F | 7,38 | 6,67 | 10,28 | 5 | 11,39 | 6,67 | 10,28 | 13,33 | 5 | 9,44 | 13,33 | 12,92 |
| G | 4,52 | 1,67 | 1,67 | 5,83 | 3,33 | 6,94 | 6,94 | 0 | 5 | 5 | 8,89 | 4,58 |
| H | 4,52 | 6,67 | 1,67 | 5 | 3,33 | 1,67 | 1,67 | 0 | 5 | 5 | 0 | 0 |
| | NONE | (BDE) | (BDF) | (BDG) | (DEF) | (DEG) | (DFG) | (BDEF) | (BDEG) | (BDFG) | (DEFG) | (BDEFG) |

**Table 5.2.** Calculations of unconstrained and constrained Shapley-Shubik power indices considering a priori union structure according to feasible majority coalitions after the 1992 election

Following the first rule, the reasoning is very simple. There is only one possible coalition with more than 100 deputies and it is the (DEG) coalition.

The second rule provides larger space for choices. Considering that the usual and the most of the time used decision rule in the Czech Chamber of Deputies is the absolute majority rule, therefore the first part of the Table 5.2. is the main one for our decision. For D as the party with most mandates would seem the best the (BDEFG) coalition, but it contradicts the suggestion of picking as small as possible number of coalition partners and it is not the preferred choice for any of the other parties. They will probably try to arrange some of the three-member coalition, since their power increase is there quite significant. Which one of those can suggest the second part of the Table 5.2. B will prefer any of the first two and G will prefer any of the last two arrangements. All D, E and F will prefer the (DEF) coalition. This therefore seems to be the best choice also giving the final coalition the greatest power of all three-member coalitions.

The reality seems to prefer the first rule of picking partners since it got to the right result in this case. It however might be only a coincidence and the real coalition is different from the reasonable best choice as suggests the outcome of the second rule. It

might be just an example of the influence of personal sympathies, which turned the result of coalition talks in favour of G. Party G used to be a widely honoured right-middle party with many respected personalities. Since such a "move" in favour of G costs the parties D and E only a negligible amount of power the real solution of (DEG) can be considered as quite good and under the political pressure as the best one even under the second rule.

In some cases can also appear a need to include some possible "anti-coalitions", in another words some other coalitions that might be formed concurrently with the government one. During the Czech electoral history however nothing like that ever appeared, so I am omitting such possible coalitions in my paper.

### 5.2.2. Election of 1996

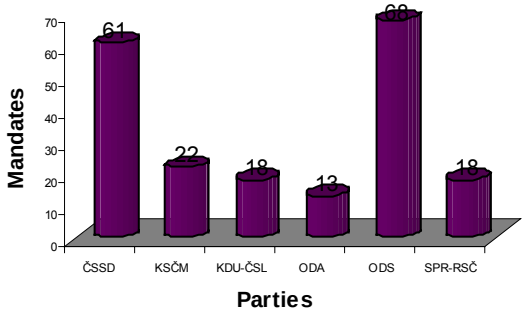


**Figure 5.2.** Result of the 1996 election

| | | B | A | C | D | E | F |
|---|---|---|---|---|---|---|---|
| Party | Mark | KSČM | ČSSD | KDU-ČSL | ODA | ODS | SPR-RSČ |
| KSČM | B | 0 | 3 | 3 | 3 | 3 | 3 |
| ČSSD | A | | 0 | 1 | 3 | 3 | 3 |
| KDU-ČSL | C | | | 0 | 1 | 1 | 3 |
| ODA | D | | | | 0 | 1 | 3 |
| ODS | E | | | | | 0 | 3 |
| SPR-RSČ | F | | | | | | 0 |

**Table 5.3.** Evaluation of partnership potential after the 1996 election, where numerical evaluations are explained by the Table 5.1.

List of feasible coalitions is the same according to the 1st and 2nd rule in this case:

| FC | Mandates |
|---|---|
| (AC) | 79 |
| (CD) | 31 |
| (CE) | 86 |
| (DE) | 81 |

| FC | Mandates |
|---|---|
| (CDE) | 99 |

None of the politically feasible coalitions exceeded the absolute majority quota needed for being able to compose a majority government, so I counted indices for all feasible coalitions listed above.

| | Czech abbreviation | Mandates | | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | abs. | % | SS | SSAU | SSAU | SSAU | SSAU | SSAU | SS | SSAU | SSAU | SSAU | SSAU | SSAU |
| A | ČSSD | 61 | 30,5 | 26,67 | 28,33 | 30 | 16,67 | 23,33 | 16,67 | 26,67 | 27,5 | 30 | 20 | 20 | 16,67 |
| B | KSČM | 22 | 11 | 16,67 | 23,33 | 13,33 | 16,67 | 23,33 | 16,67 | 11,67 | 10 | 13,33 | 11,67 | 11,67 | 16,67 |
| C | KDU-ČSL | 18 | 9 | 10 | 11,67 | 10 | 13,33 | 6,67 | 11,11 | 6,67 | 7,5 | 6,67 | 13,33 | 3,33 | 8,33 |
| D | ODA | 13 | 6,5 | 3,33 | 6,67 | 3,33 | 0 | 5 | 2,78 | 6,67 | 10 | 6,67 | 3,33 | 13,33 | 8,33 |
| E | ODS | 68 | 34 | 33,33 | 23,33 | 30 | 36,67 | 35 | 36,11 | 41,67 | 35 | 38,33 | 48,33 | 48,33 | 50 |
| F | SPR-RSČ | 18 | 9 | 10 | 6,67 | 13,33 | 16,67 | 6,67 | 16,67 | 6,67 | 10 | 5 | 3,33 | 3,33 | 0 |
| | | | | NONE | (AC) | (CD) | (CE) | (DE) | (CDE) | NONE | (AC) | (CD) | (CE) | (DE) | (CDE) |

**Table 5.4.** Calculations of unconstrained and constrained Shapley-Shubik power indices considering a priori union structure according to feasible majority coalitions after the 1996 election

Since there is no politically feasible coalition, which would be able to form a majority government, any finally formed coalition will be quite unstable. To find the best of the poor ones we should first look at the absolute majority part of the Table 5.4. and try to make the final decision on the basis of the three-fifths majority part of the Table as usually. Counting the total power of single coalition possibilities, we find that the (CE) and the (CDE) coalitions are the most powerful ones during the usual voting processes in the Chamber of Deputies. This deuce is then resolved by the second part of the Table, which shows, that by voting on the 3/5-majority basis the (CDE) coalition has significantly higher power than the (CE) coalition. The winner seems to be the (CDE), but in order to minimise the already quite extensive danger of destabilisation as small as possible number of partners should join the final coalition. This condition on the other hand the (CDE) possibility disqualifies. The party D however has some personal sympathies at its disposal, so it is highly expected that D will be part the government. Putting all of this together the result speaks in favour of the (CDE) coalition, which corresponds to the reality.

My reasoning matches with the reality also in the judgement of the government coalition stability since as it was mentioned above in the Chapter 4.5 the coalition finally felt apart and the government resigned which led to announcement of an early election in 1998.

### 5.2.3. Election of 1998

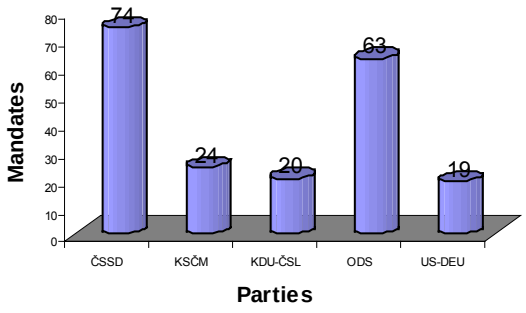


**Figure 5.3.** Result of 1998 election

| | | B | A | C | E | D |
|---|---|---|---|---|---|---|
| Party | Mark | KSČM | ČSSD | KDU-ČSL | US | ODS |
| KSČM | B | 0 | 3 | 3 | 3 | 3 |
| ČSSD | A | | 0 | 1 | 2 | 3 |
| KDU-ČSL | C | | | 0 | 1 | 1 |
| US | E | | | | 0 | 1 |
| ODS | D | | | | | 0 |

**Table 5.5.** Evaluation of partnership potential after the 1998 election, where numerical evaluations are explained by the Table 5.1

Lists of feasible coalitions according to the 1st and 2nd rule are the same in this case as it was in the previous case.

| FC | Mandates |
|---|---|
| (AC) | 94 |
| (CD) | 83 |
| (CE) | 39 |
| (DE) | 82 |
| (AE) | 93 |

| FC | Mandates |
|---|---|
| (ACE) | 113 |
| (CDE) | 102 |

Out of the 1998 election arose only two politically feasible coalitions (ACE) and (CDE). Both of them had the same total power potential, as it is seen in the Table 5.6. Since there were strong personal antipathies between the party D and E, since party E recently seceded from the party D's unsatisfied members, which initiated the downfall

of the former government coalition, there arose strong personal antipathies. That disqualifies the (CDE) possibility and the reasonable result of this election is the (ACE) coalition.

| | Czech abbreviation | Mandates | | Power index for absolute majority | | | | Power index for 3/5 majority | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | abs. | % | SS | SSAU | SSAU | SSAU | SS | SSAU | SSAU | SSAU |
| A | ČSSD | 74 | 37 | 30 | 44,44 | 0 | 50 | 35 | 44,44 | 16,67 | 50 |
| B | KSČM | 24 | 12 | 13,33 | 0 | 0 | 0 | 10 | 16,67 | 16,67 | 0 |
| C | KDU-ČSL | 20 | 10 | 13,33 | 27,78 | 27,78 | 0 | 10 | 11,11 | 11,11 | 0 |
| D | ODS | 63 | 31,5 | 30 | 0 | 44,44 | 50 | 35 | 16,67 | 44,44 | 50 |
| E | US | 19 | 9,5 | 13,33 | 27,78 | 27,78 | 0 | 10 | 11,11 | 11,11 | 0 |
| | | | | NONE | (ACE) | (CDE) | (AD) | NONE | (ACE) | (CDE) | (AD) |

**Table 5.6.** Calculations of unconstrained and constrained Shapley-Shubik power indices considering a priori union structure according to feasible majority coalitions after the 1998 election

The reality however turned out to be very surprising. The largest opposition parties A and D settled on an agreement that as a result guaranteed the support of party D to the minority government of party A.

And what was the reason of such a solution? As the upper listed results prompt the parties C and E were convinced that they would be part of any possible formed government coalition and therefore set quite disproportionate claims during the post-electoral talks. This probably led the party A to check if some another agreement is possible. The outcome turned to be amazingly good from the power point of view. Both parties actually divided the total power of the Chamber of Deputies and the common goal of changing the electoral rule of the Czech Republic prevented both parties of breaking the agreement.

### 5.2.4. Election of 2002

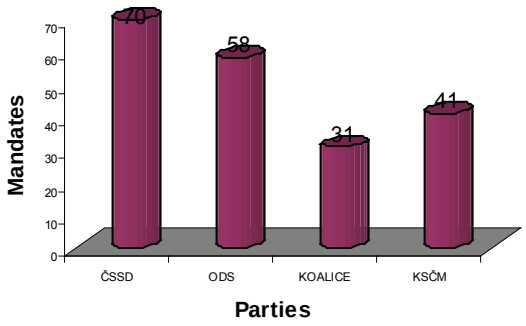


**Figure 5.4.** Result of the 2002 election considering the Coalition as a single political subject

| | | D | A | C | B |
|---|---|---|---|---|---|
| Party | Mark | KSČM | ČSSD | KOALICE | ODS |
| KSČM | D | 0 | 3 | 3 | 3 |
| ČSSD | A | | 0 | 1 | 3 |
| KOALICE | C | | | 0 | 1 |
| ODS | B | | | | 0 |

**Table 5.7.** Evaluation of partnership potential after the 2002 election considering the Coalition as a single political subject, where numerical evaluations are explained by the Table 5.1.

List of feasible coalitions according to the 1st and 2nd rule is the same since there are strong personal antipathies among the leaders of parties A and B. The new party A leader declared that a such bond as the one after the previous election is inadmissible this time. Also the Coalition showed it's weak stability even during the pre-electoral agitation when it excluded one of the initial four parties and quickly changed it's name from Four-coalition to Coalition. If it had been meant to be a long lasting union they would have tried to solve the fourth's party problems instead of excluding it, which prevented the rest of the parties from dividing the gained mandates among more members and therefore from loosing some of them. The moral argumentation was not really convincing and therefore even the first rule would come to the same coalition possibilities as the second one no matter the antipathies among parties A and B.

| FC | Mandates |
|---|---|
| (AC) | 101 |
| (BC) | 89 |

Out of the 2002 election came only one possible majority government coalition (AC), which is therefore the best solution of this election.

| | Czech abbreviation | Mandates | | Power index for absolute majority | | Power index for 3/5 majority | |
|---|---|---|---|---|---|---|---|
| | | abs. | % | SS | SSAU | SS | SSAU |
| A | ČSSD | 70 | 35 | 50 | 66,67 | 33,33 | 41,67 |
| B | ODS | 58 | 29 | 16,67 | 0 | 33,33 | 16,67 |
| C | KOALICE | 31 | 15,5 | 16,67 | 33,33 | 16,67 | 25 |
| D | KSČM | 41 | 20,5 | 16,67 | 0 | 16,67 | 16,67 |
| | | | | NONE | (AC) | NONE | (AC) |

**Table 5.8.** Calculations of unconstrained and constrained Shapley-Shubik power indices considering a priori union structure according to feasible majority coalitions after the 2002 election

Interesting can be also to examine another understanding of the election of 2002, which judges the Coalition not as a single subject but decomposes it into the original parties. To the reason for such decomposition, which was sketched above contributes the fact that the two main Coalition parties actually led the post-electoral talks separately and each formed its own political group in the Chamber of Deputies. The outcome of the election then looks as follows:

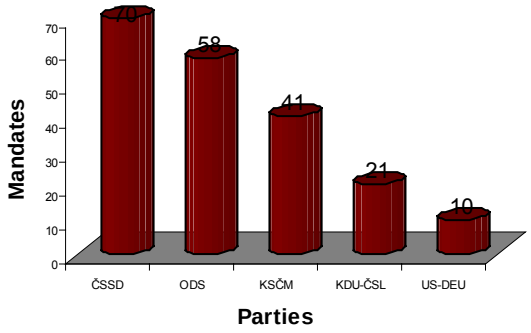


**Figure 5.5.** Result of the 2002 election considering the Coalition break-up

| | | C | A | D | E | B |
|---|---|---|---|---|---|---|
| Party | Mark | KSČM | ČSSD | KDU-ČSL | US-DEU | ODS |
| KSČM | C | 0 | 3 | 3 | 3 | 3 |
| ČSSD | A | | 0 | 1 | 1 | 3 |
| KDU-ČSL | D | | | 0 | 1 | 1 |
| US-DEU | E | | | | 0 | 1 |
| ODS | B | | | | | 0 |

**Table 5.9.** Evaluation of partnership potential after the 2002 election considering the Coalition break-up, where numerical evaluations are explained by the Table 5.1.

List of feasible coalitions according to the 1st and 2nd rule is the same in this case as it was in the previous one.

| FC | Mandates |
|---|---|
| (AD) | 91 |
| (BD) | 79 |
| (BE) | 68 |
| (DE) | 31 |
| (AE) | 8 |

| FC | Mandates |
|---|---|
| (BDE) | 89 |
| (ADE) | 101 |

| | Czech abbreviation | Mandates | | Power index for absolute majority | | Power index for 3/5 majority | |
|---|---|---|---|---|---|---|---|
| | | abs. | % | SS | SSAU | SS | SSAU |
| A | ČSSD | 70 | 35 | 40 | 55,56 | 41,67 | 50 |
| B | ODS | 58 | 29 | 23,33 | 0 | 25 | 16,67 |
| C | KSČM | 41 | 20,5 | 23,33 | 0 | 16,67 | 16,67 |
| D | KDU-ČSL | 21 | 10,5 | 6,67 | 22,22 | 8,33 | 8,33 |
| E | US-DEU | 10 | 5 | 6,67 | 22,22 | 8,33 | 8,33 |
| | | | | NONE | (ADE) | NONE | (ADE) |

**Table 5.10.** Calculations of unconstrained and constrained Shapley-Shubik power indices considering a priori union structure according to feasible majority coalitions after the 2002 election

The result does not depend on whether we consider the coalition as a single political subject or as two independent ones. The best and only possible majority government coalition is the (ADE) coalition (the (AC) coalition from the initial calculation of the 2002 coalition possibilities).

# 6. Model of Voting Games with Probabilistic A priori Union Structure

In some cases it is obvious, that some coalitions (a priori unions) do not or are not supposed to work at 100%. They might be concluded only for some specific cases or kinds of voting or so. I also found interesting the fact that members of some lower house political groups do usually vote identically but in some political groups appear quite substantial differences among their members. In order to describe the reality as well as possible there appears a need to include these conditions into power indices.

## 6.1. Characterisation of the Model

Owen[54] outlined such a modification of indices with a priori unions in his work, but he didn't really work it out. The modification is based on adding probabilities (or percentage of occurrence) to calculations of usual indices and could be defined the following way:

Consider a voting body with $n$ members $(i = 1, 2, ..., n)$, weights $w_i$ and quota $\gamma$. Let $T = \{T_1, T_2, ..., T_m\}$ be a set of $m$ different disjoint a priori union structures and $p_1, p_2, ..., p_m$ be probabilities of creation of corresponding a priori union structures (i.e. $p_j$ is a probability with which the structure $T_j$ will appear in voting). Then we can consider $m$ a priori union voting games

$$G_j(\gamma,\omega,T_j) = [\gamma,(\omega_1,\omega_2,...,\omega_n),T_j]$$

and a **composite game**

$$G(\gamma,\omega,T,p) = [G_1(\gamma,\omega,T_1),G_2(\gamma,\omega,T_2),...,G_m(\gamma,\omega,T_m),(p_1,p_2,...,p_m)]$$

modelling the voting process with probabilistic structure of a priori unions. For each voting game $G_j$ we have vector of Owen's power indices

$$\pi^{(j)} = (\pi_1^j,\pi_2^j,...,\pi_n^j)$$

Assuming, that in a large number of voting acts each a priori union voting game $G_j$ can appear with probability $p_j$, the value

$$\Pi_i^C = \sum_{j=1}^{m} p_j \pi_i^j$$

[54] Owen, G. (1977)

is mathematical expectation (mean value) of power index of member *i* in composite voting game *G* with probabilistic a priori union structure *{T, p}*. Let's call it a **composite power index**.

## 6.2. Calculation Procedure

On the basis of the example in Chapter 2.4., where we calculated power indices of the 2002 elected Chamber of Deputies considering Coalition to be a priori union, we can continue to calculate composite power indices.

Let's suppose we know the party discipline of single political groups of the Chamber, which are listed together with the mandate decomposition of the Chamber in following table.

| Political group | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Czech abbreviation | ČSSD | PDS | KSČM | KDU-ČSL | US-DEU |
| No. of members | 70 | 58 | 41 | 21 | 10 |
| Party discipline | 0,75 | 0,75 | 0,9 | 0,8 | 0,7 |

**Table 6.1.** Results of the 2002 election considering Coalition with estimated party discipline

Let's also suppose we know that the Coalition (a priori union) doesn't work for the full 100% but only for 70%. We get here **a priori union structure** $T=\{T_1,T_2,T_3,T_4\}$ where $T_1=\{1-70\}$, $T_2=\{71-128\}$, $T_3=\{129-169\}$, $T_4=\{170-200\}$ in the committee

$$[\gamma,\omega,p]=\left[{}^{101}\!/_{200};{}^{70}\!/_{200},{}^{58}\!/_{200},{}^{41}\!/_{200},{}^{21}\!/_{200},{}^{10}\!/_{200};0{,}7\right],$$

where size of quota $\gamma={}^{101}\!/_{200}$ represents that the 200 members of Chamber of Deputies of the Czech Parliament is regularly acting on the simple majority basis.

To the results of the unconstrained and constrained power indices calculated in the Chapter 2.4. (Table 6.2.) we now need to add the probabilities of coalition congruity (bottom row of the Table 6.2.)

| Czech abbreviation | Mandates | | Power index for absolute majority | | | | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | 70 | 35 | 40 | 50 | 38,46 | 50 | 23,08 | 33,33 |
| ODS | 58 | 29 | 23,33 | 16,67 | 23,08 | 16,67 | 23,08 | 22,22 |
| KSČM | 41 | 21 | 23,33 | 16,67 | 23,08 | 16,67 | 23,08 | 22,22 |
| KDU-ČSL | 21 | 11 | 6,67 | 8,33 | 7,49 | 8,33 | 15,38 | 11,11 |
| US-DEU | 10 | 5 | 6,67 | 8,33 | 7,49 | 8,33 | 15,38 | 11,11 |
| PROBABILITY | | | $(1-p)=0{,}3$ | $p=0{,}7$ | $(1-p)=0{,}3$ | $p=0{,}7$ | $(1-p)=0{,}3$ | $p=0{,}7$ |

**Table 6.2.** Constrained and unconstrained power indices for the 2002 election considering Coalition to be a priori union

The constrained power indices for the probability 70% of the Coalition opinion congruity are calculated as follows:

**constrained Shapley-Shubik power index**

$$\Pi^{CSS} = (1-p)\Pi^{SS}(\gamma,\omega) + p\Pi^{SS}(\gamma,\omega,T)$$

$CSS = (1-p)\,SS + p\,SSAU$

$CSS_1 = (1-p)SS_1 + pSSAU_1 = 0{,}3*40 + 0{,}7*50 = 47$

$CSS_2 = (1-p)SS_2 + pSSAU_2 = 0{,}3*23{,}33 + 0{,}7*16{,}67 = 18{,}66$

$CSS_3 = (1-p)SS_3 + pSSAU_3 = 0{,}3*23{,}33 + 0{,}7*16{,}67 = 18{,}66$

$CSS_4 = (1-p)SS_4 + pSSAU_4 = 0{,}3*6{,}67 + 0{,}7*8{,}33 = 7{,}83$

$CSS_5 = (1-p)SS_5 + pSSAU_5 = 0{,}3*6{,}67 + 0{,}7*8{,}33 = 7{,}83$

**constrained Penrose-Banzhaf power index**

$$\Pi^{CPB} = (1-p)\Pi^{PB}(\gamma,\omega) + p\Pi^{PB}(\gamma,\omega,T)$$

$CPB = (1-p)\,PB + p\,PBAU$

$CPB_1 = (1-p)PB_1 + pPBAU_1 = 46{,}54$

$CPB_2 = (1-p)PB_2 + pPBAU_2 = 18{,}59$

$CPB_3 = (1-p)PB_3 + pPBAU_3 = 18{,}59$

$CPB_4 = (1-p)PB_4 + pPBAU_4 = 8{,}08$

$CPB_5 = (1-p)PB_5 + pPBAU_5 = 8{,}08$

**constrained Holler-Packel power index**

$$\Pi^{CHP} = (1-p)\Pi^{HP}(\gamma,\omega) + p\Pi^{HP}(\gamma,\omega,T)$$

$CHP = (1-p)\,HP + p\,HPAU$

$CHP_1 = (1-p)HP_1 + pHPAU_1 = 30{,}26$

$CHP_2 = (1-p)HP_2 + pHPAU_2 = 22{,}48$

$CHP_3 = (1-p)HP_3 + pHPAU_3 = 22{,}48$

$CHP_4 = (1-p)HP_4 + pHPAU_4 = 12{,}39$

$CHP_5 = (1-p)HP_5 + pHPAU_5 = 12{,}39$

Adding the party discipline will further change the result of the composite power indices. It will actually divide each party into two sub-parties, one containing it's "disciplined" and the other it's "undisciplined" deputies. For each sub-party we calculate the composite power indices and finally add the indices of the "disciplined" and "undisciplined" part of each party to get the constrained power indices considering both coalition congruity and party discipline of each party.

## 6.3. Probability Evaluation

Owen also didn't suggest any way of finding the relevant probabilities of single indices. According to me there are two basic approaches to this problem.

1) The first approach, which I would call an **ex ante approach**, uses only somehow reasonable expectations and provides only a prediction of the composite index. There is of course a problem, how to find the best possible projection of the actual ex post calculated index.
2) The second approach can be called an **ex post approach**, since the composite index is retrospectively calculated on the basis of real statistic data and provides information about the past.

For the estimation of functioning probabilities in ex ante indices we need to check the character of the coalition agreement. The agreement doesn't have to obligate the coalition partners to vote in common all the time. It can contain some kind of weaker commitments like, that partners should commonly support only the strategic proposals or such.

We also have to determine the party discipline. The accuracy of the predicted probabilities depends mostly on our knowledge of the behaviour of single parties. We are basically looking for the average percentage of members of single political parties that vote in common.

Finding the party discipline is not a difficult problem in old democratic countries. The discipline of single parties is there usually settled and long-term stable and can be therefore simply used for predictions. This is however not the case of the Czech Republic. Since the Czech democracy is still quite young, the conditions inside the parties keep changing as they are fighting for their place on the political stage. On the beginning of 90ties the success of most of the new established parties was highly dependent on their leaders rather than on their political programmes, so the discipline

should have been quite high. It however didn't always correspond to the truth. Gradually all of them changed their initial leaders and the discipline began to fluctuate. So, in the Czech case we need to watch not only the previous state of discipline, but also the present stability of the party, if there seem to be some fighting fractions inside the party or even some dissatisfied individuals, we need to gauge the strength of the new leader if some party has one and also we have to paying attention to which party or parties are governing and which are in opposition, since being in opposition to something connects people and therefore the parties in opposition should have a higher discipline than those in rule.

Finding the probability of common voting in coalitions can become quite tricky as well. In cases where it is set that the coalition is supposed to work for 100%, it usually does, since written agreements are relatively easily enforceable. The problem emerge if the agreement is set the way mentioned above, that partners have to for example commonly support only strategic proposals. It is however not known exactly what proposals are going to be considered as the strategic ones, how many of them will occur during the particular electoral period and what share on the total amount of proposals will the strategic ones have. It is therefore better to count series of the seemingly most accurate ex ante power indices depending on different possible outcomes of the coalition agreement to map somehow the possibility space.

Comparison of the ex ante and the ex post indices can provide an interesting information. Following backwards our previous reasoning for probability divisions of the best corresponding ex ante index, we might find some interesting suggestions of what and why happened and that were the causes for it.

## 6.4. Case Studies Considering Coalition Congruity

Cases of not fully functioning coalitions can be found also in the Czech electoral history. Some of them are a priori declared as confined, but some of them turn out to be confined later during voting. One of those a priori declared ones is the so-called "Opposition Agreement" concluded by the Czech Social Democratic Party and the Civil Democratic Party after the 1998 election. Even thought both of these parties had totally different pre-electoral programs, they decided to co-operate, because of unfeasible claims of the other parties that come into consideration. It is therefore clear, that they wouldn't be able to unify fully their proposals and voting. The nature of the

agreement was that the minority social democratic government would work with a silent support of the civil democrats. Therefore the civil democrats should vote for some fundamental acts as the state budget etc. in exchange for some benefits. They has also one common plan to try to enforce some constitutional acts like for instance the change of the Czech electoral system in favour of larger parties.

As an example of a not fully functioning coalition, which can on the first sight look like a fully functioning one, ca serve the present government coalition of the Czech Social Democratic Party, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union. These parties were able to create a majority government after the 2002 election and composed and agreed on it's programme, so there should be therefore expected a high degree of opinion unity. This should imply a high probability of coalition functioning.

On the basis of this information about the character of coalitions we can estimate the range of probabilities, which seem to be likely to describe the coalition functioning. Counting the **composite power indices** for these probabilities then shows the range of power we estimate for single parties. This is the **ex ante** approach.

The **ex post composite power indices** can be calculated only once the voting data are available. I used the data I obtained from the Chamber of Deputies[55] for creating two basic kinds of statistics I needed for the following calculations of power. The first kinds are the statistics about the opinion congruity inside coalitions. Having data about the number of deputies from each political group who agreed, disagreed or didn't vote by each voting till the 11$^{th}$ of March 2003, I compared the majority voting of each coalition party. I added together all voting, where all coalition parties (their majorities) voted in identically and calculated what percentage on the total amount of voting the identical ones have. The result is the percentage or probability of the coalition consensus.

The second kind of statistics serves to find out the so-called party discipline. In this case I was comparing the number of deputies who voted with the majority of deputies from their political group and the number of those, who voted differently. I found the ratio of those deputies, who voted in accordance to the majority in their party on the total amount of the present deputies from the party for each voting and

[55] Here I'd like to thank Mgr. Sklenar for his helpfulness and compliance to my requests about the data structure he provided to me.

calculated the average of these ratios to get the party opinion congruity (discipline). The detailed calculations of the statistics are on the attached CD-R.

The problem by calculation of the statistics was the relevant data selection, since single voting in the Chamber has different importance. Some of the voting has only a procedural character and some of them are top political matters. I resolved the problem similarly like Krejčí and Soukeník[56] by omitting these differences. In their analysis they found that it is very difficult to distinguish among the "needless" and the important voting, which are essential for showing the opinion of deputies. They however concluded that the procedural voting cannot be left out, since even the voting procedure can affect the final result of voting. They tried some other variants, which showed only minor differences.

The ex post composite power indices are not used only to describe the past, but they can be used for estimations as well. Having data of voting from the beginning of the electoral period it is very likely, if nothing revolutionary happens, that the percentage of voting correspondence of coalition parties will remain on the same level.

For calculations of the composite power indices I will use the Shapley-Shubik, Penrose-Banzhaf and Holler-Packel power indices.

### 6.4.1. The 1998 Post-Electoral Agreement

To estimate the range of probabilities of voting unity of two opposition parties, which signed some kind of agreement of co-operation, is quite difficult. I decided for the range form 20% till 80% just to see, how much would their power change with the probability changes.

Composite power indices for $p=0,8$ and $p=0,2$ are listed in the Table 6.3. and the indices for another probabilities from the range $p \in \langle 0,2;0,8 \rangle$ are listed in the Attachment No.7. Detailed procedure of calculation of composite indices is on the attached CD-R.

[56] Krejčí, H., Soukeník, K. (1997)

| Czech abbreviation | Mandates | | P=0,8 | | | | | | P=0,2 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Power index for absolute majority | | | Power index for 3/5 majority | | | Power index for absolute majority | | | Power index for 3/5 majority | | |
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74 | 37 | 46 | 45,71 | 44 | 47 | 47,27 | 44 | 34 | 32,86 | 26 | 38 | 39,09 | 26 |
| KSČM | 24 | 12 | 2,67 | 2,86 | 4 | 2 | 1,82 | 4 | 10,66 | 11,43 | 16 | 8 | 7,27 | 16 |
| KDU-ČSL | 20 | 10 | 2,67 | 2,86 | 4 | 2 | 1,82 | 4 | 10,66 | 11,43 | 16 | 8 | 7,27 | 16 |
| ODS | 63 | 31,5 | 46 | 45,71 | 44 | 47 | 47,27 | 44 | 34 | 32,86 | 26 | 38 | 39,09 | 26 |
| US | 19 | 9,5 | 2,67 | 2,86 | 4 | 2 | 1,82 | 4 | 10,66 | 11,43 | 16 | 8 | 7,27 | 16 |

**Table 6.3.** Composite power indices for the 1998 electoral results considering a priori union of the Czech Social Democratic Party and the Civil Democratic Party for *p=0,8* and *p=0,2*

All indices show, that the "coalition" parties are loosing their power as the percentage of coalition unity is decreasing. Surprising however can be the amount of power the coalition parties would have by only a 20% opinion congruity.

The real percentage of voting unity of the in 1998 concluded Opposition Agreement is according to my statistics a little over 60%. It is a rather interesting result as it is more than reached some regular government coalitions in the Czech electoral history.

The ex post composite power indices considering the real probability of Opposition Agreement parties uniformity *p= 0,60428* are listed in the Table 6.4.

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74 | 37 | 42,09 | 41,52 | 38,13 | 44,06 | 44,60 | 38,13 |
| KSČM | 24 | 12 | 5,27 | 5,65 | 7,91 | 3,96 | 3,60 | 7,91 |
| KDU-ČSL | 20 | 10 | 5,27 | 5,65 | 7,91 | 3,96 | 3,60 | 7,91 |
| ODS | 63 | 31,5 | 42,08 | 41,52 | 38,13 | 44,06 | 44,60 | 38,13 |
| US | 19 | 9,5 | 5,27 | 5,65 | 7,91 | 3,96 | 3,60 | 7,91 |

**Table 6.4.** Composite power indices for the 1998 electoral results considering a priori union of the Czech Social Democratic Party and the Civil Democratic Party for *p=0,60428.*

All indices commonly agree, that the "coalition" parties remain incomparably more powerful than the opposition parties even thought the voting congruity of the "coalition" parties is only some 60%. This enabled these parties to take control over the Chamber of Deputies of the Parliament of the Czech Republic during the third electoral period and only the Senate limited their resultant power in the Czech Parliament. This shows another sense in which the Senate can be understood as a constitutional insurance.

### 6.4.2. The 2002 Post-Electoral Agreement

Estimation of the range of probabilities, that parties of a government coalition will vote in common identically, seem so be quite simple. As I already reasoned above, these parties need to show a high degree of opinion unity, which is proved by the fact, that they are able to compose a government together and agree on it's programme.

Therefore I chose the probability range form 50% till 100%, which should cover even the worst expectations and calculated the composite power indices for some probabilities of the range. Results of the probabilities p=0,5 and p=1 are listed in the Table 6.5., the others are in the Attachment No.8.

| Czech abbreviation | Mandates | | P=1 | | | | | | P=0,5 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Power index for absolute majority | | | Power index for 3/5 majority | | | Power index for absolute majority | | | Power index for 3/5 majority | | |
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70 | 35 | 74,99 | 71,96 | 42,86 | 47,62 | 35,72 | 21,43 | 57,4 | 55,21 | 32,97 | 44,65 | 38,7 | 23,22 |
| ODS | 58 | 29 | 0 | 0 | 0 | 16,67 | 25 | 25 | 11,67 | 11,54 | 11,54 | 20,84 | 25 | 20,84 |
| KDU-ČSL | 21 | 10,5 | 12,5 | 14,02 | 28,57 | 9,52 | 7,14 | 14,27 | 9,59 | 10,76 | 21,98 | 8,93 | 7,74 | 15,47 |
| US-DEU | 10 | 5 | 12,5 | 14,02 | 28,57 | 9,52 | 7,14 | 14,27 | 9,59 | 10,76 | 21,98 | 8,93 | 7,74 | 15,47 |
| KSČM | 41 | 20,5 | 0 | 0 | 0 | 16,67 | 25 | 25 | 11,67 | 11,54 | 11,54 | 16,67 | 20,84 | 25 |

**Table 6.5.** Composite power indices for the 2002 electoral results considering a priori union of the Czech Social Democratic Party, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union for *p=1* and *p=0,5*

All composite power indices show that power of coalition parties by voting on the absolute majority basis is decreasing with lower percentage of opinion congruity. All indices however suggest an interesting thing, that the power the Czech Social Democratic Party by voting requiring a 3/5-majority is greater if the coalition works only for 50% than if it works for 100%. Social democrats then might be paradoxically willing to lower the coalition congruity in some cases.

This might be some kind of a poor explanation of the rather surprising outcome of the voting statistics. The statistics show, that the real percentage of voting unity of the 2002 government coalition is only a bit more than 45%, which is considerably less than the unity of the parties of the Opposition Agreement from the previous electoral period. It is even less than the opinion unity of the present opposition parties the Civic Democratic Party and the Communist Party of Bohemia and Moravia, which is over 50%. Another very interesting output of the statistics shows, that there is absolutely no opinion difference among the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union. Another words the opinion

disagreement is caused only by the opinion difference of the social democrats. In is therefore possible to state that even thought the Coalition splat up after the election took place, it de facto still exists.

The ex post composite power indices considering the real probability of coalition uniformity *p= 0,45168* are assembled in the Table 6.6.

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70 | 35 | 55,80 | 53,59 | 32,01 | 44,36 | 38,98 | 23,39 |
| ODS | 58 | 29 | 12,79 | 12,66 | 12,66 | 21,23 | 25,00 | 20,43 |
| KDU-ČSL | 21 | 10,5 | 9,30 | 10,44 | 21,34 | 8,87 | 7,79 | 15,59 |
| US-DEU | 10 | 5 | 9,30 | 10,44 | 21,34 | 8,87 | 7,79 | 15,59 |
| KSČM | 41 | 20,5 | 12,79 | 12,66 | 12,66 | 16,67 | 20,43 | 25,00 |

**Table 6.6.** Composite power indices for the 2002 electoral results considering a priori union of the Czech Social Democratic Party, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union for *p= 0,45168*

All composite power indices agree again on the decline of power of the coalition parties by the voting requiring the absolute majority, but only the Shapley-Shubik composite power index suggests the same for the voting on the basis of 3/5 majority. The other two indices show, that the power of all coalition parties actually increased by this type of voting comparing to the power they would gain being more uniform. The power increase is however not as big and only for cases of the less frequent voting to be convincing enough, that it might be some kind of an intention.

## 6.5. Case Studies Considering both Coalition Congruity and Party Discipline

As I already mentioned in the Chapter 6.3., the coalition congruity is not the only factor, which influences the power in committees. In the case of Parliaments is it also something I would call a party discipline or to put it differently opinion congruity inside single political groups.

I went in for the pitfalls of estimation of the discipline of single parties on the Czech political stage in the Chapter 6.3., so it is clear, that it can become very tricky in the Czech conditions. On the other hand it is easier than estimation of the coalition congruity once we have the statistics of party discipline from the previous period. For a better approximation of probable party disciplines in ex ante approach and for the

detection of real disciplines in the ex post approach we need to have the statistical data. The outcome of my statistics is organised in the Table 6.7.

| | Electoral period | | |
|---|---|---|---|
| Party | 1996-98 | 1998-2002 | 2002-11th of March 2003 |
| KSČM | 83,321 | 78,954 | 80,262 |
| ČSSD | 76,666 | 76,704 | 77,527 |
| KDU(-ČSL) | 78,911 | 75,872 | 80,109 |
| US(-DEU) | 70,069 | 73,415 | 72,206 |
| ODA | 76,235 | | |
| ODS | 76,423 | 75,450 | 74,585 |
| SPR | 95,451 | | |
| N | 70,382 | 94,705 (81,289) | |

**Table 6.7.** Party discipline of the parties from the Chamber of Deputies of the Parliament of the Czech Republic in percents. In parenthesis is discipline calculated without the time there was only one independent deputy, which distorts the actual discipline according to the length of the time he was the only one.

As it is seen from the Table 6.7., estimations on the basis of previous electoral periods would work quite well. The highest variation of party discipline between two following periods achieved the Christian Democratic Union - Czechoslovak People's Party between the third and the fourth electoral periods and it reached only 4,237 of per cent points. I will therefore calculate directly the ex post composite indices, since the estimated ex ante ones would turn out really close.

### 6.5.1. The 1998 Post-Electoral Agreement

According to my calculations of party discipline, I divided each political group in Chamber of Deputies to its "disciplined" deputies and to its "undisciplined" deputies. This way I actually got ten independent subjects with numbers of mandates listed in the Table 6.8.

| Czech abbreviation | disciplined | undisciplined |
|---|---|---|
| ČSSD | 56,76 | 17,24 |
| KSČM | 18,95 | 5,05 |
| KDU-ČSL | 15,17 | 4,83 |
| ODS | 47,53 | 15,47 |
| US | 13,95 | 5,05 |

**Table 6.8.** Party discipline during the third electoral period expressed by numbers of mandates

I then calculated the unconstrained power indices and the a priori power indices for the ten subjects as if the Opposition Agreement was a fully working a priori union. These indices considering only the party discipline are part of the Attachment No.9. Finally I added the percentage of coalition congruity to these indices, calculated

the composite power indices for each of the ten subjects and added the power of the undisciplined and the disciplined members of each political group together to get the final composite power indices of the groups (Tables 6.9. and 6.10.).

I considered interesting to check differences in the power decomposition in the Lower House between the cases if the "undisciplined" deputies of the coalition parties are considered as some kind of an anti-coalition and between the cases they are considered as disunited. It is not clear which one of these cases is closer of reality, but probably the first one, since the indices I use consider only two variants of voting, for and against and nothing else (like abstain or absent).

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74 | 37 | 47,54 | 49,27 | 34,00 | 42,73 | 42,18 | 19,85 |
| KSČM | 24 | 12 | 4,46 | 5,216 | 6,42 | 9,15 | 8,74 | 14,46 |
| KDU-ČSL | 20 | 10 | 3,70 | 4,29 | 7,97 | 6,56 | 7,24 | 21,89 |
| ODS | 63 | 31,5 | 40,96 | 37,38 | 43,82 | 35,00 | 34,60 | 21,91 |
| US | 19 | 9,5 | 3,33 | 3,83 | 7,70 | 6,56 | 7,24 | 21,89 |

**Table 6.9.** First variant - Composite power indices for the 1998 electoral results considering party discipline and two a priori unions of the disciplined and the undisciplined deputies of the Czech Social Democratic Party and the Civil Democratic Party for *p=0,60428.*

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74 | 37 | 47,66 | 49,27 | 34,00 | 44,03 | 44,84 | 19,96 |
| KSČM | 24 | 12 | 4,46 | 5,22 | 6,42 | 8,15 | 7,00 | 13,25 |
| KDU-ČSL | 20 | 10 | 3,70 | 4,29 | 7,97 | 5,91 | 5,75 | 19,47 |
| ODS | 63 | 31,5 | 40,84 | 37,38 | 43,82 | 36,01 | 36,45 | 27,84 |
| US | 19 | 9,5 | 3,33 | 3,83 | 7,70 | 5,91 | 5,86 | 19,47 |

**Table 6.10.** Second variant - Composite power indices for the 1998 electoral results considering party discipline and a priori union only of the disciplined deputies of the Czech Social Democratic Party and the Civil Democratic Party for *p=0,60428.*

The Tables 6.9. and 6.10. show, that there are only minor differences in power decomposition in the Chamber of Deputies between the two variants. The only exception is the judgement of power of the Civil Democratic Party by the Holler-Packel index. For the second variant it is evaluated much higher. It is however the only case, so we don't have to be actually solving the problem, which one of the variants is more real.

Comparing the results of the case we didn't count with the party discipline in the Table 6.4. to these in the Tables 6.9. and 6.10. is a bit more interesting. All indices suggest, that considering the party discipline, the non-coalition parties are less powerful in cases of voting on the absolute majority basis, but they are more powerful in cases of

the 3/5-majority voting. The civil democrats have the highest "decreases" of power once we start to consider the party discipline even thought their party discipline is not the lowest of the Chamber. On the other hand the social democrats seem to be "gaining" power by taking into account the discipline. Only the Holler-Packel index disagrees on it and even suggests a tremendous power decrease in the cases of 3/5-majority voting.

I was also interested what kind of power decomposition would have a hypothetical Chamber of Deputies consisted only of the "disciplined" deputies. And the result was rather surprising, as it is seen from comparison of the Tables 6.11. and 6.4.,

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 56,76 | 37,25 | 42,09 | 41,52 | 38,13 | 44,06 | 44,60 | 38,13 |
| KSČM | 18,95 | 12,44 | 5,27 | 5,65 | 7,91 | 3,96 | 3,60 | 7,91 |
| KDU-ČSL | 15,17 | 9,96 | 5,27 | 5,65 | 7,91 | 3,96 | 3,60 | 7,91 |
| ODS | 47,53 | 31,20 | 42,09 | 41,52 | 38,13 | 44,06 | 44,60 | 38,13 |
| US | 13,95 | 9,15 | 5,27 | 5,65 | 7,91 | 3,96 | 3,60 | 7,91 |

**Table 6.11.** Composite power indices for the 1998 electoral results calculated only for the disciplined deputies of single political parties considering a priori union of the Czech Social Democratic Party and the Civil Democratic Party for *p=0,60428*

the power decomposition is absolutely identical to the one not considering the party discipline. We can therefore conclude, that ignoring the "undisciplined" deputies is like ignoring the party discipline at all, which distorts the calculated power proportions.

### 6.5.2. The 2002 Post-Electoral Agreement

The numbers of the "disciplined" and "undisciplined" deputies of each political group in the Chamber of Deputies calculated from the so far party disciplines after the 2002 election shows the Table 6.12.

| Czech abbreviation | disciplined | undisciplined |
|---|---|---|
| ČSSD | 54,27 | 15,73 |
| ODS | 43,26 | 14,74 |
| KDU-ČSL | 16,82 | 4,18 |
| US-DEU | 7,22 | 2,78 |
| KSČM | 32,91 | 8,09 |

**Table 6.12.** Party discipline during the first nine months of the fourth electoral period expressed by numbers of mandates

They again, as it was in the Chapter 5.4.1. for the third electoral period, are considered to be ten subjects in the Chamber for the fourth electoral period. Also for

this period I calculated the composite power indices for two variants of a priori union structure. The results of the variants are assembled in the Tables 6.13. and 6.14. The tables with partial calculations are part of the Attachments No.10 and No.11.

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70 | 35 | 40,61 | 42,56 | 19,09 | 37,38 | 37,79 | 22,18 |
| ODS | 58 | 29 | 23,17 | 22,90 | 26,71 | 28,33 | 28,87 | 24,74 |
| KDU-ČSL | 21 | 10,5 | 11,26 | 9,69 | 14,46 | 10,72 | 10,70 | 15,82 |
| US-DEU | 10 | 5 | 6,16 | 5,45 | 14,46 | 5,26 | 5,07 | 12,26 |
| KSČM | 41 | 20,5 | 18,80 | 19,40 | 25,28 | 18,30 | 17,55 | 25,00 |

**Table 6.13.** First variant - Composite power indices for the 2002 electoral results considering two a priori unions of the disciplined and the undisciplined deputies of the Czech Social Democratic Party, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union for $p= 0,45168$

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70 | 35 | 39,65 | 40,04 | 20,75 | 38,34 | 38,63 | 22,93 |
| ODS | 58 | 29 | 25,54 | 24,92 | 25,54 | 25,86 | 26,63 | 19,52 |
| KDU-ČSL | 21 | 10,5 | 9,24 | 9,00 | 14,25 | 11,85 | 11,43 | 17,90 |
| US-DEU | 10 | 5 | 4,73 | 5,03 | 14,25 | 5,98 | 5,35 | 13,40 |
| KSČM | 41 | 20,5 | 20,84 | 20,99 | 25,21 | 17,97 | 17,97 | 26,23 |

**Table 6.14.** Second variant - Composite power indices for the 2002 electoral results considering a priori union only of the disciplined deputies of the Czech Social Democratic Party, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union for $p= 0,45168$

In this case there is also no need to decide, which of the variants is better, since the results differ very slightly and the relative proportions of power come out the same. Evaluating the power of the civil democrats by the Holler-Packel index for 3/5- majority voting, there is again one difference like in the case of the third electoral period, which can be again ignored.

The comparison with indices in Table 6.5., calculated without consideration of party discipline, is of more interest. Taking into account the discipline, all indices, except the Holler-Packel for absolute majority voting, consider the Freedom Union - Democratic Union as the way weakest party. Not considering the discipline, this party had always the same amount of power as the Christian Democratic Union - Czechoslovak People's Party with more than twice as many mandated. For the strongest party is considered the Czech Social Democratic Party no matter the discipline, but again with the exception of the Holler-Packel indices, which for absolute majority voting propose the civil democrats closely followed by the communists to be the

strongest parties and for the case of 3/5-majority voting even the communists only. The power of both non-coalition parties turns out much greater once we take into account the party discipline specially for voting when the absolute majority is required.

For this electoral period I again checked the outcome of the composite indices calculated only of the "disciplined" part of deputies (Table 6.15.).

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 54,27 | 35,13 | 47,03 | 53,35 | 32,01 | 40,18 | 38,50 | 26,24 |
| ODS | 43,26 | 28,00 | 12,79 | 12,66 | 12,66 | 23,06 | 24,39 | 21,26 |
| KDU-ČSL | 16,82 | 10,89 | 13,69 | 10,67 | 21,34 | 15,18 | 12,83 | 17,50 |
| US-DEU | 7,22 | 4,67 | 13,69 | 10,67 | 21,34 | 3,08 | 4,28 | 8,75 |
| KSČM | 32,91 | 21,30 | 12,79 | 12,66 | 12,66 | 18,50 | 20,00 | 26,24 |

**Table 6.15.** Composite power indices for the 2002 electoral results calculated only for the disciplined deputies of single political parties considering a priori union of the Czech Social Democratic Party, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union for $p = 0{,}45168$

The outcome this time differs from those indices calculated without taking into account the party discipline (Table 6.6.), but it is still much closer to these indices, specially for the absolute majority voting, than to those from the Tables 5.13. and 5.14., which calculate with both, party discipline and the coalition congruity. The conclusion from the previous chapter, that it is not covetable to ignore the "undisciplined" deputies, seems to be confirmed.

# 7. CONCLUSION

The whole method of choosing the most feasible and stable coalition on the Czech political stage I have introduced in the Chapter No.5 seems to work. I have listed five basic factors, which in my view have the highest influence on coalition formation on the Czech political stage. The only problem might be identification of the politically feasible coalition set from which the final choice should be made. I have introduced two methods of the initial set selection, which both seemed to me as reasonable for the Czech reality.

I have tried to identify the better one in the sense of the correspondence to reality, since none of them helped to gain the 100% right results. The first one however seems to be a better fitting one since using it we got the right result in the 1992 election case where the second one led to a different one. The outcome of the 1998 election was extraordinary and as such couldn't be expected by any ordinary method.

The main goal of this chapter however was to compare the decision ability of power indices to a simple addition of the number of mandates each possible coalition gained. The calculated results show, that both approaches provide very similar results by judging the political feasibility of a single coalition, but as the approach of mandates addition is much simpler for calculations and the knowledge of political and personal attitudes of parties on the Czech political stage are quite clear to single party managements, I would suggest to them to keep their old way of deciding even though such a unity of results can't be declared as a universal rule.

Using Owen's[57] basic idea about modification of indices with a priori unions, I defined and developed a model of voting games with probabilistic a priori union structure in the Chapter No.6 and applied it to the Czech Chamber of Deputies as it was elected for the 1998 and the 2002 election.

The reason why I started to think about further improvement of indices, which consider a priori union structure and are therefore already improvements of the original unconstrained indices is, that they omit some basic aspects of political markets, which can have according to me a significant impact on the power of single players. Those aspects are coalition congruity (a priori unions can be designed to work only in some special cases or the internal rules are not strict enough) and party discipline (depends on

[57] Owen, G. (1977)

an opinion congruity inside single parties and on the possibility to express difference of opinion).

The main problems of the model are the methods of estimation or calculation of the numerical expression of congruity and discipline. I have introduced methods with some kind of I think reasonable simplification of voting procedure, which provides the numerical percentage of coalition congruity and party discipline.

The goal of the Chapter No.6 was to confirm the hypothesis that the model provides a more realistic description of the power decomposition in the Lower House of the Czech Parliament than the model with a priori unions. I a priori excluded the possibility, that the unconstrained power indices (which are in terms of my probabilistic methodology composite power indices with zero probability of coalition functioning) could properly describe the reality, since the coalition agreements I examined positively existed. I watched the course of power decomposition in the Lower House using the power indices with a priori unions (which are in terms of my probabilistic methodology composite power indices with hundred percent probability of coalition functioning) and the composite power indices, which at first considered only the coalition congruity and later I added consideration of the party discipline into them and formed an opinion of the results' matching of reality. Since the composite power indices can be considered as improvements of those with a priori union structure and they adopt the qualities of the original power indices tested by Laruelle's and Turnovec's criteria (Chapter 2.3.) I considered the results of those based on the Shalpley-Shubik indices as the most authoritative and the results of those indices derived from the Penrose-Banzhaf indices as more authoritative than of those derived from the Holler-Packel indices. I however don't deprecate any of the indices since there so far exists no widely agreed single method of determination of the right index.

Concerning the power decomposition after the 1998 election, all indices with a priori unions (no matter the voting rule) show that the total power of the Chamber was equally divided among the Opposition Agreement parties. The other parties came out with a zero power. This however couldn't be the case otherwise these parties would have pushed through the constitutional changes they were willing to and the social democratic government wouldn't have had such problems with state budget approval[58].

[58] specially in 2000

The composite power indices seem to suggest a more probable power distribution. Meanwhile those considering only the coalition congruity agree on equal division of power among agreement parties and equal division of power among opposition parties pointing out, that the power of the opposition parties is lower in cases of 3/5-marority voting, the composite indices, which take into account also the party discipline, draw a conclusion that there are, in some case quite substantial, differences among the power of agreement parties and even among the opposition parties, whose power gets larger once the 3/5-majority is required. It is interesting that the civil democrats were losing the largest amount of power due to their party discipline, especially by the 3/5-majority voting, even thought their discipline was not the lowest one in the Chamber of Deputies and unionists, who had the lowest party discipline in the Chamber, were actually gaining around 66% of power in cases of this voting rule once the discipline was included into the model.

The final 1998 post electoral power decomposition according to my model agrees on some power for the opposition parties, but the main power remains in the hands of agreement parties with social democrats being the strongest. This can actually explain the in some sense strange decision of this party rather to create a minority government with the support of the civil democrats than to try harder to reach an agreement on a majority government creation with Christian democrats and unionists. This way they could occupy all ministry chairs, the single-party government could more easily reach a consensus and they even remain the most powerful party in the Chamber of Deputies.

Concerning the power decomposition after the 2002 election, the constrained power indices considering a priori unions award the non-government parties, the Civil Democratic Party and the Communist Party of Bohemia and Moravia, no power at all for voting on the absolute majority basis, which cannot be the truth, as it is seen from the voting data of the Chamber of Deputies (attached CD-R). The constrained power indices for the 3/5-majority voting as well as all the composite power indices no matter the voting rule agree that the opposition parties have more power than the two smaller government parties, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union. When the party discipline is not included in the model, these parties show equal an amount of power, but once the discipline gets considered, the power of unionists is somewhere around half of the power of Christian democrats. This reflects the unionist’s traditionally lowest party discipline of all parties

in the Chamber. Inclusion of party discipline strengthened the power of opposition parties especially for the absolute majority based voting and showed an interesting matter, that the civil democrats became actually stronger than the communists even though their discipline is lower. The discipline inclusion into the model also weakened the social democrats especially in cases of absolute majority voting.

The final 2002 post electoral power decomposition according to my model shows that there are only minor differences among the power decomposition between both voting rules. Another interesting matter is that power decomposition comes out close to mandate decomposition during this period. It is rather unusual especially once the power and mandates of the coalition and opposition parties are almost equal. The model suggests that the attendance of deputies during this electoral period is a very significant factor for the voting outcomes.

Both examined electoral periods suggest that the model of voting game with probabilistic a priori union structure is rather more accurate than the model with a priori unions in the sense of describing reality.

My appraisal of the calculated power indices is based only on verbal reasoning and my more or less intuitive judgement of the successfulness of single government coalitions and opposition parties, but there also exist more objective ways of comparing the results of power indices to reality. One of them is to find an empirical power index. For the Penrose-Banzhaf power index we can accomplish empirical verification for example by checking in how many cases a party gets in a "swing" situation, i.e. has the ability of changing the final outcome of voting by changing its votes (considering for each voting act that all members who voted 'yes' changed their vote to 'no' or abstain, and all members, who voted 'no' or abstained voted 'yes'). Then we obtain the number of "empirical swings" can be used for calculation of "empirical" power index[59].

As I already mentioned above, as one of the main problems of the model of voting games with probabilistic a priori union structure in the Chapter No.6 can be considered the way of estimation of the numerical expression of coalition congruity. Except for the method I have introduced in the thesis I have been thinking about another method, which would deserve further examination. It is based on the method I used, but it includes the hypothesis, that some 33,33% of the identical voting is a coincidence in coalition of two players, some 11,11% is a coincidence in coalition of three players etc.

[59] Kubeček (1998)

I reached the percentage of coincidence the following way. I considered in my statistics three voting possibilities, 'yes', 'no' and abstain. There is therefore a one third chance that two parties will vote identically, an one ninth chance that three parties will vote identically etc. The number of the "coincident" identical voting should be then subtracted from the percentage, which came out of the statistics, to get the final percentage of coalition congruity.

As a problem or a challenge for future investigation can be also classified the fact, that all indices I used in my thesis omit the situations of abstaining and absence in voting. Each of these situations is different and deserves therefore special treatment. Abstaining works differently from absence in that it doesn't affect the quorum and might be therefore considered as a vote more against the proposal than the absent vote, which lowers the quorum needed for approval. There exist methods, which somehow tried to numerically evaluate abstention and absence votes[60]. These problems are also addressed by the work of Felsenthal and Machover[61], who defined a ternary voting game, where voters have three options 'yes', 'no' and abstain.

Including all these voting possibilities into the power methodology however wouldn't cover all the real world situations. There often come up agreements among the government parties on one side and one or more opposition parties on the other about coordination of absent deputies from both blocs. These agreements (so called pairing) are hard to be included into the methodology, as they are usually only ad hoc arranged and the praxis showed, that they are often violated.

Very interesting can be also evaluations of some hypothetical situations by the use of the model of voting games with probabilistic a priori union structure, as suggest the results of the couple of hypothetical situations analysed by power indices with a priori unions in Chapter 4.3. Except for the situation from this Chapter, disjunction of Hana Marvanová from her party, which remained part of the government coalition, expulsion of the Freedom Union - Democratic Union from the coalition and the government coalition break up considering unionists and Christian democrats to create a coalition again, Czech electoral history offers a wide range of such situations and configurations that are worth checking. From the present electoral period I would

[60] Kubeček (1998)

[61] Felsenthal, Machover, (1997)

mention a re-establishment of Coalition as part of the government coalition, which suggests the outcome of my statistics[62] or creation of opposition agreement by the Civil Democratic Party and the Communist Party of Bohemia and Moravia, which actually have higher opinion congruity than the government coalition.

Further research connected to both models I introduced in the thesis might proceed towards the combination of both of them. Adding the composite power indices to the model of coalition formation on the Czech political stage, we would get something that might be called a "power potential" of single parties, which would be dependent on the number of politically feasible coalitions a party can potentially be part of, on the probability of their formation and functioning and also on the party discipline.

Power methodology experienced during the last years a very dynamic development, one of the highest in the public choice discipline. It combines the approaches of economical and political sciences and lies therefore somewhere on the interface of these scientific disciplines. The interconnection of single disciplines is a relatively new matter, which is only the beginning of its development, which indicates a promising perspective for future research in the field of voting power.

[62] according to my statistics, there is absolutely no opinion difference among the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union

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| http://www.parlamentni-zpravodaj.cz | Parliamentary newspaper |
| http://www.psp.cz | Chamber of Deputies |
| http://www.senat.cz | Senate |
| http://www.unie.cz | The Freedom Union - Democratic Union |
| http://www.vlada.cz | Government of the Czech Republic |
| http://www.volby.cz | about election |

# ATTACHMENTS

## 1. Attachment – Parties of the Czech Political Landscape[63]

### Czech Social Democratic Party (ČSSD)

**Background:** The party was found on 7th April 1878. It is the oldest of the existing Czech political parties, dating back to the days of the Austro-Hungarian Empire. The party played a significant role in the foundation of Czechoslovakia after World War I, and between the wars it was one of the prominent players on the Czechoslovak political scene. In 1948 it was merged with the Communist Party of Czechoslovakia, but was renewed on 19th November 1989. Since then it has grown into one of the main players on the Czech political scene. It has been the party of Government since 22nd August 1998.

**Party leader**: Vladimir Špidla (current Prime Minister)

**Deputy leaders:**

Stanislav Gross (current Deputy Prime Minister and Minister of the Interior)

Martin Stařec

Zdeněk Škromach (current Minister of Labour and Social Affairs)

Marie Součkova (current Minister of Health)

Martin Tesařík

**About the party:** European-style Social Democratic Party, identifying closely with such parties as the Social Democrats in Germany and the British Labour Party. Favours a "social market economy", but in government it has also overseen an acceleration of the privatisation process (the main Czech banks are among the most prominent examples). In government the party has also put considerable stress on encouraging foreign investment. On many issues there is a wide spectrum of opinion within the party, but for all these differences there have not been major party rifts during the Social Democrats' period of government. The party leadership is strongly pro-European Union. The former Prime Minister and leader of the party Miloš Zeman has handed over the party leadership to Vladimir Špidla and has announced his intention to retire after the 2002 parliamentary elections and he had. The Social Democratic Party is an active member of the Socialist International.

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[63] Updated version of http://www.czech.cz

**Voter base:** The party traditionally draws working-class voters in industrial towns. Many of its voters are also public service employees and trade union members. Opinion polls suggest that the party does not have a particularly stable support base.

Website: www.cssd.cz

## Civic Democratic Party (ODS)

**Background:** The Civic Democratic Party (ODS) officially came into being in February 1991 after the break-up of Civic Forum, the driving force of the Velvet Revolution. The party held its establishing congress in April 1991, when the then Finance Minister Václav Klaus became party leader, a function he held till December 2002 (He became the President of the Czech Republic in February 2003). In 1995 it absorbed the far smaller Christian Democratic Party. After parliamentary elections in 1992, the ODS became the senior partner in the ruling right-of-centre coalition and Mr. Klaus became Prime Minister. After the June 1996 elections the ODS headed a fragile right-of-centre government, comprised of the same political partners, but reduced to just under half the seats in the Chamber of Deputies. A row broke out inside the ODS in late 1997 following a dispute over the party's funding. This led to the collapse of the coalition government, and some leading party figures seceded from the ODS to establish the Freedom Union. After the June 1998 parliamentary elections the Civic Democratic Party, which won the second largest number of seats, has tolerated the minority Social Democratic government through a pact known as the "Opposition Agreement". It is currently in opposition.

**Party leader**: Mirek Topolánek

**Deputy party leaders:**

Jan Zahradil

Petr Bendl

Petr Nečas

Miroslava Němcová

**About the party:** throughout its 12-year history its leader Václav Klaus has dominated the Civic Democratic Party. He is one of the Czech Republic's most charismatic politicians, loved and hated in equal measure. As an economist he firmly embraces the free market. On many issues his vision comes close to that of the former British Prime Minister Margaret Thatcher, whom Mr. Klaus often quotes as his role

model. The ODS instigated many of the economic reforms of the early and mid 1990s and was the instigator of the "voucher privatisation" scheme, which aimed to create a mass share-owning society. The party retains a political vision of minimal state intervention and low taxation, coupled with a reduction of state bureaucracy. As part of their pre-election campaign the Civic Democrats are calling for flat taxation. The party leadership is in favour of Czech membership of the European Union, but is heavily critical of increased European integration. This "Euro scepticism" is also reflected in the party's views on defence, which focus on the trans-Atlantic link.

**Voter base:** The party appeals strongly to the middle class and to entrepreneurs, and enjoys considerable support in some of the larger cities such as Prague and Brno and among younger voters. It is particularly popular with women.

Website: www.ods.cz

## Christian Democratic Union - Czechoslovak People's Party (KDU-CSL)

**Background:** The Czechoslovak People's Party goes back to the days of the foundation of Czechoslovakia in 1918 as a conservative, largely Catholic party. The party survived the communist regime, but only nominally, as part of the so-called "National Front". It began to function again as a fully independent party after the Velvet Revolution. In 1992 it changed its name to the Christian Democratic Union - Czechoslovak People's Party, partly as a way of distancing itself from the communist past. The party served as a junior partner in the two governments led by Václav Klaus, between July1992 and January 1998, and the party also took part in the interim government between January and August 1998. It was in opposition till 2002 when it entered the social democratic government. The party has been in a close pact with the Freedom Union since 1999.

**Party leader:** Cyril Svoboda (current Deputy Prime Minister and Minister of Foreign Affairs and former Interior Minister)

**Deputy party leaders:**

Milan Šimonovský (current Minister of Transport and Communications)

Jan Kasal

Zuzana Roithová (former Health Minister)

Tomaš Kvapil (former Regional Development Minister)

Miloslav Výborný (former Defence Minister)

**About the party:** The KDU-CSL is a traditional, conservative, Roman Catholic-based party. It defines itself as right of centre, but in many respects it is closer to the Social Democrats than the other right-wing parties. Like the Freedom Union - Democratic Union, the party is pro-European Union and is strongly in favour of direct presidential elections. On some social issues, such as the question of legalising homosexual partnerships, it is conservative, consistent with its Catholic tradition. The KDU-CSL and the Freedom Union-Democratic Union have put forward a common right-of-centre pre-election manifesto with a strong focus on the battle against corruption and on the rule of law.

**Voter base:** The party appeals particularly to Catholic voters and to conservative voters in small towns and rural areas. It enjoys strong and stable support in rural parts of Moravia.

Website: www.kdu.cz

## The Freedom Union - Democratic Union (US-DEU)

**Background:** disenchanted members of parliament, who broke away from Václav Klaus's Civic Democratic Party after a row about party financing, formed The Freedom Union in January 1998. They accused the party leadership of not being willing to investigate and answer serious questions about party sponsors. They were also unhappy with the leadership style of Mr. Klaus. The row brought down the Klaus's government in November 1997. Several members of the emerging Freedom Union served in the interim government of Josef Tošovský prior to the early elections held in June 1998. Although it won 19 seats in the election the party failed to draw mass support from Civic Democrat supporters, some of who saw them as "traitors".

In September 1999, the Freedom Union, along with three other right of centre parties (the Christian Democratic Union-People's Party, the Democratic Union and the Civic Democratic Alliance) signed a pact, committing them to close cooperation in the run-up to the next parliamentary elections and in the period to follow. From then on they were known as the "Four Coalition". The Freedom Union merged with the Democratic Union (a small right-of-centre party that came well short of gaining the 5% of votes needed to enter parliament in the 1998 election) at the end of 2001. The Four Coalition collapsed at the end of January 2002, after a row over how to solve the debt

crisis of its smallest member, the Civic Democratic Alliance (another party that had failed to enter parliament in the 1998 election). Since then the Freedom Union - Democratic Union has signed a new agreement with the Christian Democrats to go into the elections together with a new logo and under the title "Coalition".

**Party leader:** Petr Mareš

**Deputy party leaders:**

| | |
|---|---|
| Jan Hadrava | Ratibor Majzlik |
| Pavel Němec | Karel Kühnl |
| František Pelc | Robert Kolář |
| Vlastimil Ostrý | Jan Váňa |

**About the party:** The Freedom Union-Democratic Union is a right-of-centre party, committed to free-market liberalism. It combines classic right-wing policies, such as tax reductions and the introduction of tuition fees for university students, with a stress on the environment and on minority rights. A further frequent theme in the party's rhetoric is the battle against economic and political corruption. The party is strongly pro-European Union. The party vigorously advocates constitutional change to enable the Czech President to be elected directly by the electorate rather than parliament.

**Voter base:** The Freedom Union is popular among people with higher education and particularly appeals to young people and to those disillusioned with the larger parties. Its support is mainly urban.

Website: www.unie.cz

## The Communist Party of Bohemia and Moravia (KSČM)

**Background:** it is one of the few largely unreconstructed Communist parties on the political scene in the post-communist countries of Central and Eastern Europe. In other countries the word "communist" has usually been replaced by terms such as "democratic left", but the KSČM continues to take pride in its Communist history. The party in its current form was not founded until March 1990, but it is effectively the heir to the KSC (Communist Party of Czechoslovakia), in power from 1948-1989. Several groups splintered from the party in the early 1990s and founded their own parties - such as Left Block and later the Party of Czechoslovak Communists, but while they have faded into obscurity the KSČM has sustained its firm position in parliament consistently winning over ten percent of the vote.

**Party leader:** Miroslav Grebeníček

**Deputy party leaders:**

| | |
|---|---|
| Vlastimil Balin | Zuzka Rujbrová |
| Jiri Dolejš | Otakar Zmitko |
| Vaclav Exner | Dana Hrabková |
| Miloslav Ransdorf | |

**About the party:** The KSČM is a socialist party, believing in strong state control of the economy. The party's political programme calls for "an appropriate degree of state ownership in key sectors of the economy (banking, transport, telecommunications, energy, the extractive industries etc.)". The party is strongly opposed to Czech NATO membership and describes the NATO action against Yugoslavia in 1999 as "aggression". Recently some leading party members have expressed support for European Union membership, but the party remains divided on the issue. Most mainstream trade union leaders distance themselves from the party. Up to now all the other parties currently represented in parliament have ruled out any kind of coalition deal with the KSČM, unless the party undergoes major reforms.

**Voter base:** mainly older people who have found it hard to adapt to the new conditions. The party also enjoys support in industrial areas with high unemployment. The party has a large base of grass roots members, far outnumbering the other main political parties.

Website: www.kscm.cz

## Parties that didn't cross the 5% threshold enabling them to enter parliament after the June 2002 election

### Civic Democratic Alliance - ODA

Between 1992 and 1997 this was one of the parties of government. It failed to win the 5% of votes needed to enter parliament in June1998. Afterwards the party joined the right of centre opposition grouping, the Four Coalition, but a row over the ODA's considerable debts led to the break up of the coalition at the end of last year, leaving the party in the political wilderness.

Website: www.oda.cz

## Republicans of Miroslav Sladek

This is a far right-wing party, appealing to nationalist sympathies. The party emerged from ashes of the Republican Party of Czechoslovakia, which failed to cross the 5% parliamentary threshold in the 1998 election. The new name of the party reflects an attempt at a political comeback by its controversial leader Miroslav Sladek. With its vehemently anti-Romany and anti-German rhetoric, the party can be described as extremist. The party is anti-NATO, anti-EU and strongly opposed to immigration.

Website: www.republikani.cz

## Czech National Social Party - CSNS

This is one of the oldest parties, going back over a hundred years, but has failed to win mass support in the Czech Republic in recent years. It styles itself as a party of Czech national interests. The party's rhetoric is often at its strongest in criticizing illegal immigration, which it sees as one of the main sources of organized crime. The party is investing large sums of money into its election campaign, having recently sold its headquarters in central Prague.

Website: www.csns.cz

## The Party for Security in Life - SZJ

The party is the successor of the party "Pensioners for Security in Life", which gained just over 3% of the vote in the last parliamentary elections, when the party leader kept his promise to eat a beetle if the party failed to break the 5% barrier. The party aspires to represent the weaker in society: pensioners, unemployed people, disabled people, rural voters and women who feel disadvantaged. It has a socially based programme, based on a strong welfare state. Website: www.szj.cz

## The Green Party

In terms of electoral support the Greens have never really got off the ground in the Czech Republic. The party is strongly opposed to nuclear power, which is one of its key electoral issues. The Greens' pre-election manifesto also calls for policies to "reduce the rate of divorce, abortion and other undesirable phenomena."

Website: www.stranazelenych.cz

## The Path for Change and Hope

These two parties have common roots in the wave of public disillusionment with the current political elite that came at the end of the 1990s. However their founders quarrelled and went their separate ways. Both are close to the centre of the political spectrum, pro-free market and strongly pro-European, and both accuse the two strongest political parties, the Social Democrats and the Civic Democrats of corruption and cynicism. The businessman Jiri Lobkowicz heads the Path for Change, and the driving force of Hope is one of the student leaders during the Velvet Revolution, Monika Pajerova.

Website of The Path for Change: www.cestazmeny.cz

Website of Hope: www.strana-nadeje.cz

## The Other

Action to Abolish the Senate and against the Asset-Stripping of Pension Funds

The Balbin Poetic Party

The Czech Right

The Czech Social Democratic Movement

The Czechoslovak Socialist Party

The Democratic League

The Humanist Alliance

The Moravian Democratic Party

The National Democratic Party

New Movement

The Right Bloc

The Republicans

The Roma Civic Initiative

The Association of Independents

The Party of Democratic Socialism

The Party of the Countryside - Combined Civic Forces

The Party for Security in Life

The Common Sense Party

Choice for the Future

## 2. Attachment – Czech Election Results

### 1990 Elections to the Czech National Council

| Mandates | | English name of the party or coalition (Czech name) | Czech abbreviation |
|---|---|---|---|
| abs. | % | | |
| 22 | 11 | (Movement for Autonomous Democracy- League for Moravia and Silesia (Hnutí za samosprávnou demokracii - Společnost pro Moravu a Slezsko) | MORSL |
| 32 | 16 | The Communist Party of Czechoslovakia (Komunistická strana Československa) | KSČ |
| 19 | 9,5 | Christian Democratic Union (Křesťanská a demokratická unie (Czechoslovak People's Party (Československá strana lidová) and Christian Democratic Movement (Křesťanskodemokratické hnutí)) | KDU |
| 127 | 63,5 | Civil Forum (Občanské fórum) | OF |

### 1992 Elections to the Czech National Council

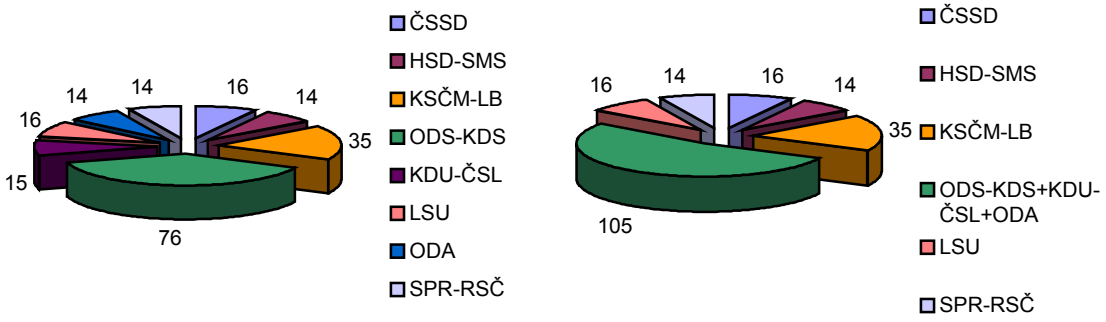


**Figure A1** Post-electoral coalition of 1992

| Mandates | | English name of the party or coalition (Czech name) | Czech abbreviation |
|---|---|---|---|
| abs. | % | | |
| 16 | 8 | Czech Social Democratic Party (Česká strana sociálně demokratická) | ČSSD |
| 14 | 7 | Movement for Autonomous Democracy- League for Moravia and Silesia (Hnutí za samosprávnou demokracii - Společnost pro Moravu a Slezsko) | HSD-SMS |
| 35 | 17,5 | Coalition of Left bloc (The Communist Party of Bohemia and Moravia (Komunistická strana Čech a Moravy, KSČM) and Democratic Left of CSFR (Demokratická levice ČSFR) | LB |
| 76 | 38 | Coalition of Civic Democratic Party (Občanská demokratická strana) and Christian Democratic Party (Křesťanskodemokratická strana) | ODS-KDS |
| 15 | 7,5 | Christian Democratic Union - Czechoslovak People's Party (Křesťanská a demokratická unie - Československá strana lidová) | KDU-ČSL |
| 16 | 8 | Liberal Social Union (Liberálně sociální unie) | LSU |
| 14 | 7 | Civic Democratic Alliance (Občanská demokratická aliance) | ODA |
| 14 | 7 | Association for Republic-Czechoslovak Republican Party (Sdružení pro republiku - Republikánská strana Československa) | SPR-RSČ |

## 1996 Elections to the Chamber of Deputies of the Czech Republic

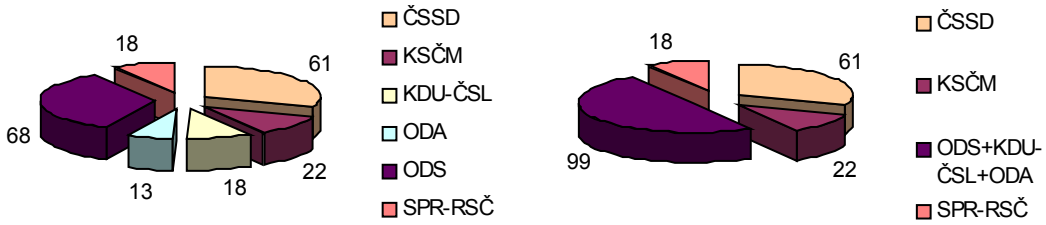


**Figure A2** Post-electoral coalition of 1996

| Mandates | | English name of the party or coalition (Czech name) | Czech abbreviation |
|---|---|---|---|
| abs. | % | | |
| 61 | 30,5 | Czech Social Democratic Party (Česká strana sociálně demokratická) | ČSSD |
| 22 | 11 | The Communist Party of Bohemia and Moravia (Komunistická strana Čech a Moravy) | KSČM |
| 18 | 9 | Christian Democratic Union - Czechoslovak People's Party (Křesťanská a demokratická unie - Československá strana lidová) | KDU-ČSL |
| 13 | 6,5 | Civic Democratic Alliance (Občanská demokratická aliance) | ODA |
| 68 | 34 | Civic Democratic Party (Občanská demokratická strana) | ODS |
| 18 | 9 | Association for Republic-Czechoslovak Republican Party (Sdružení pro republiku - Republikánská strana Československa) | SPR-RSČ |

## 1998 Elections to the Chamber of Deputies of the Czech Republic

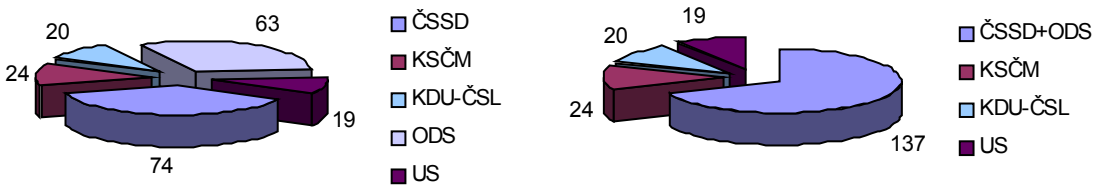


**Figure A3** Post-electoral coalition of 1998

| Mandates | | English name of the party or coalition (Czech name) | Czech abbreviation |
|---|---|---|---|
| abs. | % | | |
| 74 | 37 | Czech Social Democratic Party (Česká strana sociálně demokratická) | ČSSD |
| 24 | 12 | The Communist Party of Bohemia and Moravia (Komunistická strana Čech a Moravy) | KSČM |
| 20 | 10 | Christian Democratic Union - Czechoslovak People's Party (Křesťanská a demokratická unie - Československá strana lidová) | KDU-ČSL |
| 63 | 31,5 | Civic Democratic Party (Občanská demokratická strana) | ODS |
| 19 | 9,5 | The Freedom Union - Democratic Union (Unie svobody) | US |

## 2002 Elections to the Chamber of Deputies of the Czech Republic

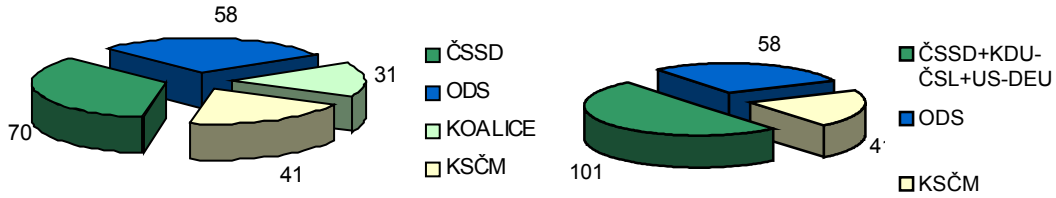


**Figure A4** Post-electoral coalition of 2002

| Mandates | | English name of the party or coalition (Czech name) | Czech abbreviation |
|---|---|---|---|
| abs. | % | | |
| 70 | 35 | Czech Social Democratic Party (Česká strana sociálně demokratická) | ČSSD |
| 58 | 29 | Civic Democratic Party (Občanská demokratická strana) | ODS |
| 31 | 15,5 | Coalition of Christian Democratic Union - Czechoslovak People's Party (Křesťanská a demokratická unie - Československá strana lidová) and The Freedom Union - Democratic Union (Unie svobody) | KOALICE |
| 41 | 20,5 | The Communist Party of Bohemia and Moravia (Komunistická strana Čech a Moravy) | KSČM |

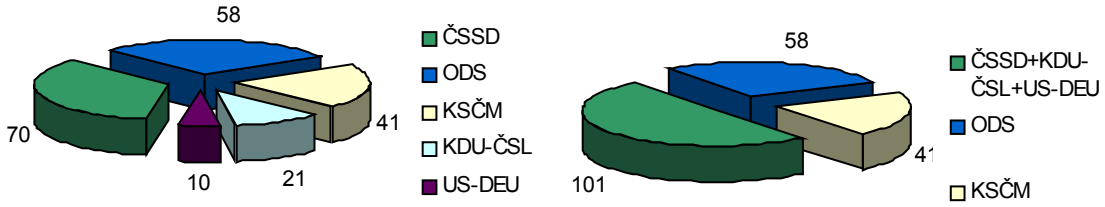


**Figure A5** Post-electoral coalition of 2002 after the Coalition break-up

## 3. Attachment – Left-Right Axis

1992

| Extreme Left | Left | Left-Centre-Right | | | | Right | Extreme Right |
|---|---|---|---|---|---|---|---|
| KSČM-LB | ČSSD | LSU | HSD-SMS | KDU-ČSL | ODA | ODS-KDS | SPR-RSČ |

1996

| Extreme Left | Left | Left-Centre-Right | | Right | Extreme Right |
|---|---|---|---|---|---|
| KSČM | ČSSD | KDU-ČSL | ODA | ODS | SPR-RSČ |

1998

| Extreme Left | Left | Left-Centre-Right | | Right | Extreme Right |
|---|---|---|---|---|---|
| KSČM | ČSSD | KDU-ČSL | US | ODS | |

2002

| Extreme Left | Left | Left-Centre-Right | | Right | Extreme Right |
|---|---|---|---|---|---|
| KSČM | ČSSD | KOALICE | | ODS | |
| | | KDU-ČSL | US-DEU | | |

## 4. Attachment – Senate[64]

The first Senate votes took place in 1996, when one third on senators was voted for 2 years, one-third for 4 years and one third for 6 years. Another votes took place in one third on voting districts in 1998. The length of mandate of all Senators is since those votes 6 years.

Senate has 81 senators, who are elected in 81 districts in the Czech Republic.

[64] adapted from http://www.senate.cz

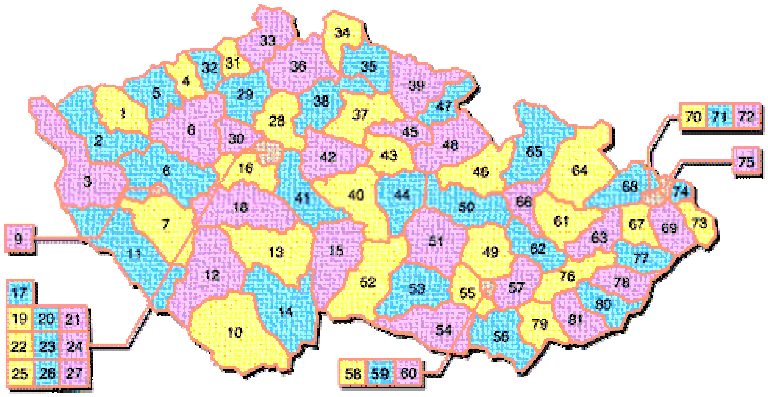

**Figure A6** Senate electoral districts

Election to Senate takes place every two years in one third of electoral districts:

| | | |
|---|---|---|
| 1998, 2004 and so on electoral districts 1,4,7,10,13,16,19, 22 and so forth. | 2000, 2006 and so on electoral districts 2,5,8,11,14,17,20, 23 and so forth. | 2002, 2008 and so on electoral districts 3,6,9,12,15,18,21, 24 and so forth. |

Senate is a continuous institution, it cannot be dismissed and continuously goes on doing its job. Therefore it is called an insurance of democracy.

Voters choose from candidates, which are suggested by different political parties or from independent candidates. The independent candidates have to attach to their application form a petition with more than 1000 signs of chartered voters of relevant electoral district that promotes the candidates candidacy. All candidates must give bail of 20 000 CZK, which is refundable only in case, that candidate gains at least 6% of the total number of valid votes

The candidate, who gets more than 50% of votes, becomes a senator in the first round. If none of the candidates gains more than 50% of votes, a second round of election takes place, where continue only the two candidates with the highest number of votes. The winner of the second round is the one who gets more votes.

Senator can be chosen only a national of the Czech Republic, who is at least 40 years old. Even a senator, who is running out of his mandate can stand as a candidate, so if he or she gets a public trust, he or she can continue in this job for more terms. Every voted Senator gets a certificate about his or hers legit and valid election from the voting commission and during the first Senate sitting following the votes he or she passes the Senator promise.

## 5. Attachment – Changes in Chamber of Deputies During the Electoral Period of 1996-1998[65]

| Czech abbreviation | 1996 elections | 18th of Decemb. 1996 | 25th of March 1997 | 20th of January 1998 | 27th of January 1998 | 25th of February 1998 | 23rd of March 1998 | 14th of April 1998 | 12th of May 1998 |
|---|---|---|---|---|---|---|---|---|---|
| ČSSD | 61 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 |
| KSČM | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| KDU-ČSL | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 19 |
| ODA | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 12 | 12 |
| ODS | 68 | 68 | 69 | 38 | 37 | 38 | 38 | 39 | 38 |
| SPR-RSČ | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| N | | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 |
| US | | | | 31 | 32 | 31 | 30 | 30 | 30 |

## 6. Attachment – Tables of Results of Laruelle's Testing[66]

a) Axiomatic Approach

| | SS | PB | HP |
|---|---|---|---|
| **Anonymity** | Yes | Yes | Yes |
| **Null Player** | Yes | Yes | Yes |
| **Relative Power** | Yes | No | Yes |
| **Absolute Power** | No | Yes | No |
| **Transfer** | Yes | Yes | No |
| **HP-Mergeability** | No | No | Yes |

b) Approach Based on Postulates

| | SS | PB | HP |
|---|---|---|---|
| Bloc | Yes | Yes | No |
| Monotonicity | Yes | Yes | No |
| Donation | Yes | Yes | No |
| Weak Bicameral | No | Yes | No |

## 7. Attachment – Composite Power Indices for the 1998 Electoral Results Considering A Priory Union of the Czech Social Democratic Party and the Civil Democratic Party

p

0,25

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74,00 | 37,00 | 35,00 | 33,93 | 27,50 | 38,75 | 39,77 | 27,50 |
| KSČM | 24,00 | 12,00 | 10,00 | 10,72 | 15,00 | 7,50 | 6,82 | 15,00 |
| KDU-ČSL | 20,00 | 10,00 | 10,00 | 10,72 | 15,00 | 7,50 | 6,82 | 15,00 |
| ODS | 63,00 | 31,50 | 35,00 | 33,93 | 27,50 | 38,75 | 39,77 | 27,50 |
| US | 19,00 | 9,50 | 10,00 | 10,72 | 15,00 | 7,50 | 6,82 | 15,00 |

[65] adapted from Kubeček (1998), p.34

[66] tables from Laurelle (1999)

0,3

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74,00 | 37,00 | 36,00 | 35,00 | 29,00 | 39,50 | 40,45 | 29,00 |
| KSČM | 24,00 | 12,00 | 9,33 | 10,00 | 14,00 | 7,00 | 6,36 | 14,00 |
| KDU-ČSL | 20,00 | 10,00 | 9,33 | 10,00 | 14,00 | 7,00 | 6,36 | 14,00 |
| ODS | 63,00 | 31,50 | 36,00 | 35,00 | 29,00 | 39,50 | 40,45 | 29,00 |
| US | 19,00 | 9,50 | 9,33 | 10,00 | 14,00 | 7,00 | 6,36 | 14,00 |

0,35

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74,00 | 37,00 | 37,00 | 36,07 | 30,50 | 40,25 | 41,13 | 30,50 |
| KSČM | 24,00 | 12,00 | 8,66 | 9,29 | 13,00 | 6,50 | 5,91 | 13,00 |
| KDU-ČSL | 20,00 | 10,00 | 8,66 | 9,29 | 13,00 | 6,50 | 5,91 | 13,00 |
| ODS | 63,00 | 31,50 | 37,00 | 36,07 | 30,50 | 40,25 | 41,13 | 30,50 |
| US | 19,00 | 9,50 | 8,66 | 9,29 | 13,00 | 6,50 | 5,91 | 13,00 |

0,4

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74,00 | 37,00 | 38,00 | 37,14 | 32,00 | 41,00 | 41,82 | 32,00 |
| KSČM | 24,00 | 12,00 | 8,00 | 8,57 | 12,00 | 6,00 | 5,45 | 12,00 |
| KDU-ČSL | 20,00 | 10,00 | 8,00 | 8,57 | 12,00 | 6,00 | 5,45 | 12,00 |
| ODS | 63,00 | 31,50 | 38,00 | 37,14 | 32,00 | 41,00 | 41,82 | 32,00 |
| US | 19,00 | 9,50 | 8,00 | 8,57 | 12,00 | 6,00 | 5,45 | 12,00 |

0,45

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74,00 | 37,00 | 39,00 | 38,21 | 33,50 | 41,75 | 42,50 | 33,50 |
| KSČM | 24,00 | 12,00 | 7,33 | 7,86 | 11,00 | 5,50 | 5,00 | 11,00 |
| KDU-ČSL | 20,00 | 10,00 | 7,33 | 7,86 | 11,00 | 5,50 | 5,00 | 11,00 |
| ODS | 63,00 | 31,50 | 39,00 | 38,21 | 33,50 | 41,75 | 42,50 | 33,50 |
| US | 19,00 | 9,50 | 7,33 | 7,86 | 11,00 | 5,50 | 5,00 | 11,00 |

0,5

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74,00 | 37,00 | 40,00 | 39,29 | 35,00 | 42,50 | 43,18 | 35,00 |
| KSČM | 24,00 | 12,00 | 6,67 | 7,15 | 10,00 | 5,00 | 4,55 | 10,00 |
| KDU-ČSL | 20,00 | 10,00 | 6,67 | 7,15 | 10,00 | 5,00 | 4,55 | 10,00 |
| ODS | 63,00 | 31,50 | 40,00 | 39,29 | 35,00 | 42,50 | 43,18 | 35,00 |
| US | 19,00 | 9,50 | 6,67 | 7,15 | 10,00 | 5,00 | 4,55 | 10,00 |

0,55

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74,00 | 37,00 | 41,00 | 40,36 | 36,50 | 43,25 | 43,86 | 36,50 |
| KSČM | 24,00 | 12,00 | 6,00 | 6,43 | 9,00 | 4,50 | 4,09 | 9,00 |
| KDU-ČSL | 20,00 | 10,00 | 6,00 | 6,43 | 9,00 | 4,50 | 4,09 | 9,00 |
| ODS | 63,00 | 31,50 | 41,00 | 40,36 | 36,50 | 43,25 | 43,86 | 36,50 |
| US | 19,00 | 9,50 | 6,00 | 6,43 | 9,00 | 4,50 | 4,09 | 9,00 |

0,6

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74,00 | 37,00 | 42,00 | 41,43 | 38,00 | 44,00 | 44,54 | 38,00 |
| KSČM | 24,00 | 12,00 | 5,33 | 5,72 | 8,00 | 4,00 | 3,64 | 8,00 |
| KDU-ČSL | 20,00 | 10,00 | 5,33 | 5,72 | 8,00 | 4,00 | 3,64 | 8,00 |
| ODS | 63,00 | 31,50 | 42,00 | 41,43 | 38,00 | 44,00 | 44,54 | 38,00 |
| US | 19,00 | 9,50 | 5,33 | 5,72 | 8,00 | 4,00 | 3,64 | 8,00 |

0,65

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74,00 | 37,00 | 43,00 | 42,50 | 39,50 | 44,75 | 45,23 | 39,50 |
| KSČM | 24,00 | 12,00 | 4,67 | 5,00 | 7,00 | 3,50 | 3,18 | 7,00 |
| KDU-ČSL | 20,00 | 10,00 | 4,67 | 5,00 | 7,00 | 3,50 | 3,18 | 7,00 |
| ODS | 63,00 | 31,50 | 43,00 | 42,50 | 39,50 | 44,75 | 45,23 | 39,50 |
| US | 19,00 | 9,50 | 4,67 | 5,00 | 7,00 | 3,50 | 3,18 | 7,00 |

0,7

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74,00 | 37,00 | 44,00 | 43,57 | 41,00 | 45,50 | 45,91 | 41,00 |
| KSČM | 24,00 | 12,00 | 4,00 | 4,29 | 6,00 | 3,00 | 2,73 | 6,00 |
| KDU-ČSL | 20,00 | 10,00 | 4,00 | 4,29 | 6,00 | 3,00 | 2,73 | 6,00 |
| ODS | 63,00 | 31,50 | 44,00 | 43,57 | 41,00 | 45,50 | 45,91 | 41,00 |
| US | 19,00 | 9,50 | 4,00 | 4,29 | 6,00 | 3,00 | 2,73 | 6,00 |

0,75

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 74,00 | 37,00 | 45,00 | 44,64 | 42,50 | 46,25 | 46,59 | 42,50 |
| KSČM | 24,00 | 12,00 | 3,33 | 3,57 | 5,00 | 2,50 | 2,27 | 5,00 |
| KDU-ČSL | 20,00 | 10,00 | 3,33 | 3,57 | 5,00 | 2,50 | 2,27 | 5,00 |
| ODS | 63,00 | 31,50 | 45,00 | 44,64 | 42,50 | 46,25 | 46,59 | 42,50 |
| US | 19,00 | 9,50 | 3,33 | 3,57 | 5,00 | 2,50 | 2,27 | 5,00 |

## 8. Attachment – Composite Power Indices for the 2002 Electoral Results Considering A Priory Union of the Czech Social Democratic Party, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union

p

0,55

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70,00 | 35,00 | 59,24 | 56,89 | 33,96 | 44,94 | 38,40 | 23,04 |
| ODS | 58,00 | 29,00 | 10,50 | 10,39 | 10,39 | 20,42 | 25,00 | 21,25 |
| KDU-ČSL | 21 | 10,50 | 9,88 | 11,08 | 22,63 | 8,98 | 7,68 | 15,35 |
| US-DEU | 10 | 5,00 | 9,88 | 11,08 | 22,63 | 8,98 | 7,68 | 15,35 |
| KSČM | 41,00 | 20,50 | 10,50 | 10,39 | 10,39 | 16,67 | 21,25 | 25,00 |

0,6

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70,00 | 35,00 | 60,99 | 58,56 | 34,95 | 45,24 | 38,10 | 22,86 |
| ODS | 58,00 | 29,00 | 9,33 | 9,23 | 9,23 | 20,00 | 25,00 | 21,67 |
| KDU-ČSL | 21 | 10,50 | 10,17 | 11,41 | 23,29 | 9,04 | 7,62 | 15,23 |
| US-DEU | 10 | 5,00 | 10,17 | 11,41 | 23,29 | 9,04 | 7,62 | 15,23 |
| KSČM | 41,00 | 20,50 | 9,33 | 9,23 | 9,23 | 16,67 | 21,67 | 25,00 |

0,65

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70,00 | 35,00 | 62,74 | 60,24 | 35,94 | 45,54 | 37,80 | 22,68 |
| ODS | 58,00 | 29,00 | 8,17 | 8,08 | 8,08 | 19,59 | 25,00 | 22,08 |
| KDU-ČSL | 21 | 10,50 | 10,46 | 11,73 | 23,95 | 9,10 | 7,56 | 15,11 |
| US-DEU | 10 | 5,00 | 10,46 | 11,73 | 23,95 | 9,10 | 7,56 | 15,11 |
| KSČM | 41,00 | 20,50 | 8,17 | 8,08 | 8,08 | 16,67 | 22,08 | 25,00 |

0,7

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70,00 | 35,00 | 64,49 | 61,91 | 36,93 | 45,84 | 37,51 | 22,50 |
| ODS | 58,00 | 29,00 | 7,00 | 6,92 | 6,92 | 19,17 | 25,00 | 22,50 |
| KDU-ČSL | 21 | 10,50 | 10,75 | 12,06 | 24,61 | 9,16 | 7,50 | 14,99 |
| US-DEU | 10 | 5,00 | 10,75 | 12,06 | 24,61 | 9,16 | 7,50 | 14,99 |
| KSČM | 41,00 | 20,50 | 7,00 | 6,92 | 6,92 | 16,67 | 22,50 | 25,00 |

0,75

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70,00 | 35,00 | 66,24 | 63,59 | 37,92 | 46,13 | 37,21 | 22,32 |
| ODS | 58,00 | 29,00 | 5,83 | 5,77 | 5,77 | 18,75 | 25,00 | 22,92 |
| KDU-ČSL | 21 | 10,50 | 11,04 | 12,39 | 25,27 | 9,22 | 7,44 | 14,87 |
| US-DEU | 10 | 5,00 | 11,04 | 12,39 | 25,27 | 9,22 | 7,44 | 14,87 |
| KSČM | 41,00 | 20,50 | 5,83 | 5,77 | 5,77 | 16,67 | 22,92 | 25,00 |

0,8

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70,00 | 35,00 | 67,99 | 65,26 | 38,90 | 46,43 | 36,91 | 22,14 |
| ODS | 58,00 | 29,00 | 4,67 | 4,62 | 4,62 | 18,34 | 25,00 | 23,33 |
| KDU-ČSL | 21 | 10,50 | 11,33 | 12,71 | 25,93 | 9,28 | 7,38 | 14,75 |
| US-DEU | 10 | 5,00 | 11,33 | 12,71 | 25,93 | 9,28 | 7,38 | 14,75 |
| KSČM | 41,00 | 20,50 | 4,67 | 4,62 | 4,62 | 16,67 | 23,33 | 25,00 |

0,85

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70,00 | 35,00 | 69,74 | 66,94 | 39,89 | 46,73 | 36,61 | 21,97 |
| ODS | 58,00 | 29,00 | 3,50 | 3,46 | 3,46 | 17,92 | 25,00 | 23,75 |
| KDU-ČSL | 21 | 10,50 | 11,63 | 13,04 | 26,59 | 9,34 | 7,32 | 14,63 |
| US-DEU | 10 | 5,00 | 11,63 | 13,04 | 26,59 | 9,34 | 7,32 | 14,63 |
| KSČM | 41,00 | 20,50 | 3,50 | 3,46 | 3,46 | 16,67 | 23,75 | 25,00 |

0,9

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70,00 | 35,00 | 71,49 | 68,61 | 40,88 | 47,03 | 36,32 | 21,79 |
| ODS | 58,00 | 29,00 | 2,33 | 2,31 | 2,31 | 17,50 | 25,00 | 24,17 |
| KDU-ČSL | 21 | 10,50 | 11,92 | 13,37 | 27,25 | 9,40 | 7,26 | 14,51 |
| US-DEU | 10 | 5,00 | 11,92 | 13,37 | 27,25 | 9,40 | 7,26 | 14,51 |
| KSČM | 41,00 | 20,50 | 2,33 | 2,31 | 2,31 | 16,67 | 24,17 | 25,00 |

0,95

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 70,00 | 35,00 | 73,24 | 70,29 | 41,87 | 47,32 | 36,02 | 21,61 |
| ODS | 58,00 | 29,00 | 1,17 | 1,15 | 1,15 | 17,09 | 25,00 | 24,58 |
| KDU-ČSL | 21 | 10,50 | 12,21 | 13,69 | 27,91 | 9,46 | 7,20 | 14,39 |
| US-DEU | 10 | 5,00 | 12,21 | 13,69 | 27,91 | 9,46 | 7,20 | 14,39 |
| KSČM | 41,00 | 20,50 | 1,17 | 1,15 | 1,15 | 16,67 | 24,58 | 25,00 |

# 9. Attachment – Power Indices Considering only the Party Discipline

1998

| Czech abbreviation | Mandates | | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | abs. | % | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | 56,76 | 28,38 | 31,59 | 53,21 | 28,49 | 57,43 | 9,06 | 42,87 | 31,27 | 41,37 | 32,15 | 40,94 | 11,56 | 17,34 |
| | 17,24 | 8,62 | 7,30 | 0,00 | 8,33 | 0,00 | 11,40 | 0,00 | 7,46 | 3,99 | 7,09 | 3,18 | 9,33 | 1,83 |
| KSČM | 18,95 | 9,47 | 9,21 | 0,00 | 10,66 | 0,00 | 12,75 | 0,00 | 9,60 | 6,19 | 8,51 | 6,25 | 10,22 | 4,00 |
| | 5,05 | 2,53 | 2,06 | 0,00 | 2,52 | 0,00 | 3,48 | 0,00 | 2,26 | 1,19 | 2,13 | 1,25 | 8,00 | 8,00 |
| KDU-ČSL | 15,17 | 7,59 | 7,30 | 0,00 | 8,33 | 0,00 | 11,40 | 0,00 | 6,67 | 3,81 | 6,62 | 5,00 | 10,67 | 16,00 |
| | 4,83 | 2,41 | 2,06 | 0,00 | 2,52 | 0,00 | 8,73 | 0,00 | 2,26 | 1,19 | 2,13 | 1,25 | 8,00 | 8,00 |
| ODS | 47,53 | 23,77 | 24,76 | 46,79 | 21,12 | 42,57 | 12,08 | 57,13 | 24,48 | 35,06 | 25,77 | 32,81 | 12,44 | 18,66 |
| | 15,47 | 7,73 | 7,30 | 0,00 | 8,33 | 0,00 | 11,40 | 0,00 | 7,06 | 2,20 | 6,86 | 3,07 | 11,11 | 2,17 |
| US | 13,95 | 6,97 | 6,35 | 0,00 | 7,17 | 0,00 | 10,73 | 0,00 | 6,67 | 3,81 | 6,62 | 5,00 | 10,67 | 16,00 |
| | 5,05 | 2,53 | 2,06 | 0,00 | 2,52 | 0,00 | 8,73 | 0,00 | 2,26 | 1,19 | 2,13 | 1,25 | 8,00 | 8,00 |

2000

| Czech abbreviation | Mandates | | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | abs. | % | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | 54,27 | 27,13 | 31,59 | 53,41 | 28,49 | 57,43 | 9,06 | 42,87 | 31,27 | 42,98 | 32,15 | 44,88 | 11,56 | 16,86 |
| | 15,73 | 7,87 | 7,30 | 0,00 | 8,33 | 0,00 | 11,40 | 0,00 | 7,46 | 4,52 | 7,09 | 3,63 | 9,33 | 2,50 |
| ODS | 43,26 | 21,63 | 9,21 | 0,00 | 10,66 | 0,00 | 12,75 | 0,00 | 9,60 | 4,52 | 8,51 | 3,63 | 10,22 | 2,50 |
| | 14,74 | 7,37 | 2,06 | 0,00 | 2,52 | 0,00 | 3,48 | 0,00 | 2,26 | 1,19 | 2,13 | 0,99 | 8,00 | 7,50 |
| KDU-ČSL | 16,82 | 8,41 | 7,30 | 0,00 | 8,33 | 0,00 | 11,40 | 0,00 | 6,67 | 2,74 | 6,62 | 2,79 | 10,67 | 12,50 |
| | 4,18 | 2,09 | 2,06 | 0,00 | 2,52 | 0,00 | 8,73 | 0,00 | 2,26 | 1,19 | 2,13 | 0,99 | 8,00 | 7,50 |
| US-DEU | 7,22 | 3,61 | 24,76 | 46,59 | 21,12 | 42,57 | 12,08 | 57,13 | 24,48 | 36,19 | 25,77 | 35,98 | 12,44 | 18,14 |
| | 2,78 | 1,39 | 7,30 | 0,00 | 8,33 | 0,00 | 11,40 | 0,00 | 7,06 | 2,74 | 6,86 | 2,97 | 11,11 | 12,50 |
| KSČM | 32,91 | 16,45 | 6,35 | 0,00 | 7,17 | 0,00 | 10,73 | 0,00 | 6,67 | 2,74 | 6,62 | 2,97 | 10,67 | 12,50 |
| | 8,09 | 4,05 | 2,06 | 0,00 | 2,52 | 0,00 | 8,73 | 0,00 | 2,26 | 1,19 | 2,13 | 0,99 | 8,00 | 7,50 |

**Table A.9.1.** Indices assuming that the existence of a coalition of the undisciplined deputies of coalition parties

1998

| Czech abbreviation | Mandates | | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | abs. | % | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | 56,76 | 28,38 | 31,59 | 53,41 | 28,49 | 57,43 | 9,06 | 42,87 | 31,27 | 42,98 | 32,15 | 44,88 | 11,56 | 16,86 |
| | 17,24 | 8,62 | 7,30 | 0,00 | 8,33 | 0,00 | 11,40 | 0,00 | 7,46 | 4,52 | 7,09 | 3,63 | 9,33 | 2,50 |
| KSČM | 18,95 | 9,47 | 9,21 | 0,00 | 10,66 | 0,00 | 12,75 | 0,00 | 9,60 | 4,52 | 8,51 | 3,63 | 10,22 | 2,50 |
| | 5,05 | 2,53 | 2,06 | 0,00 | 2,52 | 0,00 | 3,48 | 0,00 | 2,26 | 1,19 | 2,13 | 0,99 | 8,00 | 7,50 |
| KDU-ČSL | 15,17 | 7,59 | 7,30 | 0,00 | 8,33 | 0,00 | 11,40 | 0,00 | 6,67 | 2,74 | 6,62 | 2,79 | 10,67 | 12,50 |
| | 4,83 | 2,41 | 2,06 | 0,00 | 2,52 | 0,00 | 8,73 | 0,00 | 2,26 | 1,19 | 2,13 | 0,99 | 8,00 | 7,50 |
| ODS | 47,53 | 23,77 | 24,76 | 46,59 | 21,12 | 42,57 | 12,08 | 57,13 | 24,48 | 36,19 | 25,77 | 35,98 | 12,44 | 18,14 |
| | 15,47 | 7,73 | 7,30 | 0,00 | 8,33 | 0,00 | 11,40 | 0,00 | 7,06 | 2,74 | 6,86 | 2,97 | 11,11 | 12,50 |
| US | 13,95 | 6,97 | 6,35 | 0,00 | 7,17 | 0,00 | 10,73 | 0,00 | 6,67 | 2,74 | 6,62 | 2,97 | 10,67 | 12,50 |
| | 5,05 | 2,53 | 2,06 | 0,00 | 2,52 | 0,00 | 8,73 | 0,00 | 2,26 | 1,19 | 2,13 | 0,99 | 8,00 | 7,50 |

2002

| Czech abbreviation | Mandates | | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | abs. | % | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | 54,27 | 27,13 | 31,51 | 34,76 | 30,62 | 35,44 | 10,94 | 5,39 | 30,12 | 34,31 | 29,07 | 35,68 | 14,55 | 9,14 |
| | 15,73 | 7,87 | 6,39 | 7,02 | 6,49 | 8,17 | 10,42 | 14,63 | 7,62 | 4,76 | 8,37 | 4,40 | 10,91 | 10,71 |
| ODS | 43,26 | 21,63 | 22,34 | 15,60 | 21,75 | 13,94 | 14,58 | 14,63 | 21,67 | 18,10 | 21,37 | 19,78 | 10,45 | 7,14 |
| | 14,74 | 7,37 | 6,19 | 6,31 | 6,29 | 7,21 | 9,90 | 12,20 | 6,67 | 4,76 | 7,27 | 4,40 | 10,45 | 10,71 |
| KDU-ČSL | 16,82 | 8,41 | 6,98 | 9,17 | 7,11 | 8,23 | 9,38 | 4,62 | 7,62 | 11,33 | 8,37 | 10,27 | 10,91 | 6,86 |
| | 4,18 | 2,09 | 1,43 | 1,07 | 1,34 | 1,44 | 6,77 | 7,32 | 2,10 | 3,10 | 2,20 | 2,20 | 7,27 | 10,71 |
| US-DEU | 7,22 | 3,61 | 3,17 | 3,81 | 3,40 | 3,93 | 9,38 | 4,62 | 3,45 | 5,56 | 3,74 | 4,59 | 8,64 | 5,43 |
| | 2,78 | 1,39 | 1,43 | 1,07 | 1,34 | 1,44 | 6,77 | 7,32 | 1,11 | 2,14 | 1,32 | 1,10 | 5,45 | 7,14 |
| KSČM | 32,91 | 16,45 | 17,18 | 15,60 | 18,04 | 13,93 | 11,98 | 14,63 | 15,99 | 12,14 | 14,32 | 14,29 | 13,18 | 17,86 |
| | 8,09 | 4,05 | 3,37 | 5,60 | 3,61 | 6,25 | 9,90 | 14,63 | 3,65 | 3,81 | 3,96 | 3,30 | 8,18 | 14,29 |

**Table A.9.2.** Indices assuming that a coalition of the undisciplined deputies of coalition parties doesn‘t exists

# 10. Attachment – Power Indices Considering both, the Party Discipline and the Coalition Congruity

1998

| Czech abbrev. | Mark | Mandates | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | AA | 56,76 | 31,59 | 53,21 | 28,49 | 57,43 | 8,63 | 42,87 | 31,27 | 41,37 | 32,15 | 40,94 | 11,56 | 17,34 |
| | AB | 17,24 | 7,30 | 0,00 | 8,33 | 0,00 | 10,86 | 0,00 | 7,46 | 3,99 | 7,09 | 3,18 | 9,33 | 1,83 |
| KSČM | BA | 18,95 | 9,21 | 0,00 | 10,66 | 0,00 | 12,14 | 0,00 | 9,60 | 6,19 | 8,51 | 6,25 | 10,22 | 4,00 |
| | BB | 5,05 | 20,60 | 0,00 | 2,52 | 0,00 | 3,31 | 0,00 | 2,26 | 1,19 | 2,13 | 1,25 | 8,00 | 8,00 |
| KDU-ČSL | CA | 15,17 | 7,30 | 0,00 | 8,33 | 0,00 | 10,86 | 0,00 | 6,67 | 3,81 | 6,62 | 5,00 | 10,67 | 16,00 |
| | CB | 4,83 | 2,06 | 0,00 | 2,52 | 0,00 | 8,31 | 0,00 | 2,26 | 1,19 | 2,13 | 1,25 | 8,00 | 8,00 |
| ODS | DA | 47,53 | 24,76 | 46,79 | 21,12 | 42,57 | 11,50 | 57,13 | 24,48 | 35,06 | 25,77 | 32,81 | 12,44 | 18,66 |
| | DB | 15,47 | 7,30 | 0,00 | 8,33 | 0,00 | 10,86 | 0,00 | 7,06 | 2,20 | 6,86 | 3,07 | 11,11 | 2,17 |
| US | EA | 13,95 | 6,35 | 0,00 | 7,17 | 0,00 | 10,22 | 0,00 | 6,67 | 3,81 | 6,62 | 5,00 | 10,67 | 16,00 |
| | EB | 5,05 | 2,06 | 0,00 | 2,52 | 0,00 | 8,31 | 0,00 | 2,26 | 1,19 | 2,13 | 1,25 | 8,00 | 8,00 |

2002

| Czech abbrev. | Mark | Mandates | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | AA | 54,27 | 31,51 | 35,56 | 30,62 | 40,33 | 10,94 | 8,67 | 30,12 | 32,78 | 29,07 | 32,35 | 14,55 | 10,04 |
| | AB | 15,73 | 6,39 | 15,70 | 6,49 | 8,85 | 10,42 | 7,68 | 7,62 | 4,17 | 8,37 | 5,86 | 10,91 | 8,15 |
| ODS | BA | 43,26 | 22,34 | 13,33 | 21,75 | 12,50 | 14,58 | 17,65 | 21,67 | 20,00 | 21,37 | 20,83 | 10,45 | 11,76 |
| | BB | 14,74 | 6,19 | 3,33 | 6,29 | 4,17 | 9,90 | 11,76 | 6,67 | 8,33 | 7,27 | 8,33 | 10,45 | 17,65 |
| KDU-ČSL | CA | 16,82 | 6,98 | 16,80 | 7,11 | 9,36 | 9,38 | 7,43 | 7,62 | 9,44 | 8,37 | 9,32 | 10,91 | 7,53 |
| | CB | 4,18 | 1,43 | 2,50 | 1,34 | 1,83 | 6,77 | 4,99 | 2,10 | 2,50 | 2,20 | 1,54 | 7,27 | 5,43 |
| US-DEU | DA | 7,22 | 3,17 | 5,56 | 3,40 | 4,48 | 9,38 | 7,43 | 3,45 | 4,44 | 3,74 | 4,16 | 8,64 | 5,96 |
| | DB | 2,78 | 1,43 | 2,50 | 1,34 | 1,83 | 6,77 | 4,99 | 1,11 | 1,67 | 1,32 | 0,92 | 5,45 | 4,07 |
| KSČM | EA | 32,91 | 17,18 | 13,33 | 18,04 | 12,50 | 11,98 | 17,65 | 15,99 | 11,67 | 14,32 | 12,50 | 13,18 | 17,65 |
| | EB | 8,09 | 3,37 | 3,33 | 3,61 | 4,17 | 9,90 | 11,76 | 3,65 | 5,00 | 3,96 | 4,17 | 8,18 | 11,76 |

**Table A.10.1.** Indices assuming that the existence of a coalition of the undisciplined deputies of coalition parties

1998

| Czech abbrev. | Mark | Mandates | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | AA | 56,76 | 31,59 | 53,41 | 28,49 | 57,43 | 8,63 | 42,87 | 31,27 | 42,98 | 32,15 | 44,88 | 11,56 | 16,86 |
| | AB | 17,24 | 7,30 | 0,00 | 8,33 | 0,00 | 10,86 | 0,00 | 7,46 | 4,52 | 7,09 | 3,63 | 9,33 | 2,50 |
| KSČM | BA | 18,95 | 9,21 | 0,00 | 10,66 | 0,00 | 12,14 | 0,00 | 9,60 | 4,52 | 8,51 | 3,63 | 10,22 | 2,50 |
| | BB | 5,05 | 20,60 | 0,00 | 2,52 | 0,00 | 3,31 | 0,00 | 2,26 | 1,19 | 2,13 | 0,99 | 8,00 | 7,50 |
| KDU-ČSL | CA | 15,17 | 7,30 | 0,00 | 8,33 | 0,00 | 10,86 | 0,00 | 6,67 | 2,74 | 6,62 | 2,79 | 10,67 | 12,50 |
| | CB | 4,83 | 2,06 | 0,00 | 2,52 | 0,00 | 8,31 | 0,00 | 2,26 | 1,19 | 2,13 | 0,99 | 8,00 | 7,50 |
| ODS | DA | 47,53 | 24,76 | 48,59 | 21,12 | 42,57 | 11,50 | 57,13 | 24,48 | 36,19 | 25,77 | 35,98 | 12,44 | 18,14 |
| | DB | 15,47 | 7,30 | 0,00 | 8,33 | 0,00 | 10,86 | 0,00 | 7,06 | 2,74 | 6,86 | 2,97 | 11,11 | 12,50 |
| US | EA | 13,95 | 6,35 | 0,00 | 7,17 | 0,00 | 10,22 | 0,00 | 6,67 | 2,74 | 6,62 | 2,97 | 10,67 | 12,50 |
| | EB | 5,05 | 2,06 | 0,00 | 2,52 | 0,00 | 8,31 | 0,00 | 2,26 | 1,19 | 2,13 | 0,99 | 8,00 | 7,50 |

2002

| Czech abbrev. | Mark | Mandates | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | AA | 54,27 | 31,51 | 34,76 | 30,62 | 35,44 | 10,94 | 5,39 | 30,12 | 34,31 | 29,07 | 35,68 | 14,55 | 9,14 |
| | AB | 15,73 | 6,39 | 7,02 | 6,49 | 8,17 | 10,42 | 14,63 | 7,62 | 4,76 | 8,37 | 4,40 | 10,91 | 10,71 |
| ODS | BA | 43,26 | 22,34 | 15,60 | 21,75 | 13,94 | 14,58 | 14,63 | 21,67 | 18,10 | 21,37 | 19,78 | 10,45 | 7,14 |
| | BB | 14,74 | 6,19 | 6,31 | 6,29 | 7,21 | 9,90 | 12,20 | 6,67 | 4,76 | 7,27 | 4,40 | 10,45 | 10,71 |
| KDU-ČSL | CA | 16,82 | 6,98 | 9,17 | 7,11 | 8,23 | 9,38 | 4,62 | 7,62 | 11,33 | 8,37 | 10,27 | 10,91 | 6,86 |
| | CB | 4,18 | 1,43 | 1,07 | 1,34 | 1,44 | 6,77 | 7,32 | 2,10 | 3,10 | 2,20 | 2,20 | 7,27 | 10,71 |
| US-DEU | DA | 7,22 | 3,17 | 3,81 | 3,40 | 3,93 | 9,38 | 4,62 | 3,45 | 5,56 | 3,74 | 4,59 | 8,64 | 5,43 |
| | DB | 2,78 | 1,43 | 1,07 | 1,34 | 1,44 | 6,77 | 7,32 | 1,11 | 2,14 | 1,32 | 1,10 | 5,45 | 7,14 |
| KSČM | EA | 32,91 | 17,18 | 15,60 | 18,04 | 13,93 | 11,98 | 14,63 | 15,99 | 12,14 | 14,32 | 14,29 | 13,18 | 17,86 |
| | EB | 8,09 | 3,37 | 5,60 | 3,61 | 6,25 | 9,90 | 14,63 | 3,65 | 3,81 | 3,96 | 3,30 | 8,18 | 14,29 |

**Table A.10.2.** Indices assuming that a coalition of the undisciplined deputies of coalition parties doesn‘t exists

1998

| Czech abbrev. | Mark | Mandates | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | A | 56,76 | 30,00 | 50,00 | 28,57 | 50,00 | 20,00 | 50,00 | 35,00 | 50,00 | 36,36 | 50,00 | 20,00 | 50,00 |
| KSČM | B | 18,95 | 13,33 | 0,00 | 14,29 | 0,00 | 20,00 | 0,00 | 10,00 | 0,00 | 9,09 | 0,00 | 20,00 | 0,00 |
| KDU-ČSL | C | 15,17 | 13,33 | 0,00 | 14,29 | 0,00 | 20,00 | 0,00 | 10,00 | 0,00 | 9,09 | 0,00 | 20,00 | 0,00 |
| ODS | D | 47,53 | 30,00 | 50,00 | 28,57 | 50,00 | 20,00 | 50,00 | 35,00 | 50,00 | 36,36 | 50,00 | 20,00 | 50,00 |
| US | E | 13,95 | 13,33 | 0,00 | 14,29 | 0,00 | 20,00 | 0,00 | 10,00 | 0,00 | 9,09 | 0,00 | 20,00 | 0,00 |

2002

| Czech abbrev. | Mark | Mandates | Power index for absolute majority | | | | | | Power index for 3/5 majority | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SS | SSAU | PB | PBAU | HP | HPAU | SS | SSAU | PB | PBAU | HP | HPAU |
| ČSSD | A | 54,27 | 40,00 | 55,56 | 38,46 | 71,43 | 23,08 | 42,87 | 36,67 | 44,44 | 36,00 | 41,54 | 27,27 | 25,00 |
| ODS | B | 43,26 | 23,33 | 0,00 | 23,08 | 0,00 | 23,08 | 0,00 | 28,33 | 16,67 | 28,00 | 20,00 | 18,18 | 25,00 |
| KDU-ČSL | C | 16,82 | 6,67 | 22,22 | 7,69 | 14,28 | 15,38 | 28,57 | 11,67 | 19,44 | 12,00 | 13,85 | 18,18 | 16,67 |
| US-DEU | D | 7,22 | 6,67 | 22,22 | 7,69 | 14,28 | 15,38 | 28,57 | 3,33 | 2,78 | 4,00 | 4,62 | 9,09 | 8,33 |
| KSČM | E | 32,91 | 23,33 | 0,00 | 23,08 | 0,00 | 23,08 | 0,00 | 20,00 | 16,67 | 20,00 | 20,00 | 27,27 | 25,00 |

**Table A.10.3.** Indices calculated considering only the disciplined deputies.

# 11. Attachment – Composite Indices Considering both, the Party Discipline and the Coalition Congruity

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 56,76 | 28,38 | 44,65 | 45,98 | 29,49 | 37,37 | 37,46 | 15,05 |
| | 17,24 | 8,62 | 2,89 | 3,30 | 4,51 | 5,36 | 4,73 | 4,80 |
| KSČM | 18,95 | 9,47 | 3,64 | 4,22 | 5,04 | 7,54 | 7,14 | 6,46 |
| | 5,05 | 2,53 | 0,82 | 1,00 | 1,38 | 1,61 | 1,60 | 8,00 |
| KDU-ČSL | 15,17 | 7,59 | 2,89 | 3,30 | 4,51 | 4,94 | 5,64 | 13,89 |
| | 4,83 | 2,41 | 0,82 | 1,00 | 3,45 | 1,61 | 1,60 | 8,00 |
| ODS | 47,53 | 23,77 | 38,07 | 34,08 | 39,30 | 30,87 | 30,03 | 16,20 |
| | 15,47 | 7,73 | 2,89 | 3,30 | 4,51 | 4,12 | 4,57 | 5,71 |
| US | 13,95 | 6,97 | 2,51 | 2,84 | 4,25 | 4,94 | 5,64 | 13,89 |
| | 5,05 | 2,53 | 0,82 | 1,00 | 3,45 | 1,61 | 1,60 | 8,00 |

**Table A.11.1.** Composite power indices for the 1998 electoral results considering two a priory unions of the disciplined and the undisciplined deputies of the Czech Social Democratic Party and the Civil Democratic Party for *p=0,60428*

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 56,76 | 28,38 | 44,78 | 45,98 | 29,49 | 38,35 | 39,84 | 14,76 |
| | 17,24 | 8,62 | 2,89 | 3,30 | 4,51 | 5,68 | 5,00 | 5,20 |
| KSČM | 18,95 | 9,47 | 3,64 | 4,22 | 5,04 | 6,53 | 5,56 | 5,55 |
| | 5,05 | 2,53 | 0,82 | 1,00 | 1,38 | 1,61 | 1,44 | 7,70 |
| KDU-ČSL | 15,17 | 7,59 | 2,89 | 3,30 | 4,51 | 4,30 | 4,31 | 11,78 |
| | 4,83 | 2,41 | 0,82 | 1,00 | 3,45 | 1,61 | 1,44 | 7,70 |
| ODS | 47,53 | 23,77 | 37,95 | 34,08 | 39,30 | 31,56 | 31,94 | 15,89 |
| | 15,47 | 7,73 | 2,89 | 3,30 | 4,51 | 4,45 | 4,51 | 11,95 |
| US | 13,95 | 6,97 | 2,51 | 2,84 | 4,25 | 4,30 | 4,41 | 11,78 |
| | 5,05 | 2,53 | 0,82 | 1,00 | 3,45 | 1,61 | 1,44 | 7,70 |

**Table A.11.2.** Composite power indices for the 1998 electoral results considering a priory union only of the disciplined deputies of the Czech Social Democratic Party and the Civil Democratic Party for *p=0,60428*

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 54,27 | 27,13 | 33,34 | 35,00 | 9,91 | 31,32 | 30,55 | 12,51 |
| | 15,73 | 7,87 | 7,27 | 7,55 | 9,18 | 6,06 | 7,24 | 9,66 |
| ODS | 43,26 | 21,63 | 18,27 | 17,57 | 15,97 | 20,92 | 21,13 | 11,04 |
| | 14,74 | 7,37 | 4,90 | 5,33 | 10,74 | 7,42 | 7,75 | 13,70 |
| KDU-ČSL | 16,82 | 8,41 | 9,35 | 8,13 | 8,50 | 8,44 | 8,80 | 9,38 |
| | 4,18 | 2,09 | 1,91 | 1,56 | 5,96 | 2,28 | 1,90 | 6,44 |
| US-DEU | 7,22 | 3,61 | 4,25 | 3,89 | 8,50 | 3,90 | 3,93 | 7,43 |
| | 2,78 | 1,39 | 1,91 | 1,56 | 5,96 | 1,36 | 1,14 | 4,83 |
| KSČM | 32,91 | 16,45 | 15,44 | 15,54 | 14,54 | 14,04 | 13,50 | 15,20 |
| | 8,09 | 4,05 | 3,35 | 3,86 | 10,74 | 4,26 | 4,05 | 9,80 |

**Table A.11.3.** Composite power indices for the 2002 electoral results considering two a priory unions of the disciplined and the undisciplined deputies of the Czech Social Democratic Party, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union for *p= 0,45168*

| Czech abbreviation | Mandates | | Power index for absolute majority | | | Power index for 3/5 majority | | |
|---|---|---|---|---|---|---|---|---|
| | abs. | % | CSS | CPB | CHP | CSS | CPB | CHP |
| ČSSD | 54,27 | 27,13 | 32,98 | 32,80 | 8,43 | 32,01 | 32,06 | 12,11 |
| | 15,73 | 7,87 | 6,67 | 7,25 | 12,32 | 6,33 | 6,58 | 10,82 |
| ODS | 43,26 | 21,63 | 19,30 | 18,22 | 14,60 | 20,06 | 20,65 | 8,95 |
| | 14,74 | 7,37 | 6,24 | 6,71 | 10,94 | 5,81 | 5,97 | 10,57 |
| KDU-ČSL | 16,82 | 8,41 | 7,97 | 7,62 | 7,23 | 9,30 | 9,23 | 9,08 |
| | 4,18 | 2,09 | 1,27 | 1,39 | 7,02 | 2,55 | 2,20 | 8,82 |
| US-DEU | 7,22 | 3,61 | 3,46 | 3,64 | 7,23 | 4,40 | 4,12 | 7,19 |
| | 2,78 | 1,39 | 1,27 | 1,39 | 7,02 | 1,58 | 1,22 | 6,21 |
| KSČM | 32,91 | 16,45 | 16,47 | 16,18 | 13,18 | 14,25 | 14,31 | 15,29 |
| | 8,09 | 4,05 | 4,38 | 4,80 | 12,04 | 3,72 | 3,66 | 10,94 |

**Table A.11.4.** Composite power indices for the 2002 electoral results considering a priory union only of the disciplined deputies of the Czech Social Democratic Party, the Christian Democratic Union - Czechoslovak People's Party and the Freedom Union - Democratic Union for *p= 0,45168*

## 12. Attached CD-R Content

| File Name | Content |
|---|---|
| 1x.xls<br>2x.xls<br>3x.xls<br>4x.xls | Voting data from the Czech Chamber of Deputies (electoral periods 1 – 4) |
| Party Discipline 12.xls<br>Party Discipline 34.xls<br>Coalition Congruity 34.xls | Detailed calculations of the voting statistics - party discipline and coalition congruity |
| Composite PI.xls | Detailed calculations of composite power indices |

# ORIGINAL PROPOSITION OF THE THESIS

Charles University, Prague
Institute of Economic Studies of the Faculty of Social Sciences

## Proposition of Diploma Thesis

Title: Power Models with a Priori Unions: The Case of the Czech Republic
Consultant: Prof. RNDr. Ing. František Turnovec, CSc.
Author: Lenka Dostálová
Final Exam: Spring 2003

### Goal of my Work

The first goal of my work is to analyse the Chamber of Deputies of the Czech Republic in terms of power between 1992 and 2002 election. For the power analysis of single political groups I will use unconstrained (original) and constrained (considering a priori unions) power indices (Shapley-Shubik, Penrose-Banzhaf and Holler-Packel power index). I will analyse single changes in the Chamber of Deputies whether due to elections or due expulsions or conversions of single members of political groups in the Chamber of Deputies or due to formation of new political parties.

The second goal of my work is to generate a general model of how coalitions are made on the Czech political stage. I will compare the outcomes of this model to the reality and I will try to find explanations of possible incongruities.

### Summary Schema

**INTRODUCTION**

**THEORY OF POWER MODELS**

In this part I will introduce some theoretical basics. I will start with the history of understanding the voting power, explain the voting power in committees and get through the unconstrained power indices to the constrained power indices and finally to the a priori unions.

**CZECH PARLIAMENTARY SYSTEM**

The third part will be focused on the history and the presence of the Czech parliamentary system. I will talk about the parliamentary election, parliamentary authorities, about how the parliament works and provide a brief comparison with other middle European parliamentary systems. I will end this part with the Czech electoral history since 1992.

**PRACTICAL APPLICATION**

This final part will be composed of two subparts. The first one will contain voting power calculations on the basis of the Czech electoral history since 1992. In the second one I will try to make up a model of coalition formation on the Czech political stage and compare it‘s results to the actual post electoral coalitions.

**CONCLUSION**

**REFERENCES**

**ATTACHMENTS**

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http://www.czech.cz

http://www.volby.cz

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|---|---|
| Consultant | Author |