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WHAT'S WRONG WITH EU SPATIAL ANALYSIS?

THE ACCURACY AND ROBUSTNESS OF EMPIRICAL APPLICATIONS TO THE INTERPRETATION OF THE LEGISLATIVE PROCESS AND THE SPECIFICATION OF PREFERENCES

Dirk Junge and Thomas König

ABSTRACT

EU legislative analysis has been enriched by insightful controversies over the interpretation of the policy process. This debate has concentrated on the interpretation of the process by focusing on the identification of the agenda setter and the relevance of voting weights, but little attention has been paid to the accurate specification of the second component of spatial analysis, the preferences of the actors involved. Although a misspecification can seriously distort the predictions of spatial theory, empirical applications often tend to reduce the number of dimensions, exclude actors' saliencies and assume continuous policy issues. Using computer simulation we show that spatial models are more robust to a misinterpretation of the policy process than to a misspecification of actors' preferences, and that their institutional elements are less decisive for the models' outcome predictions. Our empirical analysis confirms these results and provides detailed insights into the impact of the institutional and the preference component of spatial theory. We conclude that scholars should pay more attention to the accurate specification of the preference component of the models to improve our understanding of legislative decision making in the EU.

KEY WORDS ● agenda setting ● empirical testing ● error tracking ● EU decision making ● procedural models ● spatial analysis ● veto players

The Components of Spatial Analysis: Institutional Provisions and Actors' Preferences

Spatial analysis has a long tradition in EU legislative research and has improved our understanding of the various procedural provisions in the institutional framework of the EU.[1] After Tsebelis's (1994) and Steunenberg's (1994) controversy on the European Parliament's (EP) conditional agenda setting and veto power, a

1. In contemporary political science and economics, spatial models are useful analytical tools for describing the logic of collective choices. The basic idea is that actors and choices can be located as

number of spatial analysts studied the inter-institutional power implications of the consultation, co-operation, co-decision and assent procedures. These analyses raised an insightful debate on the interpretation of the policy process which can crucially affect the power distribution between the member states of the Council, the Commission and the EP (Steunenberg, 1994, 1997, 2000a, 2000b; Tsebelis, 1994, 1996; Garrett, 1995; Crombez, 1996, 1997, 2000; Moser, 1996, 1997a, 1997b; Tsebelis and Garrett, 1996, 1997, 2000; Scully, 1997a, 1997b; Rittberger, 2000).

Compared to the rich literature on the interpretation of the policy process, little attention has been paid to the specification of preferences for empirical analysis. König and Pöter (2001), for example, evaluated the predictive power of competing interpretations of the co-operation procedure proposed by Tsebelis (1994), Tsebelis and Garrett (1997, 2000), Steunenberg (1994), Crombez (1996) and Moser (1996), pointing to differences produced by one- and two-dimensional specifications of the policy space, while the controversial interpretations of the policy process hardly affected the outcome prediction. More recently, Selck (2003, 2004), and Steunenberg and Selck (2006) confirmed this results when they assessed the predictive power of spatial models in the consultation and the co-decision procedure based on 66 legislative proposals from the DEU study (Thomson et al., 2006). Although the authors evaluate outcome predictions of spatial models, their specification of actors' preferences – in particular the exclusion of saliencies and weighted votes – risks distorted findings, raising questions on the robustness of spatial models and the impact of each specification on the explanatory power of spatial analysis.

This article takes a closer look at the robustness of spatial models to different interpretations of the policy process and the specification of the number of issue dimensions, actors' saliencies on issues, and the metric of the policy issues. For the purpose of analysis, we begin with studying the impact of these elements using computer simulations. Our simulations suggest that the dimensionality of the policy space and the inclusion of actors' saliencies are much more important for empirical analysis than the identification of the agenda setter or the weighting of votes. Using data from the DEU study on a large number of Commission proposals we test these expectations and find that the number of dimensions is most important for changes in the outcome prediction, though the data contain only few higher-dimensional cases. The consideration of voting weights hardly matters for the outcomes of the analyses, while the inclusion of saliencies and the nature of the policy issues almost always change the models' predictions to a considerable extent.

points in a policy space, and that their utility gain from specific choices can be expressed as some distance between these points (for more detail, see Hinich and Munger, 1997).

Process Interpretation: Specifying EU Legislative Decision Making

Recent EU spatial analysis has focused on the various interpretations of the legislative process which usually impact the size of the winset as well as the distribution of veto and agenda-setting power, and hence the predicted outcome of legislative initiatives. Compared to the intensely debated co-operation and co-decision procedures, scholars widely agree on the interpretation of the consultation procedure:[2] briefly summarized, the Commission formally initiates a proposal,[3] asks for the EP's opinion and submits the proposal to the Council. Whether the Council adopts the proposal by unanimity or qualified majority is defined by the legal basis of the proposal, but the Council can always amend it unanimously.[4] Under these conditions, conventional applications of spatial models conceive of a game between the Commission, the members of the Council and – in case of co-operation and co-decision procedure – the EP. Most often, scholars assume that the Commission and EP are unitary actors, and that the Council is composed of representatives of member states with diverging interests.

Figure 1 illustrates a simple conventional specification of the winset and agenda setting in the consultation procedure. In this picture, Council members and the Commission have different (ideal) positions on a single issue.[5] If unanimity is required in the Council, the Commission is assumed to propose a policy from the set of policies that are acceptable for all member states, which is called the unanimity winset. The basic assumption is that Council members accept policies that are closer to their ideal points than the alternative in the event of rejection (the so-called reference outcome). A further restriction for agenda setting is the Pareto set of the Council, which contains the set of policies that cannot be amended without implying losses for at least one member state. The thin grey line in the figure shows the unanimity winset, and the section between the left- and rightmost Council member (dark grey line) defines the Pareto set of the Council. If the Council decides by unanimity, the Commission will propose Out(U), that is both within the unanimity winset and the Pareto set of the Council; otherwise the Commission proposal will be amended.

Under Council qualified majority voting (which requires about 72% of the Council votes; in our simplified version 5 out of 7 members), Crombez (1996)

2. For more details, see Dinan (1994). Farrell and Heritier (2007) provide an overview of the different interpretations of the co-decision procedure.

3. Though the Commission has *de jure* a monopoly on the right of initiative, a large part of legislation is *de facto* initiated on request of the Council or the EP (see for example, Rasmussen, 2007).

4. Qualified majority defines a voting threshold of about 71 per cent of the votes, which are approximately weighted according to the countries' population size.

5. In most analyses, actors are assumed to have one-dimensional, symmetric preferences, meaning that they consider only a single issue and distances between alternatives on this issue matter for all actors equally.

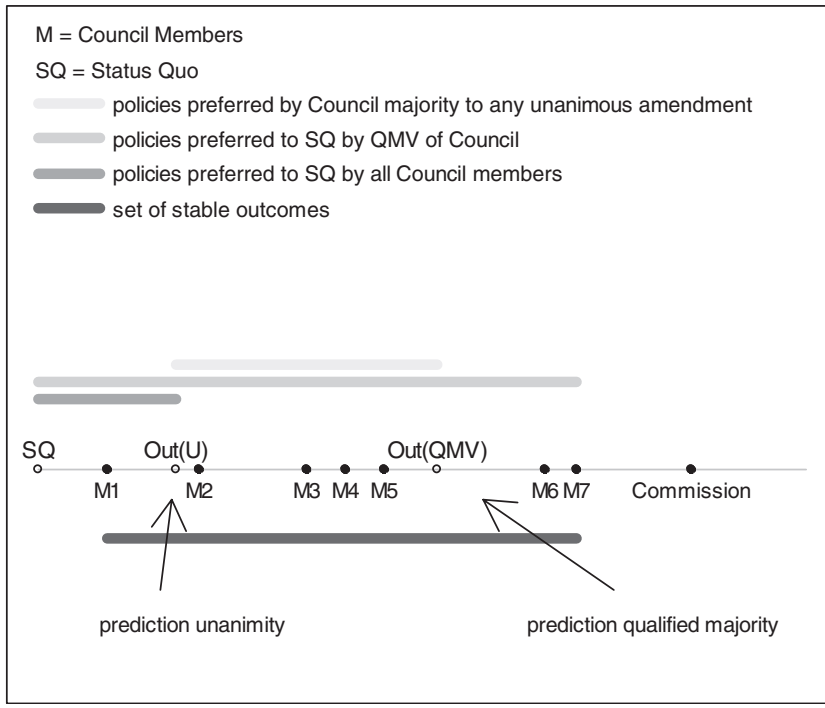

Figure 1. A Spatial Model of Legislative Decision Making in the EU: The Consultation Procedure – One-dimensional Policy Space

and Steunenberg and Selck (2006) assume that the Commission will propose the closest policy to its ideal point that is both within the majority winset and the Pareto set of the Council. The argument is that the Commission avoids amendments by proposing a policy that cannot be changed without disadvantages for at least one member state. This interpretation implies that the Council considers amendments sequentially, deciding finally between the Commission proposal and the reference outcome (Crombez, 1996). As a consequence, a Council member can enforce a final decision between the reference outcome and the Commission proposal in the Council, which will then be adopted, even if an overwhelming majority would prefer an amendment.[6] Tsebelis (1994), by contrast, argues that a (qualified) majority in the Council must always prefer a

6. A minority of the Council can propose amendments but unanimity is required for their *adoption*.

Commission proposal to all amendments. Accordingly, the Commission proposes the closest policy to its ideal point that is within the qualified majority winset of the Council and yields gains for a qualified majority compared to any possible Council amendment (Out(QMV)) and that must be located in the Council's unanimity winset and the Pareto-set. If such a policy does not exist, the Commission proposes the closest policy in the intersection of the unanimity winset and the Pareto set.

In the more complex co-decision procedure, the EP can veto proposals or amend them by simple majority. If a parliamentary amendment is not approved by the Commission, all Council members must agree on the amendment; otherwise the required majority in the Council is sufficient for adoption (usually a qualified majority, but some provisions also require unanimity in the co-decision procedure; see legal basis). The Council can also amend proposals introduced by the Commission or the EP. In contrast to the consultation procedure, the required majority for adopting an amendment in the co-decision procedure is the same as for the adoption of the initial Commission proposal (usually a qualified majority). Compared to the interpretation of the co-operation procedure, much of the co-decision procedure debate refers to the conciliation process, which established a bicameral procedure between the Council and the EP with implications on the agenda-setting right (König et al., 2007).

In their 'comparative' analysis of spatial models, Steunenberg and Selck (2006) distinguish between the Commission, the Parliament and the Council agenda-setting model. According to Steunenberg (2001),[7] Tsebelis and Garrett (2000), and Crombez (2003) the Commission can still shape the final outcome, since amendments of the initial proposal may not find the necessary support in the EP and the Council. For this reason, they conclude that the Commission takes the lead in the process and proposes the closest policy to its ideal point that cannot be amended by one of the two institutional actors but is preferred to the status quo. Other authors argue that the Commission is no longer relevant in the co-decision procedure, since the Council and the EP may always change the initial Commission proposal in the conciliation committee (see, for example, Crombez, 2000, 2001). At this point, scholars disagree on whether the Council or the EP is decisive in this process. According to Steunenberg (1997) and Crombez (2000),[8] the EP takes the lead and submits a proposal to the Council that is preferred by the required majority to the status quo. In contrast, Garrett (1995), Crombez (1997, 2000) and Tsebelis and Garrett (1997) argue that the Council takes the lead and makes a proposal that the EP will prefer to the status quo.

To assess the impact of agenda setting in the policy process, we follow Steunenberg and Selck (2006) and compare the distance between the outcome

7. Note however, that Steunenberg (2001) uses a reduced model to assess the impact of parliamentary participation in the EU more generally in his article.

8. Crombez (2000) allows for both possibilities.

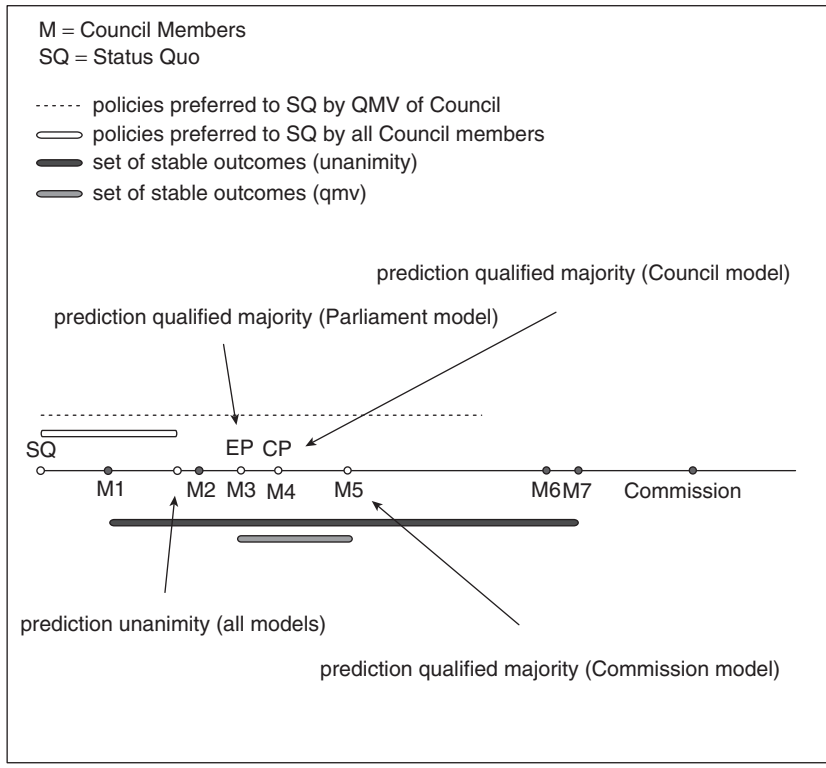

Figure 2. A Spatial Model of Legislative Decision Making in the EU: The Codecision Procedure– One-dimensional Policy Space

predictions of all three agenda-setting models. For this purpose, it is necessary to use identical technical definitions and to retain unchanged all other model characteristics. Thereby, we follow the argument of a simultaneous consideration of all possible amendments and assume that final outcomes must beat all possible amendments and the status quo. Figure 2 illustrates the impact of the different interpretations for the power distribution in the co-decision procedure. The reader will quickly uncover that the set of stable and acceptable policies corresponds to our first example and that all models predict the same outcome under unanimity. But under qualified majority rule, the location of the outcome depends on whether the Commission, the EP or the Council President (CP) is assumed to be the decisive agenda setter.

On closer inspection of the figures, the reader can easily trace the current debate in EU spatial analysis. Briefly summarized, scholars focus on the interpretation of the policy process, and they usually assume complete information on

actors' positions and the procedural provisions. Few analyses have captured voting weights and considered more than one dimension, and none of them has yet included the nature of the policy issues and the saliencies of actors. In some situations, however, a specific configuration of actors' preferences may facilitate or complicate a change of the status quo, that is, when actors' saliencies overlap or coincide. When actors attach similar saliencies to the issues at stake, the winset usually shrinks, while package deals are facilitated when one actor is more concerned about the first and the other about the second issue. This raises the question of whether and to what extent the predictions of spatial analyses are driven by the interpretation of the policy process or an accurate specification of the actors' preferences, and whether the identification of the agenda setter is more important for shaping the outcome prediction than other elements of spatial analysis.

Process Provisions, Preferences and Outcomes

Instead of presenting another interpretation of the policy process, our goal is to determine the robustness of spatial models to different specifications of actors' preferences. These specifications comprise the number of dimensions, actors' saliencies and the nature of the policy issues. To gain more theoretical insight into the robustness of spatial models, we add each of these elements to a less specified model and calculate the distance between outcome predictions for 1000 randomly generated decision-making configurations.[9] We draw positions, saliencies, reference points and, for the discrete case, policy options from a uniform distribution. Our scale ranges from 0 to 100 as the lower and upper bounds, and facilitates comparison with the empirical data from the DEU project without affecting the results of the analysis. For the same reason, we randomly assign 60 per cent of the cases to the consultation procedure and 40 per cent to the codecision procedure, and 60 percent require qualified majority voting and 40 per cent unanimity in the Council (Thomson et al., 2006). While the simulation will provide theoretical insight into the robustness of spatial models, the closeness to the DEU data allows us to examine these insights by empirical analysis.

The Impact of Procedure

Most of the literature on EU spatial analysis focuses on the interpretation of the legislative process, in particular on the identification of the agenda setter. Table 1 lists the mean difference between the outcome predictions across the 1000 simulated cases for the three main interpretations of legislative decision making as

9. As the measure of distance we use Euclidean distances, which are standardized by the square root of the number of dimensions to values between 0 and 100 independent of the dimensionality of the policy space.

Table 1. Mean Distances between Outcome Predictions of Different Agenda Setters

	Commission Model	Parliament Model	Council Model
Commission Model	0	1.79	1.72
EP Model		0	1.83

described by Steunenberg and Selck (2006), who call these interpretations the Commission model, the Parliament model and the Council model.

According to the results in Table 1, there is only a moderate difference between the outcome predictions of the three different agenda setters (for the identification of the winset and the pareto set, see appendix).[10] The small distances between the three models indicate a relatively high robustness of spatial models to modifications of the agenda setter. This suggests that although these differences might matter for the evaluation of competing interpretations of the legislative process, we expect that the identification of the agenda setter is less decisive for explaining legislative outcomes than the literature suggests.

The Number of Conflict Dimensions

Most recently, several authors made significant progress in spatial modeling by accounting for more than one-dimensional policy spaces. This is an important innovation because early social choice research already told us that the number of dimensions changes the power of the agenda setter and the location of outcomes (Plott, 1967; McKelvey, 1976; Tollison and Willet, 1979; Riker, 1986, 1993; Tsebelis, 1997). Figure 3 illustrates the consequences of adding dimensions.

Compared to the previous figures, actors also have preferences on a second issue, which allows them to trade between these issues.[11] The circles illustrate actors' indifference curves to the reference outcome and their potential for trade. The dark grey area represents the unanimity winset, the light grey area the majority winset,[12] and the points Out(U) and Out(QMV) the proposals which

10. Note that we report the overall impact across all cases, even though in some cases the different interpretations and specifications may not matter for the outcome predictions. A different solution would be to report the mean difference between the models only for those cases in which these characteristics effectively matter. In that case, the reported effects of process misinterpretations and preference misspecifications would increase in all tables. We report however the overall impact across all cases because the sample size does not change which facilitates comparisons across the models. Moreover, we believe that the overall bias is of greater practical interest for the researcher who wishes to minimize this bias in quantitative analyses. In this regard, the frequency of a bias is at least as important as the average size of the bias each time it occurs.

11. The grey reference line in the middle illustrates the policy space from the first figure.

12. Note that voting weights are excluded at this stage of the analysis.

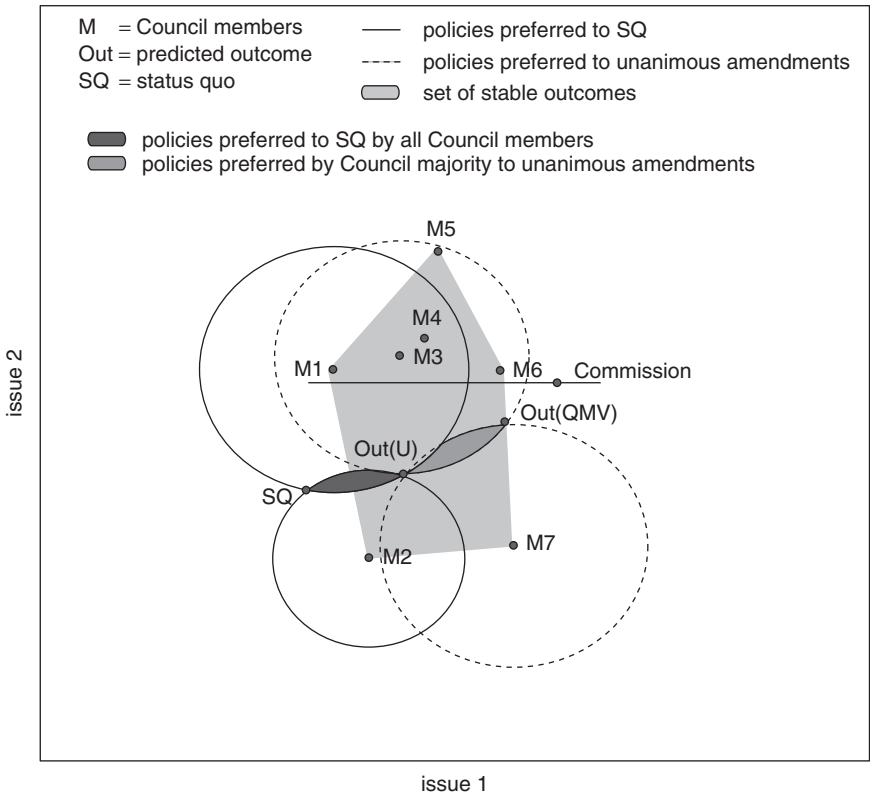

Figure 3. Accounting for Multiple Conflict Dimensions in EU Spatial Analysis (Consultation Procedure, Decisive Indifference Curves Only)

would be submitted by the Commission under the respective decision rule. In contrast to the previous one-dimensional specification, the additional dimension offers compensation on the second issue. As a consequence, all outcomes are much closer to the Commission's ideal point than in the previous one-dimensional case.

Table 2 shows the mean distances between the outcome predictions for the simulated data if dimensions are dropped from the analysis. For each case, we include the indicated number of dimensions and calculate the distance between the outcome prediction of the less and the more comprehensive model, the latter always including the dimensions of the former. For convenience, we only report the results for the fully specified model at this stage assuming that the Commission is the agenda setter in a continuous policy space, and saliencies and voting weights do not (yet) matter.

Table 2. Differences of Model Predictions for Different Numbers of Dimensions

Dimensions	1	2	3	4	5
1	0	6.48	10.16	12.31	13.77
2		0	7.31	10.32	11.93
3			0	6.89	9.30
4				0	6.91

The effect of removing a dimension on the outcome prediction is almost constant. Regarding the relative impact of this specification, we also find that changing the dimensionality of the policy space shapes outcome predictions much more than the type of agenda setter. Moreover, the relatively high variance of outcome predictions suggests that misspecification of the policy space highly risks biasing the findings.

Saliencies and Voting Weights

The controversy between scholars of the spatial approach and voting power analysts has recently attracted much attention for the impact of voting weights (i.e. Garrett and Tsebelis, 1999a, 1999b, 2001; Machover and Felsenthal, 2001, 2004) but there exists – to our knowledge – no EU application of spatial models which reflects how much distances in the policy space *matter* to the actors involved. Quite often, one unit of distance in one dimension might have a different importance for an actor than one unit of distance in another dimension.[13] In spatial analysis, differing importance of issues is represented by elliptically shaped indifference curves in Figure 4.[14]

The actors have the same positions as in Figure 3, but the two actors M1 and M3 are more concerned about the first, while the actors M2 and M7 are more interested in the second issue. This implies that actors must receive higher compensations for concessions made on the issue more salient to them. In our example, we find two distinct majority winset-Pareto-set intersections but the unanimity winset almost disappears and considerably alters the prediction of the spatial model.

From voting power analysts, applications of spatial models have been criticized for disregarding actors' voting weights under qualified majority voting

13. For a discussion of alternative interpretations and representations of saliencies outside spatial analysis, see Humphreys and Garry (2000), and, more closely to EU empirical applications, Bueno de Mesquita (2004), Selck (2004) and Thomson and Stokman (2006).

14. The ratio of the diameters of the ellipses is the inverse of the ratio of the saliencies attached to the respective dimensions in the example. See for more details on the calculation, Enelow and Hinich (1984, 1990).

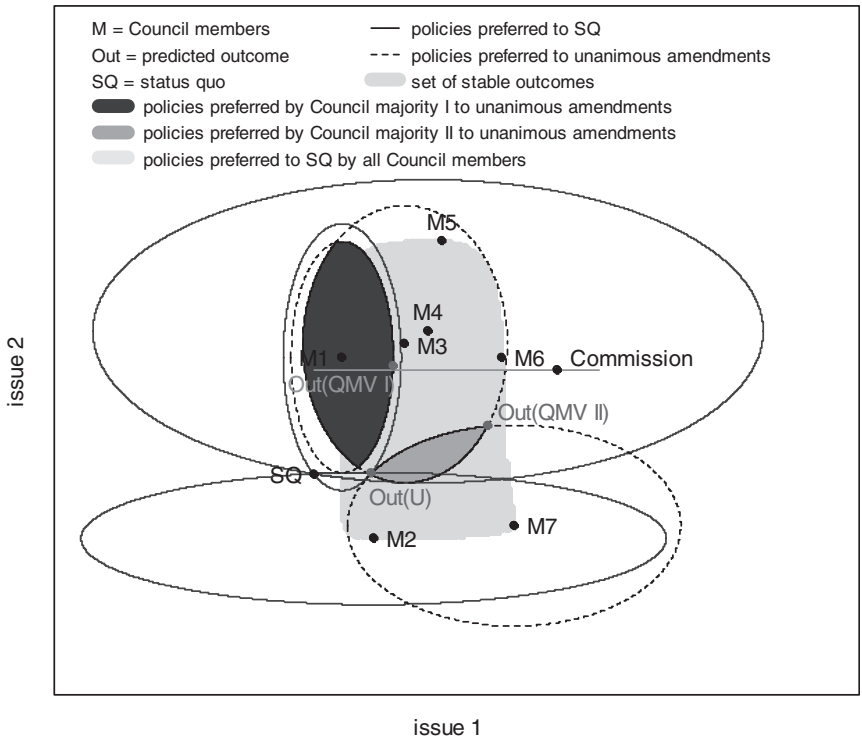

Figure 4. Accounting for Issue Salience in EU Spatial Analysis (Consultation Procedure, Decisive Indifference Curves Only)

because the treaties always provide large countries, such as Germany, Italy, France and the United Kingdom with more votes than smaller countries, such as Denmark, Ireland, Finland or Luxembourg. Under qualified majority rule, about 72 per cent of total weighted votes are needed for the adoption of a Commission proposal. Figure 4 also illustrates how voting weights change the location of the winset: if all actors have the same number of votes, any proposal in either set would receive the required majority of votes. However, if actor M1 has one more vote than actor M7, only the upper set will find sufficient support and the Commission will propose Out(QMV I). To determine the relative robustness of spatial models regarding saliencies and voting weights, we again add each of these elements to a less accurate model, and calculate the mean distance between the predictions for the 1000 simulated cases.

According to Table 3, outcome predictions are relatively robust to the disregard of voting weights. Note that voting weights can only shape the outcome when qualified majority rule applies in the Council (60% of the cases).

Table 3. Differences in Predictions by Specifications: Voting Weights and Saliencies

Specification	No Saliencies and No Voting Weights	No Saliencies and Voting Weights	Saliencies and No Voting Weights	Saliencies and Voting Weights
No Saliencies and No Voting Weights	0	3.08	7.12	8.13
No Saliencies and Voting Weights		0	8.08	7.76
Saliencies and No Voting Weights			0	3.94

Saliencies, by contrast, have always an impact on outcome predictions, independent from voting rule or procedure. This suggests that the inclusion of voting weights will affect outcome prediction less than the accurate specification of saliencies.

The Nature of Policy Issues

While empirical studies on EU legislative politics find that most policy issues are of a restricted, often dichotomous nature, spatial models usually assume continuous policy issues. In Figure 5 we show how discrete policy issues can change the outcome prediction. For simplicity, we assume that the first dimension is a continuous and the second a binary issue that can only be decided by 'Yes' or 'No', and these two options are located on the upper and the lower end of the second dimension.

Due to the binary nature of the second issue, the agenda setter's proposal is restricted to the level of these two alternatives, which are illustrated by the two lines cutting through the policy space at the level of alternative 1 and 2 on the second dimension.[15] This demonstrates that a two-dimensional policy space with one binary issue can also be represented by two connected one-dimensional policy spaces. The agenda setter determines the optimal policy proposal for each of the two spaces separately and selects the proposal that leads to the outcome closer to its ideal position. This decreases the power of agenda setting and the likelihood for policy change.

Table 4 shows that the outcome predictions of the model are quite sensitive to ignoring discreteness of policy options in the simulation. Generally, the impact of misspecification depends on the number of alternatives that exist for outcomes on each dimension, and we calculate their effect for a change from a continuous to 2 up to 5 options on each dimension. For higher numbers of alternatives, outcome predictions come closer to those of the continuous model.[16]

15. The two cutting lines must always be orthogonal to the second issue; other slopes would imply continuous alternatives on this dimension.

16. Note that the number of alternatives per dimension ranges between 3 and 4 on average in the empirical data from the DEU project (Thomson et al., 2006).

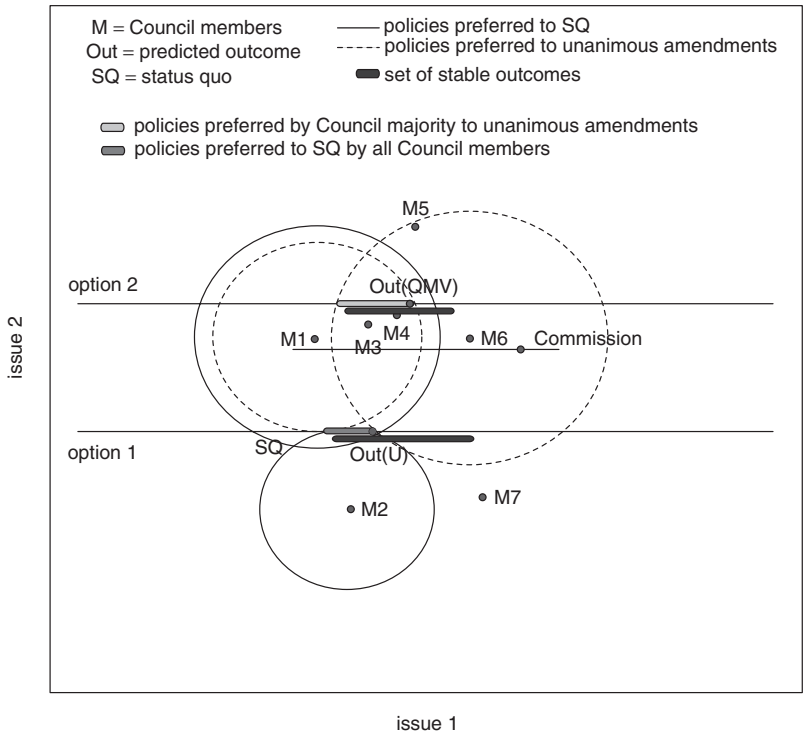

Figure 5. Accounting for Discrete Alternatives in EU Spatial Analysis (Consultation Procedure, Decisive Indifference Curves Only)

Table 4. Predictions by Specification: Discrete and Continuous Policy Issues

Specification Options/ Dimensions	No Saliencies and No Voting Weights	No Saliencies and Voting Weights	Saliencies and No Voting Weights	Saliencies and No Voting Weights
Two Options	14.03	15.20	12.92	14.07
Three Options	13.05	14.14	12.19	13.36
Four Options	12.10	13.17	11.66	12.74
Five Options	11.31	12.33	11.15	12.23

These results reveal how important the accurate specification of the preferences is. For each number of options we find an almost constant high change in the outcome prediction of the continuous model. Most variance of the models' outcome predictions is caused by the specification of preferences, while research has focused on the interpretation of the process and the identification of the

agenda setter. Compared to the impact of agenda-setting and voting weights, we expect that the accurate specification of the number of dimensions in the policy space, the exclusion of saliencies and the nature of the policy issues will seriously affect spatial analysis. To evaluate our expectations, we use data from the DEU project and test the robustness of spatial models of EU legislation.

The DEU Data: A Quantitative Case Study

In recent years, EU legislative politics has expanded in terms of the number of member states as well as in scale and scope. Very briefly stated,

- the number of integrated policy sectors increased from the three central national security domains of coal and steel, nuclear and agriculture politics to include some core national domains of economic, internal and foreign politics (Moravcsik, 1998);
- the institutional framework established a Commission with an almost exclusive right to initiate legislative proposals, facilitated the participation of the EP, and allowed the effective use of qualified majority voting among the member states in most policy sectors (Hix, 2005);
- the amount of binding legislation increased from a few regulations to more than 350 pieces of legislation per year with a very high adoption rate of about 80 per cent, and some of the proposals are decided even after a decade of negotiations (König et al., 2006).

With respect to this development, a major goal of the DEU study has been the evaluation of competing decision-making theories by predicting legislative outcomes of Commission initiatives. For this purpose, an international team collected estimates on the preferences of the 15 member states plus the Commission and the EP including their positions on each issue of the legislative proposal and the saliencies they attached to these issues (Thomson et al., 2006). The dataset also contains information on the location of the reference outcome and the outcome of the proposals, which were subject to either the co-decision or consultation procedure and have been discussed in the Council between January 1999 and December 2000. Each of these 66 proposals represents a case that attracted some public awareness in the period under study. A second selection criterion was the presence of some controversy between the actors involved in the decision making of the proposal.[17]

The DEU data on 66 proposals is neither a large-*N* quantitative study, nor a single case study. Sample selection followed the aforementioned two criteria,

17. To guarantee some public awareness and controversy, only proposals have been selected for the study that had been mentioned in *Agence Europe*, a news service on European Union Affairs, and revealed at least a minimum level of conflict in the interviews (Thomson et al., 2006).

Table 5. Procedures and Voting Rules for the Commission Proposals in the DEU Data Set

Procedure	Council Voting Rule	Number of Proposals	Percentage	Numbers of Issues	Percentage
Co-decision	Qualified Majority	21	32%	56	34.6%
	Unanimity	5	7.5%	12	7.4%
Consultation	Qualified Majority	22	33.5%	55	33.9%
	Unanimity	18	27%	39	24.1%
Total		66	100%	162	100%

and experts were mostly interviewed before the decision on the proposal had been made. Table 5 depicts the DEU sample distribution with respect to the Council voting rule and the involvement of the EP. Most of the proposals were decided under the consultation procedure, and about 65 per cent by qualified majority rule in the Council, which applies voting weights of the member states. None of the proposals is still pending or has been rejected.

Each proposal contains one or more contested issues. Estimates for the dimensionality of the proposal, the preferences (ideal positions and saliencies) of the 17 actors, the reference point and outcomes were gathered in expert interviews. For each issue, the interviewees were asked to assign the extreme values on a scale from 0 to 100 to the actors with the extreme positions. Following, they located the actors with intermediate positions on this scale (see for more detail, Thomson et al., 2006). Like any expert study, the DEU data have some measurement shortcomings, but a first cross-validation revealed that the DEU estimates are highly reliable and independent from the institutional affiliation of the interviewed experts (König et al., 2007).[18]

To sum up, the DEU dataset comprises valuable and reliable information on 162 contested issues in 66 proposals. On closer inspection, we find that only 21 per cent of all proposals are one-dimensional, 38 per cent are two-dimensional, and 41 per cent of the proposals have higher dimensional policy spaces with between three and six issues. Moreover, in 95 per cent of the cases, a limited

18. Comparing the DEU with data on seven cases negotiated in the conciliation committee, König et al. (2007) find a surprisingly high similarity regarding the point locations of the EP, Commission, status quo, outcome and the Council Pivot. Even though most experts were rapporteurs, while the DEU experts came primarily from the Council, and even though these experts were asked at different points in time, the point location of 15 positions is the same (deviation of 0–5 on the scale ranging between 0 and 100), 13 positions are very close (deviation of 6–25), four positions are not comparable due to missing values, and only three measures indicate a large deviation (50, 50 and 70). On closer inspection of these three deviating cases, two of them list a scant Council qualified majority position, while the minority position is again almost identical with the Council estimate. This suggests that the Council may have introduced the minority position in the bargaining of the conciliation process.

number of alternatives existed for at least one dimension. About two-thirds of the proposals were decided by qualified majority voting. All of the cases present different saliencies for the actors involved, 79 per cent of these cases are multidimensional and should reflect these differences in the shape of the actors' utility functions. In short, only one case from the DEU data set has been accurately specified by previously applied spatial models, which reduced the number of dimensions, excluded saliencies and voting weights and ignored the nature of the policy issues.[19] This raises the question of whether it is spatial theory or the accurate specification of the theory that produces the observed high errors (Achen, 2006).

The Robustness of Spatial Models: An Empirical Assessment

To evaluate our expectations derived from computer simulation we apply the previously employed models of legislative decision making to the DEU data. Because 18 proposals in the DEU dataset contain missing values on the reference outcome, we must drop them from the analysis and use the remaining 48 cases for our purpose (for description, see Appendix). As in the simulation, we determine the robustness of the models by calculating the mean distance between the outcome predictions for the specifications of the theory in applied research: agenda setting, the number of conflict dimensions, the salience of issues, voting weights and the nature of the policy issues. Table 6 shows the mean distance of the outcome predictions for the three most common interpretations of agenda setting. The results support our expectation derived from computer simulation: outcome predictions are relatively robust to specification of agenda setting, even though the distances are larger than the simulation suggested.

According to Table 7, dropping dimensions has a larger effect than expected, and a 13-times larger effect on outcome predictions than making a different assumption on agenda setting. This confirms our insights from computer simulation too. Unsurprisingly, the differences decrease with a lower number of dimensions, but even dropping a single dimension changes the outcome prediction more than any modification of the agenda setter.

19. The DEU data – like all empirical studies – also contain missing values. For more than half of the 162 issues, there is no information for at least one variable of the analysis, that is, the reference outcome and the position of an actor. In some cases this missing information can pose a significant problem for the evaluation of decision-making theories because they usually assume complete information on the variables of the game (König et al., 2005). While research on missing values emphasizes the superiority of multiple imputation techniques against listwise deletion, the question is which imputation method should be applied. In the following, we employ the most prominent current imputation algorithms, AMELIA, for the imputation of missing actor positions (King et al., 2001). However, if proposals contained missing values for the reference outcome, we had to drop these cases.

Table 6. Mean Distances between the Outcome Prediction of Different Agenda Setters

	Commission Model	Parliament Model	Council Model
Commission Model	0	7.03	3.30
EP Model		0	7.87

Table 7. Differences of Model Predictions for Different Numbers of Dimensions

Dimensions	1	2	3	4	5
1	0	8.53	22.17	37.13	40.14
2		0	17.96	29.23	31.50
3			0	11.05	11.24
4				0	9.81

Table 8. Differences in Predictions by Specifications: Voting Weights and Saliencies

Specification	No Saliencies and No Voting Weights	No Saliencies and Voting Weights	No Saliencies and No Voting Weights	No Saliencies and Voting Weights
No Saliencies and No Voting Weights	0	3.18	9.49	11.08
No Saliencies and Voting Weights		0	10.30	10.38
Saliencies and No Voting Weights			0	6.71

Compared to the results of the computer simulation, our empirical findings indicate a higher sensitivity to the misspecification of both agenda setting and the number of dimensions. The simulated uniform distribution of preferences obviously underestimates the effect of misspecification. This suggests that issues might be grouped in a more systematic way to overcome deadlock and provide for mutually beneficial trades of interests – a result that would be perfectly consistent with spatial theory (i.e. that the agenda setter is inclined to initiate proposals that have a fair chance for adoption).

According to Table 8, dropping voting weights does not drastically affect the outcome predictions. However, the model is still more sensitive to misspecification of saliencies or voting weights than to any interpretation on the agenda setter, which also confirms our expectations derived from computer simulation.

Finally, Table 9 shows the robustness of the model to the misspecification of the nature of the policy issues for the DEU data. Confirming our simulation results, disregarding the discreteness of policy options has a very high impact on outcome predictions, almost independent from other specifications.[20]

20. For a discussion of the empirical relevance of discrete policy issues, see for example Bueno de Mesquita (2004) and Steunenberg and Selck (2006).

Table 9. Differences by Specification: Discrete and Continuous Policy Issues

Specification	No Saliencies and No Voting Weights	No Saliencies and Voting Weights	Saliencies and No Voting Weights	Saliencies and Voting Weights
	13.84	13.74	15.35	14.63

In sum, the empirical analysis confirms most of the insights derived from the computer simulation: dropping dimensions, ignoring saliencies or discrete options from the analysis risks distortion of the outcome prediction more than any interpretation of agenda setting or the inclusion of voting weights. This result remains robust, although the real scope for policy change is higher and the predictions become more sensitive to agenda setting and the dimensionality of the policy space. In our view, this indicates suggests a systematic selection of issues by the agenda setter.

Conclusion

With regard to the relatively high error of spatial models, we asked how robust spatial models are to (mis)specification of the legislative process and of the preferences of the actors involved. While the literature focused on the interpretation of the process with respect to the identification of the agenda setter and the inclusion of voting weights, we have drawn attention to the (mis)specification of actors' preferences regarding the number of relevant issues, their salience and the nature of the policy issues. Our computer simulation suggested that the outcome predictions of the models are more distorted by disregarding the number of dimensions, saliencies and discreteness of options than interpretations of the policy process. These results have mostly been confirmed by our empirical analysis using the DEU data.

In our view, this does not mean that the interpretation of the legislative process is irrelevant for spatial analysis. Rather our comparison of the relative impact of the models' components reveals that further efforts are needed for the accurate specification of actors' preferences. We believe that spatial theory can still improve our understanding of the complex institutional framework of the EU, but the misspecification of preferences risks producing high errors in the explanatory power of spatial theory that can drastically bias our findings and mislead our conclusions. Insofar, a major key for improving the explanatory power of spatial theory is perhaps a more accurate specification of the preference component of decision making rather than a more sophisticated interpretation of institutions. Otherwise, we can hardly conclude from empirical tests

whether errors result from the theory or from the (in)accurate application of the theory.

Appendix

i) Description of the 48 proposals (Policy Domain, Legislative Procedure, Council Voting quorum and Type of Instrument)

Description	Procedure	Quorum	Type
Agriculture			
Olive oil	CONSULTATION	QMV	Regulation
Veterinary medicinal products in foodstuffs	CONSULTATION	QMV	Regulation
Forest reproductive material	CONSULTATION	QMV	Directive
Production aid for cotton	CONSULTATION	QMV	Regulation
Market in bananas	CONSULTATION	QMV	Regulation
Flax and hemp	CONSULTATION	QMV	Regulation
CMO sugar	CONSULTATION	QMV	Regulation
CMO in milk	CONSULTATION	QMV	Regulation
Regulation on milk to schools	CONSULTATION	QMV	Regulation
Beef labeling	CODECISION	QMV	Regulation
Health issues trade of cattle	CODECISION	QMV	Directive
ECOFIN			
Taxes on cigarettes	CONSULTATION	Unanimity	Directive
Standard rate of VAT	CONSULTATION	Unanimity	Directive
Reduced rate of VAT for labor intensive services	CONSULTATION	Unanimity	Directive
Budgetary discipline	CONSULTATION	Unanimity	Regulation
Electronic money institutions	CODECISION	Unanimity	Directive
Fisheries			
Financial instruments for fisheries	CONSULTATION	QMV	Regulation
CMO in fishery products	CONSULTATION	QMV	Regulation
Common fisheries policy	CONSULTATION	QMV	Regulation
Dialogue with Fishing Industry	CONSULTATION	QMV	Regulation
Protection of juveniles of marine organisms	CONSULTATION	QMV	Regulation
Conservation of fishery resources	CONSULTATION	QMV	Regulation
General			
MEDA	CONSULTATION	Unanimity	Regulation
Community civil protection program	CONSULTATION	Unanimity	Decision
Internal Market			
The directive on honey	CONSULTATION	QMV	Directive
Fruit juices	CONSULTATION	QMV	Directive
Motor insurance	CODECISION	Unanimity	Directive
Copyrights	CODECISION	Unanimity	Directive
Electronic signatures	CODECISION	Unanimity	Directive
Electronic commerce	CODECISION	Unanimity	Directive
Takeovers	CODECISION	QMV	Directive

(continued)

Appendix. (continued)

Description	Procedure	Quorum	Type
Resale rights for artists	CODECISION	QMV	Directive
Community customs	CODECISION	QMV	Regulation
Orphan medical products	CODECISION	QMV	Regulation
Food additives	CODECISION	QMV	Directive
JHA			
Establishment of Eurodac system	CONSULTATION	Unanimity	Regulation
Jurisdiction and recognition of judgments in civil and commercial matters	CONSULTATION	Unanimity	Regulation
Others			
General framework for equal treatment	CONSULTATION	Unanimity	Directive
Anti personnel landmines non-developing countries	CONSULTATION	Unanimity	Regulation
Community part in the EU audiovisual observatory	CONSULTATION	Unanimity	Decision
Establishing employment committee	CONSULTATION	QMV	Decision
Erika I, phasing out single hull	CODECISION	QMV	Regulation
SOCRATES	CODECISION	QMV	Decision
Transport of dangerous goods	CODECISION	QMV	Directive
Efficiency requirements fluorescent lighting	CODECISION	QMV	Directive
Tobacco products	CODECISION	QMV	Directive
Interoperability of European rail system	CODECISION	QMV	Directive

i) Winsets and Pareto sets

Calculations are made by a computer program written in R (R Development Core Team: 2005). This program solves spatial games for any number of discrete or continuous policy dimensions, voting weights, saliencies of actors, and it identifies pareto sets and winsets in multi-dimensional policy spaces.

To identify the best possible policy proposal in the winset, we minimize the distance of the proposal to the agenda setter under the condition that the distance of the proposal to each veto player must be smaller than her distance to the reference outcome.

For the identification of the pareto set, we evaluate the players' utility functions for each proposal and check whether these functions are non-decreasing in any direction for all players. This allows us to determine the boundaries of the pareto set even if saliencies are included, or, if some dimensions are dropped by players having no interest at all in a particular issue.

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