**Design challenges in cross-national VAAs: the case of the EU Profiler**

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**Abstract**

This article analyses the design of the EU Profiler, the first truly cross-national VAA. We assess the convergent validity and scaling reliability of the low-dimensional models that are used to represent differences between parties and users. Convergent validity of the party positions in the EU Profiler is moderate to high, but scaling reliability is low for most of the issue dimensions included. We examine whether these problems are related to the EU Profiler's cross-national nature. The EU Profiler integrates the positions of parties from all over Europe into one pan-European model, even though students of European politics emphasise that there are structural differences between party competition in Central and Eastern Europe and Western Europe. We find that the EU Profiler performs better in terms of scaling reliability in Western European party systems than in Central and Eastern European party systems. In addition, there are substantive differences between individual countries.

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*1. Introduction*

Voting Advice Applications (VAAs) come in many shapes and sizes. While almost all VAAs provide users with statements, there is a large diversity in the way these statements are selected, how the voting advice is calculated and the manner in which it is presented (Walgrave, Nuytemans, and Pepermans, 2009). Within this broad field, the EU Profiler takes a special place. Developed for the 2009 European Parliament elections, this VAA positioned 274 parties in 30 European countries, making it the first supranational VAA (Trechsel and Mair, 2009). This required a remarkable feat in data collection: more than 120 political scientists from all over Europe coded party positions on a broad range of issues. The EU Profiler is not just a tool that voters can use to make informed voting decisions, but also a means of data collection for researchers. As a means of comparative party research, it is a major contribution to the field of political science. The broad scope of the EU Profiler in terms of the number of political systems involved makes the issue of VAA design even more pressing than normal. How can it be ensured that the EU Profiler provides a valid and reliable advice in each country when we know that there are important differences between the party systems of Central and Eastern Europe and Western Europe (Marks et al., 2006, Grzymała-Busse and Innes, 2003)?

Whereas the effect of VAAs on voters has been studied, many aspects of their design have remained mostly unexplored (Garzia, 2010, Ladner and Pianzola, 2010, Walgrave, Van Aelst, and Nuytemans, 2008, Wagner and Ruusuvirta, in press). Only one published study has tested the impact of VAA design choices in a systematic way. That study focuses on the selection of statements, a very important concern in VAA design (Walgrave et al., 2009). Many other aspects of VAA design have not been extensively discussed in the literature. We specifically assess the validity and reliability of one aspect of VAAs, the low-dimensional spatial models used in the EU Profiler.

This article focuses on the EU Profiler, because it is the first truly cross-national VAA and because it uses various methods of calculating the vote advice. We assess several aspects of the EU Profiler, namely its reliability and validity and analyse whether the design problems we identify are related to its cross-national nature. The EU Profilers' models attempt to integrate the positions of parties from all over Europe into one pan-European model, even though students of European politics emphasise that there are structural differences between Central and Eastern Europe

and Western Europe in terms of the nature and structure of party competition (Marks et al., 2006, Grzymała-Busse and Innes, 2003). We find that the EU Profiler performs better in terms of scaling reliability in Western European party systems than in Central and Eastern European party systems.

We will first outline the construction of the EU Profiler. Then we will discuss how the difference between Western European and Central and Eastern European party systems may affect VAA design in the case of the EU Profiler. We subsequently examine the validity and reliability of the EU Profiler's spatial models and test our expectation regarding East-West differences using party position data from the EU Profiler. The article concludes with a set of recommendations derived from our analysis.

*2. EU Profiler design*

The EU Profiler provides voters with a political profile based on their responses to thirty statements on a five-point scale (EU Profiler Team, 2009b, p. 4). By providing voters with the responses of parties to these statements, they provide voters with information about "the intentions of the political parties running in the election" (EU Profiler Team, 2009b, p. 4). In developing the EU Profiler the team spent particular attention on statement selection, the coding of party positions and the different ways of representing these profiles.

According to the EU Profiler team the "most critical aspect" of creating a VAA is the selection of statements (EU Profiler Team, 2009b, p. 6). This is reflected in the literature, where Walgrave et al. (2009) emphasise that the selection of statements can greatly influence the advices of VAAs. Statements were selected on the basis of their relevance and ability to discriminate, and the comprehensiveness of the final selection. In order to meet the criterion of relevance, the EU Profiler team consulted party manifestos, opinion polls, journalists and academics to determine which issues were key in the election (EU Profiler Team, 2009b, p. 6). The final selection included 28 statements used for all countries and 2 national (or regional) statements. In an unprecedented data collection enterprise 274 parties from thirty countries (of which two are divided into different regions) were placed on these issue statements, using a five-point scale (Trechsel and Mair, 2009, p. 5). The EU Profiler triangulates parties' positions on the statements, combining expert judgments, text

analysis and party self-placement (Kleinneijenhuis et al., 2007, Trechsel and Mair, 2009).

After answering the statements, the EU Profiler user is guided to a webpage with his or her political profile (Trechsel and Mair, 2009, p. 8). Here three different methods are offered to compare the voters' profile to party profiles: the compass, the spider diagram and the match list. The first two are low-dimensional spatial models, constructed based on the idea "that opinions on individual issues can be aggregated to a limited number of issue dimensions" (EU Profiler Team, 2009b, p. 13). Users are, however, advised that the compass and the spider diagram only provide a "simplified partial analysis", because these do not include all statements (EU Profiler Team, 2009b, pp. 14, 16).[i]

The compass essentially is a two-dimensional spatial model, consisting of a left-right and a pro-anti EU integration dimension (EU Profiler Team, 2009b, p. 14). The left-right dimension includes both economic issues (such as spending versus taxation) and cultural issues (such as support for same-sex marriage). The selection of dimensions is based on *a priori* considerations, although the designers do not provide an explicit reason for selecting these two dimensions. The EU Profiler team has decided before scoring parties to which dimension each statement belongs (EU Profiler Team, 2009b, p. 13). The actual positions that parties or voters took on these issues do not play a role in this assignment.

The second tool is the spider diagram, which was adapted from the Swiss *smartvote* (Trechsel and Mair, 2009, p. 9). The spider diagram is a seven-dimensional representation of party and voter positions. These dimensions cover a wide range of policy areas from immigration to the environment. Again the selection of dimensions and the assignment of issues to the dimensions are based on *a priori* considerations and no justification is provided for the selection of dimensions.

The third representation of the political profiles of voters is the match list, which is also used in many other VAAs. This simply displays the extent to which the voter and the party agreed with each other on all statements. It does not assume that party and user positions can be captured by a low-dimensional model.

In the subsequent analysis we will focus on the compass and the spider diagram, because these representations make assumptions about the dimensionality of the political space. They are based on the notion that party and voter positions on several issues can be aggregated in a low-dimensional political space (EU Profiler

Team, 2009b, p. 13). Parties, it is assumed, do not pick their issue positions at random, but there is an underlying low-dimensional space which structures party positions. The goal of this article is to assess whether the dimensions used actually conform to the patterns underlying the answering patterns to the statements (scale reliability) and whether these dimensions conform to other estimates of party positions (convergent validity).

*3. A pan-European party space*

An important feature of the EU Profiler is that it allows one to compare one's position to the position of political parties, not just from one's own country, but also to parties from all over Europe. The compass and spider diagram are therefore based on the assumption that the positions of all parties in Europe can be aggregated into a single pan-European political space. Comparative research about the structure of political competition in Europe casts doubt on this possibility, in particular with reference to the difference between 'old' Western European democracies and the 'new' Central and Eastern European democracies (Grzymała-Busse and Innes, 2003, Marks et al., 2006, Evans and Whitefield, 1993, Tavits, 2005). There may be a difference between Western European democracies and Central and Eastern European democracies in the nature of party competition and the structure of party competition.

There is a debate about the extent to which ideology matters in Central and Eastern European politics. Some argue that party competition in post-communist countries is not primarily structured by ideological differences (Grzymała-Busse and Innes, 2003). Parties had little room to differ in policy positions because they were bound by EU accession requirements, which lead parties to instead distinguish themselves by their capacity to govern (Grzymała-Busse and Innes, 2003, p. 4, Evans and Whitefield, 1993, Kitschelt et al., 1999). More recent analyses, however, reveal that cleavages and issue dimensions do play a role in Central and Eastern European politics (Rohrschneider and Whitefield, 2009, Tavits, 2005, Whitefield et al., 2007). Still, it may be the case that in Central and Eastern Europe party competition is to a *lesser* extent structured by programmatic positions, while in Western Europe this extent is *greater*.

Even when issue dimensions play a role both in Western as well as Central and Eastern Europe, the dimensionality of the party competition might be different in the old and new democracies. In particular, it has been argued that there is a structural

difference between Western and Central and Eastern Europe in the relationship between the economic left-right dimension and the GAL/TAN dimension, which relates to lifestyle issues (Marks et al., 2006, Vachudova and Hooghe, 2009). In Western Europe left-wing parties tend to favour democratization and libertarian policies and right-wing parties tend to be more traditionalist on moral issues and conservative about democratic reform. In Central and Eastern European countries the relationship is reversed: here left-wing parties tend to be more conservative (specifically unreformed or late reforming communist parties). The right tends to be more in favour of democratization and extending individual liberties. In the transition from communism, the anti-system and pro-democratic parties were on the right, because they opposed the authoritarian, pro-system party, the Communists, which were on the left (Marks et al., 2006). Because of the communist transition political change in Central and Eastern Europe was inexorably linked to right-wing economic policies (Markowski, 1997, Kitschelt et al., 1999). The process of European integration has further reinforced the competition along a traditionalist left/libertarian right dimension (Vachudova and Hooghe, 2009). Former communists, joined by left-leaning populist parties tend to oppose European integration. Rohrschneider and Whitefield (2009) find a similar two-dimensional structure in party competition. The EU Profiler, however, takes the socio-economic left-right and GAL/TAN dimensions together in a single left-right dimension. If, as we expect, the relation between these issue dimensions is different in Western than in Central and Eastern Europe, the model will perform poorly, in terms of scalability, at least in one half of the countries.

Finally, European countries may differ in their national structures of political competition. There is great variation in the way that voters understand policy dimensions such as the left-right dimension, especially between countries (Klingemann, 1979). Lipset and Rokkan (1967) have pointed out that in Western European countries, specific historical circumstances brought about differences between the structures of competition. In some countries there is a centre/periphery dimension, while in others there is a religious/secular dimension. The historic development of these party systems explains these differences. Similarly, the differences between the political spaces in new democracies in the South of Europe as well as in Central and Eastern European countries have been explained by referring to country-specific historical and demographic factors (Evans and Whitefield, 1993, Rohrschneider and Whitefield, 2009, Evans and Whitefield, 1998, Kitschelt et al.,

1999, Ramonaite, 2010). One should be cautious when integrating party positions from different European countries into one single model, because of these national differences. Other attempts to integrate parties from all over Europe into one measurement model of party positions have been contested because they lead to counter-intuitive results for specific cases (Warwick, 2002, Bakker, Edwards, and De Vries, 2008, Dinas and Gemenis, 2009).

All in all, there are reasons to be hesitant about integrating the positions of parties from all European countries in a single European political space. Compared to Western Europe positions of Central and Eastern European parties may be less coherent, there may be a structural differences between party competition in Central and Eastern Europe and Western Europe, or cross-national diversity. In the remainder of this article we examine the validity and scaling reliability of the EU Profiler's spatial models and study whether we do indeed find differences between East and West.

*4. Convergent validity*

One way to assess the extent to which models form a valid depiction of party positions is by examining to what extent the positions found cohere with other estimates of party positions. This notion of convergent validity has previously been applied to several VAAs by Wagner and Ruusuvirta (in press). They found strong relationships between parties' left-right positions derived from VAAs and the party positions in expert surveys, but lower convergent validity for the issue dimensions concerning immigration and environment. Wagner and Ruusuvirta did not take the spatial models of VAAs into account. The question is thus whether their findings are also true for the EU Profiler's estimates of party positions in political spaces. We compare these estimates with those from the Chapel Hill Expert Survey (CHES) held in 2006 (Hooghe et al., 2010, Marks, 2007). We have selected this expert survey because it is the only one that includes almost all countries covered in this study, it is specifically oriented towards European politics and it covers almost all issues included in the EU Profiler.[ii] The only exception is environmental protection (part of the spider diagram), where we used the Green-Alternative-Libertarian/Traditional-Authoritarian-Nationalist variable as a proxy. We evaluate the relationship between the CHES and EU Profiler estimates of parties' policy positions by means of the rank-order correlation (Spearman's rho) as well as the absolute distance between both

scores (Wagner and Ruusuvirta in press; Achen 1978). To calculate the absolute distance scores, we rescaled each of the dimensions to run from 0 to 1 and in the same direction.

We start by assessing to what extent the dimensions in the EU Profiler's compass relate with the left-right and pro/anti-EU integration dimensions from the expert survey (see Table 1). The rank-order correlation estimates on both dimensions are at least .47 for both Eastern and Western European parties. Furthermore, the absolute distance between the CHES and EU Profiler estimates of parties' positions is relatively small, measuring 0.10 to 0.14 on a scale that runs from zero to one. These results imply that the estimates from the compass are in general validated by these external measures. We expected the relationships between the expert survey and the compass estimates to be better in Western Europe than those in Central and Eastern Europe. We find some support for this assertion from the rank-order correlation coefficients, which are generally higher for the group of West European than for the Eastern European parties. However, the absolute distances between the EU Profiler and CHES scores are not significantly larger in Eastern Europe. This suggests that while in Western Europe *on average* there is a somewhat stronger relationship between the EU Profiler and CHES data, but also slightly more variance on most issues[iii].

[Table 1 about here]

A similar observation holds for most of the dimensions included in the spider diagrams. For most issues in the spider diagrams there were good equivalents in the Chapel Hill Expert Survey.[iv] The relationships between the spider diagram dimensions and the corresponding dimensions from the expert surveys are generally strong for most dimensions (see Table 2). The liberal society dimension is most strongly related to the expert survey estimates. More moderate values of Spearman's rho were found for the other dimensions. We shall argue below that these are also particularly problematic dimensions in terms of scaling reliability. The environmental policy dimension in the EU Profiler spider diagram relates particularly weakly to the expert scores. The average distance scores for both Eastern and Western European parties exceeds 0.2, twice the average distance on the left-right dimension. This is not unsurprising given the fact that the proxy that we used, the GAL-TAN dimension, did

not only tap into environmental issues. Overall, the correspondence for the spider dimensions is slightly worse than for the dimensions in the compass. This is probably related to the fact that these dimensions were only measured by a few statements in the EU profiler (cf. Wagner and Ruusuvirta, in press).

The estimates in the seven-dimensional spider diagrams and the two-dimensional compass are generally strongly (and significantly) related to the expert estimates. These models successfully meet the requirements of convergent validity. While correlations are generally somewhat higher for West European parties, we do not find a significant difference between the average absolute distances scores in Western and Eastern Europe.


## 6. Scaling reliability

The second criterion for a good measurement instrument is that the included items consistently tap into the same latent dimensions, or scaling reliability. This can be looked at in two ways. First, we can look at scaling reliability based on voters' answers to the statements. Kleinnijenhuis and Krouwel (2009) have tested whether the models used by EU Profiler are an accurate reflection of the differences in voter positions. They identified five dimensions in the voters' answers to the EU Profiler statements, rather than the compasses two or the spider diagram's seven. This suggests that the EU Profiler's models do not offer an accurate representation of the voter space.

We use a different method to assess scaling reliability, which is based on *parties'* positions. We examine the extent to which the items in the two-dimensional compass and the seven-dimensional spider diagram form consistent scales based on parties' answers to the statements in the EU Profiler. The first aspect we examine is the extent to which the selected statements form a consistent scale. If items measure the same latent concept, this must be reflected in parties' answering patterns. To explore the coherence of the answering patterns we use Mokken scaling. The goal of Mokken scaling is to develop an ordering of the items in such a way that if a subject 'dominates' a certain item he also dominates all items that are ranked lower (Niemöller and Van Schuur, 1983). In VAA terms this means that if a party agrees with a strongly progressive proposal, it should tend to agree with a moderately progressive proposal as well *if* the items are scalable.

Mokken analysis produces estimates of three types of scalability coefficients. First, the extent to which the answer patterns of two items can be aggregated (item-pair scalability coefficients, $H_{ij}$). Second, the extent to which one item fits in with all other items in the scale (item scalability coefficients, $H_i$). Third, the extent to which all items together form a consistent scale (scale scalability coefficient, $H$). In assessing the scalability we use the following benchmark values: below 0.3 (very poor), below 0.4 (poor), below 0.5 (medium), below 0.6 (good), beyond 0.6 (very good)[v].

The first question is whether the structure that underlies the party positions can be modelled in terms of the two-dimensional pan-European party space of the compass. The Mokken Scaling analysis reveals a substantial difference between the left-right dimension and the pro- or anti-EU integration dimension (see Figure 1). The scalability coefficient for the left-right dimension is very poor (0.29), while for the pro- or anti-EU dimension scale it is very good (0.66). Thus we find support for the existence of a reliable pan-European dimension on European integration in the data, but the scalability of the items belonging to the left-right dimension is weak.


[Figure 1 about here]


The scalability of individual items can be examined by looking at their $H_i$-values (see Table 3). The items in the pro-/anti-European integration dimension form a coherent scale. The only item that does not fit well is the one on European taxation, which probably taps into both anti-European and anti-tax attitudes. The scalability coefficients of the items in the left-right dimension are much lower. Two items stand out: item 5 concerning the skilled migrant workers and item 13 concerning the common agricultural policy. Neither of these items fits with the other items in the left-right dimension. The skilled migrant workers item proposes that "[im]migration policies oriented towards skilled workers should be encouraged as a means of fostering of economic growth" (EU Profiler Team, 2009a). The EU Profiler compass assumes that right-wing parties and voters will tend to agree with this. Right-wing-oriented market-liberals may indeed support this policy, but right-wing anti-immigration conservatives will likely not do so. The agricultural statement suffers from a similar problem.

[Table 3 about here]

How does the scalability coefficient differ between Western Europe and Central and Eastern Europe? We repeated the Mokken scaling analysis of the two dimensions in the EU Profiler compass for West and East separately. We find that the scalability of both dimensions is higher in Western than in Central and Eastern Europe. When we analyse West European party positions we find an H-value for the left-right dimension of 0.35 (poor scalability) and 0.73 for the pro/anti-European (very good). If we look at exclusively at Central and Eastern European parties the H-value for the left-right dimension is extremely poor (0.18) while the scalability for the pro/anti-EU dimension is good (0.51). Both the European integration as well as left-right dimension fit considerably worse in Central and Eastern Europe than in Western Europe.

Contrary to our expectation, it does not appear to be the case that the reversed relationship between the economic left-right and the GAL/TAN dimension is the explanation of this. The EU Profiler compass assumes a "Western European" relationship between cultural and economic policies – that is, right wing parties are expected to be conservative while left-wing parties are taken to be progressive. If we, however, reverse the direction of the GAL/TAN items in the EU Profiler left-right scale, we do not find an improvement of the scalability of items on the left-right scale. On the contrary, the scalability coefficient decreases to 0.00 for Central and Eastern European parties. Thus, it does not appear to be the case that this specific structural difference between Central and Eastern and Western Europe is the explanation for the lower level of scaling reliability in the Central and Eastern European countries.

[Figure 2 about here]

The final explanation for the East-West differences is that there are national differences in the dimensionality of the party systems. Figure 2 displays the scalability coefficient for each country separately on the two compass dimensions. Northern Ireland shows very high levels of scalability on both dimensions, while Lithuania fares very poorly. The dotted grey lines indicate the benchmark minimum level of scalability. A substantial number of countries show adequate scalability of the European integration dimension, but poor levels of scalability on the left-right

dimension – these countries are located in the top-left quadrant of Figure 2. These are mostly Central and Eastern European countries. In Western European countries the average H-value for the left-right dimension indicates a mediocre scale (0.41) and the EU integration dimension scales very well (0.62)[vi]. In Central and Eastern Europe the average value indicates a very poor scale for the left-right dimension (0.14), while the pro-anti European dimension on average scales at a medium-level (0.45). It appears that the model fits particularly poorly within almost every Central and Eastern European party system.

[Figure 3 about here]

An analysis of the spider diagrams point in the same direction: some clusters of items cohere strongly, some items do not fit well with the others and there are stark differences between European states (see Figure 3). If we analyse the seven different items for all parties, there are marked differences between the different dimensions in the spider diagram: the environmental protection dimension is the only one that forms a good scale (H > 0.5). The liberal society, law and order, and the welfare state dimensions score just below the 0.5 benchmark. The items for migration policy, economic liberalization and financial policy all show poor levels of scalability. There are marked differences between Western Europe and Central and Eastern Europe. In Western Europe there are only three dimensions that *fail* to meet the medium base line, while in Central and Eastern Europe only two dimensions score *above* poor. It appears that even the more fine-grained spider diagram system cannot incorporate the differences between political parties in the whole of Europe.

How can we understand these patterns? Are the spider diagram and the compass models poorly specified, or is the poor scalability the result of a structural difference between Central and Eastern Europe and Western Europe? We might be able to arrive at a more reliable model of party positions by means of an inductive analysis of parties' answers to the VAA statements. We use multidimensional scaling (MDS) to see whether there are consistent patterns in the responses. This method looks at these differences in responses in terms of proximities (Kruskal and Wish, 1978).[vii] The goal is to construct a spatial model where parties with similar answers on the statements are placed closer to each other and far away from parties that respond differently. The badness-of-fit of an MDS model is expressed in terms of stress

(Kruskal and Wish, 1978). The goal is to find a solution that has minimal stress. If a model falls below 10% stress one may fix it at that number of dimensions (Kruskal and Wish, 1978). Thus, MDS aims to find a low-dimensional representation of parties' diverging policy stances, without losing too much information.

The MDS analysis reinforces the point that the party space is different between countries (see Figure 4). It displays the stress levels of a one-, and two-dimensional (metric) MDS solution for each country.[viii] For some countries a one-dimensional solution suffices: Northern Ireland, but also an Eastern European state such as Romania. For a larger group of countries a two-dimensional solution seems more appropriate. This includes both Western European and Central European countries, such as Austria and Slovakia. For several countries two dimensions do not suffice: the stress level for the two-dimensional solution is above 10 per cent. This group includes countries from Eastern Europe and Western Europe such as France and Latvia. It consists mainly of countries with a relatively large number of political parties. It appears that there is no structural difference between Central and Eastern European countries and Western European countries in terms of dimensionality of the system. On average, modelling a Central and Eastern European system in terms of one-dimension gives more stress (25%), than modelling a Western European system (21%). This difference, however, is not significant.


[Figure 4 about here]


The analysis shows consistently that the differences between political parties in European countries cannot simply be aggregated into a pan-European model. These differences appear to be nationally bound: in some countries party positions on all issues can be modelled in terms of one dimension, in others three dimensions are necessary. While in general, there are marked differences between Central and Eastern Europe and Western Europe in terms of the extent to which they fit in the pan-European model, this is not based on a structural difference between the two regions. This finding casts doubt on the EU Profilers' feature that enabled users to place themselves in a pan-European party space. A one-size-fits-all-approach does not actually fit the data.

*7. Conclusion*

The EU Profiler provides voters with information about their policy preferences in relation to those of political parties. It uses three distinct tools: the match list, the two-dimensional compass and the seven-dimensional spider diagram. Here we assessed two aspects of two of these tools: the reliability and the validity of the compass and the spider diagram. We find that the models as a whole successfully pass the requirements of convergent validity: the party positions on the dimensions of the EU Profiler are mostly validated by data from the Chapel Hill Expert Survey. We also find, however, that many of the spatial models in the EU Profiler do not meet basic standards of model quality in terms of scalability.

Part of these problems is caused by the fact that positions of parties from all over Europe are aggregated into one pan-European model. We found that there were strong differences between Central and Eastern Europe on the one hand and Western Europe on the other. While there is no discernible difference between the validity of party position in East and West, the Central and Eastern European EU Profiler models show lower levels of scaling reliability than Western European models, while there is also considerable variation between individual countries.

This article has presented an analysis of several aspects of the EU Profiler's design. This does, however, not imply that there is nothing to like about the EU Profiler. On the contrary, in terms of the coding of party positions the EU Profiler presents a unique infrastructure and a detailed procedure of arriving at a decision on parties' positions on statements. Every user can check what a particular position is based on, which is a good example of VAA professionalism and transparency. This transparency allows scholars of political science an unprecedented opportunity to compare patterns in political competition in European political systems. We hope that our comments may help to even further improve upon the EU Profiler in particular and VAAs more generally. Therefore, we would like to translate our findings on the EU Profiler in four general recommendations for the use of spatial models in VAAs.

First, makers of VAAs should be transparent about all their design choices. Compared to other VAAs, the EU Profiler does explain in quite some detail its statement selection procedure, party coding procedure and spatial models. We would, however, recommend that VAAs also discuss why they opt for a particular method of calculating the vote advices.

If one chooses to use a low-dimensional representation of party and voter positions, one needs to consider the difference between a VAA based on party positions and voter positions. VAA makers should be aware that the voter space and the party space do not need to be identical: issues do not need to relate in the same way for voters as they do for parties. If the main goal is to give voters the best advice for the party that matches their preferences it seems most appropriate that the VAA's underlying model is based on 'voter spaces' in which parties are superimposed. If, however, the main goal is to provide information about the differences between the positions of parties, VAAs should be based on 'party spaces' in which the voter is superimposed.

Moreover, in case a spatial model is used, users should also be able to find out how and why a particular set of dimensions is selected, what these dimensions mean and why these (and not others) matter. If the dimensionality is assumed *a priori*, VAA-makers should ensure that the statements used relate clearly to one of these dimensions and do not either measure attitudes on more than one dimension or tap into another substantive dimension. Currently, many VAAs do not make explicit how individual statements are assigned to issue dimensions.

Last, if VAAs place parties from different countries or regions in one model, VAA-makers should be aware of structural differences in the nature and the patterns of party competition between countries and regions. The creation of a supranational VAA should not be a goal in itself. We would expect some kind of argument whether it is possible and informative to compare these positions across borders.

**Tables**

**Table 1: Relationship between EU Profiler and Chapel Hill party position estimates**

|  | Spearman's rho | | Absolute Distances | |
|---|---|---|---|---|
|  | *East* | *West* | *East* | *West* |
| **Economic Liberalization** | 0.54 | 0.80 | 0.14 | 0.16 |
| **Environmental Protection** | 0.72 | 0.72 | 0.24 | 0.22 |
| **Law and Order** | 0.47 | 0.74 | 0.17 | 0.14 |
| **Left-Right** | 0.73 | 0.69 | 0.10 | 0.11 |
| **Liberal Society** | 0.22 | 0.63 | 0.13 | 0.13 |
| **Pro/Anti-EU** | 0.64 | 0.76 | 0.14 | 0.12 |
| **Restrictive Financial Policy** | 0.80 | 0.88 | 0.11 | 0.14 |
| **Restrictive Migration** | 0.66 | 0.70 | 0.15 | 0.17 |
| **Welfare State Expansion** | 0.58 | 0.80 | 0.19 | 0.17 |

Note: Distances are the average absolute distances between party positions on the EU Profiler and CHES dimensions (both rescaled to run from 0 to 1). Western Europe includes the EU-15, Switzerland, Malta and Cyprus. Central and Eastern Europe includes the 12 new member states (excluding Malta and Cyprus) and the candidate countries.

**Table 2: Scalability of items for dimensions in compass**

| Dimension | | Statement | $H_i$ |
|---|---|---|---|
| Pro/Anti-EU | 1 | EU Taxes | 0.543 |
| | 2 | Common Foreign Policy | 0.709 |
| | 3 | Common Security Policy | 0.646 |
| | 4 | European Integration | 0.734 |
| | 5 | EU Membership | 0.725 |
| | 6 | EU Parliament | 0.604 |
| | 7 | National Vetoes | 0.681 |
| Left-Right | 1 | Social Programs | 0.375 |
| | 2 | Healthcare Privatization | 0.323 |
| | 3 | Child Care Subsidies | 0.268 |
| | 4 | Skilled Immigration | -0.001 |
| | 5 | Restricting Immigration | 0.338 |
| | 6 | Integration | 0.378 |
| | 7 | Same-Sex Marriage | 0.334 |
| | 8 | Religious Values | 0.300 |
| | 9 | Decriminalization of Soft Drugs | 0.361 |
| | 10 | Euthanasia | 0.292 |
| | 11 | Government Expenditure | 0.354 |
| | 12 | Workers' Protection | 0.357 |
| | 13 | Common Agricultural Policy | 0.011 |
| | 14 | Renewable Resources | 0.342 |
| | 15 | Road taxing | 0.282 |
| | 16 | Global Warming | 0.345 |
| | 17 | Civil liberties | 0.323 |
| | 18 | Punishment | 0.402 |

**Figure 1: Scalability coefficients for dimensions in compass**
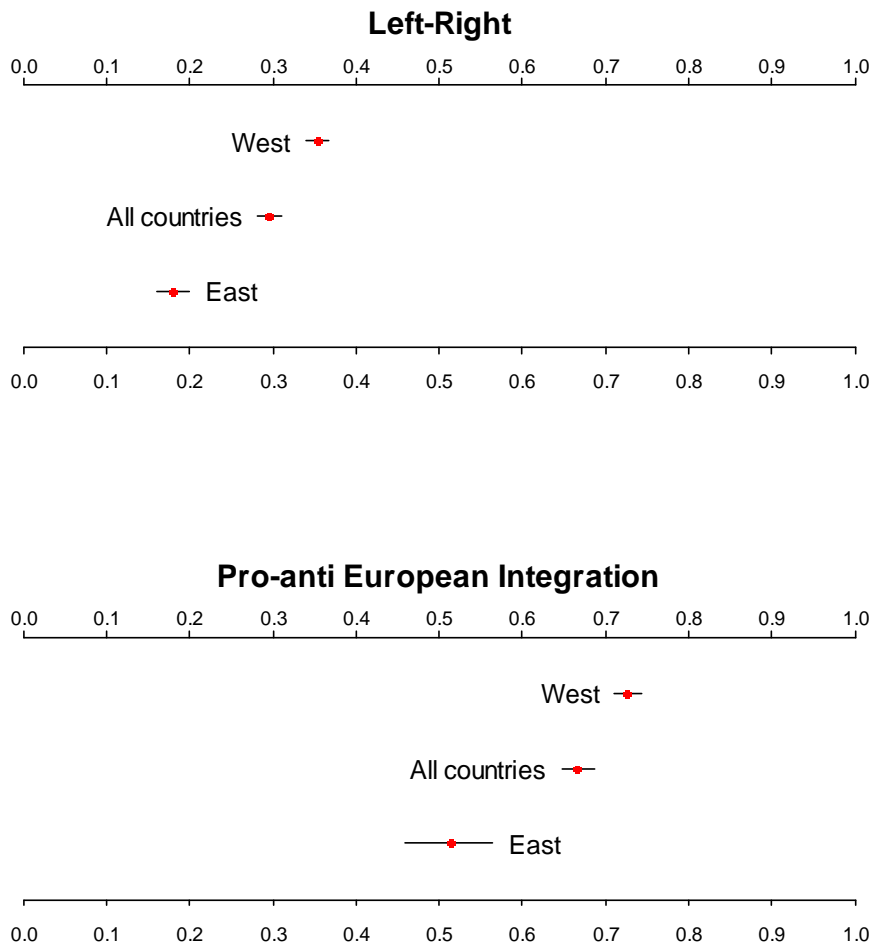


Note: lines indicate 95% standard errors for scalability coefficients from 100 imputed datasets. This is thus only error derived from imputing missing values.

**Figure 2: Scalability coefficients for dimensions in compass (country-level)**
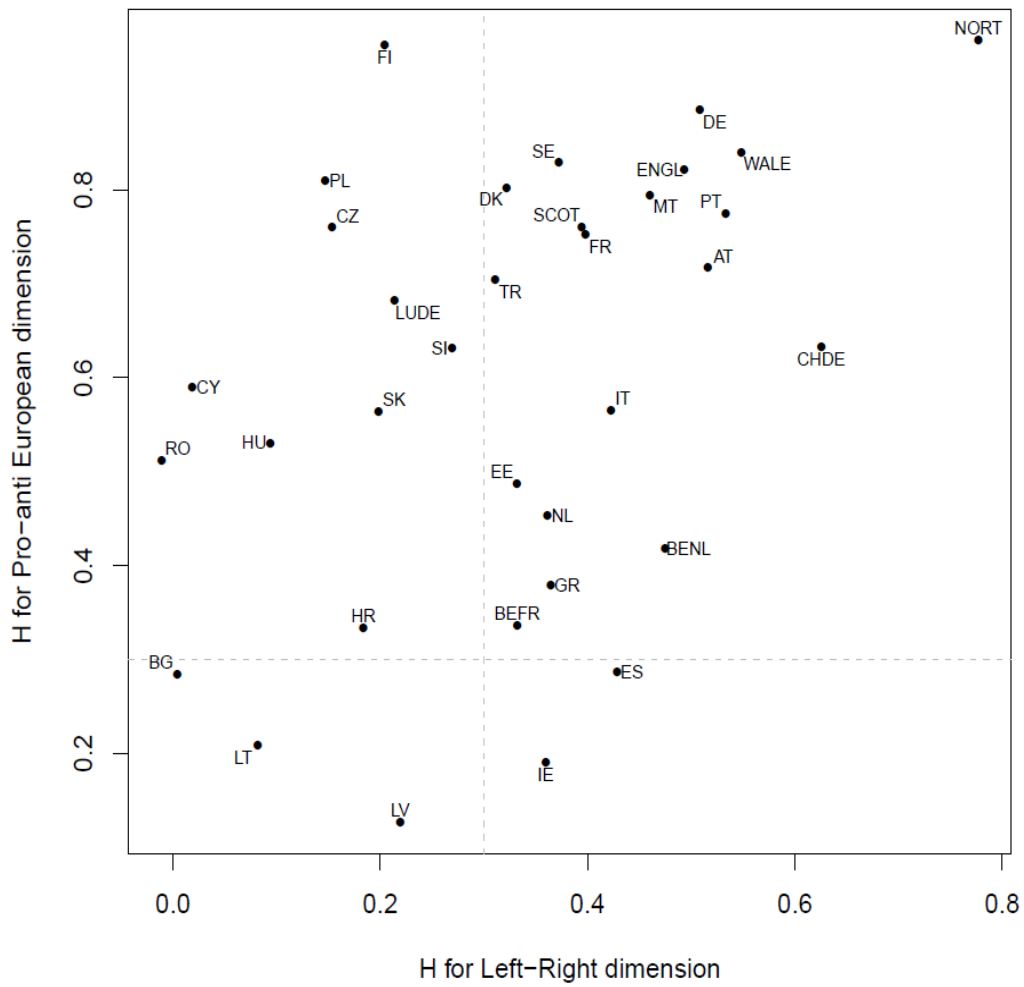


Note: The grey dotted lines indicate a value of 0.3 for the *H* coefficient, which is generally regarded as the minimally accepted level. Data is presented in appendix 1.

**Figure 3: Scalability coefficients for spider diagram dimensions**
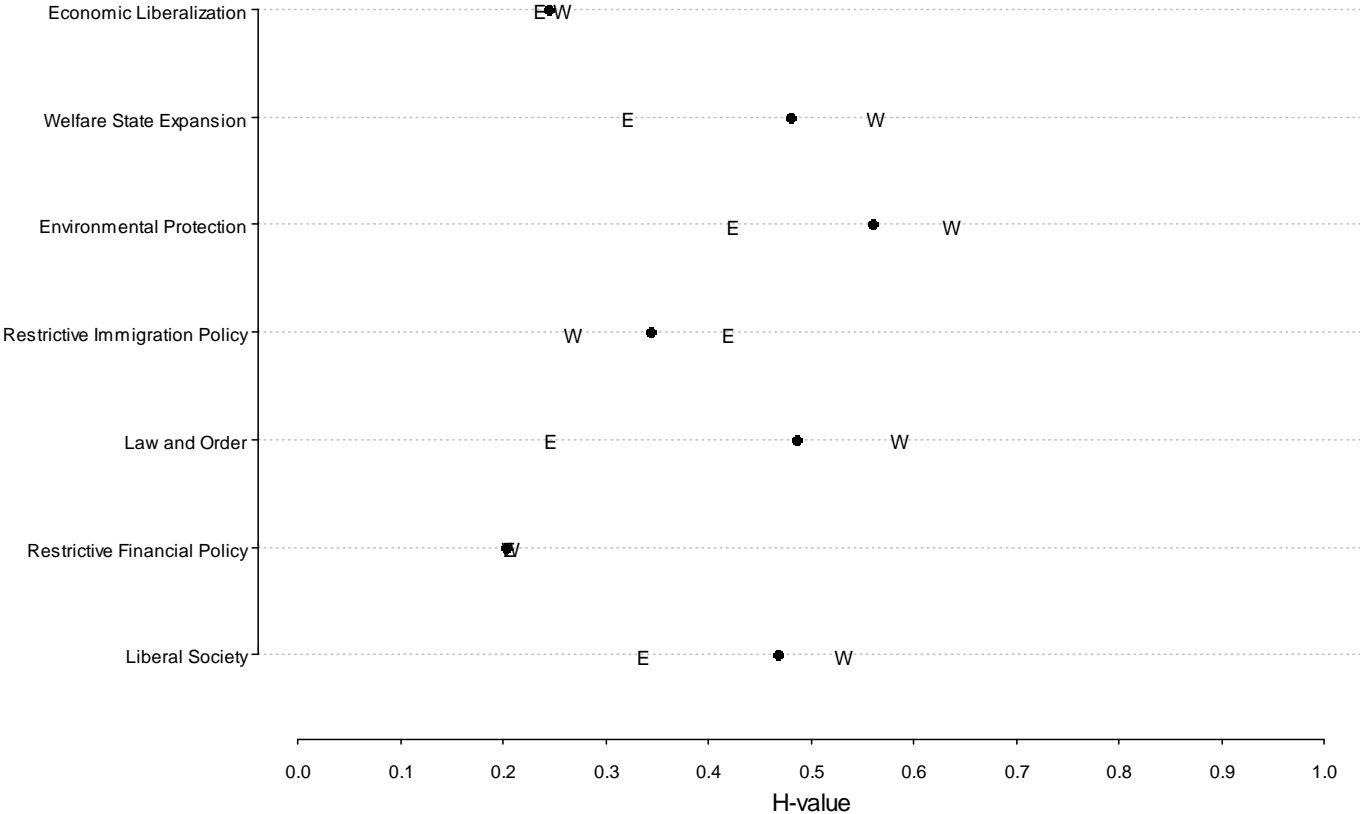


Note: The dot indicates the H value for all countries, W = Western European countries, E = Central and Eastern European countries.

**Figure 4: Stress for MDS solutions of party's answers to EU profiler statements**
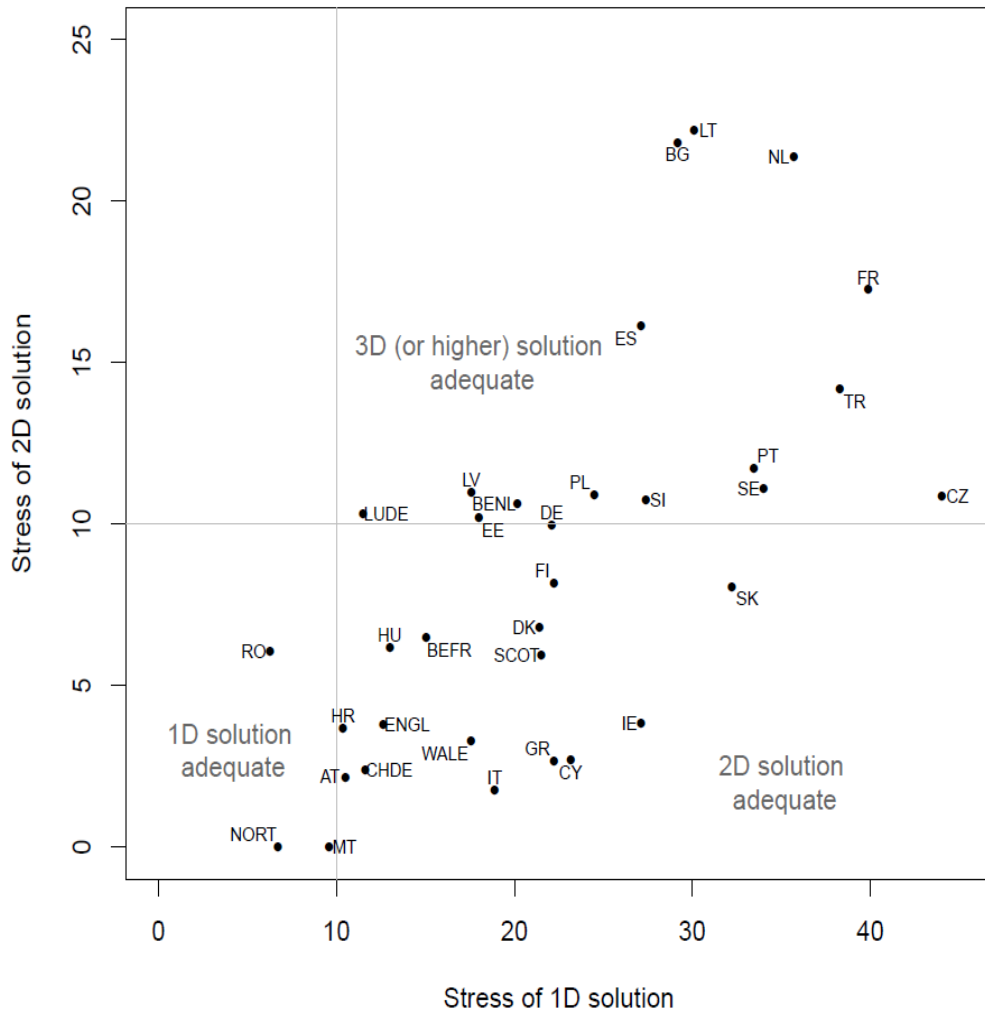


Note: The grey lines indicate a stress level of 10 per cent, which is usually regarded as the maximum level of stress for a solution to be regarded as adequate. Data is presented in appendix 2.

**Appendix 1: Scalability of specific models**

| | Compass | | | | Spider diagram | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Left-Right | Pro-/Anti-European | Liberal Society | Restrictive Financial Policy | Law and Order | Restrictive Immigration Policy | Environmental Protection | Welfare State Expansion | Economic Liberalization |
| All States | 0.296 | 0.665 | 0.467 | 0.202 | 0.485 | 0.343 | 0.560 | 0.479 | 0.244 |
| Western Europe | 0.353 | 0.726 | 0.531 | 0.207 | 0.586 | 0.268 | 0.637 | 0.562 | 0.257 |
| Central and Eastern Europe | 0.179 | 0.507 | 0.336 | 0.206 | 0.246 | 0.419 | 0.423 | 0.321 | 0.235 |
| Austria | 0.518 | 0.719 | 0.938 | 0.439 | 1 | 0.019 | 0.281 | 1 | 0.519 |
| Belgium - Flanders | 0.469 | 0.418 | 0.441 | 0.503 | 0.549 | -0.043 | 0.375 | 1 | 0.311 |
| Belgium - Wallonia | 0.339 | 0.457 | 0.391 | 0.59 | 0.82 | -0.138 | 0.886 | 0.94 | 0.609 |
| Bulgaria | 0.001 | 0.296 | -0.032 | 0.436 | -0.143 | 0.203 | -0.077 | 0.807 | 0.405 |
| Croatia | 0.182 | 0.334 | 0.638 | -0.119 | 0.437 | -0.072 | 1 | -0.263 | -0.082 |
| Cyprus | 0.021 | 0.591 | -0.094 | 0.054 | -0.317 | -0.086 | 0.478 | 0.163 | 0.043 |
| Czech Republic | 0.150 | 0.758 | 0.123 | 0.53 | 0.022 | -0.053 | 0.542 | 0.638 | 0.451 |
| Denmark | 0.328 | 0.801 | 0.159 | 0.545 | 0.569 | -0.015 | 0.899 | 0.795 | 0.531 |
| Estonia | 0.325 | 0.480 | 0.333 | 0.301 | -0.047 | 0.41 | 0.874 | 0.474 | 0.471 |
| Finland | 0.209 | 0.954 | 0.494 | -0.023 | 0.456 | -0.01 | 0.673 | 0.448 | 0.039 |
| France | 0.388 | 0.729 | 0.709 | 0.349 | 0.66 | -0.144 | 0.475 | 0.524 | 0.264 |
| Germany | 0.508 | 0.891 | 0.786 | 0.347 | 0.751 | 0.292 | 0.789 | 0.514 | 0.445 |
| Greece | 0.363 | 0.388 | 0.822 | 0.069 | 0.831 | 0.552 | 0.65 | -0.75 | 0.163 |
| Hungary | 0.073 | 0.517 | 0.644 | -0.023 | 0.673 | 0.614 | 0.023 | 0.284 | 0.043 |
| Ireland | 0.367 | 0.185 | 0.651 | 0.017 | 0.652 | 0.276 | 0.663 | 0.947 | 0.182 |
| Italy | 0.421 | 0.588 | 0.964 | 0.106 | 0.963 | -0.199 | 0.761 | 0.724 | 0.355 |

| | Compass | | | Spider diagram | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Left-Right | Pro-/Anti-European | Liberal Society | Restrictive Financial Policy | Law and Order | Restrictive Immigration Policy | Environmental Protection | Welfare State Expansion | Economic Liberalization |
| Latvia | 0.240 | 0.102 | 0.186 | 0.222 | 0.308 | 0.683 | 1 | 0.429 | 0.256 |
| Lithuania | 0.057 | 0.180 | 0.458 | 0.24 | 0.199 | 0.089 | 0.722 | 0.303 | 0.186 |
| Luxembourg | 0.215 | 0.682 | 0.594 | 0.195 | 0.533 | 0.127 | 0.299 | 0.264 | 0.223 |
| Malta | 0.469 | 0.696 | 0.392 | -0.049 | 1 | 0.5 | 1 | 0 | 0.187 |
| Netherlands | 0.367 | 0.453 | 0.559 | 0.223 | 0.577 | 0.036 | 0.923 | 0.289 | 0.403 |
| Poland | 0.154 | 0.805 | 0.288 | 0.521 | 0.184 | -0.108 | -0.317 | 0.217 | 0.296 |
| Portugal | 0.508 | 0.789 | 0.509 | 0.256 | 0.518 | -0.039 | 0.053 | 0.703 | 0.343 |
| Romania | -0.006 | 0.509 | 0.612 | -0.074 | 0.476 | 0.626 | 0.388 | 0.045 | 0.078 |
| Slovakia | 0.230 | 0.590 | 0.294 | 0.108 | 0.294 | 0.187 | 0.664 | 0.455 | 0.132 |
| Slovenia | 0.277 | 0.648 | 0.401 | 0.405 | 0.571 | -0.021 | 1 | 0.559 | 0.251 |
| Spain | 0.442 | 0.280 | 0.558 | 0.101 | 0.609 | -0.194 | 0.684 | 0.154 | 0.138 |
| Sweden | 0.355 | 0.823 | 0.501 | 0.363 | 0.588 | 0.455 | 0.728 | 0.93 | 0.379 |
| Switzerland | 0.629 | 0.592 | 0.787 | 0.497 | 0.868 | -0.195 | 1 | 1 | 0.646 |
| Turkey | 0.299 | 0.656 | 0.543 | -0.046 | 0.409 | 0.252 | 1 | 0.172 | 0.051 |
| UK - England | 0.499 | 0.798 | 0.647 | 0.387 | 0.726 | -0.041 | 0.839 | 0.705 | 0.609 |
| UK - Northern Ireland | 0.779 | 0.964 | 0.705 | 0.171 | 0.729 | 1 | 1 | 0.515 | 0.399 |
| UK - Scotland | 0.414 | 0.758 | 0.295 | 0.368 | 0.327 | 0.412 | 0.853 | 0.523 | 0.568 |
| UK - Wales | 0.553 | 0.840 | 0.517 | 0.44 | 0.528 | -0.025 | 0.878 | 0.731 | 0.649 |

**Appendix 2: Stress of MDS models**

| | MDS stress | | |
| | Number of Dimensions | | |
| | 1 | 2 | 3 |
| --- | --- | --- | --- |
| Austria | 10.505 | 2.171 | 0.467 |
| Belgium - Flanders | 20.157 | 10.645 | 6.013 |
| Belgium - Wallonia | 15.034 | 6.486 | 0.000 |
| Bulgaria | 29.153 | 21.810 | 11.384 |
| Croatia | 10.363 | 3.672 | 1.204 |
| Cyprus | 23.157 | 2.682 | 2.347 |
| Czech Republic | 44.012 | 10.856 | 7.303 |
| Denmark | 21.406 | 6.803 | 3.385 |
| Estonia | 17.996 | 10.196 | 5.574 |
| Finland | 22.222 | 8.182 | 3.260 |
| France | 39.865 | 17.251 | 8.053 |
| Germany | 22.089 | 9.954 | 5.073 |
| Greece | 22.205 | 2.647 | 1.770 |
| Hungary | 12.990 | 6.173 | 1.358 |
| Ireland | 27.114 | 3.842 | 0.725 |
| Italy | 18.886 | 1.755 | 2.941 |
| Latvia | 17.571 | 10.997 | 6.609 |
| Lithuania | 30.084 | 22.172 | 11.474 |
| Luxembourg | 11.489 | 10.297 | 4.864 |
| Malta | 9.572 | 0.000 | 0.000 |
| Netherlands | 35.689 | 21.384 | 4.970 |
| Poland | 24.479 | 10.896 | 6.490 |
| Portugal | 33.442 | 11.709 | 7.434 |
| Romania | 6.264 | 6.045 | 0.000 |
| Slovakia | 32.211 | 8.065 | 1.164 |
| Slovenia | 27.376 | 10.726 | 4.176 |
| Spain | 27.096 | 16.121 | 9.174 |
| Sweden | 33.993 | 11.092 | 9.526 |
| Switzerland | 11.622 | 2.376 | 1.117 |
| Turkey | 38.279 | 14.178 | 4.731 |
| UK - England | 12.629 | 3.783 | 0.039 |
| UK - Northern Ireland | 6.704 | 0.000 | 0.000 |
| UK - Scotland | 21.508 | 5.957 | 2.059 |
| UK - Wales | 17.552 | 3.282 | 1.124 |

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Notes

[i] Not all items that the voter responded to are integrated into the compass or the spider diagram. The spider diagram does not include any item on European integration. No explanation is provided for this.

[ii] Out of the 272 parties in the 2009 EU Profiler, 163 were included in the 2006 CHES. There are no estimates for non-EU members Croatia, Turkey and Switzerland in the CHES; additionally small countries (with few experts) such as Malta and Luxembourg are missing. Moreover, the CHES includes only parties that actually already had representation. Finally, a number of new parties emerged between 2006 and 2009.

[iii] This assertion is supported by a multivariate error variance regression model in which the errors were modeled to depend on a party being East- or West-European (not reported).

[iv] The liberal society spider diagram dimension was linked to the GAL/TAN dimension from the CHES; the restrictive financial policy dimension to the CHES tax versus spending question; the law and order dimension to civil liberties; the restrictive migration policy dimension to CHES migration question; the welfare state expansion dimension to the CHES income redistribution question; the economic liberalization dimension to the CHES deregulation question. Only the environmental protection dimension had no equivalent in the CHES, therefore we used the GAL/TAN dimension as a proxy.

[v] We used Multiple Imputation (100 datasets) to estimate the missing values of the 28 items that were used across all countries (King et al. 2001). For the country-level statements the number of observations was too low to use Multiple Imputation; here we replaced missing values with the median value.

[vi] Please observe that this is the *mean* scalability coefficient of West European countries, which is different from the scalability coefficient across all West European parties presented in Figure 1.

[vii] A number of data reduction or scaling techniques can be used to analyse the dimensionality of the supply side of politics. We choose to use multidimensional scaling here, because it works quite well when the number of respondents (parties) is low.

[viii] When using a non-metric analysis, stress levels will be somewhat lower in most countries and a two-dimensional solution will usually be adequate. However, the between-country differences are rather similar to the ones in the model presented in Figure 4.