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Who Gains More Power in the EU after Brexit?*

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Abstract

Brexit implications are analysed in most cases from the macroeconomic, financial or legal point of view while these areas are not the only ones the economists or governments should pay attention to. In this article we focus on how Brexit influences application of the European procedures, i.e. the results of various voting scenarios in the Council of the European Union. Based on power indices we examine changes of power distribution within the European Union (EU) from the perspective of each EU Member State separately as well as potential coalitions. This analysis covers also projection of power distribution in 2030 and 2060 that takes into account population forecast prepared by the Ageing Working Group. We find that larger countries benefit from the new possible power distribution while the smaller ones lose their power. Moreover, power of coalitions built by the EU Member States, representing different groups of interests in particular voting, e.g. EU budget or enforcement of the EU rules, seems to be vulnerable to the implications of the decision of the United Kingdom to leave the EU. Brexit may influence the quality of institutional and macroeconomic policy, especially in terms of decisions on the strictness of the EU rules.

1. Introduction

The project of European integration has developed into the 'ever closer union (LSE Experts, 2016) through e.g. common currency, banking union, prospects of fiscal or political union. However, the referendum in the United Kingdom (UK), in which the citizens decided to leave the European Union (EU), is a sign of a countertrend we can also observe nowadays in other countries. This decision involves legal, political and economic consequences for both the UK and the EU. In this paper we do not aim at providing an analysis of the post-Brexit scenarios but instead we focus on what the EU will look like without the UK in the context of voting procedures and power distribution. The UK is one of the largest and most populated economies of the EU and its leave changes the power of other Member States. Small countries do not have much power in voting but could be decisive in some coalitions. If a large country, like the UK, leaves the EU the number of such opportunities diminishes and thus they may relatively lose power. We concentrate on the voting procedures in the Council of the European Union (the Council) which is one of the key decision-making bodies of the EU. From 1 November 2014 a new rule for qualified majority voting (which is the most widely used voting method in the Council – 80% of all EU legislation is adopted with this procedure) has been

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implemented, but until 31 March 2017 Member States can still request to use the previous rule where the number of votes each Member State had roughly reflected the population size. In this analysis we take into account only the new procedure, because after Brexit the request of using the previous rule will be no longer available. Under the new procedure, each Member State has one vote only and the qualified majority thresholds differ depending on the origin of the legal act. In order to avoid discussion on potential changes in the Treaties, we assume that after Brexit the voting procedure will remain unchanged.

The aim of this analysis is to verify how Brexit will influence the power distribution in the Council, which countries will gain more power and which ones will lose. Moreover, we will investigate how the change in power distribution affects not only the decision process, but also the possibility of blocking the proposals. We analyse the power distribution in the Council among all Member States individually as well as potential coalitions representing similar views on selected issues, i.e. enforcement of the EU rules, EU budget, macroeconomic imbalances, common currency area, share of foreign and domestic capital in the banking sector. The analysis of these coalitions' voting power is crucial from the perspective of institutional and macroeconomic policy of the EU.

Voting power is measured by power index according to Banzhaf' approach even though the Shapley-Shubik Index is commonly used in the literature (Kóczy, 2012; Felsenthal and Machover, 1998). In our analysis the use of the Normalised Banzhaf Index seems to be more reasonable due to the assumption according to which the outcomes of votes are expressed as combinations rather than orderings. This measure presents the extent to which every player can influence the outcome, assuming that all players vote independently and voting in favour or against is equally probable. Besides, Normalised Banzhaf Index is also more convenient in terms of the results interpretation, because it shows the number of swings of each player as a proportion to the total number of swings for all players and sums up to unity. However, to make this analysis more comprehensive, we conducted a sensitivity analysis of our results. We calculated Shapley-Shubik Index for all analysed cases which confirmed the initial conclusions in terms of qualitative trends in power distribution changes after Brexit.

Having in mind the importance of demographic trends, we also take into account the population forecasts for 2030 and 2060, which let us draw conclusions on Brexit consequences in the long term.

This paper is structured as follows. Section 2 defines the power indices and discusses the voting methods. Section 3 presents the results and their interpretation while Section 4 concludes.

2. Methodology and Voting Procedures

2.1 Voting Power Measures

Voting power may be interpreted in several ways (Felsenthal and Machover, 1998). The most popular definition concerns the ability of a collective body to decide by voting if the proposal is adopted. Each assembly can use different decision rules or use many of them for voting on particular resolutions. The voting power of each player (member of the decision body) is not necessarily equal to the number or share of the votes and depends also on the power distribution of other players.

In this analysis we used the approach of weighted majority games which belong to the class of cooperative games (Matsui T and Matsui Y, 2000). Let $N = \{1, 2, \dots, n\}$ be a set of players. A subset of players is called a coalition. A weighted majority same G is defined as $G = [q;\ w_1,\ w_2, \dots, w_n]$, where q and w_i are non-negative integers, w_i represents a number of votes or a weight of player i while q describes the threshold (or quota) necessary for a coalition to win. We also assume that $\sum_{i=1}^{n} w_i\ < q \leq \sum_{i=1}^{n} w_i$.

A coalition S is called a winning coalition when the inequality $\sum_{i \in S} w_i\ \geq q$ holds. The family of all the winning coalitions is denoted by $W(G)$, or W in the case of no ambiguity. If a coalition S is not a winning one, it is called a losing coalition. A minimal coalition in the family of winning coalitions is called a minimal winning coalition. For any family of coalitions $F \subseteq 2^N$, we denote the family of minimal coalitions in F by $minF$. Therefore, $minW$ represents the family of minimal winning coalitions. For any player i, the family of all the winning coalitions including i is denoted by W_+^i while the family of all the winning coalitions excluding i is denoted by W_-^i. So, for any coalition $S \in W_-^i$, the coalition $S \cup \{i\}$ is winning and in result the inequality $|W_-^i|\ \leq |W_+^i|$ holds. Given a weighted majority game G defined on the set of players N, the characteristic functions $v_G \colon 2^N \to \{0, 1\}$ is defined as

$$v_G = \begin{cases} 1 & (S \in W), \\ 0 & (S \notin W). \end{cases} \tag{1}$$

In the case of no ambiguity we denote the characteristic function by v. For any set S and a singleton $\{e\}$, we denote $S \cup \{e\}$ by $S + e$ and $S \setminus \{e\}$ by $S - e$. For any set S, both $|S|$ and $\#S$ denote the cardinality of S.

A power index represents an expected share of decision power of the players, expressed as the ability to contribute to building a winning coalition. We shall denote by $\pi_i(q, w)$ the share of power that index π assigns to the i-th player with weight w and quota q. This share is called a power index of the i-th player. The power index describes the relative influence of each player on the decision as an opportunity to use his vote to change the losing coalition into the winning one. It can also express the number of such configurations as a proportion of all possible voting outcomes that are random and equally possible.

The differences in approach to decisive players may obviously imply various interpretations of the outcomes. In this paper we use Banzhaf Index (Banzhaf, 1965) (BZ). A pair of coalitions $(S + i, S)$ is called a swing for player i, if $S + i$ is winning and $S \subseteq N - i$ is losing. The number of swings of player i is called (raw) Banzhaf

Index of player i. If we assign probability $\frac{1}{2^{n-1}}$ to each coalition $S \subseteq N - i$, the swing probability

$$\pi_i^{BZ} = \left(\frac{1}{2^{n-1}}\right) \#\{ S \subseteq N - i : S + i \in W, S \notin W\} \\ = \left(\frac{1}{2^{n-1}}\right) \sum \{v(S + i) - v(S) : S \subseteq N - i\} \quad (2)$$

is called Banzhaf Index of player i (π_i^{BZ}). For the sake of results interpretation we used the normalized Banzhaf Index (relative to other players) which presents number of swings of each player as a proportion of the total number of swings for all players and sums up to unity.

As a sensitivity analysis, we also calculated the Shapley-Shubik Index which assigns to each player of the coalition the power share proportional to the number of permutations in which the given player is pivotal. Let $\sigma = (\sigma_1, \sigma_2, \dots, \sigma_n)$ be a permutations defined on the set of players N. Player σ_1 is the pivot of the permutation σ, if $\{\sigma_1, \sigma_2, \dots, \sigma_{i-1}\}$ is a losing coalition and $\{\sigma_1, \sigma_2, \dots, \sigma_{i-1}, \sigma_i\}$ is a winning coalition. Assuming that all the permutations are equally likely with the probability $1/n!$, the pivot probability

$$\pi_i^{SS} = \left(\frac{1}{n!}\right) \sum \{(|S| - 1)!\,(n - |S|)! : S \in W, S - i \notin W\} \quad (3)$$

is the Shapley-Shubik Index of player i (π_i^{SS}).

The values of both indices, due to different assumptions, are rarely identical. The interpretation of the results would be also different. Banzhaf Index is preferable for our analysis, because the assumption according to which the outcomes of votes are expressed as combinations rather than orderings seems to be more appropriate in this case (Leech, 2002). It also implies that the least likely outcomes have the highest weights (the largest and the smallest coalitions dominate).

However, the sensitivity analysis based on Shapley-Shubik Index (calculated in Mathematica (Tannenbaum, 1997) confirms the conclusions formulated on the basis of Banzhaf Index. The values of the two indices differ, but the pattern of observed changes in power distribution after Brexit is identical.

The values of Banzhaf Index are calculated, with the use of IOP 2.0 (Bräuninger and König, 2005) and algorithm for voting power analysis (Leech, 2002), on the basis of data on population size of the EU Member States (2015) from Eurostat and population forecasts from the AWG Report (European Commission, 2016). We analyse changes in power distribution in 2030 and 2060 because those years are presented in the literature as benchmarks for demographic changes.

2.2 Voting Procedures

In this paper we take into account the qualified majority voting procedure which is the most widely used method in the Council. After Brexit the request to use the previous procedure, in which the number of votes reflected roughly the

population size, will be no longer available so it is not justified to analyse it in this context. Under the new procedure each Member State has one vote only and if the Council acts on a proposal from the Commission or from the High Representative of the Union for Foreign Affairs and Security Policy, the qualified majority is reached if 55% of Member States vote in favor (16 out of 28 or 15 out of 27) and the proposal is supported by the MS representing at least 65% of the total EU population. Currently and after Brexit (according to the AWG population forecasts) the blocking minority must include at least 4 Council members representing more than 35% of the EU population.[2] When not all Council members participate in the vote, for example due to an opt-out in certain policy areas, a decision is adopted if 55% of the participating Council members, representing at least 65% of the population of the participating Member States, vote in favour. When the Council votes on a proposal not coming from the Commission or the High Representative, a decision is adopted if at least 72% of Council members vote in favour (21 out of 28 or 20 out of 27) and they represent at least 65% of the EU population.

3. Main Results

The aim of this analysis is to check how Brexit will influence the power distribution in the Council, which countries will gain more power and which ones will lose, if any. Another rationale behind this analysis is whether the new power distribution will affect the power of certain coalitions or lead to creation of the new ones. The coalitions we analysed are based on clustering stemming from the Treaties (e.g. euro area vs. non-euro) or representing particular interests the Member States formulate in selected issues such as enforcement of the EU rules. The values of Normalised Banzhaf Index present the number of swings (which turn the coalition into the winning configuration) of each player as a proportion of the total number of swings for all players.

3.1 Individual Results

Case 1: Council acts on a proposal from the Commission or from the High Representative of the Union for Foreign Affairs and Security Policy.

In 2015 UK was the third most powerful Member State after Germany and France. If Brexit had happened in 2015 Italy would have replaced UK in this listing. Most countries would have gained power after Brexit with the exception of Lithuania, Slovenia, Latvia, Estonia, Cyprus, Luxembourg and Malta. Small countries do not have much power in voting but could be decisive players in some coalitions. If a large country, like UK, leaves the UE the number of such opportunities diminish and thus they relatively lose power. The dominating role in the power distribution would have belonged to Germany, France, Italy, Spain and Poland which, like other larger Member States, benefit from Brexit in this context. The highest relative increase in power takes place in the case of Poland and Spain which gain approx. 29% and 23% respectively. Therefore, Spain would have become the fourth power and Poland the fifth one in the EU. Since the difference in power

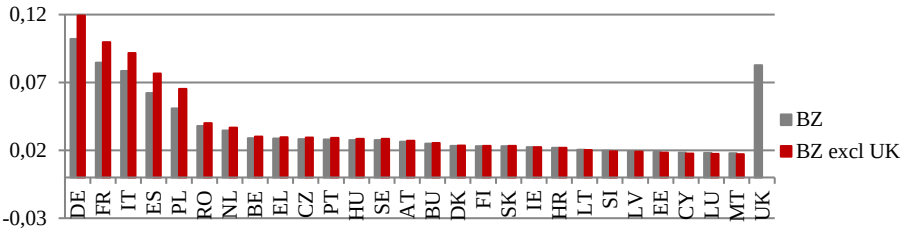
[2] A blocking minority must include at least the minimum number of Council members representing more than 35 % of the population of the participating Member States, plus one member, failing which the qualified majority shall be deemed attained (Treaty of Lisbon, Article 205 par. 3(a))

share between the first five countries and the next ones is significant (over 2 p.p.), the first five powers stand out as the most influential Member States in the decision process while the small countries (e.g. Malta, Luxembourg or Cyprus) will have even less power than currently. Similar results have been presented in the last publications on Brexit influence on power distribution in the Council (Kóczy, 2016; Macháček and Hrtúsová, 2016).

We analyse changes in power distribution in 2030 and 2060, because these years are presented in the literature as benchmarks for demographic changes. Within this period countries like France, Italy or Belgium are expected to grow in terms of population while Germany will become less populated (European Commission, 2014). However, it is worth mentioning that these forecasts do not include consequences of the migration crisis we can observe currently in Europe. Therefore, updated projections may influence the long-term outcome.

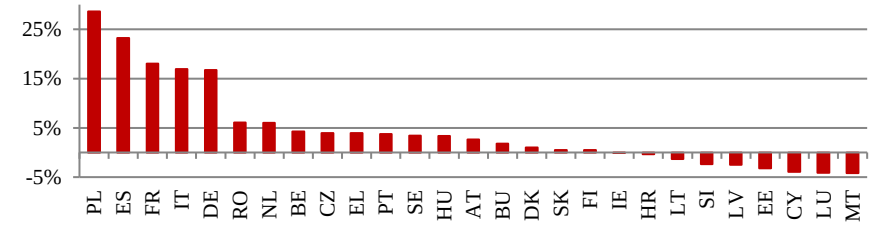
In 2030 and 2060 there is not much difference in the results apart from slight reconfiguration of countries that lose power after Brexit, compared to 2015. In 2030 Austria joins this group and in 2060 - Slovakia. Therefore, the Brexit consequences for power distribution seem to be persistent. The decision process will be more influenced by the New Member States (e.g. Poland) than it used to be so far.

Figure 1 Power Distribution Before and After Brexit (Normalised Banzhaf Index-BZ), Case 1, 2015



Source: Author's calculations (algorithm for voting power analysis, Leech 2002a).

Figure 2 Relative Change in Power Share After Brexit, Case 1, 2015

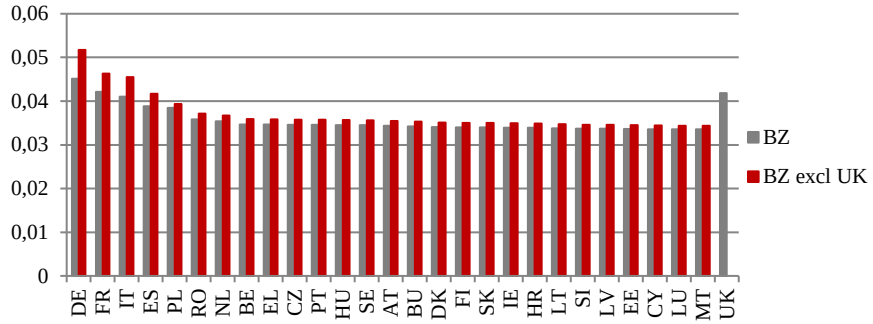


Source: Author's calculations (algorithm for voting power analysis, Leech 2002a).

Case 2: When the Council votes on a proposal not coming from the Commission or the High Representative a decision is adopted if at least 72% of Council members vote in favour (21 out of 28 or 20 out of 27) and they represent at least 65% of the EU population.UK was the third most powerful country in the EU in 2015. In 2030 and 2060 UK would be the second power due to demographic trends,

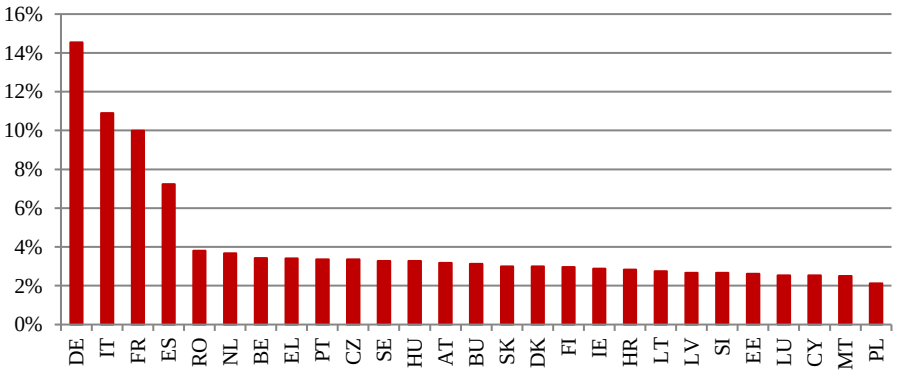
if remained in the EU. The power indices for all EU Member States would increase after Brexit under this voting method. The group of first five most powerful countries would be identical as in the Case 1, i.e. Germany, France, Italy, Spain and Poland. The difference in power share across all Member States would not be however as high as in the previously presented voting procedure. The largest improvement of power share would be noticed for Germany, Italy, France and Spain which are the largest countries in the EU. In this scenario there are no losers - even small countries gain power. The differences in power share between Member States are not as large as in the previous case because under this voting procedure, the required number of countries voting in favour of a proposal is significantly higher.

Figure 3 Power Distribution Before and After Brexit (Normalised Banzhaf Index-BZ), Case 2, 2015



Source: Author's calculations (algorithm for voting power analysis, Leech 2002a).

Figure 4 Relative Change in Power Share After Brexit, Case 2, 2015



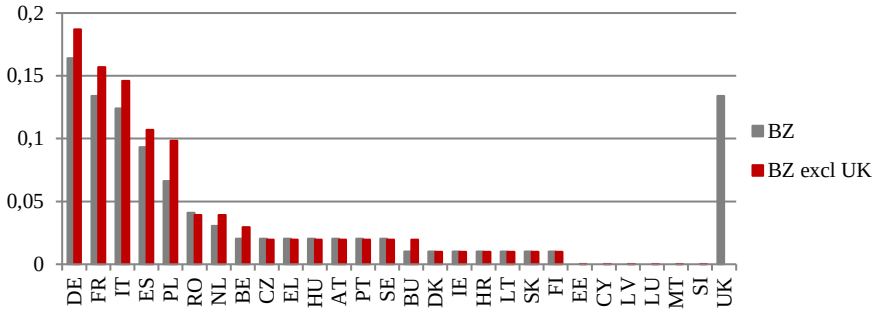
Source: Author's calculations (algorithm for voting power analysis, Leech 2002a).

Case 3: Constitution of blocking minority.

In the case when Member States aim to create a blocking minority, Brexit influences negatively the power share of small countries and increases this share for larger countries. UK was together with France the second power in terms of

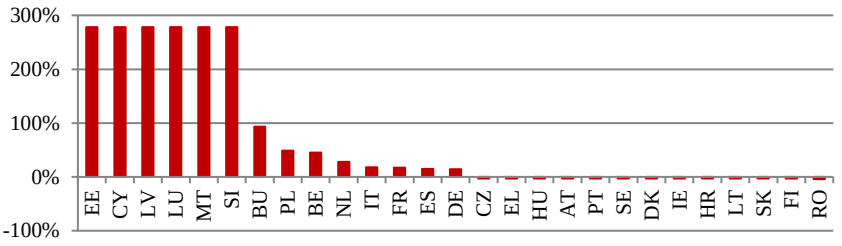
capability to build a blocking minority in 2015. The same conclusion would hold for 2030 if UK remained in the EU, while in 2060 UK would be the most powerful country in this respect. Based on population forecasts for 2030 and 2060 most countries would gain power resulting from Brexit. In 2015 Germany, France, Italy, Spain and Poland would have the largest power shares while the largest relative increase in power would be assigned to Estonia, Cyprus, Latvia, Lithuania, Malta and Slovenia. Regardless of the large power share increases in relatively small countries, they will still face problems with building the blocking minority and will not be decisive in forming this kind of coalition.

Figure 5 Power Distribution Before and After Brexit (Normalised Banzhaf Index-BZ), Case 3, 2015



Source: Author's calculations (algorithm for voting power analysis, Leech 2002a).

Figure 6 Relative Change in Power Share After Brexit, Case 3 2015



Source: Author's calculations (algorithm for voting power analysis, Leech 2002a).

3.2 Results for Coalitions

We analysed the impact of Brexit on the effectiveness of coalitions that may be built (or already exist) among the Council members. In this subchapter we analyse coalitions which could be built in 2015 without taking into account the demographic changes, because the presented clusters of countries are not constant in time and the forecast of future coalitions based on contribution to the EU budget or persistence of macroeconomic imbalances could be controversial and far from obvious. Thus, we took into account the following coalitions:

- Euro vs. non-euro.

- Home countries (BE, BU, CZ, EE, IE, HR, CY, LT, LV, LU, HU, MT, PL, RO, SI, SK, FI) vs. host countries (DK, DE, EL, ES, FR, IT, NL, AT, PT, SE, UK).

- Countries with no imbalances (CZ, DK, LV, LT, LU, MT, PL, SK, AT, BE, EE, HU, RO, UK) vs. countries with diagnosed imbalances (FI, DE, IE, NL, SI, ES, SE) vs. countries with identified excessive imbalances (BU, HR, CY, FR, IT, PT, EL)

- Net payers (BE, DK, DE, FR, IT, LU, NL, AT, FI, SE, UK) vs. net beneficiaries (BU, CZ, EE, IE, EL, ES, HR, CY, LV, LT, HU, MT, PL, PT, RO, SI, SK).

- Enthusiasts of the EU rules (BU, CZ, DK, DE, EE, LV, LU, NL, AT, FI, SE) vs. moderate supporters (BE, IE, IT, CY, LT, MT, RO, SI, SK) vs. sceptics of the EU rules (EL, ES, FR, HR, HU, PL, PT, UK).

Euro area Member States would be able to adopt any proposal regardless of Brexit. Moreover, if the UK, as a non-euro country, would leave the EU, the values of Banzhaf Index would remain unchanged, so the power distribution would be identical. However, Brexit will influence the ability of non-euro countries to build a blocking minority. So far, the population size of this group was close to the required level for forming a blocking minority (approx. 1.5% of the EU population more was needed) so if another small country joined this group, the blocking minority could be easily constituted. Brexit significantly decreases the power share of this group and blocking any proposal seems to be challenging, because the coalition would have to attract much more other countries to join. This scenario is not too likely since the euro area members represent common interests and often vote alike.

Table 1 Values of Banzhaf Index for the Coalition Euro vs. Non-Euro

Banzhaf Index (2015)	***Case 1***		***Case 2***		***Case 3***	
	Bremain	*Brexit*	*Bremain*	*Brexit*	*Bremain*	*Brexit*
Euro	1	1	1	1	1	1
Non-euro	0	0	0	0	0	0

Source: Author's calculations (IOP 2.0**)**.

The coalitions of home and host countries were formed based on the share of domestic and foreign capital in the banking sector. In host countries more than 50% of capital comes from abroad and respectively home countries report over 50% of domestic capital in the banking sector. Under two voting procedures (Case 1 and Case 2) none of the coalition can adopt any proposal itself, but home countries can easily constitute a blocking minority both before and after Brexit. The values of Banzhaf Index, however, are not affected by Brexit which indicates no change in the power distribution. These results may suggest no significant differences after Brexit in voting proposals on the financial sector regulations.

Table 2 Values of Banzhaf Index for the Coalition Home vs. Host

Banzhaf Index (2015)	*Case 1*		*Case 2*		*Case 3*	
	Bremain	*Brexit*	*Bremain*	*Brexit*	*Bremain*	*Brexit*
Home	0.5	0.5	0.5	0.5	1	1
Host	0.5	0.5	0.5	0.5	0	0

Source: Author's calculations (IOP 2.0**)**.

The third classification is based on macroeconomic soundness described as a lack or persistence of macroeconomic imbalances according to the Macroeconomic Imbalance Procedure MIP (European Commission, 2016) (MIP). In the last round of European Semester, MIP was not performed for Greece due to the stability support programme. However, we included Greece in the group of countries with excessive imbalances, because, in our opinion, the reasons for being under the support programme may be perceived as excessive macroeconomic imbalances. The analysis indicates that none of the presented group can make any decision itself under any voting procedure before or after Brexit, if it had taken place in 2015. The power distribution, however, changes in favour of countries with imbalances and excessive imbalances which gain power under all three voting methods. The Banzhaf Index values decrease for countries with no imbalances by at least 50%, indicating the voting power loss. The change in power distribution may have consequences for the future macroeconomic policy of the EU and its economic soundness. Countries suffering from macroeconomic imbalances might not be willing to vote in favour of any regulations imposing additional sanctions for lack of implementation of structural reforms aiming at maintaining the macroeconomic stability or decisions on imposing sanctions under the MIP.

Table 3 Values of Banzhaf Index for the Coalitions Formed on the Basis of Persistence of the Macroeconomic Imbalances

Banzhaf Index (2015)	*Case 1*		*Case 2*		*Case 3*	
	Bremain	*Brexit*	*Bremain*	*Brexit*	*Bremain*	*Brexit*
No imbalances	0.6	0.33	0.6	0.33	0.6	0
Imbalances	0.2	0.33	0.2	0.33	0.2	0.5
Exc. imbalances	0.2	0.33	0.2	0.33	0.2	0.5

Notes: Numbers in italics indicate a change in the value of Banzhaf Index after Brexit.
Source: Author's calculations (IOP 2.0**)**.

Analysis of the coalitions formed based on the positive or negative net contribution to the EU budget in 2015 shows that none of the voting configuration can adopt any proposal, but net payers can constitute a blocking minority. Brexit does not lead to any changes in power distribution in two voting procedures. However, since the UK is a net payer, after Brexit the coalition of beneficiaries gains more power in terms of forming a blocking minority, but the group of payers remains strong, therefore both coalitions can block any decision. This result may lead to a change in the decision process concerning the EU budget, especially the EU funds. Beneficiaries can block a proposal of the EU funds allocation which was previously not possible. This conclusion is vital in the context of current discussions on the future European funds perspective and how they should be allocated among the Member States.

Table 4 Values of Banzhaf Index for the Coalitions Formed on the Contribution to the EU Budget

Banzhaf Index (2015)	*Case 1*		*Case 2*		*Case 3*	
	Bremain	*Brexit*	*Bremain*	*Brexit*	*Bremain*	*Brexit*
Payers	0.5	0.5	0.5	0.5	*1*	*0.5*
Beneficiaries	0.5	0.5	0.5	0.5	*0*	*0.5*

Notes: Numbers in italics indicate a change in the value of Banzhaf Index after Brexit.
Source: Author's calculations (IOP 2.0**)**.

The last classification is formed on the basis of the approach to the enforcement of the EU procedures. We investigated for how many years each Member State's deficit has surpassed the threshold of 3% since the last big EU enlargement (2004). Countries for which the deficit was greater than 3% for max. 4 years constitute a coalition with restrictive approach to procedures enforcement (enthusiasts), because, in our opinion, short period of excessive deficit could be a result of economic adjustments to the last crisis. If the deficit had surpassed the required level for 5-7 years, then these countries belong to the configuration with moderately restrictive attitude to the EU rules (moderate supporters). The remaining Member States which reported large deficits for at least 8 years are perceived as a coalition with flexible attitude to the procedures enforcement (sceptics). The analysis' results point out that none of the group can adopt any regulation itself but sceptics could constitute a blocking minority. Brexit does not influence the power distribution but the enthusiasts of the EU rules report then a higher share of population and could easier attract any other Member State to form a blocking minority (approx. 1.5 % of the EU population is needed). In Case 1, which is the most common voting procedure, sceptics play the crucial rule, which may influence the decisions on the strictness of the EU rules, e.g. imposing sanctions on a country under the Excessive Deficit Procedure (EDP).

Table 5 Values of Banzhaf Index for the Coalitions Reflecting the Attitude to the Enforcement of the EU Rules

Banzhaf Index (2015)	*Case 1*		*Case 2*		*Case 3*	
	Bremain	*Brexit*	*Bremain*	*Brexit*	*Bremain*	*Brexit*
Enthusiasts	0.2	0.2	0.33	0.33	0.2	0.2
Mod. supporters	0.2	0.2	0.33	0.33	0.2	0.2
Sceptics	0.6	0.6	0.33	0.33	0.6	0.6

Source: Author's calculations (IOP 2.0**)**.

4. Conclusions

Brexit will influence the European politics, economy as well as position and power of particular Member States within the EU. In this paper we analysed what impact Brexit will have on power distribution in the Council of the EU assuming that no changes in the voting methods will be implemented after Brexit.

Based on the calculation of Banzhaf Index we find that Brexit will lead to a change in power distribution among the Council members. Large countries will gain more power in all three analysed years: 2015, 2030 and 2060. The greatest power shares will belong to Germany, France, Italy, Spain and Poland which will report the sharpest increase in the power share which would amount to approx. 29% if Britain had left the EU in 2015. After Brexit the number of coalitions which small countries

could turn into the winning ones will decrease, therefore the smallest countries will relatively lose power. In 2030 and 2060 there is not much difference in the results apart from slight reconfiguration of countries that lose power after Brexit, compared to 2015. In 2030 Austria joins this group and in 2060 - Slovakia.

Besides, Brexit will also influence the power distribution among coalitions the Member States could create. These changes may have an impact on the EU policy. Euro area Member States would adopt any proposal regardless of Brexit. However, Brexit will influence the ability of non-euro countries to build a blocking minority. So far, the population size of this group was close to the required threshold for forming a blocking minority (approx. 1.5% of the EU population more was needed), so if another small country joined this group, the blocking minority could be easily constituted. Brexit significantly decreases the power share of this group and blocking any proposal seems to be challenging, because the coalition would have to attract much more other countries to join. It clearly indicates the negative impact of Brexit on the position and power of countries with derogation.

In the context of macroeconomic stability, Brexit leads to a decrease in power share for countries with no imbalances. The change may imply that countries suffering from macroeconomic imbalances might not be willing to vote in favour of any regulations imposing additional sanctions for lack of implementation of structural reforms aiming at maintaining the macroeconomic sustainability or decisions on imposing sanctions under the MIP.

Moreover, Brexit will lead to a change in power distribution among coalitions of net payers and net beneficiaries. Since the UK is a net payer, after Brexit the coalition of beneficiaries gain more power in terms of forming a blocking minority but the group of payers remains strong, therefore both coalitions can block any decision. This result may lead to a change in the decision process concerning the EU budget, especially the EU funds. Beneficiaries will be able block a proposal of the EU funds allocation which was previously not possible.

Finally, taking into account the coalitions formed on the basis of the approach to the enforcement of the EU procedures, the power distribution clearly shows that sceptics have a dominating role but they cannot adopt any decision itself and it does not change after Brexit. Since sceptics have the highest share of power, it may influence the decisions on the strictness of the EU rules, e.g. imposing sanctions on a country under the EDP.

The sensitivity analysis including Shapley-Shubik Index calculated for all the above presented scenarios confirmed the results obtained on the basis of Banzhaf Index. Brexit significantly influences the decision process in the EU so its consequences for the voting procedures should be included in the cost and benefit analysis of Brexit.

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APPENDIX:

Table 6 Voting Power Before and After Brexit (Normalised Banzhaf Index-BZ), Case 1

Banzhaf	***2015***		***2030***		***2060***	
Index	*Bremain*	*Brexit*	*Bremain*	*Brexit*	*Bremain*	*Brexit*
BE	0.02896	0.03019	0.03029	0.03195	0.03208	0.03508
BU	0.02489	0.02533	0.0241	0.02445	0.02326	0.02336
CZ	0.02824	0.02936	0.02826	0.02951	0.02827	0.03004
DK	0.02328	0.02351	0.02371	0.02398	0.02416	0.02456
DE	0.10214	0.11924	0.09751	0.1157	0.08652	0.10428
EE	0.01887	0.01827	0.01895	0.01815	0.01929	0.01806
IE	0.02225	0.02223	0.02226	0.0222	0.02308	0.02312
EL	0.0286	0.02972	0.02758	0.02869	0.02604	0.02706
ES	0.06209	0.07651	0.05878	0.07433	0.06128	0.0778
FR	0.08454	0.09978	0.08724	0.10328	0.09142	0.11123
HR	0.02183	0.02176	0.02177	0.0216	0.02164	0.0212
IT	0.07849	0.09175	0.08097	0.09413	0.0825	0.09774
CY	0.0184	0.01768	0.01865	0.01779	0.01929	0.01806
LV	0.01955	0.01906	0.01934	0.01863	0.01956	0.01843
LT	0.02048	0.02021	0.01992	0.01934	0.01992	0.01891
LU	0.01808	0.01734	0.01855	0.01767	0.01929	0.01806
HU	0.02757	0.0285	0.02719	0.02822	0.02658	0.02778
MT	0.01793	0.01718	0.01826	0.01732	0.01874	0.01734
NL	0.03471	0.03679	0.03484	0.03728	0.03358	0.03701
AT	0.02628	0.02697	0.02861	0.02775	0.02703	0.02838
PL	0.05077	0.0653	0.04941	0.0652	0.04446	0.06055
PT	0.02809	0.02914	0.02729	0.02834	0.02569	0.02659
RO	0.03785	0.04014	0.03626	0.03876	0.03385	0.03735
SI	0.01965	0.01918	0.01982	0.01923	0.02011	0.01915
SK	0.02307	0.02319	0.02294	0.02303	0.02245	0.02228
FI	0.02313	0.02325	0.02352	0.02374	0.02389	0.0242
SE	0.02747	0.02841	0.02845	0.02974	0.03005	0.0324
UK	0.0828	-	0.08735	-	0.09595	-

Source: Author's calculations (algorithm for voting power analysis, Leech 2002a).

Table 7 Voting Power Before and After Brexit (Normalised Banzhaf Index-BZ), Case 2

Banzhaf	***2015***		***2030***		***2060***	
Index	*Bremain*	*Brexit*	*Bremain*	*Brexit*	*Bremain*	*Brexit*
BE	0.03468	0.03587	0.0349	0.03604	0.03208	0.03508
BU	0.03421	0.03528	0.03412	0.03518	0.02326	0.02336
CZ	0.0346	0.03576	0.03463	0.03575	0.02827	0.03004
DK	0,03405	0,03507	0,03407	0,03512	0,02416	0,02456
DE	0.04516	0.05173	0.04465	0.05047	0.08652	0.10428
EE	0.0336	0.03448	0.03354	0.03451	0.01929	0.01806
IE	0.03394	0.03492	0.0339	0.03493	0.02308	0.02312
EL	0.03463	0.03581	0.03455	0.03566	0.02604	0.02706
ES	0.03884	0.04165	0.03833	0.04093	0.06128	0.0778
FR	0.04211	0.04632	0.04259	0.04749	0.09142	0.11123
HR	0.0339	0.03486	0.03384	0.03486	0.02164	0.0212
IT	0.04103	0.0455	0.04125	0.0465	0.0825	0.09774
CY	0.03356	0.03441	0.03351	0.03447	0.01929	0.01806
LV	0.03367	0.03457	0.03358	0.03456	0.01956	0.01843
LT	0.03376	0.03469	0.03364	0.03463	0.01992	0.01891
LU	0.03353	0.03438	0.0335	0.03446	0.01929	0.01806
HU	0.03452	0.03565	0.0345	0.0356	0.02658	0.02778
MT	0.03352	0.03436	0.03347	0.03443	0.01874	0.01734
NL	0.03541	0.03671	0.03558	0.03674	0.03358	0.03701
AT	0.03437	0.03546	0.03445	0.03555	0.02703	0.02838
PL	0.03849	0.03931	0.03822	0.03901	0.04446	0.06055
PT	0.03458	0.03574	0.03451	0.03562	0.02569	0.02659
RO	0.0358	0.03716	0.0358	0.03698	0.03385	0.03735
SI	0.03368	0.03458	0.03363	0.03462	0.02011	0.01915
SK	0.03402	0.03504	0.03397	0.03502	0.02245	0.02228
FI	0.03403	0.03504	0.03404	0.03509	0.02389	0.0242
SE	0.03451	0.03564	0.03466	0.03578	0.03005	0.0324
UK	0.04181	-	0.04261	-	0.09595	-

Source: Author's calculations (algorithm for voting power analysis, Leech 2002a).

Table 8 Voting Power Before and After Brexit (Normalised Banzhaf Index-BZ), Case 3

Banzhaf	***2015***		***2030***		***2060***	
Index	*Bremain*	*Brexit*	*Bremain*	*Brexit*	*Bremain*	*Brexit*
BE	0.0203	0.0295	0.0203	0.0306	0.0292	0.0309
BU	0.0102	0.0197	0.0102	0.0102	0.00977	0.0103
CZ	0.0203	0.0197	0.0203	0.0204	0.0195	0.0309
DK	0.0102	0.00989	0.0102	0.0102	0.00977	0.0103
DE	0.164	0.187	0.164	0.192	0.144	0.166
EE	0.000000049	0.000000185	0.000000049	0.000000221	0.000000055	0.000000196
IE	0.0102	0.00989	0.0102	0.0102	0.00977	0.0103
EL	0.0203	0.0197	0.0203	0.0204	0.0195	0.0206
ES	0.0932	0.107	0.0932	0.109	0.098	0.106
FR	0.134	0.157	0.134	0.17	0.144	0.177
HR	0.0102	0.00989	0.0102	0.0102	0.00977	0.0103
IT	0.124	0.146	0.124	0.146	0.134	0.155
CY	0.0000000489	0.0000001850	0.0000000489	0.000000221	0.0000000549	0.000000196
LV	0.0000000489	0.0000001850	0.0000000489	0.000000221	0.0000000549	0.000000196
LT	0.0102	0.00989	0.0102	0.000000221	0.0000000549	0.000000196
LU	0.0000000489	0.000000185	0.0000000489	0.000000221	0.0000000549	0.000000196
HU	0.0203	0.0197	0.0203	0.0204	0.0195	0.0206
MT	0.0000000489	0.000000185	0.0000000489	0.000000221	0.0000000549	0.000000196
NL	0.0305	0.0391	0.0305	0.0407	0.0292	0.0412
AT	0.0203	0.0197	0.0203	0.0204	0.0195	0.0206
PL	0.0661	0.0983	0.0661	0.0872	0.0552	0.0765
PT	0.0203	0.0197	0.0203	0.0204	0.0195	0.0206
RO	0.0409	0.0391	0.0409	0.0407	0.0292	0.0412
SI	0.0000000489	0.000000185	0.0000000489	0.000000221	0.0000000549	0.000000196
SK	0.0102	0.00989	0.0102	0.0102	0.00977	0.0103
FI	0.0102	0.00989	0.0102	0.0102	0.00977	0.0103
SE	0.0203	0.0197	0.0203	0.0204	0.0292	0.0309
UK	0.134	-	0.134	-	0.153	-

Source: Author's calculations (algorithm for voting power analysis, Leech 2002a).