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Exits from the European Union and Their Effect on Power Distribution in the Council

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Abstract: Debates on an EU-leaving referendum arose in several member states after Brexit. We want to highlight how the exit of an additional country affects the power distribution in the Council of the European Union. We inspect the power indices of the member states both with and without the country which might leave the union. Our results show a pattern connected to a change in the number of states required to meet the 55% threshold. An exit that modifies this number benefits the countries with high population, while an exit that does not cause such a change benefits the small member states. According to our calculations, only the exit of Poland would be supported by the qualified majority of the Council.

Keywords: European Union; qualified majority voting; power index; Brexit

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1. Introduction

The withdrawal of the United Kingdom (UK) from the European Union (EU), Brexit, and its possible effects have become the subject of political debate in several countries like the Czech Republic, France, or Greece since the membership referendum in 2016 [1]. In 2021, a possible Polexit (Poland's exit) has emerged [2]. Although numerous political and economic effects of an exit from the European Union might be worth inspecting, in this paper we look at one aspect: how the power distribution changes in the Council of the European Union. The voting system of the Council of the European Union has long been the subject of academic interest. Brams and Affuso [3] have used the example of the Council to show real-life occurrence of the new member paradox: Luxembourg has gained more voting power with the joining of Denmark, Ireland, and the United Kingdom in 1973. In the past the voting weights have changed several times, most recently in 2014.

Grech [4], Göllner [5], Kirsch [6], Kirsch et al. [7], Kóczy [8] and Szczypińska [9] have shown independently that Brexit mainly benefits large countries. Bertini et al. [10] have examined the issue in the case of the European Parliament. We first try to explore whether the same result would hold if another country leaves. Secondly, we want to answer the question: what would be the effect of Brexit if Croatia had not joined the EU?

The Council of the European Union, often referred to as the Council of Ministers, is an institution that represents the governments of the member states. It approves EU law and synchronizes the policy of the EU. Along with the European Parliament, the Council of the European Union is the main decision-making body of the EU. Every member state is represented by an individual. The difference in size among the member states appears in a weighted qualified majority voting. Under the Treaty of Lisbon, voting is successful if

1. At least 55% of the member states (member quota);

2. Represent at least 65% of the habitants (population quota).

Support the decision. Furthermore, any blocking minority should include at least four member states (blocking minority rule). Such creation of the weights enables us to calculate how the power distribution changes if a country leaves the European Union.

Several studies have addressed how voting power affects the overall likelihood of decision-making [11,12]. Contrary to expectations, some studies have found no connection or even a negative relationship between the voting power of individual member states and bargaining success [13,14]. However, Warntjen [15] has shown empirically that there is a robust positive relationship between the number of votes backing a member state request to change European legislation and its success probability. Therefore, it is an important question to measure how much power the countries have in the Council of the European Union.

Concerning our methodology, we use two well-known power indices: (1) the Shapley–Shubik index [16]; and (2) the Banzhaf index [17–19]. These measures reflect the probabilities of the players to be instrumental in making decisions. As far as votes on the spending of the budget are concerned, the index value of a player reflects the probability of spending one (or a million) euro in the interest of that player. For several cases of departure, we show the change made by an exit until 2030, which can be called a 'farsighted' sense.

We find a pattern connected to a change in the number of states required to meet the 55% threshold. An exit that changes the absolute value of the member quota (for example, from 15 to 14) benefits the large, an exit that does not cause such a change benefits the small countries. These results may suggest that a renegotiation of weights may become relevant.

Our results point in the direction that if the UK had left the European Union before the entry of Croatia, the effect would have been reversed: it would have favored the power of the small countries. According to the calculations, the exit of only one country from the EU27 would be supported by the qualified majority of the Council, Poland.

The paper is structured in the following way. The power indices to be used are defined and presented in Section 2. The results and their interpretation are detailed in Section 3. Section 4 summarises the main findings. Numerical results are presented in Appendices A–D. Details about the blocking minority rule can be found in Appendix E.

2. Methodology

It is popular to study voting situations as simple cooperative games, where the players are the voters. The value of any coalition (a subset of the player set) is 1 if it can decide a question, or 0 if not. According to Felsenthal and Machover [20,21], there are two interpretations of voting power. One conception, the influence power (I-power) focuses on voting power conceived of as a voter's potential impact on the result of divisions of the decision-making institution: whether the policies proposed are adopted or rejected. The second conception, prize power (P-power) focuses on a voter's expected share of a fixed prize given to the winning coalition, while both seek to quantify the potential influence that a member of a decision-making body has over the possible outcomes, they differ fundamentally in what they regard as the outcome. The I-power notion takes the outcome to be the immediate one, passage or defeat of the proposed bill. The P-power view is that the passage or defeat of a bill is merely the ostensible and proximate outcome.

There are historical reasons for this differentiation. The first scientific study of a priori voting was Penrose [19], however, it remained unnoticed for almost two decades. His original definition was 'half the likelihood of a situation in which an individual vote can be decisive—that is to say, a situation in which the remaining votes are equally divided upon the issue at stake' ([19], p. 53). Later Penrose [22] changed the value to its double. Without knowing of Penrose's writings, Banzhaf [17] reinvented the idea.

Another approach proposed by Shapley and Shubik [16] derived from the theory of cooperative games with transferable utility. In such a game, every player receives some payoff of transferable utility. The amount that a given player receives depends on the

strategies chosen by all the players. So the Shapley–Shubik index is interpretable as a prior probabilistic estimation of the payoff that the voter can expect on average.

Penrose and Banzhaf's approach is the I-power, while Shapley–Shubik's is a P-power notion [21].

They are used extensively for determining power in the Council of the European Union [12,23–25]. Since we investigate a phenomenon that belongs to the P-Power, it is better to focus more on analyzing the power distribution of the Council of the European Union with the Shapley–Shubik index [20].

Let N denote the set of players and let $S \subseteq N$ be an arbitrary subset of N. We use the corresponding lower-case letters to denote the cardinality of sets, so that $s = |S|$ and $n = |N|$.

Definition 1 (Simple (voting) game)**.** *A game $v : 2^N \to R$ is a simple game if it satisfies the relation*

$$v(S) \in 0, 1 \text{ for all } S \subseteq N.$$

Coalitions S such that $v(S) = 1$ are called winning coalitions, while coalitions S as $v(S) = 0$ are the losing ones.

Definition 2 (Weighted voting game)**.** *Let v be a game on the set of players N which is defined by an input $(\mathbf{w} \in R_n^+; q \in R_+)$ as follows:*

$$v(S) = \begin{cases} 1 & \text{if } \sum_{j \in S} w_j \geq q \\ 0 & \text{otherwise.} \end{cases}$$

This simple game represented by $(N, \mathbf{w}, q)$ is known as a weighted voting game.

The Shapley–Shubik index is an application of the Shapley value [26] for voting games. Its principle can be described as follows: voters arrive in a random order, and when a coalition becomes winning, the full credit is given to the pivotal player arriving last. A player's power is specified by the proportion of orders in which it plays this role.

Definition 3 (Shapley–Shubik index)**.** *For any simple game v, the Shapley–Shubik index of player i is as follows:*

$$\varphi_i(N, v) = \sum_{S \subseteq N \setminus \{i\}} \frac{s!(n-s-1)!}{n!} \big(v(S \cup \{i\}) - v(S)\big).$$

The Banzhaf index, which is the normalized Banzhaf value [17–19], uses a different approach. A player is called critical if it can turn a winning coalition into a losing one. The index shows what is the probability that a player influences a decision.

Definition 4. *Player i's* Banzhaf value *is:*

$$\sum_{S \subseteq N \setminus \{i\}} \frac{1}{2^{n-1}} \big(v(S \cup \{i\}) - v(S)\big) = \frac{\eta_i(N, v)}{2^{n-1}},$$

where $\eta_i(v)$ is player i's Banzhaf score, the number of coalitions where i is critical.

Usually, its normalized value is reported as the measure of voting power.

Definition 5. *The* Banzhaf index *is the normalized Banzhaf score:*

$$\beta_i(N, v) = \frac{\eta_i(N, v)}{\sum_{j \in N} \eta_j(N, v)}.$$

The indices somehow show the voter's expected relative share of the total payoff. When a country leaves, its payment to the EU budget is assumed to cease, therefore the remaining countries do not share the same prize as before. This is a simplification, as some non-EU member countries, like Norway, also contribute to the EU budget in a certain sense. Taking this into account, we correct the power index by the following fraction:

$$\frac{\text{Original budget} - \text{the contribution of the leaving country}}{\text{Original budget}}. \quad (1)$$

We compute for every country and each exit the adjusted power index as a percentage of the pre-exit power index.

Adjusted power indices have not been normalized for the comparison. Thus, the change in the power index reflects two effects, a shift in power on the one hand and a reduction in the budget on the other.

To illustrate how the indices are affected by changes in the player set, we analyze the situation of the European Economic Community in 1958. This example is well known in the voting literature. Its first academic discussion is probably Brams and Affuso [3], but it has appeared in several other studies [11,27–29].

Example 1. *In the predecessor of the EU, the European Economic Community (EEC), the six founding states already used a weighted voting system. The weight of the large countries (France, Germany, Italy) was 4, the weight of the medium-sized states (Belgium, The Netherlands) was 2, and the weight of the smallest state (Luxembourg) was 1. The decision threshold was 12.*

According to Table 1, Luxembourg's power was 0. France, Germany, and Italy each contributed 28% to the EEC budget, Belgium and the Netherlands paid 7.9%, while Luxembourg paid only 0.2%. If Luxembourg had exited and the decision-threshold (12) not changed, the remaining countries' Shapley–Shubik and Banzhaf indices would have remained the same, but the adjusted indices would have decreased (see Table 2).

Table 1. Decision-making in the Council of Ministers in 1958, Shapley–Shubik (S–S) and Banzhaf (Bz) indices.

Member State	Weight	S–S Index (%)	Bz Index (%)
France	4	23.33	23.80
Germany	4	23.33	23.80
Italy	4	23.33	23.80
Belgium	2	15.00	14.29
Netherlands	2	15.00	14.29
Luxemburg	1	0	0

Table 2. The effect of Luxembourg's departure from the Council of Ministers in 1958, Shapley–Shubik (S–S) and Banzhaf (Bz).

Member State	S–S Index after %	Bz Index after %	Adjusted S–S Index %	Adjusted Bz Index %
France	23.33	23.80	23.28	23.75
Germany	23.33	23.80	23.28	23.75
Italy	23.33	23.80	23.28	23.75
Belgium	15.00	14.29	14.97	14.26
Netherlands	15.00	14.29	14.97	14.26

If a large country, for example, France, departs, and the threshold decreases to 9, then the change is more spectacular. The correction ratio, according to Formula (1), is 0.72. Table 3 shows the power measured by the adjusted Shapley–Shubik and Banzhaf

indices. The arrows show the direction of power change. The only winner of this exit is Luxembourg.

Table 3. The effect of France's departure from the Council of Ministers in 1958, Shapley–Shubik (S–S) and Banzhaf (Bz).

Member State	S–S Index before %	S–S Index after %		Adjusted S–S Index %	Bz Index before %	Bz Index after %		Adjusted Bz Index %
Germany	23.33	30.00	↓	21.60	23.80	30.43	↓	21.91
Italy	23.33	30.00	↓	21.60	23.80	30.43	↓	21.91
Belgium	15.00	13.33	↓	9.60	14.29	13.04	↓	9.39
Netherlands	15.00	13.33	↓	9.60	14.29	13.04	↓	9.39
Luxembourg	0	13.33	↑	9.60	0	13.04	↑	9.39

3. Results

In this section, our findings are presented. Currently, pursuant to the Treaty of Lisbon, the qualified majority voting is successful in the Council of the European Union if

1. At least 55% of the member states (member quota);
2. Represent at least 65% of the inhabitants (population quota).

Support the decision. Furthermore, a blocking minority must include at least four Council members, failing which the qualified majority shall be deemed attained [30]. This condition is called the blocking minority rule, for further details about this, please see Appendix E.

We use population projections for 2015 and 2030 from Eurostat [31] and budget contribution data from the European Parliament [32]. The values are given in Table 4. The software IOP-Indices of Power [33] is used to calculate the Shapley–Shubik and Banzhaf indices. The software cannot handle large numbers, thus population data are entered in 100,000 s that may have a marginal effect on the indices. For the sake of simplicity, we disregarded the blocking minority rule in the calculations of adjusted power indices, which also has some minor effect (see Appendix E).

Kóczy [8] has shown that if the United Kingdom leaves the European Union, which has 28 member states, the smallest member states' power indices decrease. We have found the same result after repeating the calculation for every other member state (see Appendix A). However, a further question remains: what happens if another member state leaves the EU? Here, we discuss the effects of the Czech Republic (Czexit) and Germany leaving the EU after Brexit. Secondly, building on our previous finding, we inspect what the effect of Brexit would be on the power distribution of the EU had the United Kingdom left it before Croatia entered. Is Brexit in this sense a belated threat? Our results show that it is.

In the following, we will call a country large or small depending on its population size. We observe a pattern, which connects the change in the member state quota to a change in the power distribution: when the departure modifies this threshold, the power indices of the large countries increase. When the departure does not evoke such a change, the power indices of the small countries increase.

3.1. The Impact of Additional Departures to Brexit

In the computations which investigate the results of an additional departure to Brexit , we base our calculations on the 27-member Union without the UK. As mentioned in the previous section, it is also considered that the exit of a country decreases the budget. The example of the Czech Republic is presented first because the EU-skeptical sentiment has recently become stronger in this country. The budget correction ratio is 0.989 according to Formula (1). Figure 1 shows the budget-adjusted change in power indices due to Czexit as a function of the population.

Table 4. Member states of the EU—population (in 100,000 s) and financial contribution.

Member State	Abbrev.	Population 2015	Population 2030	Budget Contrib. Ratio (%)
Austria	AT	86	93	1.22
Belgium	BE	113	129	2.85
Bulgaria	BG	72	65	0.31
Croatia	HR	42	41	0.3
Cyprus	CY	9	9	0.11
Czech Republic	CZ	105	108	1.02
Denmark	DK	56	61	1.72
Estonia	EE	13	12	0.14
Finland	FI	55	59	1.38
France	FR	662	704	15.22
Germany	DE	807	798	20.08
Greece	EL	110	101	1.42
Hungary	HU	99	97	0.69
Ireland	IE	46	46	1.11
Italy	IT	609	641	11.18
Latvia	LV	20	16	0.19
Lithuania	LT	29	22	0.25
Luxembourg	LU	6	8	0.18
Malta	MT	4	5	0.05
Netherlands	NL	169	176	4.97
Poland	PL	385	375	2.74
Portugal	PT	104	98	1.27
Romania	RO	199	190	1.05
Slovakia	SK	54	53	0.49
Slovenia	SI	21	21	0.25
Spain	ES	464	445	7.76
Sweden	SE	97	110	2.98
United Kingdom	UK	646	705	8.82

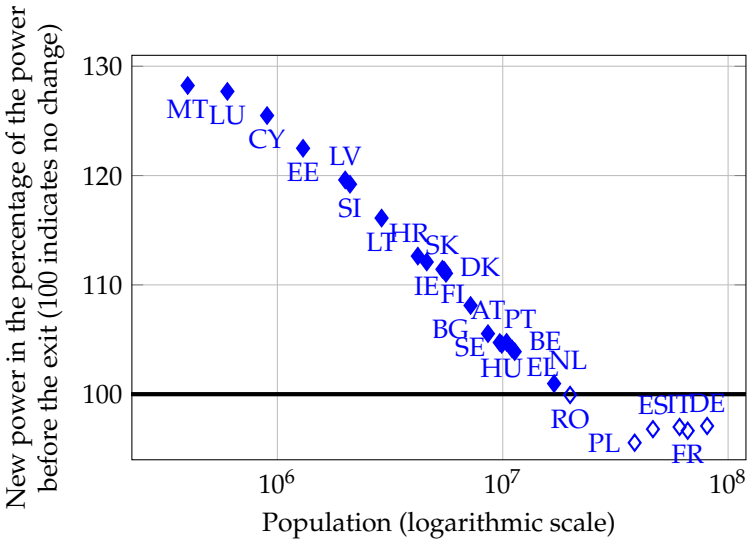

Figure 1. Effect of Czexit with populations for 2015, adjusted Shapley–Shubik index.

We find that in the case of Czexit, the power indices of the small countries increase, and the power indices of the large countries such as France, Germany, Italy, Poland, and Spain slightly decrease. The main winners from Czexit are Cyprus, Estonia, Luxembourg, and Malta.

The same can be said if one investigates Czexit in a farsighted sense, meaning to repeat the analysis with population predictions for 2030. The only country whose power

index change differs is Romania: from a slight decrease (see Figure 1), its power modestly increases (see Figure 2).

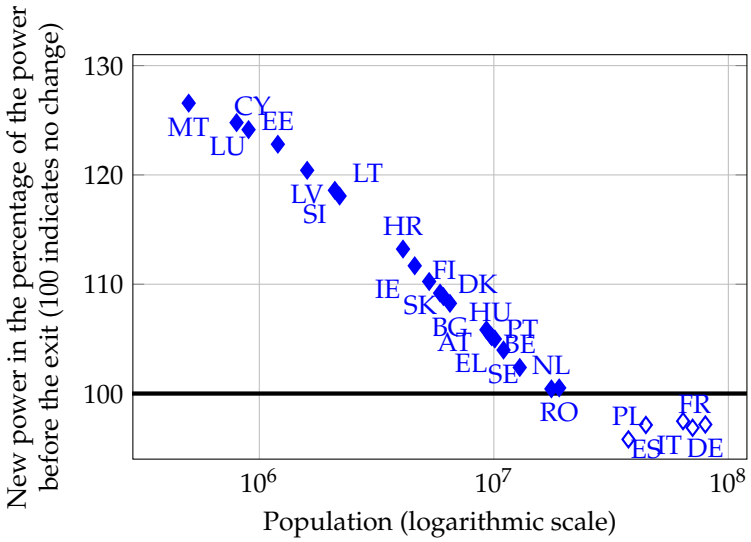

Figure 2. Effect of Czexit with population projections for 2030, adjusted Shapley–Shubik index.

We get similar results for other departures from a 27-member EU, the power indices of the small countries increase significantly. The detailed results for all member states can be seen in Appendix B. What has created more variation in these cases is the contribution of the particular country to the EU budget. To illustrate this point, let us look at the exit of Germany.

In the case of Germany's exit (Figure 3a), the adjusted Shapley–Shubik indices of the smallest countries and Poland increase, while the all the other countries lose power. This is because countries with large populations are also the ones that contribute the most, so the budget loss exceeds the power gains caused by the departure of Germany. The correction ratio (1) is 0.711.

The results concerning Poland are especially interesting. If one of the four large countries (Germany, France, Italy, or Spain) leaves, Poland is much better off than Romania or Spain which are the closest countries in the size of the population. In all four cases, its Shapley–Shubik index increases despite the power of the other remaining large countries decreases.

The simulations have been repeated with the other popular power measure, the Banzhaf index. We get the same results, the power of small countries increases. The most considerable difference is in the case of Germany. As one can see in Figure 3b, with the use of the Banzhaf index all countries, including Poland, lose power. As there is no significant difference and the Banzhaf index rather represents the I-Power approach [21], the Shapley–Shubik index is applied in the following.

Calculations for another country leaving the 26-member EU, for instance, if the Czech Republic leaves after Germany show a similar pattern to Brexit (Figure 4). This can be elucidated by the fact that as the number of member states decreases from 26 to 25, the Council of the European Union's threshold for the number of supporting member states (determined by the member quota) decreases from 15 to 14. In this case, small countries would lose while the power of the large countries would increase.

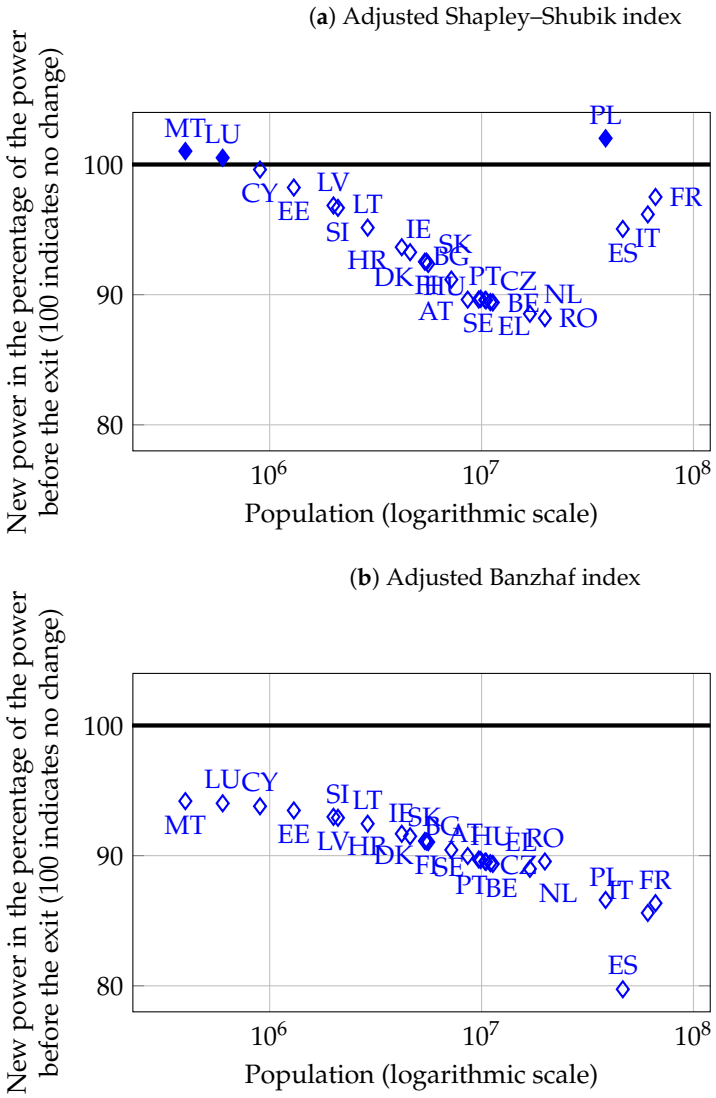

Figure 3. Effect of the German exit with populations for 2015.

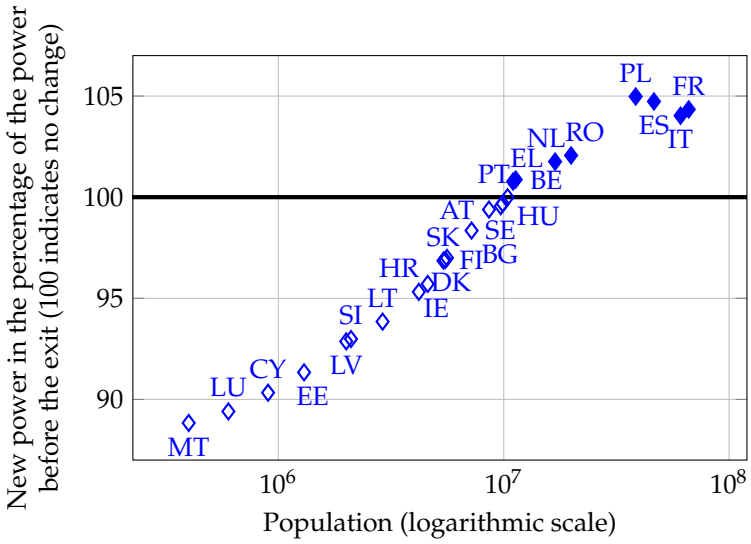

Figure 4. Change in power due to Czexit in the 26-member EU (after Brexit and Germany's exit) with populations for 2015, adjusted Shapley–Shubik index.

3.2. The Effect of Brexit before the Accession of Croatia

Since our findings on an additional departure show an impact that is the inverse of Brexit's [8], Brexit might have had a different impact before the accession of Croatia compared to the exit from the 28-member EU.

This has significance because if Brexit had decreased the power of large countries such as France and Germany, the impact of the potential Brexit would have been calculated differently by these states that usually dominate the policy of the EU: Brexit would have been a greater risk for them. In other words, if Brexit would have had the reverse impact before Croatia joined, it could be seen as a belated threat.

We find that Brexit before the accession of Croatia would have favored smaller countries (Figure 5). In this case, the power of larger countries slightly increased, but not nearly as much as what Kóczy [8] found after the enlargement of EU. The results are similar not only for Brexit but for the case of an exit of any other member state from the EU without Croatia (see Appendix C).

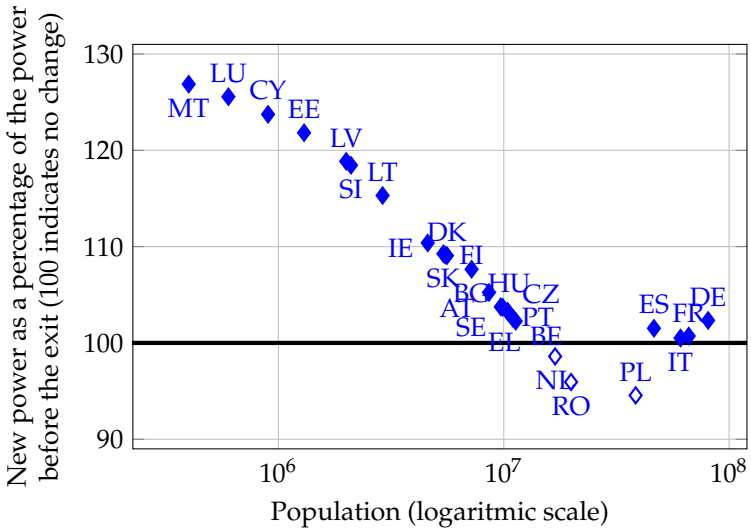

Figure 5. Effect of Brexit before Croatia joined the EU with populations for 2015, adjusted Shapley–Shubik index.

4. Discussion

Note that an additional departure to Brexit has an inverted impact compared to Brexit's impact from the 28-member EU, but it is similar to the potential effect of Brexit if it had happened before Croatia's membership. Results for a departure from the hypothetical 26-member European Union have a strong resemblance to the consequences of Brexit. The inverted impact of an additional departure to Brexit is due to the fact that 15 countries are necessary to make the vote successful in the case of both 26 and 27 members. However, the population threshold decreases after an additional exit.

The voting rule states two main requirements: the support of a given number of countries and a certain percentage of the population. A country will turn a losing coalition into a winning one if (a) the coalition just misses a member state to pass the threshold, and/or (b) if the coalition has the required participation, but the supporting countries are too small to reach the population quota.

With Czexit after Brexit, the population threshold decreases while the member state threshold remains the same, so coalitions with smaller countries become winning, which shifts power from the large to the small member states. This pattern is quite prevalent, we find similar results using population projections for 2030 (Figure 2).

It seems to be a pattern that an exit triggering a decrease in the member quota benefits more the large, while an exit not triggering such a change benefits the small member states (see Appendices A and B). Since the adjustment is only a vertical downward shift, the

direction of the results, meaning which countries are the largest beneficiaries, remains the same even for unadjusted indices (Appendix D).

Any exit induces three types of effects: (1) The increase/decrease in the relative share of the (rounded) numerical quota may increase/decrease the equality among countries of different sizes; (2) in the presence of the double quota, there is a complementarity/substitution effect such that an exit benefits similar countries, finally (3) there is a complex packaging issue with an ambiguous effect, and any of these three can dominate in a given numerical problem.

In the case of 27 member states, voting is successful if at least 15 countries, having together at least a population of 288 million vote in favor. We have examined the number of countries whose power increases if a particular country leaves, which can be considered as a yes vote for the exit of the departing country. Figure 6 presents the number of countries and their total population with an increasing power. Most of the countries would get a positive vote for leaving from 20 or 21 countries, but without the required population. However, in the case of Poland, both thresholds are met, because the power of small and large countries increases, and merely some medium countries (Belgium, Czech Republic, Greece, the Netherlands, Portugal, Romania) lose power. If we ignore the correction for the budget change, the result is unanimous: all countries would increase their influence in the Council in the case of Polexit.

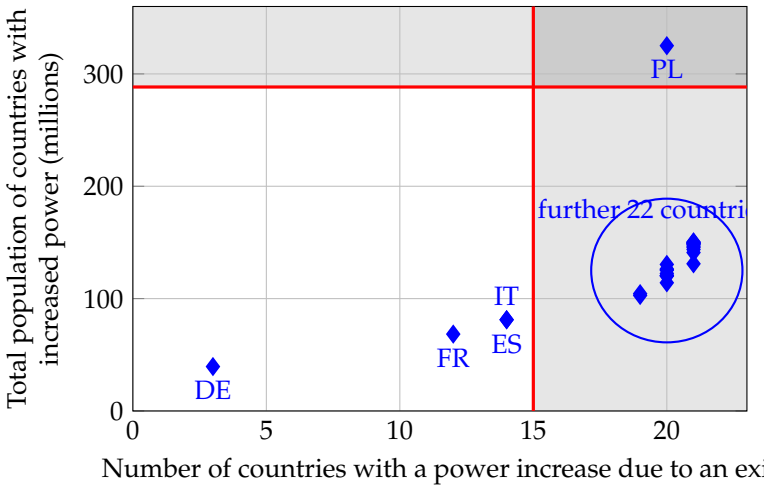

Figure 6. Effect of a departure from the EU after Brexit with populations for 2015, adjusted Shapley–Shubik index.

Inspired by Brexit, the goal of our investigation has been to examine what would happen in the Council of the European Union after a country's exit from the EU. For this purpose, the potential changes in the influence of each country have been measured with adjusted power indices.

We find that, not just Brexit, but any other exit from the 28-member EU would have favoured countries with high population. However, an additional exit would increase the power of small countries. Furthermore, we observe a pattern that is linked to the change in the member-state threshold. An exit, which changes the number of member states required for a decision, benefits the large, while an exit that does not cause such a change benefits the small countries. Thus, a hypothetical Brexit before the accession of Croatia would have favored the power of smaller countries in the Council. An exception to this general pattern is the exit of Poland, which would result in an increase of power for most countries.

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Abbreviations

The following abbreviations are used in this manuscript:

AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
UK	United Kingdom
EU	European Union

Appendix A. The Impact of Any Member State Leaving the 28-Member EU

The following table presents the impact of any member state leaving the 28-member EU. The country labels in the columns refer to the country that is leaving the EU, the rows show the remaining member states. The values represent the change (new adjusted S–S power index)/(old adjusted S–S power index) in basis points (1/100th of 1%). Bold indicates increasing, while italic signs decreasing power.

Table A1. The impact of any member state leaving the 28-member European Union with populations for 2015.

	AT	**BE**	**BG**	**CY**	**CZ**	**DE**	**DK**	**EE**	**EL**	**ES**	**FI**	**FR**	**HR**	**HU**
AT		↓*287*	↓*124*	↓*261*	↓*121*	↓*1250*	↓*317*	↓*254*	↓*151*	↓*481*	↓*287*	↓*966*	↓*213*	↓*113*
BE	↓*68*		↓*19*	↓*119*	↓*5*	↓*1137*	↓*184*	↓*112*	↓*34*	↓*419*	↓*153*	↓*868*	↓*67*	↑**13**
BG	↓*285*	↓*375*		↓*359*	↓*227*	↓*1380*	↓*427*	↓*354*	↓*248*	↓*490*	↓*398*	↓*1075*	↓*319*	↓*206*
CY	↓*1170*	↓*1223*	↓*1140*		↓*1090*	↓*2472*	↓*1299*	↓*1279*	↓*1100*	↓*929*	↓*1278*	↓*1852*	↓*1227*	↓*1073*
CZ	↓*105*	↓*192*	↓*35*	↓*155*		↓*1159*	↓*211*	↓*148*	↓*54*	↓*418*	↓*180*	↓*878*	↓*109*	↓*14*
DE	↑**348**	↑**215**	↑**426**	↑**369**	↑**398**		↑**257**	↑**369**	↑**360**	↑**544**	↑**293**	↑**297**	↑**386**	↑**418**
DK	↓*434*	↓*529*	↓*392*	↓*500*	↓*374*	↓*1545*		↓*476*	↓*398*	↓*522*	↓*541*	↓*1178*	↓*451*	↓*344*
EE	↓*1067*	↓*1138*	↓*1042*	↓*1192*	↓*1002*	↓*2349*	↓*1206*		↓*1013*	↓*889*	↓*1184*	↓*1782*	↓*1124*	↓*963*
EL	↓*78*	↓*185*	↓*28*	↓*126*	↓*14*	↓*1146*	↓*192*	↓*120*		↓*403*	↓*160*	↓*877*	↓*79*	↑**12**
ES	↑**297**	↑**137**	↑**388**	↑**350**	↑**323**	↑**16**	↑**231**	↑**350**	↑**284**		↑**266**	↑**125**	↑**369**	↑**354**
FI	↓*454*	↓*542*	↓*408*	↓*506*	↓*385*	↓*1555*	↓*575*	↓*499*	↓*409*	↓*527*		↓*1182*	↓*457*	↓*358*
FR	↑**346**	↑**207**	↑**429**	↑**382**	↑**393**	↑**160**	↑**266**	↑**380**	↑**355**	↑**526**	↑**302**		↑**400**	↑**416**
HR	↓*586*	↓*682*	↓*524*	↓*649*	↓*529*	↓*1713*	↓*695*	↓*640*	↓*553*	↓*624*	↓*667*	↓*1294*		↓*502*
HU	↓*124*	↓*234*	↓*62*	↓*186*	↓*68*	↓*1191*	↓*253*	↓*171*	↓*96*	↓*425*	↓*222*	↓*887*	↓*139*	
IE	↓*552*	↓*637*	↓*484*	↓*604*	↓*485*	↓*1655*	↓*662*	↓*600*	↓*513*	↓*590*	↓*634*	↓*1269*	↓*540*	↓*469*
IT	↑**327**	↑**184**	↑**406**	↑**367**	↑**368**	↑**54**	↑**241**	↑**367**	↑**330**	↑**535**	↑**277**	↑**71**	↑**375**	↑**393**
LT	↓*739*	↓*810*	↓*678*	↓*848*	↓*672*	↓*1914*	↓*855*	↓*841*	↓*685*	↓*769*	↓*830*	↓*1445*	↓*768*	↓*649*
LU	↓*1248*	↓*1300*	↓*1206*	↓*1401*	↓*1176*	↓*2568*	↓*1389*	↓*1369*	↓*1168*	↓*962*	↓*1364*	↓*1931*	↓*1311*	↓*1136*
LV	↓*901*	↓*975*	↓*865*	↓*1028*	↓*826*	↓*2130*	↓*1045*	↓*1014*	↓*850*	↓*841*	↓*1018*	↓*1629*	↓*960*	↓*809*
MT	↓*1308*	↓*1368*	↓*1278*	↓*1451*	↓*1234*	↓*2632*	↓*1444*	↓*1437*	↓*1247*	↓*996*	↓*1423*	↓*1986*	↓*1359*	↓*1208*
NL	↑**96**	↑**6**	↑**141**	↑**63**	↑**172**	↓*1008*	↓*31*	↑**66**	↑**142**	↓*455*	↑**1**	↓*853*	↑**83**	↑**187**
PL	↑**213**	↑**62**	↑**292**	↑**235**	↑**244**	↓*645*	↑**134**	↑**237**	↑**209**	↓*873*	↑**167**	↓*582*	↑**263**	↑**277**
PT	↓*112*	↓*202*	↓*42*	↓*160*	↓*28*	↓*1163*	↓*216*	↓*153*	↓*60*	↓*420*	↓*184*	↓*879*	↓*118*	↓*26*
RO	↑**186**	↑**82**	↑**253**	↑**134**	↑**251**	↓*1043*	↑**69**	↑**136**	↑**219**	↓*582*	↑**101**	↓*889*	↑**187**	↑**264**
SE	↓*133*	↓*239*	↓*79*	↓*195*	↓*76*	↓*1196*	↓*260*	↓*188*	↓*103*	↓*418*	↓*229*	↓*885*	↓*144*	↓*50*
SI	↓*868*	↓*934*	↓*843*	↓*1001*	↓*801*	↓*2102*	↓*1013*	↓*985*	↓*827*	↓*829*	↓*990*	↓*1611*	↓*932*	↓*777*
SK	↓*465*	↓*553*	↓*416*	↓*513*	↓*392*	↓*1565*	↓*582*	↓*506*	↓*421*	↓*526*	↓*553*	↓*1187*	↓*465*	↓*366*
UK	↑**346**	↑**201**	↑**425**	↑**376**	↑**387**	↑**136**	↑**262**	↑**376**	↑**347**	↑**541**	↑**298**	↑**142**	↑**398**	↑**415**

Table A1. *Cont.*

	IE	**IT**	**LT**	**LU**	**LV**	**MT**	**NL**	**PL**	**PT**	**RO**	**SE**	**SI**	**SK**	**UK**
AT	↓*276*	↓*652*	↓*233*	↓*275*	↓*258*	↓*264*	↓*359*	↑**215**	↓*163*	↑**153**	↓*349*	↓*261*	↓*203*	↓*252*
BE	↓*140*	↓*502*	↓*88*	↓*129*	↓*107*	↓*119*	↓*227*	↑**243**	↓*31*	↑**272**	↓*221*	↓*112*	↓*65*	↓*219*
BG	↓*386*	↓*705*	↓*353*	↓*371*	↓*365*	↓*361*	↓*445*	↑**164**	↓*251*	↑**42**	↓*436*	↓*368*	↓*315*	↓*407*
CY	↓*1287*	↓*1400*	↓*1265*	↓*1328*	↓*1285*	↓*1320*	↓*1280*	↓*495*	↓*1099*	↓*890*	↓*1292*	↓*1282*	↓*1208*	↓*1234*
CZ	↓*181*	↓*547*	↓*129*	↓*171*	↓*139*	↓*161*	↓*257*	↑**248**	↓*50*	↑**247**	↓*248*	↓*141*	↓*93*	↓*238*
DE	↑**309**	↑**586**	↑**378**	↑**360**	↑**373**	↑**370**	↑**90**	↑**826**	↑**367**	↑**582**	↑**178**	↑**366**	↑**387**	↑**1002**
DK	↓*523*	↓*822*	↓*473*	↓*513*	↓*485*	↓*503*	↓*577*	↑**11**	↓*400*	↓*90*	↓*576*	↓*487*	↓*459*	↓*535*
EE	↓*1187*	↓*1322*	↓*1168*	↓*1206*	↓*1186*	↓*1202*	↓*1195*	↓*437*	↓*1012*	↓*790*	↓*1187*	↓*1184*	↓*1112*	↓*1132*
EL	↓*151*	↓*545*	↓*110*	↓*139*	↓*119*	↓*129*	↓*236*	↑**246**	↓*39*	↑**260**	↓*223*	↓*123*	↓*72*	↓*228*
ES	↑**287**	↑**502**	↑**367**	↑**340**	↑**366**	↑**352**	↓*79*	↓*48*	↑**295**	↑**318**	↑**116**	↑**359**	↑**359**	↑**861**
FI	↓*532*	↓*825*	↓*480*	↓*520*	↓*494*	↓*515*	↓*580*	↑**3**	↓*407*	↓*102*	↓*588*	↓*495*	↓*464*	↓*536*
FR	↑**323**	↑**474**	↑**394**	↑**372**	↑**393**	↑**382**	↑**47**	↑**732**	↑**364**	↑**487**	↑**176**	↑**386**	↑**395**	↑**853**
HR	↓*661*	↓*938*	↓*618*	↓*662*	↓*643*	↓*669*	↓*742*	↓*86*	↓*548*	↓*263*	↓*731*	↓*643*	↓*588*	↓*638*
HU	↓*208*	↓*553*	↓*163*	↓*205*	↓*179*	↓*194*	↓*286*	↑**233**	↓*97*	↑**217**	↓*279*	↓*184*	↓*136*	↓*239*
IE		↓*907*	↓*569*	↓*619*	↓*595*	↓*606*	↓*694*	↓*57*	↓*506*	↓*219*	↓*697*	↓*595*	↓*554*	↓*612*
IT	↑**294**		↑**370**	↑**358**	↑**370**	↑**369**	↑**21**	↑**647**	↑**338**	↑**460**	↑**154**	↑**363**	↑**370**	↑**791**
LT	↓*820*	↓*1078*		↓*861*	↓*848*	↓*861*	↓*912*	↓*157*	↓*689*	↓*431*	↓*876*	↓*847*	↓*751*	↓*792*
LU	↓*1375*	↓*1482*	↓*1353*		↓*1374*	↓*1407*	↓*1364*	↓*557*	↓*1197*	↓*961*	↓*1358*	↓*1369*	↓*1296*	↓*1335*
LV	↓*1021*	↓*1198*	↓*1004*	↓*1053*		↓*1046*	↓*1072*	↓*294*	↓*846*	↓*613*	↓*1032*	↓*1020*	↓*943*	↓*1004*
MT	↓*1425*	↓*1517*	↓*1400*	↓*1490*	↓*1446*		↓*1419*	↓*631*	↓*1248*	↓*1015*	↓*1429*	↓*1439*	↓*1357*	↓*1366*
NL	↑**12**	↓*567*	↑**67**	↑**52**	↑**67**	↑**58**		↑**223**	↑**143**	↑**503**	↓*50*	↑**61**	↑**90**	↓*200*
PL	↑**181**	↓*287*	↑**244**	↑**226**	↑**234**	↑**238**	↓*155*		↑**216**	↑**234**	↑**36**	↑**230**	↑**257**	↑**91**
PT	↓*185*	↓*548*	↓*134*	↓*177*	↓*144*	↓*166*	↓*268*	↑**238**		↑**237**	↓*261*	↓*147*	↓*96*	↓*236*
RO	↑**111**	↓*634*	↑**163**	↑**123**	↑**146**	↑**133**	↑**55**	↑**154**	↑**220**		↑**23**	↑**140**	↑**191**	↓*250*
SE	↓*218*	↓*553*	↓*171*	↓*206*	↓*184*	↓*198*	↓*299*	↑**226**	↓*101*	↑**206**		↓*188*	↓*143*	↓*232*
SI	↓*996*	↓*1178*	↓*970*	↓*1029*	↓*997*	↓*1019*	↓*1053*	↓*270*	↓*821*	↓*587*	↓*1002*		↓*913*	↓*982*
SK	↓*539*	↓*849*	↓*492*	↓*529*	↓*498*	↓*521*	↓*595*	↓*0*	↓*412*	↓*109*	↓*596*	↓*499*		↓*549*
UK	↑**317**	↑**434**	↑**392**	↑**366**	↑**391**	↑**378**	↑**32**	↑**722**	↑**358**	↑**484**	↑**176**	↑**384**	↑**391**	

Appendix B. The Impact of Additional Departures to Brexit

The following table presents the impact of any member state leaving the 27-member EU, after the United Kingdom departed. The country labels in the columns refer to the country that is leaving the EU, the rows show the remaining member states. The values represent the change (new adjusted S–S power index)/(old adjusted S–S power index) in basis points (1/100th of 1%). Bold indicates increasing, while italic signs decreasing power.

Table A2. The impact of additional departures to Brexit with populations for 2015.

	AT	**BE**	**BG**	**CY**	**CZ**	**DE**	**DK**	**EE**	**EL**	**ES**	**FI**	**FR**	**HR**	**HU**
AT		↑**337**	↑**599**	↑**553**	↑**553**	↓*1038*	↑**418**	↑**553**	↑**502**	↓*38*	↑**451**	↓*485*	↑**557**	↑**570**
BE	↑**356**		↑**482**	↑**365**	↑**389**	↓*1059*	↑**253**	↑**377**	↑**329**	↓*172*	↑**287**	↓*618*	↑**390**	↑**415**
BG	↑**748**	↑**578**		↑**711**	↑**811**	↓*884*	↑**708**	↑**717**	↑**745**	↑**184**	↑**742**	↓*279*	↑**855**	↑**816**
CY	↑**2427**	↑**2238**	↑**2569**		↑**2548**	↓*39*	↑**2270**	↑**2352**	↑**2434**	↑**2003**	↑**2322**	↑**1159**	↑**2379**	↑**2535**
CZ	↑**370**	↑**244**	↑**488**	↑**408**		↓*1043*	↑**305**	↑**417**	↑**409**	↓*129*	↑**338**	↓*581*	↑**439**	↑**487**
DE	↓*343*	↓*462*	↓*298*	↓*364*	↓*290*		↓*473*	↓*363*	↓*311*	↓*346*	↓*436*	↓*402*	↓*335*	↓*255*
DK	↑**1052**	↑**885**	↑**1067**	↑**926**	↑**1105**	↓*763*		↑**930**	↑**1034**	↑**420**	↑**907**	↓*17*	↑**985**	↑**1121**
EE	↑**2207**	↑**1990**	↑**2349**	↑**2069**	↑**2249**	↓*177*	↑**2062**		↑**2171**	↑**1753**	↑**2094**	↑**924**	↑**2171**	↑**2248**
EL	↑**380**	↑**188**	↑**447**	↑**384**	↑**414**	↓*1056*	↑**260**	↑**387**		↓*167*	↑**297**	↓*604*	↑**403**	↑**438**
ES	↓*358*	↓*503*	↓*271*	↓*319*	↓*319*	↓*495*	↓*442*	↓*322*	↓*354*		↓*405*	↓*617*	↓*299*	↓*287*
FI	↑**1077**	↑**891**	↑**1099**	↑**936**	↑**1133**	↓*746*	↑**888**	↑**958**	↑**1066**	↑**444**		↑**10**	↑**999**	↑**1135**
FR	↓*373*	↓*511*	↓*320*	↓*364*	↓*334*	↓*249*	↓*485*	↓*366*	↓*359*	↓*530*	↓*448*		↓*342*	↓*303*
HR	↑**1173**	↑**1044**	↑**1302**	↑**1175**	↑**1263**	↓*635*	↑**1063**	↑**1180**	↑**1204**	↑**714**	↑**1097**	↑**132**		↑**1265**
HU	↑**403**	↑**292**	↑**531**	↑**451**	↑**455**	↓*1031*	↑**345**	↑**450**	↑**454**	↓*102*	↑**378**	↓*563*	↑**467**	
IE	↑**1109**	↑**1081**	↑**1224**	↑**1076**	↑**1209**	↓*673*	↑**1027**	↑**1080**	↑**1259**	↑**627**	↑**1060**	↑**93**	↑**1108**	↑**1206**
IT	↓*354*	↓*473*	↓*287*	↓*359*	↓*300*	↓*383*	↓*469*	↓*359*	↓*324*	↓*316*	↓*432*	↓*980*	↓*333*	↓*262*
LT	↑**1494**	↑**1353**	↑**1622**	↑**1522**	↑**1611**	↓*485*	↑**1417**	↑**1545**	↑**1526**	↑**1093**	↑**1451**	↑**414**	↑**1561**	↑**1603**
LU	↑**2561**	↑**2456**	↑**2736**	↑**2483**	↑**2769**	↑**51**	↑**2435**	↑**2498**	↑**2645**	↑**2203**	↑**2465**	↑**1313**	↑**2549**	↑**2711**
LV	↑**1866**	↑**1706**	↑**2051**	↑**1790**	↑**1960**	↓*314*	↑**1804**	↑**1822**	↑**1877**	↑**1475**	↑**1843**	↑**704**	↑**1923**	↑**1972**
MT	↑**2693**	↑**2575**	↑**2836**	↑**2553**	↑**2823**	↑**102**	↑**2529**	↑**2580**	↑**2773**	↑**2331**	↑**2561**	↑**1429**	↑**2660**	↑**2795**
NL	↑**54**	↓*99*	↑**166**	↑**116**	↑**96**	↓*1147*	↑**10**	↑**117**	↑**54**	↓*396*	↑**45**	↓*787*	↑**148**	↑**123**
PL	↓*468*	↓*638*	↓*372*	↓*365*	↓*444*	↑**201**	↓*528*	↓*368*	↓*490*	↑**1535**	↓*490*	↑**196**	↓*376*	↓*404*
PT	↑**381**	↑**257**	↑**494**	↑**409**	↑**474**	↓*1040*	↑**305**	↑**422**	↑**417**	↓*119*	↑**341**	↓*575*	↑**447**	↑**497**
RO	↓*45*	↓*204*	↑**40**	↑**7**	↓*6*	↓*1180*	↓*123*	↑**9**	↓*50*	↓*421*	↓*89*	↓*852*	↑**19**	↑**17**
SE	↑**417**	↑**249**	↑**529**	↑**463**	↑**472**	↓*1037*	↑**342**	↑**463**	↑**408**	↓*102*	↑**380**	↓*552*	↑**461**	↑**488**
SI	↑**1825**	↑**1657**	↑**2002**	↑**1773**	↑**1920**	↓*333*	↑**1783**	↑**1783**	↑**1845**	↑**1447**	↑**1816**	↑**682**	↑**1890**	↑**1916**
SK	↑**1105**	↑**919**	↑**1109**	↑**954**	↑**1142**	↓*746*	↑**904**	↑**970**	↑**1084**	↑**465**	↑**937**	↑**34**	↑**1012**	↑**1162**

Table A2. *Cont.*

	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK
AT	↑**475**	↓*11*	↑**572**	↑**545**	↑**561**	↑**557**	↑**189**	↑**149**	↑**523**	↑**674**	↑**305**	↑**559**	↑**552**
BE	↑**304**	↓*129*	↑**385**	↑**349**	↑**373**	↑**361**	↑**16**	↓*150*	↑**355**	↑**498**	↑**148**	↑**371**	↑**385**
BG	↑**769**	↑**243**	↑**769**	↑**705**	↑**742**	↑**708**	↑**427**	↑**493**	↑**775**	↑**975**	↑**538**	↑**742**	↑**844**
CY	↑**2293**	↑**1666**	↑**2363**	↑**2300**	↑**2345**	↑**2293**	↑**2121**	↑**3289**	↑**2503**	↑**2726**	↑**2221**	↑**2351**	↑**2438**
CZ	↑**350**	↓*95*	↑**428**	↑**392**	↑**416**	↑**401**	↑**54**	↓*40*	↑**434**	↑**547**	↑**218**	↑**414**	↑**438**
DE	↓*419*	↓*259*	↓*357*	↓*375*	↓*361*	↓*363*	↓*593*	↑**42**	↓*318*	↓*112*	↓*504*	↓*369*	↓*341*
DK	↑**899**	↑**407**	↑**964**	↑**906**	↑**945**	↑**916**	↑**644**	↑**918**	↑**1068**	↑**1179**	↑**824**	↑**934**	↑**1012**
EE	↑**2103**	↑**1439**	↑**2125**	↑**2059**	↑**2091**	↑**2076**	↑**1851**	↑**2872**	↑**2206**	↑**2504**	↑**1945**	↑**2095**	↑**2203**
EL	↑**310**	↓*116*	↑**395**	↑**357**	↑**393**	↑**371**	↑**26**	↓*117*	↑**380**	↑**517**	↑**175**	↑**392**	↑**396**
ES	↓*382*	↓*218*	↓*310*	↓*331*	↓*317*	↓*321*	↓*639*	↑**1320**	↓*346*	↓*158*	↓*538*	↓*325*	↓*308*
FI	↑**926**	↑**415**	↑**988**	↑**930**	↑**960**	↑**936**	↑**669**	↑**959**	↑**1098**	↑**1211**	↑**855**	↑**954**	↑**1025**
FR	↓*424*	↓*709*	↓*360*	↓*374*	↓*365*	↓*361*	↓*650*	↑**124**	↓*361*	↓*148*	↓*551*	↓*373*	↓*352*
HR	↑**1097**	↑**583**	↑**1182**	↑**1164**	↑**1175**	↑**1176**	↑**948**	↑**1344**	↑**1229**	↑**1459**	↑**972**	↑**1175**	↑**1204**
HU	↑**383**	↓*73*	↑**458**	↑**443**	↑**453**	↑**454**	↑**89**	↑**8**	↑**424**	↑**565**	↑**214**	↑**451**	↑**477**
IE		↑**531**	↑**1086**	↑**1065**	↑**1103**	↑**1083**	↑**851**	↑**1212**	↑**1169**	↑**1377**	↑**915**	↑**1104**	↑**1163**
IT	↓*417*		↓*352*	↓*371*	↓*356*	↓*360*	↓*604*	↑**326**	↓*327*	↓*105*	↓*511*	↓*363*	↓*336*
LT	↑**1483**	↑**886**		↑**1503**	↑**1553**	↑**1512**	↑**1377**	↑**1846**	↑**1567**	↑**1890**	↑**1295**	↑**1557**	↑**1557**
LU	↑**2447**	↑**1834**	↑**2537**		↑**2529**	↑**2437**	↑**2301**	↑**3598**	↑**2717**	↑**2944**	↑**2368**	↑**2540**	↑**2581**
LV	↑**1837**	↑**1227**	↑**1937**	↑**1770**		↑**1792**	↑**1609**	↑**2377**	↑**1912**	↑**2312**	↑**1652**	↑**1876**	↑**1949**
MT	↑**2560**	↑**1913**	↑**2645**	↑**2532**	↑**2621**		↑**2380**	↑**3782**	↑**2771**	↑**3037**	↑**2492**	↑**2626**	↑**2678**
NL	↑**71**	↓*327*	↑**144**	↑**92**	↑**125**	↑**104**		↓*569*	↑**65**	↑**158**	↓*133*	↑**121**	↑**143**
PL	↓*463*	↑**705**	↓*373*	↓*373*	↓*365*	↓*364*	↓*867*		↓*468*	↓*507*	↓*648*	↓*374*	↓*392*
PT	↑**361**	↓*85*	↑**437**	↑**400**	↑**424**	↑**412**	↑**59**	↓*41*		↑**559**	↑**230**	↑**424**	↑**438**
RO	↓*63*	↓*368*	↑**16**	↓*2*	↑**14**	↑**8**	↓*401*	↓*778*	↓*37*		↓*235*	↑**8**	↑**8**
SE	↑**392**	↓*64*	↑**467**	↑**451**	↑**464**	↑**463**	↑**101**	↑**35**	↑**438**	↑**574**		↑**463**	↑**479**
SI	↑**1792**	↑**1189**	↑**1892**	↑**1743**	↑**1858**	↑**1755**	↑**1584**	↑**2329**	↑**1879**	↑**2253**	↑**1626**		↑**1928**
SK	↑**929**	↑**430**	↑**991**	↑**944**	↑**974**	↑**960**	↑**692**	↑**988**	↑**1103**	↑**1223**	↑**880**	↑**972**	

Appendix C. The Impact of Any Member State Leaving before the Accession of Croatia

The following table presents the impact of any member state leaving the 27-member EU before the accession of Croatia. The country labels in the columns refer to the country that is leaving the EU, the rows show the remaining member states. The values represent the change (new adjusted S–S power index)/(old adjusted S–S power index) in basis points (1/100th of 1%). Bold indicates increasing, while italic signs decreasing power.

Table A3. The impact of any member state leaving before the accession of Croatia with populations for 2015.

	AT	**BE**	**BG**	**CY**	**CZ**	**DE**	**DK**	**EE**	**EL**	**ES**	**FI**	**FR**	**HU**	**IE**
AT		↑**584**	↑**758**	↑**648**	↑**756**	↓*553*	↑**573**	↑**654**	↑**730**	↑**424**	↑**605**	↓*181*	↑**773**	↑**595**
BE	↑**454**		↑**512**	↑**411**	↑**514**	↓*719*	↑**332**	↑**414**	↑**481**	↑**51**	↑**365**	↓*455*	↑**535**	↑**376**
BG	↑**860**	↑**762**		↑**797**	↑**954**	↓*413*	↑**746**	↑**800**	↑**914**	↑**597**	↑**778**	↓*45*	↑**959**	↑**772**
CY	↑**2648**	↑**2542**	↑**2733**		↑**2770**	↑**659**	↑**2509**	↑**2531**	↑**2714**	↑**2750**	↑**2537**	↑**1530**	↑**2775**	↑**2527**
CZ	↑**515**	↑**410**	↑**591**	↑**486**		↓*670*	↑**407**	↑**489**	↑**560**	↑**157**	↑**440**	↓*380*	↑**608**	↑**431**
DE	↓*373*	↓*498*	↓*301*	↓*349*	↓*332*		↓*459*	↓*350*	↓*363*	↓*186*	↓*425*	↓*422*	↓*308*	↓*413*
DK	↑**1079**	↑**973**	↑**1149**	↑**1023**	↑**1159**	↓*295*		↑**1026**	↑**1125**	↑**940**	↑**984**	↑**136**	↑**1179**	↑**966**
EE	↑**2411**	↑**2317**	↑**2492**	↑**2297**	↑**2515**	↑**525**	↑**2292**		↑**2480**	↑**2442**	↑**2327**	↑**1337**	↑**2540**	↑**2313**
EL	↑**470**	↑**360**	↑**534**	↑**437**	↑**536**	↓*702*	↑**364**	↑**438**		↑**79**	↑**398**	↓*432*	↑**564**	↑**400**
ES	↓*372*	↓*521*	↓*295*	↓*314*	↓*343*	↓*661*	↓*449*	↓*312*	↓*384*		↓*416*	↓*538*	↓*313*	↓*399*
FI	↑**1092**	↑**980**	↑**1165**	↑**1038**	↑**1171**	↓*291*	↑**961**	↑**1045**	↑**1138**	↑**962**		↑**154**	↑**1195**	↑**976**
FR	↓*384*	↓*528*	↓*318*	↓*358*	↓*355*	↓*554*	↓*477*	↓*359*	↓*391*	↓*227*	↓*443*		↓*326*	↓*427*
HU	↑**572**	↑**460**	↑**628**	↑**514**	↑**637**	↓*646*	↑**455**	↑**520**	↑**606**	↑**228**	↑**487**	↓*318*		↑**487**
IE	↑**1241**	↑**1118**	↑**1308**	↑**1195**	↑**1316**	↓*198*	↑**1090**	↑**1215**	↑**1279**	↑**1180**	↑**1120**	↑**285**	↑**1350**	
IT	↓*368*	↓*506*	↓*299*	↓*346*	↓*335*	↓*634*	↓*461*	↓*346*	↓*371*	↓*177*	↓*428*	↓*619*	↓*310*	↓*418*
LT	↑**1687**	↑**1574**	↑**1799**	↑**1665**	↑**1778**	↑**102**	↑**1599**	↑**1680**	↑**1743**	↑**1746**	↑**1632**	↑**722**	↑**1806**	↑**1636**
LU	↑**2836**	↑**2758**	↑**2925**	↑**2699**	↑**2968**	↑**771**	↑**2715**	↑**2716**	↑**2905**	↑**2976**	↑**2742**	↑**1656**	↑**2972**	↑**2701**
LV	↑**2076**	↑**1969**	↑**2201**	↑**1973**	↑**2183**	↑**327**	↑**1967**	↑**2000**	↑**2143**	↑**2091**	↑**1999**	↑**1055**	↑**2206**	↑**1979**
MT	↑**2975**	↑**2867**	↑**3066**	↑**2808**	↑**3090**	↑**831**	↑**2821**	↑**2841**	↑**3042**	↑**3139**	↑**2854**	↑**1776**	↑**3097**	↑**2821**
NL	↑**205**	↑**98**	↑**265**	↑**137**	↑**264**	↓*965*	↑**69**	↑**136**	↑**239**	↓*408*	↑**104**	↓*806*	↑**287**	↑**105**
PL	↓*226*	↓*364*	↓*131*	↓*180*	↓*186*	↓*1278*	↓*285*	↓*175*	↓*224*	↓*1592*	↓*254*	↓*1177*	↓*159*	↓*243*
PT	↑**528**	↑**425**	↑**603**	↑**480**	↑**594**	↓*661*	↑**411**	↑**502**	↑**569**	↑**176**	↑**445**	↓*367*	↑**620**	↑**442**
RO	↑**45**	↓*49*	↑**112**	↑**33**	↑**117**	↓*1180*	↓*56*	↑**34**	↑**88**	↓*670*	↓*23*	↓*1042*	↑**131**	↓*14*
SE	↑**586**	↑**474**	↑**636**	↑**531**	↑**652**	↓*644*	↑**472**	↑**535**	↑**618**	↑**255**	↑**504**	↓*296*	↑**681**	↑**502**
SI	↑**2021**	↑**1914**	↑**2150**	↑**1936**	↑**2136**	↑**298**	↑**1926**	↑**1963**	↑**2085**	↑**2044**	↑**1960**	↑**1016**	↑**2154**	↑**1935**
SK	↑**1113**	↑**1000**	↑**1177**	↑**1056**	↑**1187**	↓*283*	↑**975**	↑**1063**	↑**1149**	↑**991**	↑**1006**	↑**163**	↑**1219**	↑**980**
UK	↓*398*	↓*533*	↓*318*	↓*355*	↓*364*	↓*579*	↓*473*	↓*358*	↓*396*	↓*196*	↓*439*	↓*594*	↓*336*	↓*428*

Table A3. *Cont.*

	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
AT	↑**204**	↑**684**	↑**639**	↑**671**	↑**642**	↑**513**	↑**1123**	↑**725**	↑**100**	↑**520**	↑**665**	↑**757**	↑**523**
BE	↓*108*	↑**431**	↑**403**	↑**421**	↑**411**	↑**250**	↑**837**	↑**483**	↑**80**	↑**286**	↑**417**	↑**515**	↑**225**
BG	↑**304**	↑**838**	↑**780**	↑**815**	↑**793**	↑**664**	↑**1343**	↑**918**	↑**120**	↑**700**	↑**810**	↑**929**	↑**764**
CY	↑**2081**	↑**2587**	↑**2501**	↑**2575**	↑**2514**	↑**2380**	↑**3176**	↑**2726**	↑**300**	↑**2482**	↑**2568**	↑**2735**	↑**2373**
CZ	↑**0**	↑**510**	↑**455**	↑**499**	↑**468**	↑**319**	↑**929**	↑**553**	↑**90**	↑**358**	↑**502**	↑**581**	↑**314**
DE	↓*131*	↓*343*	↓*359*	↓*352*	↓*350*	↓*618*	↑**111**	↓*357*	↓*16*	↓*536*	↓*353*	↓*293*	↑**234**
DK	↑**552**	↑**1044**	↑**1013**	↑**1047**	↑**1023**	↑**920**	↑**1584**	↑**1126**	↑**150**	↑**920**	↑**1030**	↑**1137**	↑**906**
EE	↑**1854**	↑**2367**	↑**2268**	↑**2346**	↑**2278**	↑**2164**	↑**2932**	↑**2471**	↑**280**	↑**2252**	↑**2327**	↑**2506**	↑**2182**
EL	↓*76*	↑**455**	↑**428**	↑**452**	↑**430**	↑**272**	↑**878**	↑**506**	↑**80**	↑**313**	↑**442**	↑**545**	↑**254**
ES	↓*193*	↓*314*	↓*324*	↓*315*	↓*312*	↓*726*	↓*920*	↓*368*	↓*39*	↓*538*	↓*319*	↓*281*	↑**152**
FI	↑**556**	↑**1052**	↑**1021**	↑**1059**	↑**1041**	↑**931**	↑**1582**	↑**1138**	↑**150**	↑**937**	↑**1046**	↑**1148**	↑**912**
FR	↓*290*	↓*354*	↓*367*	↓*362*	↓*357*	↓*691*	↓*32*	↓*380*	↓*27*	↓*554*	↓*365*	↓*311*	↑**71**
HU	↑**79**	↑**558**	↑**507**	↑**542**	↑**520**	↑**368**	↑**960**	↑**607**	↑**90**	↑**409**	↑**532**	↑**636**	↑**369**
IE	↑**718**	↑**1242**	↑**1182**	↑**1240**	↑**1202**	↑**1074**	↑**1700**	↑**1280**	↑**160**	↑**1082**	↑**1228**	↑**1282**	↑**1038**
IT		↓*344*	↓*355*	↓*349*	↓*344*	↓*670*	↓*105*	↓*359*	↓*26*	↓*536*	↓*351*	↓*298*	↑**50**
LT	↑**1187**		↑**1640**	↑**1711**	↑**1659**	↑**1510**	↑**2168**	↑**1738**	↑**210**	↑**1532**	↑**1703**	↑**1805**	↑**1530**
LU	↑**2285**	↑**2789**		↑**2771**	↑**2689**	↑**2567**	↑**3354**	↑**2919**	↑**330**	↑**2665**	↑**2746**	↑**2926**	↑**2556**
LV	↑**1503**	↑**2076**	↑**1952**		↑**1972**	↑**1830**	↑**2586**	↑**2137**	↑**250**	↑**1917**	↑**2024**	↑**2172**	↑**1886**
MT	↑**2407**	↑**2885**	↑**2787**	↑**2894**		↑**2708**	↑**3480**	↑**3038**	↑**340**	↑**2795**	↑**2874**	↑**3042**	↑**2686**
NL	↓*538*	↑**153**	↑**125**	↑**137**	↑**135**		↑**453**	↑**235**	↑**60**	↑**44**	↑**131**	↑**242**	↓*139*
PL	↓*899*	↓*169*	↓*195*	↓*169*	↓*183*	↓*549*		↓*214*	↓*17*	↓*387*	↓*176*	↓*116*	↓*544*
PT	↑**15**	↑**519**	↑**466**	↑**510**	↑**480**	↑**330**	↑**928**		↑**90**	↑**370**	↑**502**	↑**593**	↑**328**
RO	↓*785*	↑**52**	↑**23**	↑**38**	↑**28**	↓*89*	↑**149**	↑**90**		↓*108*	↑**38**	↑**115**	↓*405*
SE	↑**46**	↑**557**	↑**525**	↑**555**	↑**533**	↑**390**	↑**981**	↑**623**	↑**90**		↑**546**	↑**655**	↑**374**
SI	↑**1454**	↑**2030**	↑**1912**	↑**2000**	↑**1927**	↑**1795**	↑**2539**	↑**2092**	↑**240**	↑**1877**		↑**2133**	↑**1844**
SK	↑**575**	↑**1070**	↑**1042**	↑**1077**	↑**1055**	↑**953**	↑**1595**	↑**1152**	↑**150**	↑**949**	↑**1060**		↑**926**
UK	↓*277*	↓*356*	↓*363*	↓*359*	↓*355*	↓*683*	↓*54*	↓*389*	↓*27*	↓*562*	↓*362*	↓*309*	

Appendix D. The Impact of Additional Departures to Brexit, Unadjusted Indices

The following table presents the impact of any member state leaving the 27-member EU, after the United Kingdom departed. The country labels in the columns refer to the country that is leaving the EU, the rows show the remaining member states. The values represent the change (new S–S power index)/(old S–S power index) in basis points (1/100th of 1%). Every value indicates increasing power.

Table A4. The impact of additional departures to Brexit with populations for 2015, unadjusted indices.

	AT	**BE**	**BG**	**CY**	**CZ**	**DE**	**DK**	**EE**	**EL**	**ES**	**FI**	**FR**	**HR**	**HU**
AT		1703	1664	1588	1705	2604	1646	1591	1701	1942	1639	2527	1617	1682
BE	1512		1536	1382	1522	2574	1461	1398	1508	1780	1456	2351	1434	1510
BG	1948	1976		1762	1991	2821	1970	1772	1971	2208	1963	2797	1944	1954
CY	3815	3855	3832		3918	4010	3716	3568	3853	4389	3722	4692	3621	3853
CZ	1528	1598	1542	1429		2597	1519	1442	1597	1832	1512	2399	1487	1589
DE	734	797	677	580	768		649	584	794	1571	650	2635	634	768
DK	2286	2323	2180	1997	2317	2990		2006	2293	2491	2147	3143	2088	2291
EE	3570	3573	3591	3253	3586	3816	3483		3560	4090	3468	4383	3392	3535
EL	1539	1534	1497	1402	1550	2578	1470	1409		1786	1468	2369	1447	1536
ES	717	751	707	629	736	3368	683	629	746		684	2352	674	733
FI	2314	2330	2215	2009	2348	3014	2171	2037	2329	2521		3179	2104	2305
FR	701	742	652	580	720	3714	635	581	740	1351	637		626	716
HR	2420	2504	2438	2271	2492	3171	2366	2281	2483	2844	2358	3340		2450
HU	1565	1652	1590	1476	1596	2613	1564	1478	1647	1865	1557	2423	1518	
IE	2350	2544	2353	2162	2432	3117	2327	2170	2544	2740	2316	3288	2224	2384
IT	723	784	688	586	758	3525	653	589	779	1608	654	1875	636	761
LT	2777	2853	2791	2652	2878	3382	2763	2681	2842	3299	2753	3711	2722	2823
LU	3964	4101	4016	3708	4163	4137	3901	3728	4088	4629	3881	4895	3809	4048
LV	3192	3253	3263	2947	3265	3622	3196	2986	3232	3756	3188	4093	3120	3231
MT	4111	4236	4127	3784	4222	4209	4006	3818	4230	4783	3988	5047	3931	4141
NL	1177	1208	1189	1108	1198	2451	1190	1113	1201	1512	1187	2129	1167	1187
PL	595	597	595	579	598	4348	587	579	594	3828	590	3424	589	604
PT	1540	1612	1549	1430	1617	2602	1520	1447	1606	1845	1516	2408	1496	1600
RO	1066	1089	1049	988	1083	2404	1040	995	1084	1482	1036	2043	1025	1071
SE	1581	1603	1588	1490	1615	2606	1561	1493	1595	1865	1559	2438	1511	1591
SI	3146	3197	3209	2928	3221	3596	3172	2943	3197	3722	3159	4064	3084	3169
SK	2345	2362	2226	2029	2358	3014	2189	2050	2349	2546	2180	3211	2118	2336

Table A4. *Cont.*

	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK
AT	1630	2484	1626	1589	1607	1585	1819	1476	1705	1844	1684	1613	1634
BE	1440	2337	1421	1373	1401	1370	1618	1137	1518	1648	1506	1406	1450
BG	1956	2803	1844	1764	1806	1751	2095	1866	1985	2177	1948	1814	1956
CY	3649	4583	3597	3517	3568	3490	4061	5027	3907	4120	3856	3584	3714
CZ	1491	2380	1468	1420	1448	1414	1662	1262	1606	1703	1585	1454	1509
DE	637	2175	604	576	593	574	910	1356	768	971	765	591	650
DK	2100	3008	2058	1985	2029	1979	2347	2345	2311	2404	2272	2025	2142
EE	3437	4299	3335	3252	3289	3252	3748	4555	3577	3874	3543	3302	3456
EL	1447	2353	1432	1382	1423	1381	1630	1174	1546	1669	1536	1429	1463
ES	677	2226	656	624	641	620	857	2801	737	919	727	640	686
FI	2131	3019	2084	2011	2045	2001	2377	2392	2344	2440	2307	2048	2156
FR	630	1612	601	577	588	577	845	1448	721	930	712	587	637
HR	2320	3229	2297	2269	2282	2264	2700	2828	2490	2715	2440	2291	2353
HU	1528	2408	1501	1476	1488	1472	1704	1317	1595	1723	1580	1494	1552
IE		3163	2192	2160	2203	2162	2587	2679	2423	2624	2375	2213	2309
IT	638		610	581	598	578	898	1677	758	979	758	597	655
LT	2749	3607		2641	2698	2632	3197	3395	2866	3193	2806	2710	2743
LU	3819	4792	3788		3770	3648	4269	5376	4145	4362	4023	3792	3872
LV	3142	4033	3127	2934		2940	3466	3996	3249	3661	3211	3061	3175
MT	3945	4891	3907	3772	3871		4361	5585	4205	4466	4164	3886	3979
NL	1182	2089	1156	1090	1128	1087		663	1195	1271	1186	1131	1184
PL	588	3381	586	578	588	573	593		602	532	602	586	593
PT	1503	2392	1479	1429	1457	1426	1669	1260		1716	1599	1465	1509
RO	1032	2039	1015	986	1006	982	1134	427	1081		1070	1007	1035
SE	1538	2418	1512	1484	1500	1482	1717	1347	1610	1733		1508	1555
SI	3092	3986	3078	2905	3033	2899	3437	3941	3213	3596	3181		3152
SK	2134	3037	2088	2027	2061	2027	2403	2425	2350	2453	2336	2067	

Appendix E. The Blocking Minority Rule

According to the Article 16(4) of the Treaty on European Union 'as from 1 November 2014, a qualified majority shall be defined as at least 55% of the members of the Council, comprising at least fifteen of them and representing Member States comprising at least 65% of the population of the Union. A blocking minority must include at least four Council members, failing which the qualified majority shall be deemed attained.' (https://eur-lex.europa.eu/resource.html?uri=cellar:2bf140bf-a3f8-4ab2-b506-fd71826e6da6.0023.02/DOC_1&format=PDF , accessed on 1 September 2021).

For the sake of simplicity, we left out the blocking minority rule in the calculations of the adjusted power indices. In the following, the effect of this modification will be calculated.

In the past 28-member state case, there were only 10 variants of coalitions that are winning only due to the blocking minority rule. Table A5 shows all coalitions that are not blocking minorities even though they reach the population quota.

Table A5. Coalitions which reach the population quota but cannot reject a decision in the 28-member EU.

1	Germany	France	United Kingdom
2	Germany	France	Italy
3	Germany	France	Spain
4	Germany	France	Poland
5	Germany	United Kingdom	Italy
6	Germany	United Kingdom	Spain
7	Germany	United Kingdom	Poland
8	Germany	Italy	Spain
9	Germany	Italy	Poland
10	France	United Kingdom	Italy

In the case of small countries, in other words, for countries not appearing in Table A5 (their number is 23), we do not take them as a pivotal player in 10 possible variations, by ignoring the blocking minority rule, but they are. Thus, their Shapley–Shubik index should be increased by $(24! \times 3! \times 10)/28! = 1/8190 = 0.000122$.

In the case of France, Germany, Italy, Poland, Spain, and the United Kingdom, we need to reduce the index. If France, Italy, and the United Kingdom oppose a decision, they cannot block it until another country joins them, so Germany is not considered as a pivotal player despite it plays this role. At the same time, we have counted Germany in nine variants as a pivotal player (for example, in the blocking coalition of France, Germany, and the United Kingdom), but it does not play such a role. Therefore, the correction for Germany is:

$$\frac{24! \times 3! - 25! \times 2! \times 9}{28!} = -\frac{444}{491400} = -0.000904.$$

After Brexit, in the 27-member EU, there are 27! possible coalitions, and 19 variants involved in the correction needed due to the blocking minority rule.

By ignoring the blocking minority rule, in the case of countries not appearing in Table A6 (their number is 12), we do not take them as a pivotal player in 19 possible variants despite the fact that they are. Their Shapley–Shubik index should be increased by $(23! \times 3! \times 19)/27! = 19/70200 = 0.000271$.

We show the overall effect of these corrections for Malta. The Shapley–Shubik index of Malta, calculated by the IOP software without the blocking minority rule, is 0.008487, which needs to be increased by 1/8190. After Brexit, the Shapley–Shubik index of Malta is 0.008036. As mentioned, it should be increased by 19/70200. With the payment correction, the adjusted Shapley–Shubik index will be 0.007574. Therefore, the accurate change in power is $0.007574/(0.008487 + 0.000122) = 0.879751$. The original result was 0.863331,

the difference is only 0.016421. Since Malta has the smallest Shapley–Shubik value, the adjustment for the other countries is lower. Consequently, ignoring the blocking minority rule does not have a significant effect on our results.

Table A6. Coalitions that reach the population quota but cannot reject a decision in the 27-member EU after Brexit.

1	Germany	France	Italy
2	Germany	France	Spain
3	Germany	France	Poland
4	Germany	France	Romania
5	Germany	France	Netherlands
6	Germany	France	Belgium
7	Germany	France	Greece
8	Germany	France	Czech Republic
9	Germany	France	Portugal
10	Germany	France	Hungary
11	Germany	France	Sweden
12	Germany	France	Austria
13	Germany	Italy	Spain
14	Germany	Italy	Poland
15	Germany	Italy	Romania
16	Germany	Italy	Netherlands
17	Germany	Spain	Poland
18	France	Italy	Spain
19	France	Italy	Poland

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