Power distribution in the Weimar Reichstag in 1919–1933

Fuad Aleskerov · Manfred J. Holler · Rita Kamalova

Abstract We present an analysis of the distribution of voting power in the Reichstag of the Weimar Republic based on the outcomes of the nine general elections in the period 1919–1933. The paper contains a brief description of the political and electoral system of the Weimar Republic and a characterization of the main political actors and their political views. The power distributions are evaluated by means of the Banzhaf index and two new indices which take into account the parties' preferences to coalesce. A model is constructed to evaluate the parties' preferences with reference to the closeness of the ideological positions in a one-dimensional political space.

Keywords Power distribution · Preferences · Reichstag · Weimar Republic

1 Introduction

The Weimar Republic during 1919–1933 represents an example of a parliamentary system based on proportional representation. It was an essential component of the political

F. Aleskerov (✉) · R. Kamalova
National Research University Higher School of Economics, 20 Myasnitskaya Str., Moscow 101000, Russia
e-mail: alesk@hse.ru

R. Kamalova
e-mail: rkamalova@hse.ru

F. Aleskerov
Institute of Control Sciences of Russian Academy of Sciences, 65 Profsoyuznaya Str., Moscow 117997, Russia

M.J. Holler
Institute of SocioEconomics, IAW, University of Hamburg, Von-Melle-Park 5, 20146 Hamburg, Germany
e-mail: holler@econ.uni-hamburg.de

M.J. Holler
Public Choice Research Centre, Turku, Finland

environment among others that brought Adolf Hitler into power and it is not exaggerated to claim that it thereby was of outstanding relevance for the course of world history. Therefore, to analyze its power structure is more than just another theoretical exercise. However, our work will focus on the theoretical, and not the historical dimension of the problem. Still, we hope to learn about both political history and the properties of formal voting power analysis.

In what follows we use two types of indices in order to evaluate the power distribution in the Weimar parliament, the Reichstag. For a first evaluation we will use the Banzhaf index. It will be applied in order to measure the *a priori* voting power of factions within the parliament. The index assumes that each faction can form a coalition with every other faction and restrictions or preferences do not exist. The second evaluation, following Aleskerov (2006), is based on measures that take into account the agents' preferences in coalition formation. Here, of course, ideological closeness and cleavages matter.

To begin with, in Sect. 2, we give an outline of the socio-economic performance of Weimar Germany. Section 3 contains the characterization of the political system, including brief descriptions of the major parties of the Weimar Republic and of the relevant electoral rules. In Sect. 4, we introduce a theoretical voting model, the Banzhaf index and variations of the Banzhaf index that take into account the factions' preferences to form coalitions with other factions. Then we apply these tools to evaluate the power distributions in the Reichstag of January 19, 1919 and March 5, 1933, the 'first and the last' of the Weimar Republic, and give an interpretation of the results. Section 5 concludes.

2 The Weimar Germany 1919–1933: a brief history of socio-economic performance

In November 1918, as the result of the German Revolution, the parliamentary republic replaced the imperial form of government in each state of the Reich, and Friedrich Ebert, the leader of the Social Democratic Party of Germany (SPD),[1] became Reichspräsident.

The cooperation of the SPD under the leadership of Friedrich Ebert and the Independent Social Democratic Party of Germany (USPD), a pacifist and leftist SPD split-off since 1917, formed a temporary government and acknowledged the military defeat of Germany in the First World War. On November 11, 1918 the warfare stopped.

Other political parties entered the arena such as the Catholic Centre Party and some new parties—the Communist Party of Germany, the German Democratic Party, the German People's Party, the German-National People's Party. Elections for the National Assembly were scheduled as early as January 19, 1919 also to prevent further revolutionary actions and perhaps even civil war. However, the main goal of these elections was to set the stage for giving the new republic a constitution. On August 11, 1919 the Weimar Constitution was approved.

During its history the Weimar Republic suffered from budget deficits and high rates of unemployment, essentially caused by the consequences of World War I and the harsh conditions of the Versailles Treaty 1919. The years 1920–1923 saw the eruption of a devastating hyperinflation that did not only ruin substantial parts of the economy but also destabilized the social structure, especially the middle classes.[2] In July 1920, the German Mark—USD exchange rate was 39.5. In February 1923, this ratio was already 28 000, and on November 20, 1923 this ratio skyrocketed to 4 200 000 000 000 for $1. At this date a new currency,

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[1]Hereafter we use German abbreviation for parties.

[2]Seidl (2010) argues that this was to a large extent the consequence of the failure of a planned capital levy.

called Rentenmark, was introduced that implied a substantial depreciation. This at first was no legal tender, however it was widely accepted. As a result, the hyperinflation was curbed. Given the gained monetary stability, on August 30, 1924 the legal tender Reichsmark was introduced. However, this did not prevent the budget squeeze and unemployment that characterized the following decade.

The strengths of the Weimar Republic lied in social welfare arrangements: the 8-hour working day for workers, the system of workers' participation, especially the Works Councils, improved social services (e.g., 40 % of federal government expenditures went on war-related pensions), and a social insurance policy with a rather extensive coverage (Potthoff and Miller 2006). Since the time of Bismarck, its pillars were the health insurance, old age pensions insurance, and work accidents insurance. On October 1, 1927 an unemployment insurance was introduced; unemployment was no longer seen as a problem that the individual worker could (or should) solve, but as a social problem and, in modern parlance, a macroeconomic issue. During the first two years, it seems that the major challenge to this insurance was not the economic recession, as this was foreseen, but the seasonable unemployment that resulted from extremely cold winters (see Carroll 1929).

In any case, unemployment was severe, especially since the onset of the Great Depression in October 1929. Many industrialists, generals and even high-ranking state bureaucrats and leading members of the legal profession, supported the Republic less than before. A huge socio-economic cleavage between the middle-class and the workers and an economy that relied on short-term foreign loans undermined the legitimacy of the democratic regime.

Other weaknesses of the Republic were its political fragmentation, the increasing influence of authoritarian-minded bureaucrats, the absence of charismatic leaders, the disappointment about the performance of liberal parliamentary democracy, and the lack of *decisionism*.[3] However, fatal decisions were taken. On January 30, 1933, the 82-year-old Reichspräsident Paul von Hindenburg appointed Adolf Hitler to the chancellorship, thereby inaugurating 12 years of Nazi dictatorship.

3 Political system

The following summary should illustrate the background of our power analysis. It is not meant to give a wide representation of the historical facts, nor a profound sketch of the governmental system of the Weimar Republic.

3.1 Political institutions

According to the Weimar Constitution, the major political institutions of the Reich consisted of the Reichstag, the Reichsrat, the Reichspräsident and the Reichsregierung.

The Reichstag, the national parliament, was the main legislative body. It was meant to serve a four-year period. Its members were elected in a general, equal, immediate and secret election. Elections were held according to the principles of representative democracy. A decision-making procedure in the Reichstag was a simple majority rule, unless the constitution prescribed a different quorum. For constitutional changes, a 2/3 majority rule applied.

In the Reichsrat the German states were represented by members of their respective governments. With some qualifications, the share of votes was proportional to the population

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[3]The term used by Carl Schmitt means the ability to make decision in the state of emergency and the absence of any regulations (see Schmitt 2007).

shares of the various states. The Reichsrat could veto a law that was decided by the Reichstag and the law then needed a 2/3 majority in the Reichstag to pass the legislation. On the whole, however, the Reichsrat was not a very powerful institution.

The Reichspräsident, the president of the Reich, was elected by a popular vote. The term of office lasted seven years and reelection was permitted. The Reichspräsident also had the right to dismiss and to appoint the Reichskanzler, the head of the government. He had also the right to dissolve the Reichstag and call for election of a new one, but only once for the same reason. In 1932, President Paul von Hindenburg made use of this privilege when the Reichstag did not decide as expected (and did not produce any majority government). Special attention should be drawn to Article 48 of the Constitution that provided the President with the power to govern by *Notverordnungen* (presidential emergency decrees) that served as substitutes to regular law-making by the Reichstag. In 1931, the Reichstag passed 34 laws while the President issued 44 Notverordnungen. The right to Notverordnung empowered the President 'to take all necessary steps to re-establish law and order', if necessary using armed force (The Reich Constitution 1919, Article 48).

The Reichsregierung, the government, consisted of the Reichskanzler, i.e. the Chancellor, and the Reichsminister, i.e. the heads of the ministries. In order to start working, the government required the confidence of the Reichstag. Another way, actively used in 1930–1933, was to obtain the Notverordnung from the Reichspräsident.

3.2 Electoral system for the Reichstag

Although the power of the Reichstag is constrained by the presidential power, it was still considered the core of legislation and its division into parliamentary fractions and seat shares was considered important. The electoral law of April 27, 1920 provided for the election of deputies on a party list system (Reichswahlgesetz 1920). It divided the Reich into 35 electoral districts (Wahlkreise), and these districts were combined into 17 groups (Wahlkreisverbände). Votes were cast for the party list at the level of a Wahlkreis and the particular candidates were elected in the order they appeared on the list. For each 60 000 votes in an electoral district a party was entitled to a seat in the Reichstag. The rest of the votes were allocated via the Wahlkreisverbände. A party could claim an additional MP seats if its remainder of votes is over 30 000. Then the remaining votes for party are pooled at the country level and then party gets one additional seat for 60 000 votes, and gets two for 90 000 and more votes. Obviously, the total number of seats in the Reichstag in 1919–1933 varied—namely, between 423 and 647.

3.3 Political parties

The political system of the Weimar Republic was based on parties. The number of parties which possessed at least one seat in one of the Reichstags in 1919–1933 equals 29. Below we list the most prominent of them.[4]

- Communist Party of Germany (KPD)
- Social Democratic Party of Germany (SPD)
- German Democratic Party (DDP)
- German Centre Party (Zentrum)
- German People's Party (DVP)

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[4]A full list of political parties in the Weimar Reichstag can be found in Aleskerov et al. (2010).

- German-National People's Party (DNVP)
- National Socialist German Workers' Party (NSDAP)

Their coalitional experience can be presented this way:[5]

SPD and DDP: Jan. 1919—Nov. 1922, Aug. 1923—Nov. 1923, June 1928—March 1930.

SPD and Zentrum: Jan. 1919—Nov. 1922, Aug. 1923—Nov. 1923, June 1928—March 1930.

SPD and DVP: June 1920—May 1921, Aug. 1923—Nov. 1923, June 1928—March 1930.

DDP and Zentrum: Jan. 1919—Sep. 1932.

DDP and DVP: June 1920—May 1921, Nov. 1922—Sep. 1932.

DDP and DNVP: Jan. 1925—June 1928.

Zentrum and DVP: June 1920—May 1921, Nov. 1922—Sep. 1932.

Zentrum and DNVP: Jan. 1925—June 1928.

DNVP and DVP: Jan. 1925—June 1928.

DNVP and NSDAP: March 1933.

4 Power distribution in the Weimar Reichstag 1919–1933

4.1 Formal model of parliamentary decision making and Banzhaf index

Consider a parliament $N = \{1, \ldots, m\}$ with faction $i \in N$. The number of seats in the parliament is n. Faction i has v_i seats, $\sum_i v_i = n$. Faction i often does not have enough seats to pass a decision and has to enter a coalition with other factions. A coalition ω is a set of factions (a subset of N, $\omega \subseteq N$) voting together *for* or *against* a motion proposed to the parliament.

Coalition ω is a *winning* one if the number of votes it possesses exceeds the quota q, i.e.

$$\sum_{i \in \omega} v_i \geq q$$

A faction $i \in \omega$ said to be *critical* in a coalition ω if ω is winning while $\omega \setminus \{i\}$ is *losing*. Then faction i is called a *swinger*. The regular decision-making procedure in the Reichstag was simple majority rule (The Reich Constitution 1919, Article 32), and therefore the quota was $q = n/2 + 1$. For constitutional changes the minimum of votes was $q_{const} = 2n/3 + 1$ to get accepted, i.e. the 2/3 rule applied.

In general, the seat distribution v is a poor proxy of the power distribution in the voting body, i.e., the potential to form winning coalitions. To get a first evaluation of the power distribution in the Reichstag we use the Banzhaf index.[6] The index examines the number of winning coalitions where faction i is critical. Let us denote this number as b_i.

Given b_i, the normalized Banzhaf index of faction i is calculated as the ratio

$$\beta_i = b_i \Big/ \sum b_j \tag{1}$$

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[5] We do not include the periods, when the government functioned through presidential emergency decrees.

[6] In the literature this index is better known as the Banzhaf power index. However Banzhaf's (1965) index is actually a normalized version of Penrose power index—power index first introduced by Penrose (1946). For details see Felsenthal and Machover (1998).

Values of normalized Banzhaf index range from 0 to 1, i.e., $0 \leq \beta_i \leq 1$. This measure assumes that all deputies in the faction 'solidify' to vote and that each faction can coalesce with any other faction without any restrictions.

In the following we will refer to the normalized form β_i whenever we discuss the Banzhaf index. It is well known that the normalized form has properties that are different from the properties of its non-normalized form (see, e.g., Felsenthal and Machover 1995, and Turnovec 1998), and a probability interpretation of the normalized version is not straightforward.

Of course, there is still the question why to take the Banzhaf index instead of other indices, e.g. the Shapley-Shubik index, the Deegan-Packel index or the Public Good Index just to mention the perhaps most prominent alternatives. A series of arguments in favor of this choice are offered in Felsenthal and Machover (1998). However, the fact that we have selected the Banzhaf index does not mean that we subscribe to all of these arguments—in fact, we submit that the application of other indices could be justifiable and produce very interesting results as well.

4.2 Coalitional preferences and coalition formation

In order to evaluate the Banzhaf index we assume that each faction can coalesce with any other faction without any restrictions. A set of new power indices introduced in Aleskerov (2006) takes into account the extent to which players are prepared to coalesce, i.e., taking into consideration the preferences of the political decision makers as defined by ideologies, party programs, historical records, etc. Of course, the political personnel also matters as the history of the Weimar Republic excessively demonstrates.

4.2.1 A model of preference-based power index

There are many ways to take political preferences into account in order to analyze the relationship between political agents and thereby try to explain or forecast a particular outcome. But we have to acknowledge that this way we add new information to the power analysis, other than the decision rule (i.e., the quota q) and the vote distribution v, and in terms of Barry (1980a, 1980b) by taking care of preferences we add some agent's 'luck' to our analysis, i.e. one can get the desired outcome without any power.[7]

The Banzhaf index examines a number of winning coalitions where faction i is a swing player, assuming that each coalition is equally likely. Aleskerov (2006) introduces two modifications of this measure which evaluate the intensity of i's connections within the winning coalitions. One index is based on the assumption that the agents' preferences are linear orders, the second uses cardinal information about the intensity of preferences. In what follows we will use only ordinal measures.

In ordinal indices agents' preferences are presented as linear orders. Each faction i has a willingness to coalesce with faction j denoted as p_{ij}. In the preference order of faction i a higher value p_{ij} means a larger willingness to form a coalition with j, such that $p_{ij} = |N| - 1$ holds if faction j is in the highest rank in i's preference order. It is not assumed that i and j have the same preferences to coalesce with each other, i.e., in general, $p_{ij} \neq p_{ji}$.

Next, denote the intensity function between faction i and each winning coalition ω as $f(i, \omega)$. Intensity functions $f(i, \omega)$ can be constructed on the following basis:

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[7]For an extensive discussion of the use of preferences in power analyses, see Braham and Holler (2005a, 2005b), Napel and Widgrén (2005), Holler and Nurmi (2005), and the references given in these articles.

(a) Intensity of i's coalitional preferences. We only consider i's direct preferences towards each faction j, i.e. p_{ij}, in winning coalition ω, and the summation assumes $j \neq i$,

$$f^+(i, \omega) = \sum_{j \in \omega} p_{ij}/|\omega| \qquad (2)$$

(b) Intensity of preferences for i. In this case we summarize backward preferences p_{ji} given by other members of ω coalition to i:

$$f^-(i, \omega) = \sum_{j \in \omega, j \neq i} p_{ji}/|\omega| \qquad (3)$$

Using intensity function values Aleskerov (2006) defines the corresponding power χ_i for each faction i, which is evaluated as

$$\chi_i = \sum_{\omega} f(i, \omega) \qquad (4)$$

i.e., we sum i's intensity functions for all winning coalitions ω that have i as a swing player.

The normalized form of these voting power indices, α_i, is defined as the ratio between faction i's power and all factions' powers, i.e. their sum

$$\alpha_i = \chi_i / \sum_j \chi_j \qquad (5)$$

Normalized power indices add up to one. This gives us clear understanding of the existing power balance.

4.2.2 Coalitional preferences and power in the Reichstag

The coalitional preferences of the parties in the Reichstag varied substantially. Our analysis can only outline some of the aspects of this issue. To evaluate the relative power relations among the factions of the Reichstag under the assumption of coalitional preferences we will use the ordinal α^I and α^{II} indices based on the intensity of i's preferences and on the intensity of preferences for i, i.e. on the functions $f^+(i, \omega)$ and $f^-(i, \omega)$, respectively.

In order to form the preference profiles of the factions of the Reichstag, for simplicity we consider them to be linear orders. One can use the closeness of the parties' positions on a one-dimension 'left-right' ideological scale and order parties according to the economic policy dimension they proclaim. We identify ten possible positions, r_i, with $i = 1, 2, \ldots, 10$, the first one being the most *left*, i.e. socially-oriented position (see Table 1). The Communists stood for expropriation of private property, while the Nazi party presented itself as guarantor of private property and especially of 'Big Business'. The most radical parties on this issue, the KPD and the NSDAP, receive opposite marginal positions of 1 and 10, respectively. The Zentrum is located in the middle of the scale, $r_{\text{Zentrum}} = 5$, as it had rather moderate position and cooperated with both liberals and nationalists, except radicals. On the left side from the Zentrum there are in the following order the DDP and the DStP (former DDP), the SPD, the USPD (radical split-off from the majority SPD, $r_{\text{USPD}} = 2$) and the KPD. The DDP was committed to individual freedom, private property and social responsibility, $r_{\text{DDP}} = 4$. On the right side—the DVP, a set of small regional parties, the DNVP, the Battlefront Black-White-Red (KFSWR) and the NSDAP. The DVP was the representative of corporations and big industrial capital interests and also proclaimed the commitment to national liberalism, $r_{\text{DVP}} = 6$. The DNVP advocated interests of the privileged strata of German society, industrialists and big landed classes, took the anti-Semitist and xenophobic position. The KFSWR

Table 1 Parties' positions

Party i	Position r_i
1. Communist Party of Germany (KPD)	1
2. Independent Social Democratic Party of Germany (USPD)	2
3. Social Democratic Party of Germany (SPD)	3
4. German Democratic Party (DDP)	4
5. German States Party (DStP)	4
6. German Centre Party (Zentrum)	5
7. Christian People's Party (CVP)	5
8. German People's Party (DVP)	6
9. Bloc DVP-CZVD-DBP-DHP	7
10. Bavarian Farmers' Union (BBB)	7
11. Bavarian People's Party (BVP)	7
12. German National People's Party (DNVP)	8
13. Battlefront Black-White-Red (KFSWR)	9
14. National Socialist German Workers' Party (NSDAP)	10

was the closest supporter of the NSDAP formed by the DNVP and veterans' organization 'Steel Helmet, League of Front Soldiers', $r_{KFSWR} = 9$. In order to simplify the analysis, we treat several small regional nationalistic parties as one entity and give them the same position 7, as BVP has. This linear order was constructed in accordance with the analysis in Post (1997), Potthoff and Miller (2006) and Vatlin (2009).

In order to achieve a majority status, i.e. to pass a quota, any parties had to enter a coalition with other parties. Of course, in parliament with many ideologically polarized factions, such as the Reichstag, not all coalitions were possible. Usually, it was likely to obtain support from ideologically close factions from the left or right. However, ideologically distant parties could hardly ever support the same policy. For example, the SPD formed alliances with the USPD, the DDP, Zentrum and the DVP, but did not coalesce with the Bavarian Farmers' Union or the DNVP as well as with the KPD. Tensions between social-ist and communist parties foiled the attempts to set up any coalition. After the end of the First World War, the SPD Defence Minister, Gustav Noske, dispatched special paramilitary units—freikorps—against radical left uprisings and cruelly suppressed emerging workers' and soldiers' councils: 'Someone must be the bloodhound—I won't shrink from the re-sponsibility' (Rippert 2008). Since the mid-1920s the KPD followed the directions of the Communist International—e.g., accused the SPD of the commitment to 'social fascism'.

In order to construct the coalitional preferences p_{ij}, let us introduce a measure $\lambda = |r_i - r_j|$ based on the difference between two parties' (ordinal) positions. It is assumed that the preferences to coalesce decrease when λ increases, i.e.

- if $\lambda = 0$ or $\lambda = 1$, then $p_{ij} = 3$;
- if $\lambda = 2$, then $p_{ij} = 2$;
- if $\lambda = 3$, then $p_{ij} = 1$;
- if $\lambda > 3$, then parties are assumed not to coalesce, $p_{ij} = 0$.

It seems reasonable, and by and large confirmed by the historical data, to assume a thresh-old $\lambda = 3$ for coalition formation. Some deviations from the threshold $\lambda = 3$, for e.g. 'Grand coalitions', can be explained by a careful analysis of coalitions that emerged in the Reichstag 1919–1933. Some of these cases are briefly described in Aleskerov et al. (2010).

Table 2 Reichstag election of January 19, 1919

Party i	Position r_i	Seats ($n = 423$)	Share of seats s	Banzhaf β	α^{I}
Christian People's Party (CVP) (Zentrum)	$r_{\mathrm{CVP}} = 5$	91	0.215	0.154	0.186
German Democratic Party (DDP)	$r_{\mathrm{DDP}} = 4$	75	0.177	0.154	0.193
German National People's Party (DNVP)	$r_{\mathrm{DNVP}} = 8$	44	0.104	0.115	0.041
German People's Party (DVP)	$r_{\mathrm{DVP}} = 6$	19	0.045	0.038	0.038
Social Democratic Party of Germany (SPD)	$r_{\mathrm{SPD}} = 3$	165	0.390	0.462	0.512
Independent Social Democratic Party of Germany (USPD)	$r_{\mathrm{USPD}} = 2$	22	0.052	0.038	0.03
Others		7	0.017	0.038	0

Consider the results of the elections for the National Assembly on January 19, 1919. Table 2 shows parties' positions r_i, faction size and share of seats in the parliament[8] as well as respective power indices' values. The total number of seats in this Reichstag was $n = 423$, and the decision-making procedure implied a simple majority rule. Hence the quota $q = 423/2 + 1 = 212$. No faction enjoyed an absolute majority in the Reichstag, thus they had to form coalitions.

For an interpretation of the results in Table 2, let us first compare the share of seats and the values of Banzhaf index. Obviously, there are considerable differences. The Christian People's Party (CVP, the forerunner to the Zentrum party) and the DDP had quite different shares of seats, but $\beta_{\mathrm{CVP}} = \beta_{\mathrm{DDP}} = 0.154$. These values seem to indicate a rather low influence of both factions, because they are smaller than the corresponding shares of seats in the Reichstag. On the contrary, the potential power of the Social Democratic Party of Germany, $\beta_{\mathrm{SPD}} = 0.462$, exceeds its shares of seats of 0.390. The DVP and the USPD had the shares of seats of 0.045 and 0.052, respectively, but the same relative power evaluated by the Banzhaf index, $\beta_{\mathrm{DVP}} = \beta_{\mathrm{USPD}} = 0.038$.

The Banzhaf index does not take into account agents' preferences in coalition formation, while ordinal indices allow us to differentiate factions according to their ability to coalesce. Note that the indices α^{I} and α^{II} give the same power values to factions in this Reichstag, because the agents' preferences are symmetric, e.g., $p_{\mathrm{SPD\text{-}DVP}} = 1$ and $p_{\mathrm{DVP\text{-}SPD}} = 1$. The SPD possessed almost 39 % of seats in parliament, and both α-index and Banzhaf index values are high, expressing the party's dominating position, $\alpha^{\mathrm{I}}_{\mathrm{SPD}} = 0.512$, and $\beta_{\mathrm{SPD}} = 0.462$. The party provided a relatively moderate policy, and thereby caused irritations to conservative and nationalistic forces. The latter accused the Social Democrats of having been operational to the defeat in the World War and therefore did not want to join the Weimar coalition headed by the SPD.

Opposite results we get from the analysis of the performance of the German National People's Party (DNVP). The value of the Banzhaf index, $\beta_{\mathrm{DNVP}} = 0.115$, does not reflect possibilities to coalesce if parties take their ideological positions and platforms into account. The DNVP did not support the policy provided by the ruling coalition and positioned itself as a challenge to the Weimar Republic. The value $\alpha^{\mathrm{I}}_{\mathrm{DNVP}} = 0.041$ is by 64 % smaller than

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Table 3 Reichstag election on March 5, 1933

Party i	Position r_i	Seats ($n = 647$)	Share of seats s
Bavarian People's Party (BVP)	$r_{BVP} = 7$	18	0.028
Bloc DVP-CZVD-DBP-DHP	$r_{DVP} = 7$	2	0.003
German Centre Party (Zentrum)	$r_{Zentrum} = 5$	74	0.114
Battlefront Black-White-Red (KFSWR)	$r_{KFSWR} = 9$	52	0.080
Communist Party of Germany (KPD)	$r_{KPD} = 1$	81	0.125
German States Party (DStP, former DDP)	$r_{DStP} = 4$	5	0.008
National Socialist German Workers' Party (NSDAP)	$r_{NSDAP} = 10$	288	0.445
Social Democratic Party of Germany (SPD)	$r_{SPD} = 3$	120	0.185
Others		7	0.010

the corresponding value of Banzhaf index. For the USPD there is an $\alpha^I_{USPD} = 0.03$ which is smaller than its value of the Banzhaf index ($\beta_{USPD} = 0.038$) but the difference does not explain much in absolute terms. The USPD was rather unstable as different wings struggled for the party's policy direction. Radical activists, the majority of party members, showed no willingness to coalesce with the other parliamentary parties, but intended to form a Soviet republic in Germany.

The power values of the Christian People's Party and the German Democratic Party were relatively high. The CVP's α-index of 0.186 is more than 20 % larger than its value of the Banzhaf index ($\beta_{CVP} = 0.154$). Similar results we can observe for the DDP. It is interesting to note that there is a small advantage of DDP with respect to the power based on the intensity of i's preferences, as $\alpha^I_{CVP} = 0.186$ and $\alpha^I_{DDP} = 0.193$, although the seat shares of CVP and DDP are 0.215 and 0.177, respectively.[9]

Let us now give up the assumption that preferences are determined by ordinal distances as assumed above and consider the case with asymmetric preferences in coalition formation, i.e. $p_{ij} \neq p_{ji}$. In this case α^I and α^{II} show different results, reflecting the faction's relative power in both cases: when the agent himself desired to form coalitions and when other agents wanted him to participate in. The Reichstag after the fatal election on March 5, 1933, seems to be a good example. Election results and preferences are presented in Table 3 and Table 4, respectively.

Beginning from July 1932 the Zentrum and the BVP tried to form a government with the NSDAP, but the attempt failed. The Zentrum did not want to approve Adolf Hitler's political ambitions, which were attacking the substance of the constitution. The NSDAP, on the other hand, did not support von Papen's Cabinet. After the Reichstag election in November 1932, Adolf Hitler rejected a coalition with the Zentrum.

The KPD was accused of having supported the Reichstag Fire on February 27 and on March 8, 1933 the party lost its legal status and became non-existing from an official point of view. After most of the communist deputies were arrested or murdered and none of them was allowed to take a seat, the number of seats in the Reichstag of March 5, 1933 was decreased to $n = 566$ with $q_{const} = 2 \cdot 566/3 + 1 = 377$ seats.

The NSDAP urged the Zentrum to join a coalition promising not to dissolve the party, so the Zentrum supported the NSDAP in order to obtain the two-third majority and to pass the

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[9] We can conclude that α^I_i does not satisfy local monotonicity. See Holler and Napel (2004).

Table 4 Preference matrix, $\|p_{ij}\|$

i \ j	BVP	DVP (bloc)	Zentrum	KFSWR	KPD	DStP	NSDAP	SPD
BVP	3	3	2	2	0	1	1	0
DVP (bloc)	3	3	2	2	0	1	1	0
Zentrum	2	2	3	**1**	0	3	**1**	**2**
KFSWR	2	2	**1**	3	0	0	3	0
KPD	0	0	0	0	3	0	0	0
DStP	1	1	3	0	0	3	0	3
NSDAP	1	1	**1**	3	0	0	3	0
SPD	0	0	**3**	0	0	3	0	3

Table 5 Power index values for Reichstag election on March 5, 1933

Party	Share of seats ($n = 647$)	Banzhaf β	α^{I}	α^{II}
Bavarian People's Party (BVP)	0.028	0	0	0
Bloc DVP-CZVD-DBP-DHP	0.003	0	0	0
German Centre Party (Zentrum)	0.114	0.091	0.161	0.174
Battlefront Black-White-Red (KFSWR)	0.080	0.091	0.132	0.132
Communist Party of Germany (KPD)	0.125	0.091	0	0
German State's Party (DStP)	0.008	0	0	0
National Socialist German Workers' Party (NSDAP)	0.445	0.636	0.625	0.625
Social Democratic Party of Germany (SPD)	0.185	0.091	0.082	0.070
Others	0.010	0	0	0

Ermächtigungsgesetz—the 'Law to Remedy the Distress of the People and the Nation'—on March 23, 1933. This helped to give dictatorial power to Adolf Hitler, in compliance with the previously democratic procedures. The historical data suggest $\lambda = |r_{\mathrm{NSDAP}} - r_{\mathrm{Zentrum}}| = |10 - 5| = 5$ for the relative positions of the two parties and 'zero' preferences, but here we put $p_{\mathrm{NSDAP\text{-}Zentrum}} = 1$ and $p_{\mathrm{Zentrum\text{-}NSDAP}} = 1$.

The SPD was opposing the coalition which was in favor of *Ermächtigungsgesetz*.[10] Still we can assume a strong preference of the SPD in favor of the Zentrum, and thus $p_{\mathrm{SPD\text{-}Zentrum}} = 3$, but a more moderate preference of the Zentrum with respect to the SPD, expressed by $p_{\mathrm{Zentrum\text{-}SPD}} = 2$. Table 4 below shows asymmetric preferences for the Social Democrats, the Zentrum and the NSDAP, and symmetric one for other parties.

The ordinal indices α^{I} and α^{II} are not the same for the Zentrum and for the SPD, i.e. $\alpha^{\mathrm{I}} \neq \alpha^{\mathrm{II}}$. This implication is evident from Table 5.

The last elections in Weimar Germany took place under overwhelming influence of the NSDAP on country's political life, particularly in the Reichstag: the Banzhaf index value for the NSDAP was equal to 0.636. Obviously, both Banzhaf β and α-indices values exceed the

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[10]It is said that on the occasion of the parliamentary discussion of the Ermächtigungsgesetz, Otto Wels, the head of SPD party, did the last free speech at the Weimar Reichstag. All 91 representatives of the SPD voted against the Law. 26 elected SPD were already imprisoned or on the run. Of course, Otto Wels had to leave the country. He died in his exile at Paris.

share of seats. The NSDAP was inevitable but not the most desirable player in all possible winning coalitions. This is reflected by the values $\alpha^I_{NSDAP} = \alpha^{II}_{NSDAP} = 0.625$ which are a bit lower than the value of the Banzhaf index. The NSDAP and its closest supporter, the KF-SWR, formed a winning coalition. The quota was 324 and the joint number of seats for these parties was 340. The KFSWR had substantially strengthened its position by its ideological proximity to the NSDAP. This is confirmed by the values $\alpha^I_{KFSWR} = \alpha^{II}_{KFSWR} = 0.132$, both larger than the vote share of 0.08 and the value of the Banzhaf index, i.e., $\beta_{KFSWR} = 0.091$.

The relative power of the Zentrum within the Reichstag, as measured by both $\alpha^I_{Zentrum} = 0.161$ and $\alpha^{II}_{Zentrum} = 0.174$ was much higher than by Banzhaf index ($\beta_{Zentrum} = 0.091$). This seems to be reasonable because of Zentrum's decisive position on the issue of the Enabling Act.

In 1933, the SPD and the KPD were the only factions which did not coalesce with the Nazi faction. They are evaluated as equal by the Banzhaf index, but their α^I values were rather different, i.e., 0.082 and 0, respectively. There were no factions that wanted to form a coalition with the Social Democrats except, to some extent, the Zentrum and, perhaps, restrictedly the DStP (DDP). As a result the power value of the SPD that takes into consideration 'reciprocal preferences' ($\alpha^{II}_{SPD} = 0.070$) was smaller than the power value based on direct preferences, α^I_{SPD}, and the value of the Banzhaf index.

The most illustrative case of underperformance in potential influence is the history of the Communist Party of Germany of 1919–1933. Guided by the Comintern, the Communists stood for the republic of councils (soviets) and did not form any coalition even with the Social Democrats, who were closer to them than the others. The KPD strongly opposed both the NSDAP and the SPD. 'There is particularly no differences between the government of Gustav Noske and the fascists,'—asserted Nikolai Bukharin in 1928 (Vatlin 2009) referring to the murder of Karl Liebknecht and Rosa Luxemburg by *freikorps* during the uprising of the radical left in January 1919. The absence of any preferences of and for the KPD gives zero values to both α^I_{KPD} and α^{II}_{KPD}. Note that it was impossible to form a coalition with the KPD because, after election of March 5, 1933, the party's elected representatives were not allowed to take their seats in the Reichstag.

5 Conclusions

Our study was motivated by an interest in the historical case as well as in the theoretical tools. We want to get a better understanding of the historical facts and, more general, of how a parliamentary system *in nascendi* works and why it might fail. We also want to learn about the properties of the theoretical instruments we applied, i.e. the Banzhaf index and some of its variations which take into account the preferences of parties to coalesce.

The analysis of the power distribution using preference-based indices shows substantial differences in comparison with the values of Banzhaf index. This results from the fact that some major parties in the Reichstag did not coalesce, and were stubbornly unwilling to do so, even when the Weimar Republic was threatened by political collapse. This paved the way to Hitler's regime.

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