Strategic vs. Non-strategic Voting Power in the EU Council of Ministers: The Consultation Procedure*

Stefan Napel** and Mika Widgrén†

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Abstract

This paper evaluates the distribution of power within the Council of the European Union from the a priori perspective of constitutional design using two distinct approaches: (1) applying traditional voting power indices; (2) carrying out strategic equilibrium analysis of the EU's *consultation procedure*. It clarifies why both approaches lead to different power indications, and investigates the determinants of the differences' magnitudes. Depending on one's assumptions about behavior of the consultation procedure's agenda setter, the European Commission, traditional indices turn out to deliver a good approximation also of relative strategic power in the Council.

Keywords: Voting power, spatial voting, agenda setting, Council of Ministers, European Commission

JEL codes: C70, D71, H77

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**PCRC and Department of Economics, University of Bayreuth, Universitätsstr. 30, 95447 Bayreuth, Germany; e-mail: stefan.napel@uni-bayreuth.de

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1 Introduction

National voting weights in the Council of the European Union and the implied influence on EU legislation have received great attention from academics, politicians and the general public. The topic has stimulated lively debate – normative, positive, and methodological. Numerous studies have employed *voting power indices* in the tradition of Penrose (1946), Shapley and Shubik (1954), and Banzhaf (1965) in order to link the Amsterdam, Nice, or Lisbon Treaties' formal rules of decision making to the associated individual a priori influence on EU policy outcomes.[1] Power indices allow a more informed evaluation of who gains and loses from treaty reforms because they clearly distinguish between voting *weights* and voting *power*. It is often overlooked, however, that these indices are defined for so-called *simple games* with only two policy alternatives; they boil down to a non-strategic combinatorial analysis of countries' possibilities to form winning coalitions. Moreover, almost all studies of the distribution of power in the Council of the European Union, also known as the Council of Ministers (CM), neglect an important fact: weighted voting only applies to legislation on which the European Commission (EC) or the European Parliament also have a say. The Council needs to interact and negotiate with these institutions.

The narrow focus and high level of abstraction in most investigations of the distribution of voting power in the EU are presumably due to the relative ease with which traditional indices can be computed. Furthermore, the studies are usually motivated by EU enlargements or institutional reforms that have mostly affected decision making inside CM. One can conjecture that it is harmless to leave out the other EU institutions in ceteris paribus analysis. Still, sharp criticism has been raised against the inference of countries' voting weight-related power from a purely combinatorial exercise, particularly by political scientists who are used to analyzing EU decision making in the framework of spatial voting (e.g., Steunenberg et al. 1999; Garrett and Tsebelis 1999; Garrett and Tsebelis 2001). Statistically independent 'yes'-or-'no' votes on supposedly exogenous proposals are at the heart of traditional power indices. The critiques' fundamental point is that strategic interaction renders independence more than just a pragmatic simplification, but risks distorting the facts of the matter.

The spatial voting framework can explicitly take preferences, the inter-institutional context, and strategic behavior of policy makers into account. But rigorous quantitative analysis of power relations within this framework – and especially regarding the distribution of power inside CM with the a priori perspective of constitutional design – is still very rare. So it is difficult to say whether the more complex spatial and strategic methodology espoused, for instance, by Garrett and Tsebelis but also Napel and Widgrén (2004; 2005) actually pro-

[1]For representative examples see, e.g., Widgrén (1994), Laruelle and Widgrén (1998), Felsenthal and Machover (2001; 2004), Leech (2002), Baldwin and Widgrén (2004) and the many references therein.

duces results that differ in a significant way from the findings obtained by traditional indices. The possible measurement differences have, to our knowledge, not yet been quantified and investigated very systematically.

This paper aims at filling that blank. It carries out a more comprehensive than usual power analysis of the Council of Ministers as a methodological case study. We evaluate the distribution of power at the *inter*-institutional and *intra*-institutional levels simultaneously. Even though we analyze the link between voting weights and power from the traditional a priori perspective of constitutional design (i.e., ignoring any country asymmetries apart from weight differences), all actors are considered to have spatial preferences at the decision making stage and to behave strategically. The role of the Commission as the main initiator of EU legislation is accounted for explicitly, and the procedural character of the decision making process is reflected by an extensive game form that describes the EU's *consultation procedure*. After the Lisbon Treaty has come into force, this procedure plays a much smaller role – mainly for competition law – than it used to. But its relative simplicity provides an ideal framework for investigating the effects of inter-institutional strategic interaction on intra-institutional power. It is a special case, for which the general relation between traditional indices and strategic power analysis becomes particularly transparent.

The measure that is used for assessing power under the consultation procedure picks up actors' a priori impact on the subgame perfect equilibrium policy outcome, and hence explicitly accounts for strategic interaction. In particular, we compute a variant of the *strategic measure of power* introduced in Napel and Widgrén (2004). It generalizes the fundamental ideas underlying, e.g., the Penrose-Banzhaf or Shapley-Shubik indices to non-cooperative game-theoretic models and preference-based strategic interaction. We can thus overcome the major limitations of traditional indices which were highlighted, amongst others, by Garrett and Tsebelis.

The, in our view, most closely related voting power analysis of the Council has been carried out by Passarelli and Barr (2007). They consider a spatial model of CM votes on take-it-or-leave-it proposals coming from an external player referred to as the Commission. The setup resembles the EU's consultation procedure. Their model however does not take into account all procedural possibilities – namely the Council's power to amend a proposal. Nor is it strategic: the agenda setter picks a policy from a one-dimensional convex space at random, using a probability distribution that is independent of the Council members' preferences.[2] Their key methodological contribution is a generalization of the multilinear extension of simple voting games (see Owen 1972) that is suited to study the implications of member states' policy attitudes, as inferred from Eurobarometer surveys. Passarelli and

[2] In fact, Passarelli and Barr consider four different benchmark distributions in their computations, corresponding to four different Commission 'types'.

Barr's use of historic preference data complements a literature that so far has taken an extreme a priori perspective – one which abstracts from reality-based preference information as well as from the procedural parts of formal decision rules. Our paper shares Passarelli and Barr's interest in procedural aspects of EU decision making, whilst having the rather abstract 'veil-of-ignorance'-based symmetry assumptions of constitutional analysis in common with the traditional power index literature.

We quantify the measurement biases that result from a purely intra-institutional, non-procedural and non-strategic analysis of voting power in the Council. The differences between the relative power indicated by the strategic approach and traditional indices turn out to be quite small if one assumes that the Commission's aggregate policy ideals are drawn independently from the same distribution as those of the Council members. This suggests that the arguments exchanged in a sometimes heated debate between opponents and proponents of traditional power indices are of significant conceptual but not much numerical relevance. Traditional indices can deliver a good approximation also of the procedural and strategic balance of power in the EU's most-studied institution.

This cannot be expected to hold in general, however. As a case in point, an alternative assumption about the Commission's preferences, which aligns them to the median position in CM, leads to quite substantial numerical differences between strategic and non-strategic power in relative terms. We therefore investigate the key determinants of the differences in some detail. In a nutshell, traditional indices fail to weed out those voting configurations in which the pivotal Council member's policy position has no bearing on the outcome: intra-CM swing or pivot positions are irrelevant, for example, if the Commission's agenda setting power allows it to pass its own ideal policy. Small and large Council members can be affected very differently by this possibility, which creates the reported discrepancies in relative power.

The remainder of the paper is organized as follows: Section 2 describes the relevant rules for the Council's internal decision making and its interaction with the Commission under the consultation procedure. The first benchmark of our methodological comparison, a traditional combinatorial power index analysis of CM, is introduced in Section 3. Then Section 4 investigates a stylized game-theoretic model of consultation, which serves as input for strategic power analysis. The latter is presented in Section 5. A careful comparison of the respective voting power ascriptions is carried out in Section 6, and we conclude with a discussion of our main findings in Section 7.

2 The Consultation Procedure

We first describe the Council of Ministers' qualified majority voting system. It is used in order to reach a decision whenever the Treaty on the Functioning of the European Union

(TFEU) does not require unanimity. These decisions have legislative implications only under the appropriate form of interaction with the EU's two other policy-making institutions, the European Parliament and the European Commission. The simplest such form of interaction, the consultation procedure, will be explained in Section 2.2.

2.1 CM's internal voting rule

Weighted voting with a qualified majority requirement was introduced as one of two Council decision rules in the Treaty of Rome in 1957, the other being unanimity rule. The original voting system remained essentially unchanged – with small adaptations that accommodated the European Community's increasing number of member states – until the *Treaty of Nice* came into force in November 2004. Its provisions for the internal voting rules of CM will apply at least until 2014 (cf. Treaty on European Union, Art. 16(5), and Protocol on Transitional Provisions, Art. 3).

The main ingredients of the Nice rules are national *voting weights*. They increase degressively in member states' population sizes. Twenty-nine votes are allocated to each of the four largest member states (Germany, France, UK, Italy), 27 votes to the two next-largest (Spain, Poland), etc. down to 3 votes for the smallest one (Malta). The first requirement for a proposal to be accepted by CM is that it receives at least 255 out of the 345 votes in total (73.9%). Two extra requirements have to be satisfied: the supporting votes have to be cast by at least a simple majority of member states (i.e., 14 out of 27), and, moreover, these countries have to represent 62% of the total EU population. The latter two requirements turn out to have only a negligible effect on members' possibilities to form a winning coalition (Baldwin et al. 2001; Felsenthal and Machover 2001). They affect the quantitative results of traditional as well as strategic analysis at most at the 5$^{\text{th}}$ or 6$^{\text{th}}$ decimal place.

The 27 EU member states agreed in December 2007 on the *Treaty of Lisbon* as the Nice Treaty's successor. It builds heavily on the so-called *Constitutional Treaty*, which was brought down by referenda in France and the Netherlands in Spring 2005. The Lisbon Treaty breaks with the long tradition of voting weights that increase degressively in population sizes. The prospective new system takes up only the second and third dimensions of the Nice provisions, requiring a *dual majority* in member states and population. Specifically, a proposal needs, first, the support of at least 55% of EU member states and, second, these supporters must represent at least 65% of the total EU population. Additionally, at least four 'no' votes are needed in order to block a proposal, i.e., 24 countries can jointly pass a proposal irrespectively of their aggregate population. This implies that a minority coalition of, e.g., France, Germany and UK cannot block even though it represents about 41.6% > 35% of the EU's almost 500 mio. citizens. But the rule's overall effect on countries' possibilities to form a winning or blocking coalition is negligible. It is taken into account in our computations

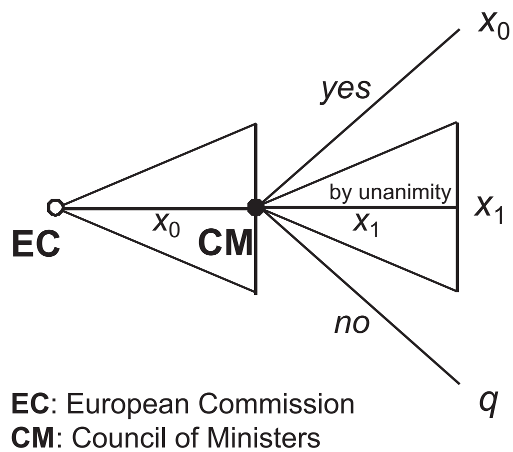

Figure 1: The sequence of moves in the consultation procedure

for reasons of principle rather than precision. Even though the Lisbon Treaty itself came into force in December 2009, its new voting rules will not apply till November 2014. There is, moreover, a transition period until April 2017 during which any Council member may request the application of the Nice rules instead of the Lisbon rules.

2.2 Interaction of CM and Commission

The *consultation procedure* was introduced already in the Treaty of Rome and for a long time remained the only way to take decisions in what is now the European Union. The Treaty of Lisbon has very much replaced its practical usage by that of the *codecision procedure* (now referred to as the *ordinary legislative procedure* – cf. TFEU, Art. 294).[3] The consultation procedure, however, is better suited for the primarily methodological purposes of this paper due to its simplicity.

The procedure can involve two different internal CM voting rules: qualified majority as described above and unanimity, depending on the issue at stake. Because a priori power is trivially the same for all CM members under unanimity rule, this paper concentrates entirely on the qualified majority version. The procedure involves interaction between Council, Commission and also the European Parliament. However, the Parliament can only deliver non-binding advisory opinions. It is therefore omitted from the subsequent analysis, i.e., it will not be treated as a player in our game-theoretic model.

Figure 1 illustrates the timing of interaction in the consultation procedure by a stylized game tree. The Commission makes the first move by submitting a legislative proposal x_0

[3]See Napel and Widgrén (2006) or Napel and Widgrén (2009) for details on the codecision procedure. It puts the Parliament on a seeming par with the Council, but strategic power analysis confirms the casual impression that CM is the dominant force behind ‘codecisions’.

to CM.[4] The Council can accept the proposal exactly in the submitted form by a qualified majority, or refuse it and thus confirm the legislative status quo q. CM may also pass an amended version x_1 of EC's proposal but, critically, this requires a unanimous Council decision. This amendment possibility is the key difference to standard take-it-or-leave-it protocols (see, e.g., Romer and Rosenthal 1979); it reduces EC's leverage from controlling the agenda. Still, because it is easier to pass the Commission's proposal x_0 than any alternative x_1, EC has *conditional agenda setting power*.[5] This matters for the inter-institutional balance of power and, less obviously, also for the distribution of power within the Council.

We will later analyze EC's scope to use its agenda setting power in the spatial voting framework pioneered by Black (1948a, 1948b), assuming single-peaked preferences over an ordered set of policy alternatives. Before that, however, we turn attention to traditional index-based analysis of Council member's a priori influence on legislation. It implicitly takes non-strategic, exogenous policy proposals as given.

3 Traditional power index analysis of CM

Traditional voting power indices operate on so-called *simple (voting) games*. For a given set N of n voters, such a game classifies each subset $S \subseteq N$, called a *coalition*, as either *winning* or *losing*. This bipartition of the set of all coalitions is conveniently summarized by a *characteristic function* $v\colon 2^N \to \{0,1\}$, where $v(S) = 1$ if coalition S is winning, and $v(S) = 0$ if it is losing. Though characteristic functions often describe situations with transferable utility in cooperative game theory, no such assumption is made here. Power indices do not predict or prescribe a particular division of a fixed surplus, but they reflect agents' possibilities to 'play a role' in a future decision. In the context of the EU's Council of Ministers, every group of member states which jointly meet the weight and population requirements of the Nice or Lisbon Treaty, respectively, constitute a winning coalition; all others are losing ones. The corresponding mapping v simply summarizes CM's internal voting rules.[6]

A traditional a priori *power index* π maps the space of n-player simple games to $\mathbb{R}^n_+$, where vector $\pi(v)$'s component $\pi_i(v)$ indicates the a priori voting power of voter $i \in N$. Felsenthal and Machover (1998) or Laruelle and Valenciano (2008) give comprehensive overviews.

The most established power indices are the *Penrose-Banzhaf index* (PBI) (Penrose 1946; Banzhaf 1965) and the *Shapley-Shubik index* (SSI) (Shapley and Shubik 1954). They are

[4] Since the Council can prompt the Commission to submit a policy proposal (TFEU, Art. 241), the Commission does not have explicit gate-keeping powers: it can propose $x_0 = q$ when it wants to keep the status quo. This proposal, however, might be amended by CM.

[5] For the initial use of the term, in the context of the EU's *cooperation procedure*, see Tsebelis (1994).

[6] See Taylor and Zwicker (1999) for a thorough treatment of simple games and weighted voting.

weighted averages of an individual voter i's *marginal contribution* $v(S) - v(S \setminus \{i\})$ to all conceivable coalitions $S \subseteq N$ which include i, and can be expressed as

$$\pi_i(v) = \sum_{S \subseteq N,\ i \in S} \rho_S^i \cdot [v(S) - v(S \setminus \{i\})] \tag{1}$$

for non-negative weights ρ_S^i. Indices differ in the weights that they give to positive marginal contributions – also referred to as *swings* or *pivot positions* – and, of course, the distinct interpretations and properties implied by a particular weighting scheme. The (non-normalized) PBI is defined by

$$\rho_S^i = \frac{1}{2^{n-1}} \tag{2}$$

and the SSI by

$$\rho_S^i = \frac{(s-1)!\,(n-s)!}{n!}, \tag{3}$$

where $s = |S|$. Both are symmetric indices in the sense that ρ_S^i does not depend on i. The PBI assigns equal weight to *all coalitions* S containing i. The SSI amounts to assigning an equal weight to all coalition sizes s, and then also to all coalitions of a fixed size; or, perhaps more transparently, it gives an equal weight of $1/n!$ to *all orderings* of the set N. Then, for any given coalition S, it aggregates the weights of those orderings in which voter i is at the s-th position whilst the remaining members of S are at positions smaller than s.

There are several complementing ways to motivate the SSI or PBI as power measures. One of them is the *axiomatic approach* (Dubey 1975; Dubey and Shapley 1979; Laruelle and Valenciano 2001), which starts by formalizing rather abstract conditions or 'axioms' for the ascription of power, and proceeds by identifying those power measures which (often uniquely) satisfy them. Such axiomatizations are helpful in reducing a rather complex formula, such as the one resulting from (1) and (2) or (3), to a few basic properties which define and distinguish it.

The *probabilistic approach*, which goes back to Penrose (1946) and Banzhaf (1965) and was refined by Owen (1972) and Straffin (1977), derives weights ρ_S^i as probabilities from a model of random coalition formation.[7] This allows to interpret π_i as the (conditional) probability of voter i being in a pivotal position, the expected marginal contribution of voter i or, equivalently, as the expected change in $v(S)$ resulting from a switch from 'yes' to 'no' by voter i when the votes of all agents $j \neq i$ result from independent Bernoulli experiments with particular 'yes'-probabilities or *acceptance rates* t_j. If t_j equals $1/2$ for all $j \neq i$, or if the t_j are independent random variables with expectation $1/2$, one obtains the PBI. In contrast, when t_j is identical to a common level t for all $j \neq i$ where t is drawn from the uniform distribution on $[0, 1]$, the SSI is implied.

[7] Also see Laruelle and Valenciano (2005), who compare probabilistic measurements of *success* and *decisiveness*.

Member state	Population in 1,000s	Nice weight	PBI (Nice)	PBI (Lisbon)	SSI (Nice)	SSI (Lisbon)
Belgium	10754.5	12	0.01547	0.04825	0.03397	0.02336
Bulgaria	7606.6	10	0.01299	0.04182	0.02810	0.01848
Czech Republic	10467.5	12	0.01547	0.04767	0.03397	0.02291
Denmark	5511.5	7	0.00916	0.03754	0.01951	0.01521
Germany	82002.4	29	0.03269	0.19647	0.08742	0.15460
Estonia	1340.4	4	0.00525	0.02897	0.01098	0.00889
Greece	11257.3	12	0.01547	0.04928	0.03397	0.02415
Spain	45828.2	27	0.03116	0.11540	0.08022	0.07854
France	64351.0	29	0.03269	0.15618	0.08716	0.11450
Ireland	4465.5	7	0.00916	0.03540	0.01951	0.01363
Italy	60053.4	29	0.03269	0.14674	0.08696	0.10574
Cyprus	794.0	4	0.00525	0.02784	0.01098	0.00807
Latvia	2261.3	4	0.00525	0.03087	0.01100	0.01029
Lithuania	3349.9	7	0.00916	0.03311	0.01951	0.01192
Luxembourg	493.5	4	0.00525	0.02722	0.01098	0.00762
Hungary	10031.2	12	0.01547	0.04677	0.03397	0.02223
Malta	413.6	3	0.00396	0.02706	0.00815	0.00751
Netherlands	16486.6	13	0.01669	0.05996	0.03673	0.03251
Austria	8355.3	10	0.01299	0.04335	0.02810	0.01959
Poland	38135.9	27	0.03116	0.09530	0.07988	0.06611
Portugal	10627.3	12	0.01547	0.04799	0.03397	0.02316
Romania	21498.6	14	0.01789	0.07059	0.03984	0.04106
Slovenia	2032.4	4	0.00525	0.03040	0.01100	0.00995
Slovakia	5412.3	7	0.00916	0.03734	0.01951	0.01507
Finland	5326.3	7	0.00916	0.03716	0.01951	0.01494
Sweden	9256.3	10	0.01299	0.04519	0.02810	0.02099
United Kingdom	61634.6	29	0.03269	0.15013	0.08701	0.10898
Total	499747.4	345	0.42000	1.71399	1.00000	1.00000

Table 1: PBI and SSI power indices for EU27 under Nice and Lisbon Treaty (2009 data)

As the benchmark for our strategic analysis, Table 1 displays the intra-Council distribution of voting power as evaluated by the PBI and SSI under the Nice and Lisbon Treaties' respective voting rules.[8] By construction, countries' SSI values add up to unity irrespectively of which internal voting rule is used by CM. They make a statement about member states' *relative* power, and allow no inference about something like the institutional difficulty of reaching a 'yes'-decision. The (non-normalized) PBI indicates voting power in *absolute* terms. The PBI-columns in Table 1 suggest that the switch from the Nice to the Lisbon rules will increase the a priori voting power for *all* member states: Lisbon's combined 65% of population and 55% of members thresholds are more easily passed than Nice's dominant 73.9% weight threshold. This makes it more probable – under the PBI's behavioral assumptions and considering non-strategic exogenous proposals – that some country finds itself in a situation in which it has influence on legislation. One can obtain *relative* statements from the PBI by looking at its *normalized* version (nPBI). The nPBI agrees with the SSI that the Lisbon rules will make the biggest four countries significantly more powerful. The indices produce different signs for the changes in relative power of Romania (a winner according to the SSI, but a loser in terms of its nPBI value) and the six smallest member states plus Denmark (who are SSI-winners but nPBI-losers).

For the later comparison with EU member states' strategic voting power it is worth mentioning a particular interpretation of the SSI. It combines Shapley's (1953) story of sequential coalition formation and surplus allocation with Penrose's statistical view on $\pi_i(v)$ as the probability of voter i being critical for a decision (which is equivalent to i's expected marginal contribution to the binary outcome $v(S) \in \{0, 1\}$). Suppose that for any randomly chosen policy issue, voters have positions so that they can be ordered in a unidimensional space which captures their respective intensity of support for the 'yes' position (or, equivalently, the 'no' position). This ordering is likely to affect the formation of a winning coalition. One plausible hypothesis is that the formation of a coalition is initiated by the most supportive voters, and that this coalition grows by successively reaching out to the most supportive remaining outsiders until it has accumulated enough members to meet the majority requirements formalized by v. Call the last entering member, who turns a coalition that is so far still losing into a winning one, decisive or pivotal. This pivotal voter can be considered the most powerful one for the given issue: his relatively low enthusiasm for the 'yes'-position makes him the most credible agent to play supporters of the proposal at hand off against its opponents. This is picked up by the marginal contribution in equation (1). And if one assumes that future policy issues make each ordering a priori equally likely to arise, the SSI

[8] Provisional Eurostat population data for 2009 (downloaded from http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tps00001 on 18.9.2009) are rounded to full 1,000s for the Lisbon computations and full 10,000s for the more memory-intensive Nice computations.

of player i corresponds exactly to the probability of i being pivotal.

Section 6 below draws on the possibility of giving the SSI an even more explicitly spatial interpretation, as discussed in detail by Napel and Widgrén (2008b): instead of viewing voters' positions in the considered unidimensional space as an ordering of support for some exogenous proposal, they can be viewed as actual positions in a metric *policy space*. Voter i's position corresponds to i's most preferred policy outcome, with any alternative evaluated on the basis of its distance to this *bliss* or *ideal point*. Now consider the endogenous generation of policy proposals. And assume, for simplicity, that a simple majority rule is used (i.e., voters have normalized weights w_i and a coalition S is winning iff $\sum_{i \in S} w_i > 50\%$). Then, less than 50% of total weight is located to the left of the pivotal player, and less than 50% of total weight is located to his right, i.e., he is the *median voter* for the given weights. This implies that, ruling out log-rolling or side payments, the pivotal voter's position (and only it) cannot be defeated by any other policy alternative. In the absence of friction, it must end up being the collective policy decision under an open agenda protocol. The marginal contribution in equation (1) thus can also be interpreted as an indicator variable which equals one iff the respective voter determines the endogenous policy outcome. The SSI then captures the probability of an individual Council member i determining the collective decision, assuming that all ideal point configurations are equally likely.[9]

4 Strategic analysis of Consultation

The following analysis of consultation legislation combines the internal decision rules in the Council, which are picked up by traditional indices, with strategic agenda setting by the European Commission. A key assumption is that for any policy issue which might come up for a legislative decision under the consultation procedure, say, the level of a tax on CO_2 or the grace period before phasing out a particular subsidy, members of CM and EC have commonly known Euclidean preferences over a single-dimensional space of policy alternatives. Specifically, we will consider the one-dimensional convex Euclidean policy space $X = [0, 1]$ and refer to it in terms of an abstract left-right spectrum. The legislative *status quo* regarding the (a priori random) issue which is up for a decision is $q \in X$. The considered political actors are all assumed to have single-peaked preferences concerning the issue, characterized by an individual *ideal point* $\lambda \in X$. The smaller the distance $|\lambda - x|$, the higher the agent values a policy outcome $x \in X$.

Spatial analysis of supermajority voting has first been carried out by Black (1948b). We

[9]In case of a supermajority rule, the location of the status quo affects the policy outcome. The above interpretation still applies when the status quo lies outside voters' Pareto set, e.g., if it is always to the very left.

here need to deal with a qualified majority rule that is slightly more complex than in the classical case. Moreover, CM's agenda is (partly) controlled by an external strategic player (cf. Romer and Rosenthal 1979, Tsebelis 1994). The key distinction, however, is that the prediction of a policy outcome for a given configuration of ideal points, which this section will describe, is a means to a different end: we are ultimately interested in differences between Council members' a priori influence on the collective decision. This will be operationalized by computing the probabilities with which individual Council members find themselves determining the predicted outcome. As already highlighted by Black's work, the latter is closely related to being the 'right' or 'left' pivot for a given preference configuration, i.e., to defining by one's policy ideal one of the two boundary points of the interval of policies that cannot be defeated under the considered voting rule. But two complications arise for the consultation procedure: first, because a different majority requirement applies to passing or rejecting the Commission's proposal than to amending it, the relevant pivot position can be either an interior or a boundary point of CM's Pareto set. Second, the equilibrium outcome may be insensitive to *any* pivotal Council member's policy ideal (and is then not regarded as being 'determined' by it) because it coincides with either the status quo or the Commission's ideal point.

In the following, the ideal points of the 27 CM members will be denoted by μ_i for $i \in N = \{1, \ldots, 27\}$. Member i finds it in his interest to support a policy proposal x_0 which is put on the table by EC if two conditions are met: first, $|\mu_i - x_0| \leq |\mu_i - q|$, i.e., it is subjectively preferred to the status quo. Second, no subjectively even better alternative x_1 with $|\mu_i - x_1| < |\mu_i - x_0|$ exists which i could unanimously agree on with the 26 other Council members.

Ideal points of the 27 European Commissioners will be referred to as γ_j for $j \in N = \{1, \ldots, 27\}$. Since the Commission must make a single proposal to CM, its aggregate preferences as a unitary actor matter. Different assumptions about how an aggregate ideal point γ is determined from $\gamma_1, \ldots, \gamma_{27}$ will be investigated in Sections 5 and 6. For the time being it is sufficient to consider any EC ideal point $\gamma \in X$ as given. The Commission will in any subgame perfect equilibrium choose its policy proposal x_0 to the Council such that the anticipated outcome is as close as possible to γ.

As illustrated by Figure 1, the consultation outcome is either the original Commission proposal $x_0 \in X$, an alternative x_1 if CM can unanimously agree on it, or the status quo q if there is neither a qualified majority in favor of x_0 nor unanimous support for any alternative x_1. In order to be more specific about which outcome will result for a given configuration of ideal points $\mu_1, \ldots, \mu_{27}$ and γ, let us denote the *ordered* ideal points of Council members by $\mu_{(1)} \leq \ldots \leq \mu_{(27)}$. If we assume that all ideal points are distinct from one another, member (k) is well-defined as the national representative who, for the considered issue, holds the k-th leftmost policy position in X among all members of CM.[10] The permutation $(\cdot)$ on $N = \{1, \ldots, 27\}$ makes $p_{(k)}$ and $w_{(k)}$ the respective k-th leftmost country's population size and number of votes (when the Nice rules are concerned) for given vectors of national population sizes $(p_1, \ldots, p_{27})$ and Nice voting weights $(w_1, \ldots, w_{27})$.

If CM is prompted to consider, for instance, a change of a status quo q lying very much to the right towards something lying more to the left, the support of the countries holding the left-most positions $\mu_{(1)}$, $\mu_{(2)}$, etc. will be the easiest to obtain. The critical CM member is the country that first brings about the required qualified majority as less and less enthusiastic supporters of a move to the left join their peers who already endorse the new policy. We refer to this critical member as CM's *right pivot*, and to its ideal point as CM's *right pivot position* μ_R. Under the Nice voting rules, the right pivot's rank from the left can be written as

$$R^{Nice} = \min\Big\{r \in \{14, \ldots, 27\} : \sum_{k=1}^{r} w_{(k)} \geq 255 \ \wedge \ \sum_{k=1}^{r} p_{(k)} \geq 0.62 p_{\Sigma}\Big\}, \tag{4}$$

where $p_{\Sigma} = \sum_{i \in N} p_i$ refers to the EU's total population; we denote its ideal policy by $\mu_R^{Nice} \equiv \mu_{(R^{Nice})}$. The right-hand side in equation (4) first considers the sizes of all coalitions built up from the left (involving ideal points $\mu_{(1)}$, $\mu_{(2)}$, etc. up to some $\mu_{(r)}$), which are winning, i.e., which include at least 14 out of the 27 CM members, have an aggregate weight exceeding the Nice threshold of 255 out of 345 votes, and represent at least 62% of the EU's population. Then, the critical rank position is inferred as the smallest value of r that suffices to establish a winning coalition for the given ideal point configuration. (R^{Nice})'s bliss point is the relevant position in CM if the Commission wants a change of q towards the left. If the status quo is sufficiently far to the right, it is the rightmost policy alternative that would internally – inside CM – beat q and also any other status quo-beating policies $x \in (\mu_R^{Nice}, q)$; any policy to the left of μ_R^{Nice} will attract the required majority iff (R^{Nice}) prefers it to q.

Similarly, we have

$$L^{Nice} = \max\Big\{l \in \{1, \ldots, 14\} : \sum_{k=l}^{27} w_{(k)} \geq 90 \ \wedge \ \sum_{k=l}^{27} p_{(k)} \geq 0.38 p_{\Sigma}\Big\}, \tag{5}$$

and $\mu_L^{Nice} \equiv \mu_{(L^{Nice})}$ as the position of the government that is critical inside CM when EC contemplates a change of q towards the right. And analogously, the Lisbon Treaty's voting rules lead to μ_R^{Lisbon} and μ_L^{Lisbon}, defined by

$$R^{Lisbon} = \min\Big\{\min\big\{r \in \{15, \ldots, 27\} \colon \sum_{k=1}^{r} p_{(k)} \geq 0.65 p_{\Sigma}\big\}, 24\Big\} \tag{6}$$

[10] This is satisfied with probability one if all μ_i are independently drawn from a continuous distribution on X, such as the uniform one considered in Section 5.

and

$$L^{Lisbon} = \max\Big\{\max\big\{l \in \{1,\ldots,13\}\colon \sum_{k=l}^{27} p_{(k)} \geq 0.35 p_\Sigma\big\}, 4\Big\}. \tag{7}$$

The nested minimization in (6) first takes care of the dual majority requirement of at least 15 members and 65% of total population (in direct parallel to (4)). It then corrects the critical rank position to 24 if the population threshold should be met only by 25 or more members of CM (cf. Section 2.1).

Note that, under either treaty T, *no* policy $x \neq q$ would be supported by the required majority if $\mu_L^T < q < \mu_R^T$. Also more generally only the locations of μ_L^T and μ_R^T – not which rule has determined them – matter for EC. Hence we can drop treaty superscripts.

In its optimal choice of a proposal x_0, which in equilibrium must correctly anticipate CM's reaction to it, EC faces four qualitatively distinct possibilities or cases. They are defined by the locations of the status quo q, EC's own ideal point γ, the ideal points μ_L and μ_R of the potentially pivotal players in CM, and the most extreme positions in CM, $\mu_{(1)}$ and $\mu_{(27)}$. The corresponding configurations are illustrated together with the implied optimal Commission proposals x_0 in Figure 2.

In *case I*, the legislative status quo q prevails in equilibrium (see panel I in Figure 2). This can materialize in two ways: first, it may be impossible to get CM's support for any change of the status quo: if q falls between the left and right pivot positions in CM, there is a blocking minority on both sides of the status quo. Since any proposal $x_0 \neq q$ would be rejected, it is optimal for EC to propose keeping the status quo.[11] Second, the Commission may use its role as the agenda setter in order to prevent what would from its own perspective constitute a deterioration: if EC and a qualified majority but not all members of CM have ideal points on opposite sides of q, EC would hurt itself by proposing anything that is favored by the qualified majority in CM. Any suggestion to move from q in EC's preferred direction would be rejected. Since there fails to exist unanimous support in CM for an amendment $x_1 \neq x_0 = q$, proposing $x_0 = q$ ends up preserving the status quo. For the given configuration, the latter is the best that the Commission can achieve.

In *case II*, EC is able to pass its own ideal policy γ (panel II). This happens when, first, EC's ideal point lies closer to the relevant pivot in CM than does the status quo, and, second, EC's ideal policy does not fall outside CM's Pareto set $[\mu_{(1)}, \mu_{(27)}]$. The latter condition ensures that there is no unanimous agreement in CM to pass any alternative $x_1 \neq x_0 = \gamma$. The former condition makes sure that the relevant pivotal Council member (i.e., the left pivot if EC wants to move from q to the right, and the right pivot if EC wants to move to

[11]We directly select between all equilibria in a way that allows a concise exposition and ignores the usual coordination problems (e.g., ruling out the trivial equilibria in which a qualified majority prefers a policy to q but all simultaneously vote 'no').

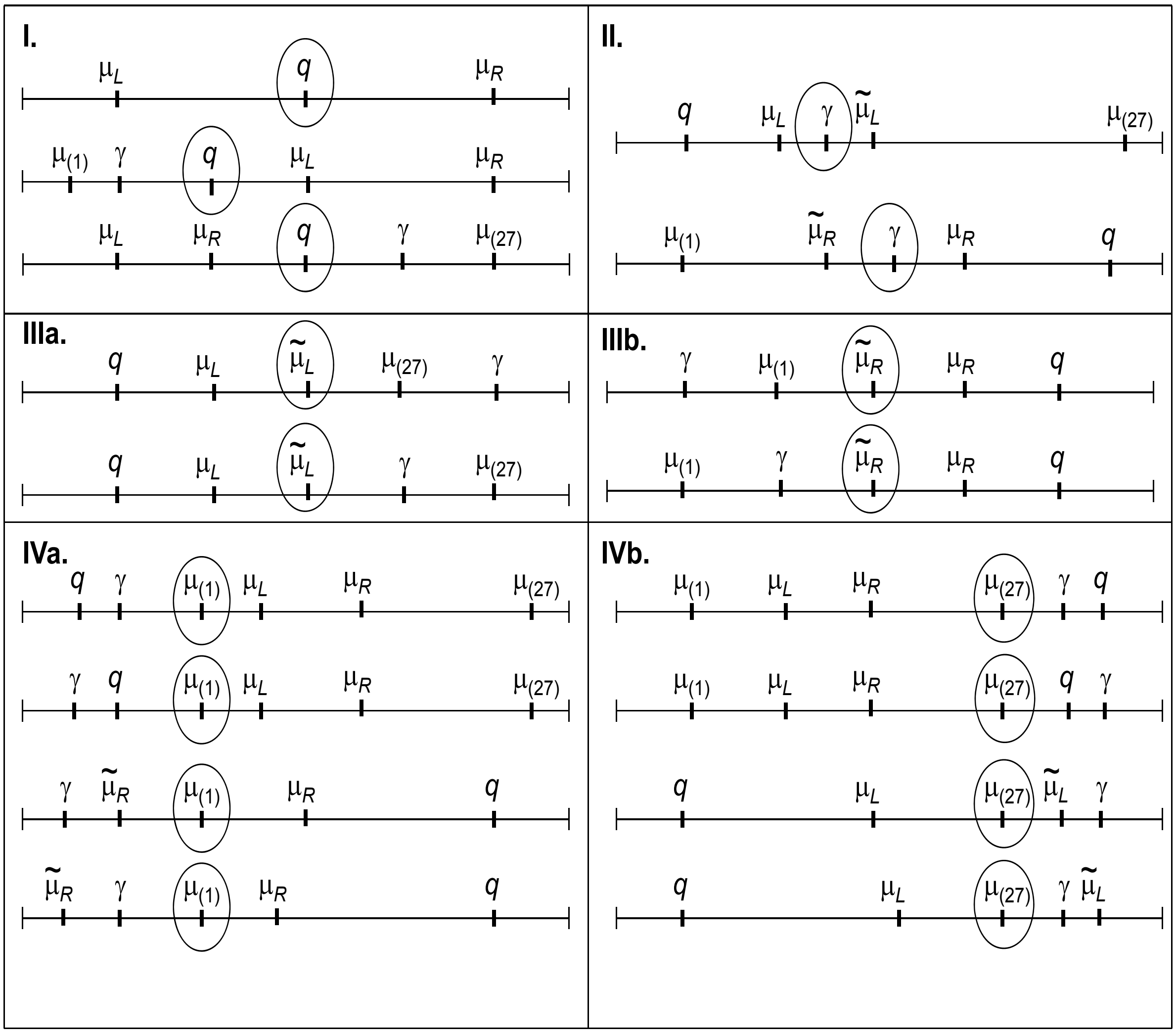

Figure 2: Equilibrium outcomes in the consultation procedure

the left) prefers to accept $x_0 = \gamma$ rather than maintain the status quo. This can be stated more concisely if we define

$$\tilde{\mu}_L \equiv \mu_L + (\mu_L - q) = 2\mu_L - q \tag{8}$$

and

$$\tilde{\mu}_R \equiv \mu_R - (q - \mu_R) = 2\mu_R - q \tag{9}$$

as the policies that respectively render the left and right pivots indifferent to the status quo. Panel II then comprises all ideal point configurations with $\gamma \in [\mu_{(1)}, \mu_{(27)}]$ and either $\gamma \in (q, \tilde{\mu}_L)$ or $\gamma \in (\tilde{\mu}_R, q)$. Note that for preference configurations pertaining to this case, pivotality inside CM is well-defined. It just does not translate into any influence on legislation: the consultation outcome is fully determined by the Commission's objectives, as captured by its ideal point γ. This will play a role in Section 6, when we relate the power indications of traditional indices and those derived from strategic analysis.

In *case III*, the CM pivot determines the legislative outcome, even though this typically does not mean that the outcome is particularly close to the pivot's ideal point (panels IIIa and IIIb). The first possibility, illustrated in panel IIIa, involves a Commission that wants to shift legislation to the right. It then needs to make sure that its proposal is supported by the left pivot in CM. Because its own ideal point γ is inferior to the status quo from the left pivot's perspective, the best that EC can do is to propose $\tilde{\mu}_L$. The second possibility, illustrated in panel IIIb, is the mirror situation in which EC wants to move legislation to the left.

In *case IV*, either the leftmost or the rightmost position in CM is proposed and passes (panels IVa and IVb). The first type of situations, for which this is the equilibrium outcome, arises when all members of CM want to move farther away from the status quo than EC or in the opposite direction of EC. The Commission anticipates that any policy $x_0 \notin [\mu_{(1)}, \mu_{(27)}]$ would be amended to some $x_1 \in [\mu_{(1)}, \mu_{(27)}]$ by a unanimous Council (assuming that bargaining inside CM is efficient). Irrespectively of which such x_1 would result from intra-CM interaction, EC can guarantee itself the least undesirable bargaining outcome – either $\mu_{(1)}$ if q lies to the left of the Council ideal points, or $\mu_{(27)}$ if it lies to the right – by using its agenda power. It directly proposes $x_0 = \mu_{(1)}$ or $x_0 = \mu_{(27)}$; this cannot be amended to the benefit of every CM member. A second type of situations, for which one extreme position in CM defines the outcome, can arise. Namely, EC may want to move more radically in the same direction as the entire Council. The difference to case III is that the corresponding left or right pivot in CM is located sufficiently far from q not to block the boundary point of $[\mu_{(1)}, \mu_{(27)}]$ preferred by EC.

If we denote the equilibrium outcome of the consultation procedure for a given configuration of preferences and status quo by x^*, we can summarize all cases by[12]

$$x^* = \begin{cases} q & \text{if} \quad \{\mu_L < q < \mu_R\} \;\text{ or} \\ & \phantom{\text{if}} \quad \{\gamma < q < \mu_L \;\wedge\; \mu_{(1)} < q\} \;\text{ or} \\ & \phantom{\text{if}} \quad \{\mu_R < q < \gamma \;\wedge\; q < \mu_{(27)}\} \\ \gamma & \text{if} \quad \{\mu_{(1)} < \gamma < \mu_{(27)} \;\wedge\; q < \gamma < \tilde{\mu}_L\} \;\text{ or} \\ & \phantom{\text{if}} \quad \{\mu_{(1)} < \gamma < \mu_{(27)} \;\wedge\; \tilde{\mu}_R < \gamma < q\} \\ \tilde{\mu}_L & \text{if} \quad \{q < \tilde{\mu}_L < \gamma \;\wedge\; \tilde{\mu}_L < \mu_{(27)}\} \\ \tilde{\mu}_R & \text{if} \quad \{\gamma < \tilde{\mu}_R < q \;\wedge\; \mu_{(1)} < \tilde{\mu}_R\} \\ \mu_{(1)} & \text{if} \quad \{\gamma < \mu_{(1)} \;\wedge\; q < \mu_{(1)}\} \;\text{ or} \\ & \phantom{\text{if}} \quad \{\gamma < \mu_{(1)} \;\wedge\; \tilde{\mu}_R < \mu_{(1)}\} \\ \mu_{(27)} & \text{if} \quad \{\mu_{(27)} < \gamma \;\wedge\; \mu_{(27)} < q\} \;\text{ or} \\ & \phantom{\text{if}} \quad \{\mu_{(27)} < \gamma \;\wedge\; \mu_{(27)} < \tilde{\mu}_L\}. \end{cases} \tag{10}$$

5 Strategic voting power in Consultation

The strategic considerations which drive the above outcome predictions reflect the procedural nature of EU legislation. They are not picked up by the power indices introduced in Section 3, but we will now discuss how the key ideas behind traditional indices can be operationalized in a non-cooperative game-theoretic framework. We then report computation results. They quantify the extent to which the strategic and procedural aspects of legislation matter for the distribution of power in CM numerically, rather than only conceptually.

5.1 Method

That traditional indices fail to capture potentially crucial aspects of agents' legislative influence under procedural decision rules does not mean that the core concept of the traditional power index approach, a player's *marginal contribution to the outcome*, is useless. To the contrary, it identifies the important difference between being successful (obtaining a desired outcome) and being powerful in the sense of having been a critical determinant of the outcome, where the latter may but in general need not be the individually most desired one.

[12] We focus on generic configurations, in which all relevant points are distinct. – Recall that, at least in our interpretation, Art. 241 of the TFEU prevents EC from making *no* proposal, i.e., it cannot 'keep the gates closed'. *If* the Commission could perpetually delay submitting a proposal despite the Council's (or Parliament's) request, it would benefit from doing so for certain configurations pertaining to the first type of situations in case IV.

The question is how to extend this concept from binary simple games to settings such as the strategic agenda setting and amendment game considered above.

One proposal has been made in Napel and Widgrén (2004). We refer to that paper for an extended discussion. The suggested framework involves the same qualitative steps as the probabilistic approach to traditional indices: first, it infers an agent's *ex post* or *a posteriori power* as an indicator of his potential or ability to have an impact under a given scenario from comparing it to a what-if scenario or 'shadow outcome'. The latter is the collective decision which would have resulted if the agent had behaved differently than he a posteriori did, e.g., if he had stayed out of the considered coalition. Second, it imputes *ex ante* or *a priori power* as expected a posteriori power based on a probability distribution over all scenarios which reflects suitable normative principles, such as the symmetry assumptions typically adopted by the 'veil of ignorance'-perspective of constitutional design.[13]

In a strategic setting, this can be operationalized by linking a posteriori power ascriptions to the following question: which impact would a small move of a given player's ideal policy have on the collective decision? From the player's internal perspective, having a positive impact means that he has the power to induce a different outcome if he wanted to. This impact is also what outsiders, such as external lobbyists, care about: the greater it is for the issue at stake, the more desirable is having the considered player's attention. A player's preferences are the determinant of his strategic behavior, which in turn affects the strategic behavior of other players. So a small preference change may, in general, trigger changes in the actions of all players; these then alter the equilibrium policy outcome in a potentially drastic way.

Combining such an impact-based notion of a posteriori power and meaningful probabilistic assumptions about all relevant players' preferences, a given player's a priori power is simply the *expected change to the equilibrium outcome which would be brought about by a (marginal) change in this player's preferences.*[14] Averaging the impact of small preference changes over all conceivable scenarios amounts to the ascription of power based on an agent-

[13]Note that our use of the terms 'a posteriori' and 'a priori' deviates from the parts of the power measurement literature in which 'a posteriori' is reserved for analysis involving *empirical* data, e.g., about actual preferences of the Polish CM member, (dis)affinities between the French and German ones, etc. We merely distinguish between power ascriptions which take into consideration particular realized biases of the decision makers (considering a situation *after* the auxiliary player Nature has assigned preference types to the players of a Bayesian game), and those which do not but are based on the prior probability distribution over types (applying *before* Nature's move).

[14]Napel and Widgrén (2004) also investigate *discrete* instead of marginal changes of preferences. Another alternative is to consider *action* changes and to make probabilistic a priori assumptions about players' actions. Traditional power indices take this 'short-cut'. But thereby they lose the ability to transparently account for stochastic dependence of actions, which usually results from strategic interaction (cf. the response by Napel and Widgrén 2005 to Braham and Holler 2005).

specific *sensitivity analysis of collective decisions*. Conventional indices' weighted counting of players' pivot positions is just a special case of this.

Here, in order to infer the Commission's and member states' a posteriori power for a given preference profile, we consider the effect of a marginal shift of ideal points γ or $\mu_1, \ldots, \mu_{27}$ to the left or right on the anticipated policy outcome x^*. This effect is captured in *quantitative* terms by the partial derivatives of the predicted outcome, displayed in equation (10), with respect to the considered agent's ideal point. These are

$$\frac{\partial x^*}{\partial \gamma} = \begin{cases} 1 & \text{if} \quad \{\mu_{(1)} < \gamma < \mu_{(27)} \ \wedge \ q < \gamma < \tilde{\mu}_L\} \ \text{ or} \\ & \qquad \{\mu_{(1)} < \gamma < \mu_{(27)} \ \wedge \ \tilde{\mu}_R < \gamma < q\} \\ 0 & \text{otherwise} \end{cases} \tag{11}$$

for the Commission and

$$\frac{\partial x^*}{\partial \mu_i} = \begin{cases} 2 & \text{if} \ \ \{L = i \ \wedge \ q < \tilde{\mu}_L < \gamma \ \wedge \ \tilde{\mu}_L < \mu_{(27)}\} \ \text{ or} \\ & \qquad \{R = i \ \wedge \ \gamma < \tilde{\mu}_R < q \ \wedge \ \mu_{(1)} < \tilde{\mu}_R\} \\ 1 & \text{if} \ \ \{(1) = i \ \wedge \ \gamma < \mu_{(1)} \ \wedge \ q < \mu_{(1)}\} \ \text{ or} \\ & \qquad \{(1) = i \ \wedge \ \gamma < \mu_{(1)} \ \wedge \ \tilde{\mu}_R < \mu_{(1)}\} \ \text{ or} \\ & \qquad \{(27) = i \ \wedge \ \mu_{(27)} < \gamma \ \wedge \ \mu_{(27)} < q\} \ \text{ or} \\ & \qquad \{(27) = i \ \wedge \ \mu_{(27)} < \gamma \ \wedge \ \mu_{(27)} < \tilde{\mu}_L\} \\ 0 & \text{otherwise} \end{cases} \tag{12}$$

for Council member i. A simpler *qualitative* assessment is obtained by just considering $\text{sign}(\partial x^*/\partial \gamma)$ and $\text{sign}(\partial x^*/\partial \mu_i)$ as indicator variables of whether a small shift of the respective ideal point would have *any* consequence at all. There is a difference between these two possibilities only for outcomes pertaining to case III of Section 4: a given small change Δ of the Council pivot's ideal point would shift the equilibrium outcome by 2Δ. From a lobbyist's perspective, an agent with such leverage may plausibly be regarded as twice as powerful a posteriori than one for whom preference shifts translate only one-to-one into outcome changes. But we do not want to take a particular stand on this issue here. A dichotomous qualitative assessment seems conceptually closer to the ascription of a posteriori power by traditional indices because the expected value of $\text{sign}(\partial x^*/\partial \mu_i)$ coincides with the probability of Council member i determining the collective decision under strategic interaction. We will focus on it in this paper, and define

$$\xi_i \equiv \int \text{sign}\left(\frac{\partial x^*}{\partial \mu_i}\right) dP \tag{13}$$

as the *strategic measure of power* (SMP) for Council member $i \in N$. An analogous expression captures the strategic power of EC.

Note that the measure P, which aggregates all possible ideal point configurations, could in general reflect different things: the fact that it is not yet known which issues will be on the agenda in a future-oriented evaluation, or that an outsider has only partial information even in historical analysis. Here we want to evaluate the consultation procedure's decision rules from the a priori perspective of constitutional design, which intentionally carries out analysis from behind a veil of ignorance. This is what traditional indices have been created for. In line with the 'principle of insufficient reason', which is invoked by the Shapley-Shubik and Penrose-Banzhaf indices regarding player orderings and 'yes'-or-'no' decisions, respectively, we assume that all status quo and ideal point configurations are equally likely. In particular, all individual ideal points have uniform probability distributions on $X = [0, 1]$.

5.2 Results

The various conditions by which the legislative outcome in equation (10) and hence agents' a posteriori power is determined make an analytical computation of ξ_i very complicated. We have therefore resorted to extensive Monte Carlo simulations – repeatedly drawing random configurations of Council members' ideal points $\mu_1, \ldots, \mu_{27}$, Commissioner's ideal points $\gamma_1, \ldots, \gamma_{27}$, and the status quo q, and then counting the frequencies with which the respective conditions in equation (10) are satisfied. Recall that we did not make specific assumptions about how individual Commissioners' ideal points are aggregated to a collective ideal point γ above. This is, of course, necessary for our power computations. At least four different modeling choices, which translate into distinct distributional assumptions for γ, can be motivated.

The first one reflects the Commission's 'portfolio principle': all individual Commissioners (except for the President) are assigned distinct portfolios at the beginning of their tenure. They then play a key role for those issues (especially lower key ones) that happen to fall into their respective unit. This can be captured by identifying the aggregate policy position γ with any randomly selected Commissioner j's ideal point γ_j. Then, γ varies uniformly on $X = [0, 1]$, independently from any individual μ_i and q.

A second alternative is to take the prescription of simple majority voting inside the college of Commissioners by TFEU, Art. 250, seriously. This may be particularly relevant for controversial issues that affect several Commissioners' portfolios. Under our assumption of single-peaked preferences over $[0, 1]$, the Commission's aggregate ideal point is then likely to correspond to the issue-specific median opinion in EC. This yields the assumption $\gamma = \gamma_{(14)}$, where the latter is independent from any μ_i or q, and has a beta distribution with parameters (14,14).

A third option is to retain the assumption of the Commission using simple majority voting, but to account for possible dependence between Commissioner j's ideal point γ_j and the ideal point μ_j of the Council member with the same nationality. Whilst appointed Commissioners "...shall neither seek nor take instructions from any Government or other institution, body, office or entity ..." (TEU, Art. 17(3)), they are selected in a procedure that leaves national heads of state or government effectively unrestricted in choosing Commissioners to their liking.[15] This makes it plausible to assume that – at least at the beginning of its tenure – Commissioner j's ideal point coincides with the respective Council member's ideal point, i.e., $\gamma_j = \mu_j$. This would translate into the presumption $\gamma = \gamma_{(14)} = \mu_{(14)}$ for the Commission's ideal point.[16] Note, however, that the independence prescription in Art. 17(3) theoretically rules out that preference changes in CM, which take place *during* Commissioners' tenure, translate into changes in EC.

Finally, as a fourth possibility, one might consider a Commission whose members have dependent individual ideal points $\gamma_j = \mu_j$ and in which the portfolio principle prevails. This would translate into the assumption that $\gamma = \gamma_j = \mu_j$ for a randomly determined member country j.

Tables 2 and 3 report approximation results for the first and the third of these modeling options:[17] a Commission that applies the portfolio principle and consists of members with independent preferences, referred to as the *independent Commission case*; and one that resorts to simple majority voting and has members with initial ideal points reflecting the appointing country's preferences, referred to as the *dependent Commission case*. It is unproblematic to restrict attention to these cases because the numerical differences between the first and the fourth option, and similarly between the second and third alternative are small.[18]

Regarding the move from Nice to Lisbon rules, the SMP contradicts the suggestion of PBI analysis that all members of CM, and so in some sense CM as an institution, gain greater influence in absolute terms. It can be confirmed that the less demanding Lisbon majority requirements make it easier to pass new legislation. This is reflected in a decreasing

[15]See Napel and Widgrén (2008a) for a detailed analysis of the *investiture procedure*, as originally laid out in Art. 214 of the EC Treaty. The procedure for appointing the successor of the current Barroso Commission is essentially unchanged (cf. TEU, Art. 17(7)), even though the number of Commissioners might be reduced to two-thirds of the number of member states (see Art. 17(5)).

[16]The permutation $(\cdot)$ which orders EC members from left to right is generally different from the one which orders CM members; both coincide, of course, if $\gamma_j = \mu_j$ for all $j \in N$.

[17]Results are based on 10^9 iterations. Matlab source codes are available upon request. The remaining inaccuracies (visible, e.g., in the Nice nSMP values in Table 2: Finland must theoretically have weakly less power than more populous Slovakia) could be reduced by considering even more iterations. This would not change any of our qualitative conclusions, however.

[18]For instance, the second option gives configurations that are ruled out by the third option (such as the bottom two in panel I of Figure 2) a vanishingly small probability. Confirmations of q become slightly more likely. Also the odds of EC determining the outcome vs. CM doing so shift slightly: under the Nice rules, for instance, the probability of EC getting its will rises from 0.195 to 0.217 if one considers the second instead of the third option; the probability of the outcome being locally sensitive to some CM member's ideal point falls from 0.354 to 0.326. Similarly, under the Lisbon rules, aggregate power of CM rises from 0.248 to 0.256 whilst that of the Commission falls from 0.458 to 0.420.

Member state	SMP (Nice)	SMP (Lisbon)	nSMP (Nice)	nSMP (Lisbon)	$\frac{\text{(SSI-nSMP)}}{\text{SSI}}$ (Nice)	$\frac{\text{(SSI-nSMP)}}{\text{SSI}}$ (Lisbon)
Belgium	0.01021	0.00690	0.03428	0.02348	−0.9%	−0.5%
Bulgaria	0.00850	0.00546	0.02852	0.01857	−1.5%	−0.5%
Czech Republic	0.01021	0.00677	0.03429	0.02303	−0.9%	−0.5%
Denmark	0.00597	0.00450	0.02004	0.01531	−2.7%	−0.6%
Germany	0.02549	0.04534	0.08559	0.15422	2.1%	0.2%
Estonia	0.00345	0.00263	0.01158	0.00895	−5.5%	−0.6%
Greece	0.01021	0.00714	0.03429	0.02428	−0.9%	−0.5%
Spain	0.02350	0.02299	0.07890	0.07821	1.7%	0.4%
France	0.02544	0.03354	0.08542	0.11409	2.0%	0.3%
Ireland	0.00597	0.00403	0.02004	0.01372	−2.7%	−0.6%
Italy	0.02540	0.03100	0.08528	0.10545	1.9%	0.3%
Cyprus	0.00345	0.00239	0.01159	0.00812	−5.6%	−0.7%
Latvia	0.00345	0.00304	0.01159	0.01035	−5.4%	−0.6%
Lithuania	0.00597	0.00353	0.02003	0.01201	−2.7%	−0.7%
Luxembourg	0.00345	0.00225	0.01158	0.00767	−5.5%	−0.6%
Hungary	0.01021	0.00657	0.03427	0.02234	−0.9%	−0.5%
Malta	0.00262	0.00222	0.00879	0.00755	−7.8%	−0.6%
Netherlands	0.01102	0.00960	0.03699	0.03267	−0.7%	−0.5%
Austria	0.00849	0.00579	0.02852	0.01970	−1.5%	−0.6%
Poland	0.02343	0.01939	0.07868	0.06594	1.5%	0.3%
Portugal	0.01021	0.00685	0.03428	0.02328	−0.9%	−0.5%
Romania	0.01191	0.01209	0.04000	0.04112	−0.4%	−0.2%
Slovenia	0.00345	0.00294	0.01159	0.01001	−5.4%	−0.6%
Slovakia	0.00597	0.00446	0.02003	0.01516	−2.7%	−0.6%
Finland	0.00597	0.00442	0.02004	0.01502	−2.7%	−0.6%
Sweden	0.00849	0.00621	0.02850	0.02111	−1.4%	−0.6%
United Kingdom	0.02541	0.03194	0.08531	0.10863	2.0%	0.3%
CM total	0.29783	0.29399	1	1		
Commission	0.16873	0.27386				

Table 2: Approximate SMP for EU27 under Nice and Lisbon Treaty with independent EC

Member state	SMP (Nice)	SMP (Lisbon)	nSMP (Nice)	nSMP (Lisbon)	$\frac{\text{(SSI-nSMP)}}{\text{SSI}}$ (Nice)	$\frac{\text{(SSI-nSMP)}}{\text{SSI}}$ (Lisbon)
Belgium	0.01202	0.00514	0.03391	0.02075	0.2%	11.1%
Bulgaria	0.00993	0.00377	0.02800	0.01519	0.3%	17.8%
Czech Republic	0.01201	0.00502	0.03390	0.02026	0.2%	11.6%
Denmark	0.00690	0.00284	0.01946	0.01147	0.2%	24.6%
Germany	0.03104	0.04384	0.08756	0.17692	−0.2%	−14.4%
Estonia	0.00388	0.00108	0.01095	0.00436	0.3%	50.9%
Greece	0.01202	0.00538	0.03390	0.02169	0.2%	10.2%
Spain	0.02850	0.02097	0.08039	0.08462	−0.2%	−7.7%
France	0.03097	0.03159	0.08738	0.12749	−0.3%	−11.3%
Ireland	0.00690	0.00240	0.01946	0.00970	0.3%	28.9%
Italy	0.03092	0.02899	0.08723	0.11698	−0.3%	−10.6%
Cyprus	0.00388	0.00085	0.01095	0.00342	0.2%	57.6%
Latvia	0.00388	0.00147	0.01095	0.00593	0.4%	42.4%
Lithuania	0.00690	0.00192	0.01945	0.00776	0.3%	34.9%
Luxembourg	0.00388	0.00073	0.01093	0.00293	0.4%	61.6%
Hungary	0.01201	0.00482	0.03388	0.01946	0.3%	12.4%
Malta	0.00288	0.00069	0.00813	0.00280	0.3%	62.7%
Netherlands	0.01299	0.00776	0.03664	0.03131	0.2%	3.7%
Austria	0.00993	0.00407	0.02802	0.01644	0.3%	16.1%
Poland	0.02839	0.01783	0.08008	0.07193	−0.3%	−8.8%
Portugal	0.01201	0.00509	0.03389	0.02053	0.2%	11.3%
Romania	0.01409	0.01019	0.03976	0.04112	0.2%	−0.1%
Slovenia	0.00389	0.00138	0.01096	0.00555	0.3%	44.2%
Slovakia	0.00690	0.00280	0.01945	0.01131	0.3%	24.9%
Finland	0.00690	0.00277	0.01946	0.01117	0.3%	25.2%
Sweden	0.00993	0.00447	0.02801	0.01803	0.3%	14.1%
United Kingdom	0.03094	0.02995	0.08728	0.12087	−0.3%	−10.9%
CM total	0.35446	0.24781	1	1		
Commission	0.19539	0.45764				

Table 3: Approximate SMP for EU27 under Nice and Lisbon Treaty with dependent EC

probability for status quo-confirming outcomes: it falls from $\approx 1 - 0.298 - 0.169 = 0.533$ under Nice rules to $\approx 1-0.294-0.274 = 0.432$ under Lisbon rules for an independent EC (and from 0.450 to 0.295 for a dependent EC). But the total probability that *any* Council member is decisive for the outcome stays almost constant under the independent EC assumption, at a little less than 30%. This aggregate influence is merely re-distributed internally, from small to large member states. CM's aggregate power even falls quite significantly if one considers the corresponding figures for a dependent EC, from 35% to 25%. In contrast, legislation becomes by more than 20 percentage points more sensitive to the Commission's behavior.

If Commissioners took orders from the respective national governments during their tenure, it would, of course, be futile to distinguish between power of EC and CM: $1/27^{\text{th}}$ of EC's power could then be added to each member state's SMP value, shifting relative power from smaller to larger member states. But as already mentioned, the Treaty on European Union is explicit about appointed Commissioner's independence (whilst its investiture rules can justify perfect alignment at the appointment stage). Preference shifts in one institution as, e.g., sought after by external lobbyists or national voters, should hence be independent from possible shifts in the other one. So we can in summary conclude that the Lisbon rules a priori enhance EC's power, whilst CM's policy ideals on average become less relevant despite a greater total number of status quo-changing decisions.

Tables 2 and 3 include an approximation of members' *normalized SMP* (nSMP) as an indicator of their *relative* strategic power inside the Council. For instance, the nSMP values corroborate the SSI-based finding that the four largest members states, and to a smaller extent also Romania, gain influence in relative terms under the Lisbon Treaty. The two tables also report the percentage deviations from the relative power indicated by the Shapley-Shubik index. It is important to note that these reported deviations are based on Table 1's SSI values, which have been computed exactly with the generating function method, and nSMP values approximated by Monte Carlo simulations. Since the latter values have magnitudes similar to the former ones but entail statistical imprecision at the fifth and, to a lesser extent, the fourth decimal place, it is meaningful to compare the order of magnitude of the deviations and to look at broad patterns, but not to discuss any individual figures. The analogous deviations between nSMP and the normalized Penrose-Banzhaf index tend to be higher (ranging between -35% for Germany to 52% for Malta under the Lisbon Treaty and the assumption of an independent EC, for instance). But, interestingly, the deviations between nSMP and nPBI are often smaller than those between a country's SSI and nPBI.

Before we investigate the differences between strategic and non-strategic power in more detail in Section 6, it is already worth pointing out that the magnitudes of differences vary significantly between the Nice and Lisbon rules:[19] under the independent EC assumption,

[19]The same is true also when the nPBI is concerned. Deviations between nPBI and nSMP are smaller

SSI values involve basically negligible deviations from the nSMP under the Lisbon rules, but are by a factor of more than ten higher under the Nice rules. Assuming a dependent EC aligns the SSI very closely with the nSMP under the Nice rules, but it produces huge over and under-statements of strategic power under the Lisbon rules. This means that the following 'ceteris paribus conjecture' is *wrong*: traditional index figures of Council members' influence on legislation may make a mistake by ignoring inter-institutional strategic interaction (akin to figures of GDP levels, which miss some economic activity); but if different intra-institutional rules for CM are compared, such as the Nice and Lisbon provisions, any mistakes should cancel out (just like changes of GDP fairly accurately measure activity changes in *all* parts of the economy). Rather, it turns out that Council members' SMP values do *not* vary proportionately in their SSI or PBI values.

6 Explanations

What explains that the magnitudes of deviations between the nSMP and traditional indices are sensitive to the Council's internal voting rules? And why does the SSI overstate large member states' relative strategic power under the assumption of an independent Commission (Table 2) but understate it under the assumption of a dependent Commission (Table 3)? Such questions can be answered by taking a closer look at the differences in a posteriori power ascriptions. We focus on the SSI as the traditional index which is closest in spirit to the single-dimensional spatial preference framework adopted in our strategic analysis. Before we begin our discussion, let us remark that certain non-strategic aspects of decision procedures can be reflected in the traditional framework, when the protocol is as simple as consultation: one can construct a *compound game* (see, e.g., Owen 1995, pp. 275ff) that essentially adds EC to all Council winning coalitions except for the grand coalition. This method has only occasionally been used in the context of the EU (see Kirman and Widgrén 1995, for instance), and here turns out *not* to produce power indications that are systematically more in line with the strategic approach (see the computations reported in the Appendix).

Note that one would obtain exactly a proportionally rescaled version of the SSI in our framework if, instead of looking at the probability of the event $\{\text{sign}(\partial x^*/\partial \mu_i) = 1\}$, one computed the probability of the events $\{(L) = i\}$, or $\{(R) = i\}$, or their union. That would count all preference configurations which make a given member state i pivotal inside CM. The reported differences between (normalized) strategic and non-strategic power result from some of these configurations being discarded or replaced in the computation of strategic power. We can distinguish three types of biases or sources of deviations. They are linked to the distinct preference configurations discussed in Section 4 and to the fact that the

under the Nice rather than the Lisbon rules irrespectively of the assumption about EC.

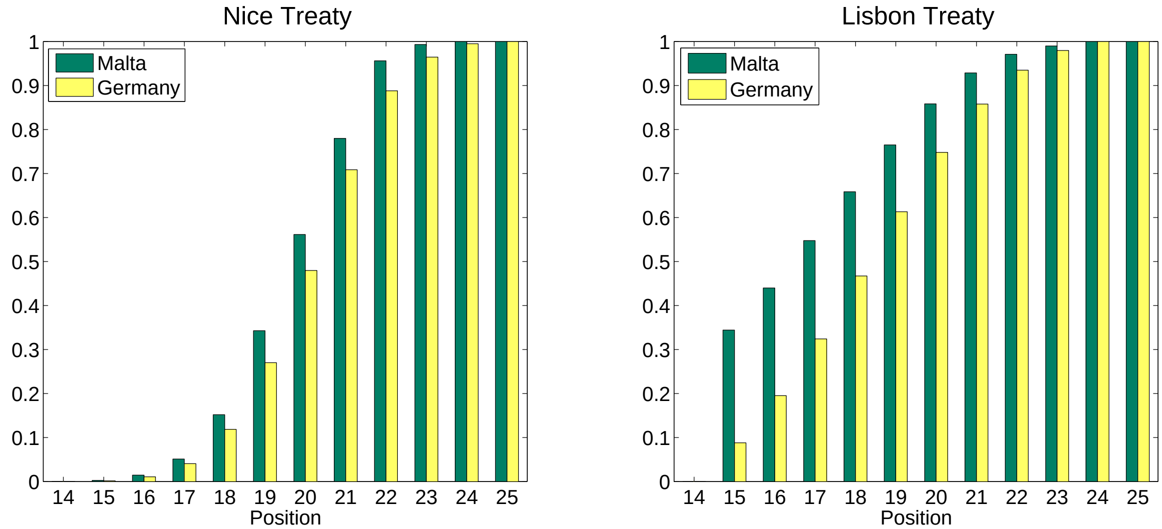

Figure 3: Cumulative conditional probability of being pivotal at a given position

probabilities of the four configuration types *conditional* on $\{(L) = i\}$ or $\{(R) = i\}$ are a priori different for different member states i.

Let us first point out the reason for the latter. The key observation is that large, medium-sized, and small countries a priori tend to be pivotal inside CM at different rank positions, associated with different locations inside the policy space $X = [0, 1]$. For instance, most of the pivot positions of small countries can under the Lisbon rules be attributed to the member majority requirement (15 out of 27). They are most often pivotal when they have the 15$^{\text{th}}$ position from the left or right. This is associated with an issue-specific ideal point located very much in the center of X. In contrast, a large member state has relatively more of its intra-CM pivot positions when the 65%-population majority requirement is binding. Then its ideal policy is located between one end of X and the positions of usually several more than 15 other countries. A large member state's ideal point therefore tends to be more extreme (closer to a boundary of X) when it is pivotal in CM.

This is illustrated by Figure 3. It depicts the probability of country i being pivotal at rank position k conditional on $\{(R) = i\}$ in cumulative terms for the largest and smallest EU members. Germany's pivot positions are already located more towards the right under the Nice Treaty a priori.[20] And this becomes much more pronounced under the Lisbon rules. Intuitively, small countries are pivotal inside CM in relatively small coalitions containing a few big countries, whilst big countries are pivotal inside CM in relatively large coalitions containing many small countries. This affects the magnitudes of the following three sources of deviations between SSI and nSMP.

[20] Formally, Germany's conditional pivot position distribution first-order stochastically dominates Malta's.

The first reason for possible deviations is that for ideal point configurations pertaining to case IV of Section 4, neither the CM member with ideal point μ_R nor the one at μ_L is, in fact, having influence on the outcome of legislation. The Commission's ideal point γ lies outside CM's Pareto set $[\mu_{(1)}, \mu_{(27)}]$, and EC either wants to move the status quo as little or as much as possible under the constraint that its proposal will not be overruled by a unanimous Council. The strategically relevant player is therefore either the one at position $\mu_{(1)}$ or the one at $\mu_{(27)}$, and neither player R nor L as presumed by the SSI. Moving from SSI values to SMP values hence involves removing μ_R and μ_L-positions from the counting, and adding a voter's respective $\mu_{(1)}$ or $\mu_{(27)}$-positions instead. Whilst the probability of events $\{(L) = i\}$ and $\{(R) = i\}$ depends on the population and weight distributions, those for $\{(1) = i\}$ and $\{(27) = i\}$ simply equal 1/27 for every country by symmetry. So large member states lose more pivot positions than they gain in this 'strategic correction' of the SSI. The result is a tendency for the SSI to *overstate* large members' relative power in CM and to understate that of small members. We will refer to this as the *boundary pivot bias* of the SSI. It is the more pronounced the more likely it is for the Commission's ideal point γ to lie outside CM's Pareto set. In particular, it only matters for the case of an independent EC, and plays no role in the dependent EC case.

The second source of differences between SSI and SMP, which translate into different ascriptions of relative power, is what seems adequately labeled as the *divided CM bias*. Namely, for ideal point configurations pertaining to case I, the players with ideal points μ_R or μ_L do not matter for legislation because there exists neither a qualified majority for shifting q to the left nor one for shifting it to the right. The Council is divided; the status quo q will persist. The corresponding intra-CM pivot positions are counted by the SSI but have to be discarded when one adopts a strategic notion power. If, hypothetically, the same proportion of such positions were discarded for all players, SSI and nSMP values could still coincide. However, the former is not the case because the random position $x_i = \mu_R$ of a large country i conditional on the event $\{(R) = i\}$ tends to be further to the right end of X than the corresponding position $x_j = \mu_R$ of a small country j conditional on the event $\{(R) = j\}$ (see Figure 3), and an analogous statement applies to μ_L. Paired with any given player other than i and j who is assumed to hold position μ_L, the interval $[\mu_L, \mu_R]$ is hence larger conditional on $\{(R) = i\}$ than conditional on $\{(R) = j\}$. This implies a greater probability for the random status quo q to lie inside $[\mu_L, \mu_R]$ in the former case. So proportionally more SSI-relevant intra-CM pivot positions of a large country are ineffective in a strategic sense, and need to be ignored. Again, a tendency for the SSI to *overstate* the relative power of large countries results. This will be the more pronounced the more the conditional distributions of μ_R and μ_L differ across the conditions $\{(R) = i\}$ and $\{(R) = j\}$. The divided CM bias hence matters more under the Lisbon rules, and plays a subdued role under the Nice rules.[21]

Finally, the third source of different relative power indications by SSI and SMP is the Commission's possibility to make its own ideal point γ the outcome of legislation. We will refer to this as the *agenda power bias*. For ideal point configurations pertaining to case II, the Council member with ideal point μ_R (or, respectively, μ_L) is undoubtedly the critical player *inside CM*. But he does not have an effect on the overall decision that is taken: when the Commission proposes its own ideal point, there is no unanimous agreement in CM to modify it, and accepting the proposal is better for a qualified majority than keeping the status quo. These intra-CM pivot positions are counted by the SSI. But they need to be discarded if one adopts a strategic perspective on the procedural context of Council decisions. Again, SSI and nSMP values might still coincide if all members of CM suffered identically from the Commission's agenda setting power. But, in analogy to the divided CM case, the probability of the events $\{q < \gamma < \tilde{\mu}_L\}$ or $\{\tilde{\mu}_R < \gamma < q\}$ depends on whether one conditions on a small or a large member state being the intra-CM pivot. In particular, the event $\{\tilde{\mu}_R < q\}$ is more likely, for any fixed q, the smaller μ_R tends to be (because $\tilde{\mu}_R = 2\mu_R - q$). Since small countries have (in a stochastic sense) smaller positions μ_R than large countries, the event $\{\tilde{\mu}_R < \gamma < q\}$ is conditionally more likely for them. So proportionally more of their intra-CM pivot positions do not translate into influence on legislation. This results in a tendency for the SSI to *understate* the relative power of large countries. The bias is particularly pronounced when the conditional distributions of μ_R (and μ_L) differ a lot between large and small countries, as they do under the Lisbon rules. Moreover, for any given $\tilde{\mu}_R$ and q, the magnitude of the bias increases in the probability of γ being located outside of $[0, \tilde{\mu}_R]$ and $[q, 1]$, i.e., the probability of lying more in the center of X. This implies a more pronounced agenda power bias under the assumption of a dependent EC than that of an independent one.

The reported differences between SSI and nSMP result from a superposition of these biases. For instance, in case of the Lisbon rules and a dependent EC, the agenda power bias points towards an understatement of large countries' strategic power by the SSI, whilst the divided CM bias points in the opposite direction. Little can be said upfront about which one dominates. But we can compare to, e.g., the case of an independent EC: the agenda power bias is then weaker, and the divided CM bias is complemented by boundary pivot bias. It follows that any net understatement by the SSI of large countries' relative strategic power for the dependent EC situation (as picked up by the nSMP) must be mitigated by

[21]A divided CM as such is more likely under the *Nice rules* than the Lisbon ones; SSI values hence tend to exceed the corresponding SMP values by more for the Nice rules. But differently sized countries face non-proportional differences, and these non-proportionalities are more pronounced under the *Lisbon rules* because the (on average smaller) size of interval $[\mu_L, \mu_R]$ is more country-specific.

EC independence, or even turned into an overstatement. As the computations show, the SSI does understate, for instance, Germany's relative strategic power under the dependent EC assumption (by about −14%), and indeed mildly overstates it under the presumption of an independent EC. We can also observe in Table 3 that the move from Nice to Lisbon rules increases the SSI's understatement of Germany's nSMP under EC dependence. So the Lisbon Treaty's strengthening of agenda power bias dominates its magnification of divided CM bias. This suggests a reduction in the corresponding net overstatement also under the independent EC assumption, which can also be observed in Table 2.[22]

The tempting claim that it is harmless to leave out strategic interaction in ceteris paribus analysis is wrong because internal voting rules affect the magnitudes of the described biases. Whether internal pivot positions in CM translate into influence on legislation or not depends on their location relative to the status quo and the policies pursued by the agenda setter. The latter depend on how the Commission forms its strategic objective; and CM voting rules determine the country-specific distributions of internal pivot locations.

7 Conclusion

A non-cooperative sensitivity-based power analysis can overcome traditional indices' main problem. Namely, strategic interdependencies are taken into account. They are a natural feature of procedural decision making. We conjecture that this partly accounts for why indices based on the fiction of independent 'yes'-or-'no' decisions have had difficulties in convincing practitioners – such as politicians who consult with lawyers rather than economists or political scientists on voting matters. Of course, the above analysis has shortcomings in this respect, too. In particular, unidimensionality and common knowledge of preferences are restrictive assumptions. We cannot rule out that a more sophisticated model of interaction between Council and Commission would change our findings. Modeling multi-dimensionality, log-rolling, or side payments between EU member states would make strategic analysis more realistic. Still, simplicity is a virtue and a main reason for why traditional power indices are considered useful tools by many academics. We have studied a setting that retains much of the straightforwardness of traditional power indices, whilst providing at least a first approximation of the EU Council's strategic legislative environment.

In our view, three main conclusions emerge from this investigation. The first one is that

[22] Recall that we have opted for the simple qualitative a posteriori power assessment based on sign$(\partial x^*/\partial\mu_i)$ in the SMP's definition. Had we instead worked with $\partial x^*/\partial\mu_i$, some configurations in which CM member i influences the outcome would have entered ξ_i with a leverage factor of 2. Since these configurations coincide with ones counted by the SSI, a correspondingly modified nSMP would have produced values somewhat closer to the SSI.

traditional, non-strategic power analysis of voting bodies and more complex strategic analysis do not produce very different a priori assessments of relative power in the Council. It seems fair to describe the differences in two or even three of the considered four legislative scenarios as negligible. This statement is conservative in the sense that the differences could have been smaller still: we opted for a binary ascription of a posteriori power. This is more similar to what traditional indices do than consideration of multiple degrees of a posteriori power would have been, but here happens to produce bigger numerical divergence (see fn. 22). It is, moreover, noteworthy that when the reported differences in relative power are sizeable (up to 63% for Lisbon rules and a dependent EC), they just match the magnitude of differences between assessments by distinct traditional indices. For instance, the normalized Penrose-Banzhaf index and the Shapley-Shubik index differ by up to 110% for the Lisbon rules. Still, many key qualitative findings of a priori analysis are very robust. For instance, the conclusion that the four largest EU member states gain significantly in relative influence under the Lisbon rules does not depend on whether one carries out a comprehensive intra and inter-institutional strategic power analysis or uses the short-cuts provided by traditional indices.

However, and this is our second major conclusion, such robustness should not be taken for granted. There are several differences between strategic and non-strategic power ascriptions; they imply distinct biases into different directions. These may cancel out each other, but they *need not*. The significant deviations under the Lisbon rules and the assumption of a dependent EC attest to this. It is hard to say, without carrying out any computations, which bias dominates in a given decision environment. Different internal rules and decision procedures can in principle produce very different net deviations. This calls for caution, even if analogous analysis of the EU's codecision procedure, reported in Napel and Widgrén (2009), reveals only small deviations between SSI and nSMP also for that decision protocol.

Finally, the investigation demonstrates that an encompassing simultaneous analysis of intra and inter-institutional influence on legislation yields insights that go beyond a strategic reassessment of relative power inside the Council. The move from the Nice to the Lisbon Treaty's rules a priori increases the ease with which new legislation can be passed. But this will empower the Commission rather than the Council. The latter's lower decision thresholds make it significantly simpler for the former to get its way. So the Council loses rather than gains influence in absolute terms. Traditional indices fail to pick this up. In case of Coleman's (1971) 'power of the collectivity to act', which is a close relative of the Penrose-Banzhaf index, they in fact yield wrong conclusions. Explicit modeling of strategic agenda setting is sometimes unavoidable. It affects indications of relative power in the EU Council by little; but regarding influence in absolute terms, significant conceptual differences go along with big numerical ones, too.

Appendix

Some procedural aspects of a sequential decision making protocol like the EU's consultation procedure can be picked up even within the traditional power index framework. In particular, if one is willing to disregard the Commission's special privilege to strategically select the proposal that is being voted on, it is possible to interpret decision making under the consultation procedure as a standard (compound) simple game. Its 28 players are the 27 members of CM *and* the European Commission; and a coalition $S \subseteq N = \{1, \ldots, 27, \mathrm{EC}\}$ is winning iff $S = \{1, \ldots, 27\}$ (corresponding to a unanimous Council) or we have (i) $\mathrm{EC} \in S$ and (ii) $S \setminus \{\mathrm{EC}\}$ is a winning coalition in the simple voting 'subgame' that reflects CM's internal voting system, i.e., the Commission and a qualified majority in CM support the considered exogenous proposal.[23]

Council members' PBI values (cf. equations (1)–(2)) for this 28-player simple game can be inferred in a relatively straightforward manner from the numbers calculated in the main text. In particular, the PBI of voter i in an n-player simple game corresponds to the number of coalitions in which i is a member and pivotal, scaled by factor $1/2^{n-1}$. For instance, Belgium's value of $\mathrm{PBI}_1 = 0.01547$ (see column 4 in Table 1) indicates that it is a critical member in approximately 1.038 million of the altogether about 67 million coalitions of which Belgium is part when the Council is studied in isolation. Now, if the Commission is added as the 28^{th} player, the number of coalitions which contain Belgium doubles to 2^{27}, or about 134 million. In this enlarged game, Belgium is pivotal, first, in the approximately 1.038 million coalitions that have it pivotal inside CM and additionally contain the Commission. Second, it is pivotal in the one coalition containing all CM members but not the Commission. For any Council member $i \in \{1, \ldots, 27\}$ the PBI value in the compound simple game which involves the Commission can accordingly be computed from the corresponding CM-only value, PBI_i, as

$$\mathrm{cPBI}_i = \frac{2^{26} \cdot \mathrm{PBI}_i \, + \, 1}{2^{27}}.$$

This essentially rescales the PBI values reported in Table 1 by factor 1/2. All statements in the main text concerning the comparison of Council members' normalized PBI and SMP values are unaffected.

Regarding Council members' SSI values in the 28-player game involving the Commission, recall that a voter i's SSI in an n-player simple game equals the number of orderings of the set $\{1, \ldots, n\}$ in which i swings the coalition comprising all players ordered to its left from losing to winning by joining it, scaled by $1/n!$. For any given ordering of the 27 CM members in

[23] One could also replace a unitary EC by 27 independent players, corresponding to individual Commissioners. A simple majority of these would have to be part of any winning coalition, except the one comprising a unanimous Council.

which voter i is having such a swing, say, at position k, there are k corresponding orderings of the 27 CM members *and* EC in which, first, the relative order of the CM members is unchanged and, second, EC is situated at a position to the left of voter i. Suppose that a contribution ϕ_{ik}^{CM} to country i's intra-CM SSI value, which is reported in Table 1, comes from orderings in which it swings at position k out of 27, i.e., let us consider the decomposition $\mathrm{SSI}_i \equiv \sum_{k=1}^{27} \phi_{ik}^{CM}$ which underlies Figure 3.[24] Then we can infer that there are $k \cdot 27! \cdot \phi_{ik}^{CM}$ orderings in the game *including* EC in which i swings at position $k+1$ out of 28. In addition, there are 26! orderings in which EC is the right-most player, country i is located at position 27, and can thus make the coalition of its 26 Council peers, who are located to its left, winning by joining it. Adding the latter kind of swings, where a unanimous Council does not need EC's support, to the former ones, where a qualified majority in CM agrees with EC, one obtains

$$\mathrm{cSSI}_i = \frac{27! \sum_{k=1}^{27} k\, \phi_{ik}^{CM} \; + \; 26!}{28!}$$

as country i's SSI in the 28-player compound game involving the Commission.

The corresponding numbers are reported in Table 4 together with the normalized values (ncSSI) which indicate countries' relative power in CM according to power index analysis of the compound game. The deviations between the latter and their normalized SMP counterparts are reported, too; they are not systematically different in magnitude from those reported in Tables 2 and Tables 3. The main intra-CM effect of considering the compound game is an increase in the relative power of small member states (compare SSI values in Table 1 to ncSSI-values in Table 4): they gain swings in configurations in which a unanimous CM forms a winning coalition without EC.

Note that the SSI power indications for CM in aggregate and for EC deviate widely from the corresponding SMP values. This remains the case even after normalizing the latter numbers in order to take out incidences of status quo confirmation, which efficient power indices like the SSI necessarily ignore. The reason for the divergence is that the compound game does *not* reflect the Commission's agenda setting power – it treats EC and CM like two equal chambers in a bicameral system. In particular, in the compound simple game approach, most situations in which EC can make strategic use of its agenda power in order to implement its own ideal point (cf. case II of Section 4) are wrongly counted as configurations in which some CM member – rather than the Commission – is critical for the outcome.

[24]The Nice and Lisbon rules' membership quotas of 50% and 55%, respectively, imply that $\phi_{ik}^{CM} = 0$ for small k, irrespectively of the considered country i.

Member state	cSSI (Nice)	cSSI (Lisbon)	ncSSI (Nice)	ncSSI (Lisbon)	$\frac{\text{(ncSSI-nSMP)}}{\text{ncSSI}}$ (Nice, indep. EC)	$\frac{\text{(ncSSI-nSMP)}}{\text{ncSSI}}$ (Lisbon, indep. EC)	$\frac{\text{(ncSSI-nSMP)}}{\text{ncSSI}}$ (Nice, dep. EC)	$\frac{\text{(ncSSI-nSMP)}}{\text{ncSSI}}$ (Lisbon, dep. EC)
Belgium	0.02576	0.01596	0.03387	0.02337	−1.2%	−0.5%	−0.1%	11.2%
Bulgaria	0.02150	0.01272	0.02826	0.01863	−0.9%	0.3%	0.9%	18.4%
Czech Republic	0.02576	0.01567	0.03387	0.02294	−1.2%	−0.4%	−0.1%	11.7%
Denmark	0.01530	0.01055	0.02011	0.01545	0.4%	0.9%	3.2%	25.7%
Germany	0.06540	0.10508	0.08596	0.15385	0.4%	−0.2%	−1.9%	−15.0%
Estonia	0.00917	0.00638	0.01205	0.00934	3.9%	4.2%	9.2%	53.3%
Greece	0.02576	0.01649	0.03387	0.02415	−1.3%	−0.5%	−0.1%	10.2%
Spain	0.05992	0.05325	0.07875	0.07796	−0.2%	−0.3%	−2.1%	−8.5%
France	0.06517	0.07760	0.08566	0.11362	0.3%	−0.4%	−2.0%	−12.2%
Ireland	0.01530	0.00951	0.02011	0.01392	0.4%	1.5%	3.3%	30.3%
Italy	0.06500	0.07160	0.08544	0.10483	0.2%	−0.6%	−2.1%	−11.6%
Cyprus	0.00917	0.00583	0.01205	0.00854	3.8%	4.9%	9.1%	59.9%
Latvia	0.00918	0.00730	0.01207	0.01069	4.0%	3.2%	9.3%	44.6%
Lithuania	0.01530	0.00838	0.02011	0.01227	0.4%	2.1%	3.3%	36.7%
Luxembourg	0.00917	0.00554	0.01205	0.00811	3.9%	5.5%	9.3%	63.9%
Hungary	0.02576	0.01522	0.03387	0.02228	−1.2%	−0.3%	−0.1%	12.6%
Malta	0.00713	0.00547	0.00937	0.00800	6.2%	5.6%	13.3%	65.0%
Netherlands	0.02776	0.02207	0.03649	0.03232	−1.4%	−1.1%	−0.4%	3.1%
Austria	0.02150	0.01346	0.02826	0.01970	−0.9%	0.0%	0.9%	16.6%
Poland	0.05962	0.04514	0.07836	0.06609	−0.4%	0.2%	−2.2%	−8.8%
Portugal	0.02576	0.01583	0.03387	0.02318	−1.2%	−0.4%	−0.1%	11.4%
Romania	0.03004	0.02783	0.03948	0.04074	−1.3%	−0.9%	−0.7%	−0.9%
Slovenia	0.00918	0.00708	0.01207	0.01036	4.0%	3.4%	9.2%	46.4%
Slovakia	0.01530	0.01046	0.02011	0.01531	0.4%	1.0%	3.3%	26.1%
Finland	0.01530	0.01037	0.02011	0.01518	0.4%	1.1%	3.3%	26.5%
Sweden	0.02150	0.01438	0.02826	0.02106	−0.8%	−0.2%	0.9%	14.4%
United Kingdom	0.06504	0.07383	0.08549	0.10810	0.2%	−0.5%	−2.1%	−11.8%
CM total	0.76079	0.68299	1	1				
Commission	0.23921	0.31701						

Table 4: SSI power indices in compound game involving CM and EC under Nice and Lisbon Treaty (compared to approximate SMP for independent or dependent EC)

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