ONLINE APPENDIX

WHAT YOU SEE IS NOT ALWAYS WHAT YOU GET: BARGAINING BEFORE AN AUDIENCE UNDER MULTIPARTY GOVERNMENT

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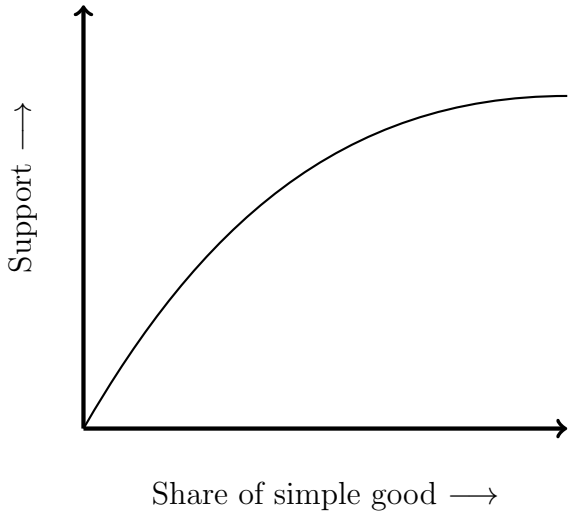
APPENDIX A: Technical Proof for the Edgeworth Box Analysis

The purpose of this appendix is to provide the technical underpinnings for the Edgeworth Box analysis presented in Figures 1 and 2 in the main text. We proceed in two steps. First, we outline the payoff functions for the parties that give rise to the iso-support curves displayed in the figures. We then prove that, provided that less sophisticated supporters—including most voters—rely sufficiently on a heuristic to evaluate parties, any efficient bargain between the parties will allocate the simple good in line with the division implied by the voter heuristic. We do this in a general framework that eschews particular functional forms and imposes only general, standard conditions on payoff functions.

Payoff Functions. We assume that parties are motivated by securing the support of their target audiences, and act so as to maximize this support. Thus, they care about the outcomes of coalition bargaining indirectly, via the manner in which these bargains shape support. We assume that the cumulative support for a party—i.e., the party's payoff—is an additive function of the backing secured from sophisticated and unsophisticated supporters, weighted by the relative importance of each support group to the party. Denote the relative importance of unsophisticated supporters by $\gamma \in (0, 1)$ and the relative importance of sophisticated supporters by $1 - \gamma$. (Typically, but not necessarily, importance may be tied to the relative size of the groups—this would especially be true with respect to voters.)

We assume that the support that is secured from each group in response to a coalition bargain increases at a (weakly) diminishing rate as a party secures more of a good. Specifically, for each party and good x, there exists a support function $s(x)$ that denotes the support secured by the party if it obtains share x of the good, where $s'(x) > 0$ and $s''(x) \leq 0$. Note that this is a general functional form in keeping with standard modeling approaches for payoff functions: Support is monotonically increasing in x, but at a diminishing rate. A generic representation of this support function is displayed in Figure A1. Common functional forms that satisfy these conditions (and are therefore often used as utility functions in applications

Figure A1. *Support Function - Sophisticated Supporters*



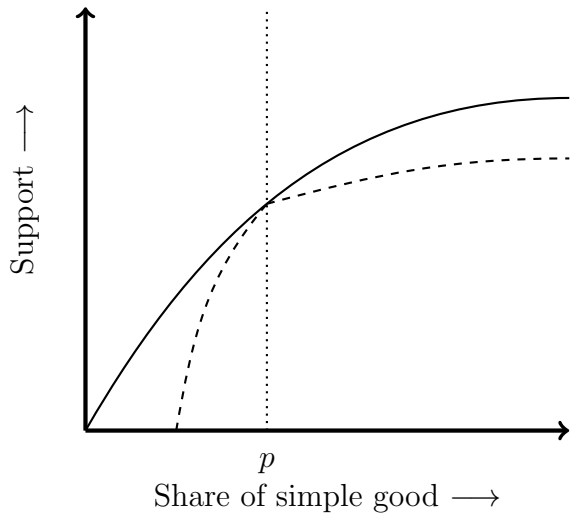
in economics and political science) are the logarithmic function (e.g., $s(x) = Log(x)$), or a power function (e.g., $s(x) = x^a$, where $a \in (0, 1]$).

Recall that sophisticated supporters are aware of both the simple and complex goods in a coalition bargain, and do not rely on heuristics to make their support decision. Thus, support for the parties by sophisticated voters in response to a bargain $\Omega = \{s, c\}$, which allocates share $s \in (0, 1)$ of the simple good to Party A (with $1 - s$ going to Party B) and share $c \in (0, 1)$ of the complex good to Party A (with $1 - c$ going to Party B) is given by:

- $S_A^{Soph}(\Omega) = s(s) + s(c)$ where $\frac{\partial s(j)}{\partial j} > 0$ and $\frac{\partial^2 s(j)}{\partial j^2} < 0$ for $j \in \{s, c\}$
- $S_B^{Soph}(\Omega) = s(1 - s) + s(1 - c)$ where $\frac{\partial s(1-j)}{\partial j} < 0$ and $\frac{\partial^2 s(1-j)}{\partial j^2} > 0$ for $j \in \{s, c\}$.

Recall that unsophisticated supporters differ from sophisticated ones in two ways. First, they only observe the simple good, and therefore their support only depends on the allocation of the simple good. Second, these supporters rely on a heuristic to evaluate their party. This heuristic defines a division of goods between the parties such that support declines sharply if a party secures less than the share implied by the heuristic, and does not respond significantly once the heuristic threshold has been met. We model this heuristic in the following way. First, the parameter $p \in (0, 1)$ denotes the division of the simple good implied by the voter heuristic. Second, we add two parameters to the support function for unsophisticated

Figure A2. *Support Function - Sophisticated voters*



voters, which modify the slope of $s(x)$. Specifically, the support function—which we display graphically in Figure A2—is given by:

$$S_A^{\sim Soph}(\Omega) = \begin{cases} (1-\alpha)s(p) + \alpha s(s) & s < p \\ s(o) & o = p \\ (1-\beta)s(p) + \beta s(s) & s > p \end{cases} \tag{1}$$

$$S_B^{\sim Soph}(\Omega) = \begin{cases} (1-\beta)s(1-p) + \beta s(1-s) & s < p \\ s(1-o) & o = p \\ (1-\alpha)s(1-p) + \alpha s(1-s) & s > p. \end{cases} \tag{2}$$

The constant terms at the front of the function represent an intercept shift that ensures that the support function is continuous and passes through $s(s)$ for $s = p$. (This feature is not critical to the argument.) The parameter $\alpha > 1$ increases the slope of the support function to the left of p, with a steeper slope as α increases. The parameter $\beta \in (0, 1)$ decreases the slope of the support function to the right of p, with the slope becoming more shallow as β approaches 0.

The payoff (support) function for each party is given by the cumulative support obtained from sophisticated and unsophisticated supporters, weighted by their relative importance:

$$S_A(\Omega) = \begin{cases} (1-\gamma)(s(s)+s(c)) + \gamma((1-\alpha)s(p)+\alpha s(s)) & s < p \\ (1-\gamma)(s(s)+s(c)) + \gamma s(s) & s = p \\ (1-\gamma)(s(s)+s(c)) + \gamma((1-\beta)s(p)+\beta s(s)) & s > p \end{cases} \tag{3}$$

$$S_B(\Omega) = \begin{cases} (1-\gamma)(s(1-s)+s(1-c)) + \gamma((1-\beta)s(1-p)+\beta s(1-s)) & s < p \\ (1-\gamma)(s(1-s)+s(1-c)) + \gamma s(1-s) & s = p \\ (1-\gamma)(s(1-s)+s(1-c)) + \gamma((1-\alpha)s(1-p)+\alpha s(1-s)) & s > p. \end{cases} \tag{4}$$

Efficient Bargaining. In this section, we show that if parties bargain efficiently, the coalition agreement that is reached will distribute the simple good in line with the heuristic used by unsophisticated voters. Suppose that—given the particular protocol employed—the relative bargaining power of the parties implies a bargain at $\Omega^0 = (s^0, c^0)$. (We intentionally leave this bargaining protocol unspecified to highlight that the result does not depend on a specific protocol.) We need to demonstrate that if $s^0 \neq p$, the bargain is inefficient and the parties can engage in additional reallocations that increase the support of both parties. Specifically, the parties can shift some of the simple good to the party whose share of the simple good is below the share implied by the heuristic, and compensate the party who gives up the simple good by shifting some of the complex good to it.

Note that if the marginal rate of substitution between the simple and the complex good (given by the ratio of marginal utilities) is larger for one party than for the other at a proposed bargaining outcome, the outcome cannot be efficient: The difference in the marginal rates of substitution implies that there is a mutually beneficial trade available. Recall that the slope of iso-support curves is given by the marginal rate of substitution. This implies that in the Edgeworth Box analysis presented above, at a bargain that is efficient, the iso-support curves of the parties must be just tangent. We want to show that—given the fact that

unsophisticated voters are employing a heuristic that focuses on whether their party's share of the simple good corresponds to the threshold implied by their heuristic—this requires that $o = p$, i.e., the simple good is allocated in line with the unsophisticated voters' heuristic. The proof proceeds by demonstrating that the marginal rates of substitution cannot be equal if $s^0 \neq p$.

Case 1: $x = \{s, c\}$ **s.t.** $s < p$**.**

Given the support functions defined above, the marginal rates of substitution are given by:

$$MRS_A = \frac{\frac{\partial S_A(x)}{\partial s}}{\frac{\partial S_A(x)}{\partial c}} = \frac{(1 - \gamma + \gamma\alpha)}{(1 - \gamma)} \frac{s'(s)}{s'(c)} \tag{5}$$

$$MRS_B = \frac{\frac{\partial S_B(x)}{\partial s}}{\frac{\partial S_B(x)}{\partial c}} = \frac{(1 - \gamma + \gamma\beta)}{(1 - \gamma)} \frac{s'(1 - s)}{s'(1 - c)}. \tag{6}$$

Note that for α sufficiently large, and β sufficiently small, the marginal rate of substitution for Party A must exceed the marginal rate of substitution for Party B; that is, the existing bargain is inefficient and the two parties can trade a portion of the complex good from Party A to Party B in return for an increase in Party A's share of the simple good.

Case 2: $x = \{s, c\}$ **s.t.** $s > p$**.**

Given the support functions defined above, the marginal rates of substitution are given by:

$$MRS_A = \frac{\frac{\partial S_A(x)}{\partial s}}{\frac{\partial S_A(x)}{\partial c}} = \frac{(1 - \gamma + \gamma\beta)}{(1 - \gamma)} \frac{s'(s)}{s'(c)} \tag{7}$$

$$MRS_B = \frac{\frac{\partial S_B(x)}{\partial s}}{\frac{\partial S_B(x)}{\partial c}} = \frac{(1 - \gamma + \gamma\alpha)}{(1 - \gamma)} \frac{s'(1 - s)}{s'(1 - c)}. \tag{8}$$

Note that for α sufficiently large, and β sufficiently small, the marginal rate of substitution for Party B must exceed the marginal rate of substitution for Party A; that is, the existing bargain is inefficient and the two parties can trade a portion of the complex good from Party B to Party A in return for an increase in Party B's share of the simple good.

Since an increasing α and declining β imply that unsophisticated voters evaluate the bargain more intensely with respect to the cutoff p, this is equivalent to saying that if the behavior of unsophisticated voters is sufficiently strongly tied to their heuristic, bargains that do not allocate the simple good in line with the voters' heuristic are inefficient, and parties have opportunities for mutually advantageous trades. Translated into the Edgeworth Box framework, this result implies that the iso-support curves for Party A have a steeper slope than the iso-support curves for Party B when the simple good is below p and a more shallow slope than the iso-support curves for Party B if the simple good is above p. The iso-support curves are tangent only for bargains for which $s = p$.

APPENDIX B: Sources for Coding Partisanship of Government Ministers

In this appendix, we list the archival sources used to create the data on ministry assignments. The countries and years (and number of coalition governments) in the sample are as follows: Austria (1949–2016) [20], Belgium (1947–2011) [32], Denmark (1950–2014) [23], Finland (1945–2014) [41], France (1959–2017) [29], Germany (1949–2018) [25], Great Britain (2010) [1], Greece (1989–2015) [6], Iceland (1971–2016) [19], Ireland (1954–2011) [12], Italy (1946–2016) [38], Luxembourg (1959–2013) [13], the Netherlands (1946–2012) [23], Norway (1963–2009) [11], Portugal (1978–2011) [5], and Sweden (1951–2014) [10].

The years listed range from the formation year of the first coalition appearing in the sample to that of the last. With a few exceptions, the data comprise all the multiparty governments that formed in these 16 democracies from the end of World War II until the last election year covered in the 2017 version of the Manifestos Project (MARPOR) dataset. Bargaining situations resulting in single-party, non-partisan, or caretaker administrations are excluded, as are governments in which all coalition parties ran on a single policy platform and those with government parties that are missing in the MARPOR data. In addition, bargaining situations in Luxembourg before 1959 and Iceland before 1971 are excluded because of missing information on a number of cabinet ministries.

Austria	Republik Österreich, Parlament, Bundesregierungen seit 1918
Belgium	Centre de Recherche et d'Information Socio-Politiques, Gouvernements Fédéraux depuis 1944
Denmark	Statsministeriet, Regerigen, Regeringer siden 1848
Finland	Valtioneuvosto, Hallitukset ja Ministerit vuodesta 1917
France (V)	Assemblée Nationale, Les Gouvernements de la Vème République Assemblée Nationale, Les Députés Français depuis 1789
Germany	Schindler, Peter. 1999. *Datenhandbuch zur Geschichte des Deutschen Bundestages 1949 bis 1999*. Baden-Baden: Nomos Verlagsgesellschaft. Das Datenhandbuch des Bundestages
Great Britain	BBC News, "Cameron's Government: A Guide to Who's Who"
Greece	General Secretariat of the Government, Governments from 1909 to Today
Iceland	Althingi, Ministries since 1917 Althingi, Ministers since 1904
Ireland	Department of the Taoiseach, Historical Information, History of Government Houses of the Oireachtas, Directory of Members
Italy	Governo Italiano, Governi dal 1943 ad Oggi
Luxembourg	Thewes, Guy. 2003. *Les Governements du Grand-Duché de Luxembourg depuis 1848*. Luxembourg: Service Information et Presse du Gouvernement Luxembourgeois. Le Gouvernement Luxembourgeois, Anciens Membres du Gouvernement
Netherlands	Rijksoverheid, Regering, Inhoud, Kabinetten sinds 1945
Norway	Norske Regjeringer Siden 1945
Portugal	Guimarãis, Alberto Laplaine, Bernardo Diniz de Ayala, Manuel Pinto Machado, and Miguel Félix António. 2011. *Os Governos da República: 1910–2010*. Lisboa: s.n.). República Portuguesa, Governos Anteriores
Sweden	SverigesMinistrar.se

APPENDIX C: Multilevel Model Estimation of Table 1

Table C1. *Random Intercepts Estimation*

Explanatory Variables	**Estimates**
Seat Contribution	0.790 ***
	(0.011)
Intercept	0.068 ***
	(0.004)
σ^2(Intercept)	0.000
	(0.000)
σ^2(Residual)	0.004
	(0.000)

Displayed are maximum likelihood coefficient estimates and standard errors from a multilevel random intercepts model. Dependent variable: Numerical share of cabinet ministries. N: 602 coalition parties (after 308 parties, one per bargaining situation, are randomly dropped from the analysis). Likelihood ratio test against linear model with a fixed intercept (Table 1) implies we cannot reject the null hypothesis of no difference between the models ($p > 0.99$). Significance levels : $*$: 10% $**$: 5% $***$: 1%.

Table C2. *Random Coefficients Estimation*

Explanatory Variables	**Estimates**
Seat Contribution	0.793 ***
	(0.012)
Intercept	0.066 ***
	(0.005)
σ^2(Seat Contribution)	0.006
	(0.003)
σ^2(Intercept)	0.000
	(0.000)
σ(Seat Contribution, Intercept)	-0.001
	(0.001)
σ^2(Residual)	0.004
	(0.000)

Displayed are maximum likelihood coefficient estimates and standard errors from a multilevel random coefficients model (with no constraints imposed on the covariance matrix). Dependent variable: Numerical share of cabinet ministries. N: 602 coalition parties (after 308 parties, one per bargaining situation, are randomly dropped from the analysis). Likelihood ratio test against linear model with a fixed intercept and slope (Table 1) implies we cannot reject the null hypothesis of no difference between the models ($p > 0.09$). Significance levels : $*$: 10% $**$: 5% $***$: 1%.

APPENDIX D: Measuring Issue Saliency and Positions on 6 Dimensions

Using data on party election programs from the Manifestos Project (MARPOR), and the scaling approach developed by Lowe et al. (2011), we calculated issue saliency scores and policy positions for parties on six policy dimensions:

(1) Economic Regulation and State Services
(2) Traditional Morality
(3) Environmental Protection
(4) Internationalism and European Integration
(5) Social Cohesion and National Identity
(6) Conflict and Military Power.

These dimensions overlap considerably with dimensions defined in several prominent expert studies, such as the pair of studies conducted by Laver and Hunt (1992) and Benoit and Laver (2006), as well as the Chapel Hill Expert Survey (Bakker et al. 2015).

The MARPOR coding scheme classifies each "quasi-sentence" in a party's electoral program into one of 56 mutually exclusive policy categories. Typically, some subset of the resulting category counts from a coded electoral program are aggregated and scaled to construct a more general—and presumably, substantively meaningful—index, such as the commonly used left-right socioeconomic scale. Lowe et al. (2011) proposed a new scaling method (based on log-odds ratios), which improved on previous scales in several ways, to produce both saliency and position estimates on multiple dimensions. Specifically, their measure of the *position* of a party on a given dimension is defined as,

$$ln\left(\frac{R+0.5}{L+0.5}\right),$$

and their measure of the *saliency* of the dimension for a party is defined as,

$$ln\left(\frac{R+L+1}{N}\right),$$

where N is the total number of quasi-sentences in the manifesto, and R and L represent, respectively, the number of quasi-sentences in the party program assigned to the "right" and "left" sides of the policy dimension. (For instance, for the traditional morality dimension defined by Lowe et al., R was the number of quasi-sentences in a party program assigned to the MARPOR category "Traditional Morality: Positive," while L was the number of quasi-sentences in the program assigned to the category "Traditional Morality: Negative."[1])

Lowe et al. (2011) constructed several policy dimensions (which they defined *a priori*) from the MARPOR data set, using categories for each dimension that (a) deal with the same general issue (such as state-provided services) and (b) are inherently positional and confrontational (such as the categories "Welfare State Expansion: Positive" and "Welfare State Limitation: Positive"). We followed the same logic in constructing our *a priori* policy dimensions, some of which, as noted above, are similar (if not identical) to those from the Lowe et al. study. Specifically, the policy dimensions in our study are constructed from the MARPOR categories as follows.[2]

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1 As shown in the latter equation above, the Lowe et al. (2011) scaling procedure produces issue saliency scores for a party that are on a logarithmic scale. For each party, we exponentiate this measure on each of the six dimensions and then create a *relative saliency* score for a dimension by dividing the dimension's exponentiated measure by the average exponentiated measure across dimensions. Thus, if a policy dimension is of above-average importance to a party, it receives a relative policy saliency score greater than 1.0, while a dimension of below-average importance to the party receives a score less than 1.0.

2 The three-digit numbers in the tables refer to the MARPOR policy category codes. The "traditional morality" and "environmental protection" dimensions are identical to those constructed by Lowe et al. (2011), while the "economic regulation and state services" dimension is very similar to their "state involvement in economy" dimension.

(1) Economic Regulation and State Services

Left	*Right*
403 Market Regulation +	401 Free Enterprise +
404 Economic Planning +	402 Incentives +
406 Protectionism +	407 Protectionism –
409 Keynesianism +	414 Economic Orthodoxy +
412 Controlled Economy +	505 Welfare State Limitation +
413 Nationalisation +	507 Education Limitation +
503 Social Justice +	702 Labour Groups –
504 Welfare State Expansion +	
506 Education Expansion +	
701 Labour Groups +	

(2) Traditional Morality

Left	*Right*
604 Traditional Morality –	603 Traditional Morality +

(3) Environmental Protection

Left	*Right*
416 Anti-Growth Economy +	410 Economic Growth +
501 Environmental Protection +	

(4) Internationalism and European Integration

Left	*Right*
107 Internationalism +	109 Internationalism –
108 European Integration +	110 European Integration –

(5) Social Cohesion and National Identity

Left	*Right*
301 Decentralisation +	302 Centralisation +
602 National Way of Life –	601 National Way of Life +
607 Multiculturalism +	605 Law and Order +
	606 Social Harmony +
	608 Multiculturalism –

(6) Conflict and Military Power

Left	*Right*
103 Anti-Imperialism +	104 Military +
105 Military –	
106 Peak +	

To assess the construct validity of these dimensions, we performed a confirmatory factor analysis to ensure that the MARPOR categories load on the latent predefined policy dimensions in plausible ways—of particular importance is that the categories grouped *within* each "side" of the dimension (i.e., "left" or "right") are correlated with the underlying dimension in the same direction and that the signs of the correlations *across* sides are in the opposite direction.[3] The results are as follows.

(1) Economic Regulation and State Services

Left	403 Market Regulation +	0.22
	404 Economic Planning +	0.14
	406 Protectionism +	0.05
	409 Keynesianism +	0.06
	412 Controlled Economy +	0.30
	413 Nationalisation +	0.37
	503 Social Justice +	0.35
	504 Welfare State Expansion +	0.23
	506 Education Expansion +	0.09
	701 Labour Groups +	0.35
Right	401 Free Enterprise +	-0.53
	402 Incentives +	-0.28
	407 Protectionism –	-0.17
	414 Economic Orthodoxy +	-0.48
	505 Welfare State Limitation +	-0.38
	507 Education Limitation +	-0.14
	702 Labour Groups –	-0.13

(2) Traditional Morality

Left	604 Traditional Morality –	0.24
Right	603 Traditional Morality +	-0.24

[3] The factor analysis was performed using the full set of parties and elections (1,956 election-party observations) for all Western European parliamentary democracies covered by the 2017 version of the MARPOR dataset.

(3) Environmental Protection

Left	416 Anti-Growth Economy +	0.43
	501 Environmental Protection +	0.45
Right	410 Economic Growth +	-0.26

(4) Internationalism and European Integration

Left	107 Internationalism +	0.25
	108 European Integration +	0.31
Right	109 Internationalism –	-0.22
	110 European Integration –	-0.21

(5) Social Cohesion and National Identity

Left	301 Decentralisation +	-0.25
	602 National Way of Life –	-0.16
	607 Multiculturalism +	-0.13
Right	302 Centralisation +	0.11
	601 National Way of Life +	0.33
	605 Law and Order +	0.42
	606 Social Harmony +	0.02
	608 Multiculturalism –	0.47

(6) Conflict and Military Power

Left	103 Anti-Imperialism +	0.09
	105 Military –	0.46
	106 Peace +	0.45
Right	104 Military +	-0.14

Clearly, the degree to which the MARPOR categories are correlated with the predefined underlying policy dimensions varies quite a bit, but the loadings are all consistent with expectations, both within and between the "left" and "right" poles of each dimension.

Just as important a task is to demonstrate that the position and saliency estimates for political parties on these six dimensions have face validity. To assess this (in a somewhat summary fashion), we used the Lowe et al. (2011) measures discussed above to generate position and saliency estimates for all the parties and elections examined in the factor analysis,

and then aggregated those estimates across parties and elections according to the MARPOR-defined *party families* to which the parties belong. The nine major MARPOR-defined party families are Ecologist (ECO), Communist (COM), Socialist (SOC), Liberal (LIB), Christian Democratic (CHR), Conservative (CON), Nationalist (NAT), Agrarian (AGR), and Ethnic/Regionalist (REG). In the figures below, we simultaneously display the mean saliency and position estimates for party families over the postwar period, along with Hotelling T^2 confidence regions.[4]

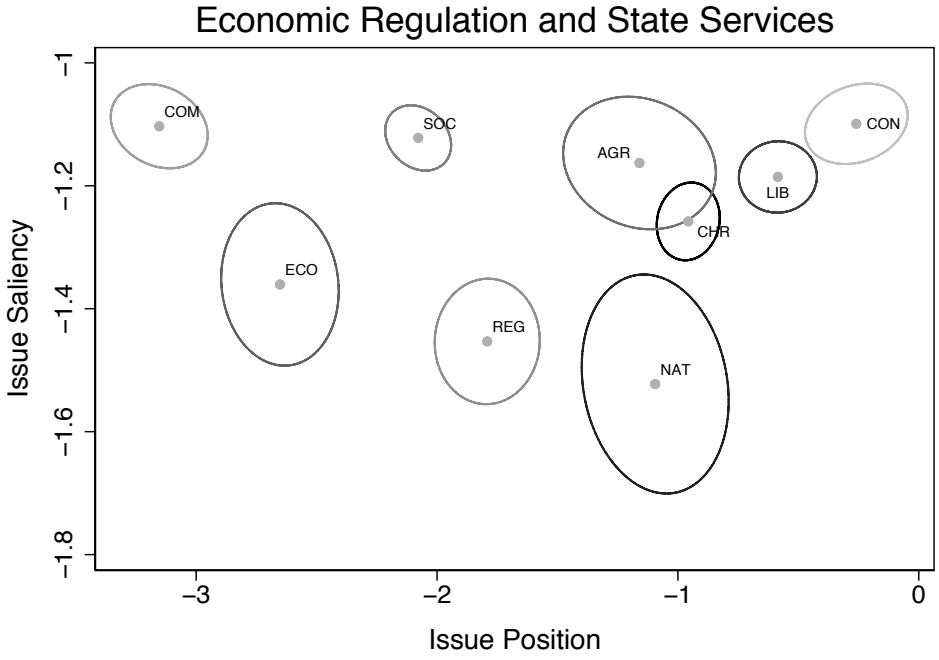


Figure D1. *Economic Regulation and State Services, by Party Family*

Beginning with the *Economic Regulation and State Services* dimension, we see that most party families in postwar Western Europe have placed approximately the same amount of emphasis on economic issues. The most notable exceptions are Green parties, Regionalist parties, and Nationalists, all of which (as will be shown below) place almost equal stress on some other issue. In terms of position estimates, we see essentially the same pattern

[4] Analogous to a univariate confidence interval, a confidence region is centered at the sample mean vector of the observed variables. The length of each axis of a region is longer the higher the variability in observed values of the corresponding variable and the smaller the sample size. The tilt of a region reflects the direction of the covariance between the plotted variables.

Figure D2. *Traditional Morality, by Party Family*

as revealed by most expert surveys of party economic stances, with the Communists, then Greens, then Socialists on the left of the spectrum, Agrarian and Christian Democratic parties on the center-right, and Liberal and Conservative parties farthest to the right.

Estimates on the *Traditional Morality* dimension also appear consistent with typical assessments of party issue emphases and positions. No party family stresses this dimension as much as the economic dimension (note that the issue saliency estimates can be directly compared across figures). But there is significant differentiation between parties in terms of the importance of this dimension, which correlates positively with their positions. For example, Greens, Socialists, Communists, and Regionalists put relatively little stress on "morality" issues and are also on the relatively "permissive" side of the scale. They are joined by Liberal parties, which are known to be progressive on such issues as gay rights, abortion, gender equality, etc. On the other side of the dimension are party families that tend to stress this issue more, such as Agrarians, Conservatives, and Nationalists, all of whom tend to court rural and/or religious voters with more traditional social views. Christian Democratic parties, with their obvious religious roots, are farthest to the right on this issue.

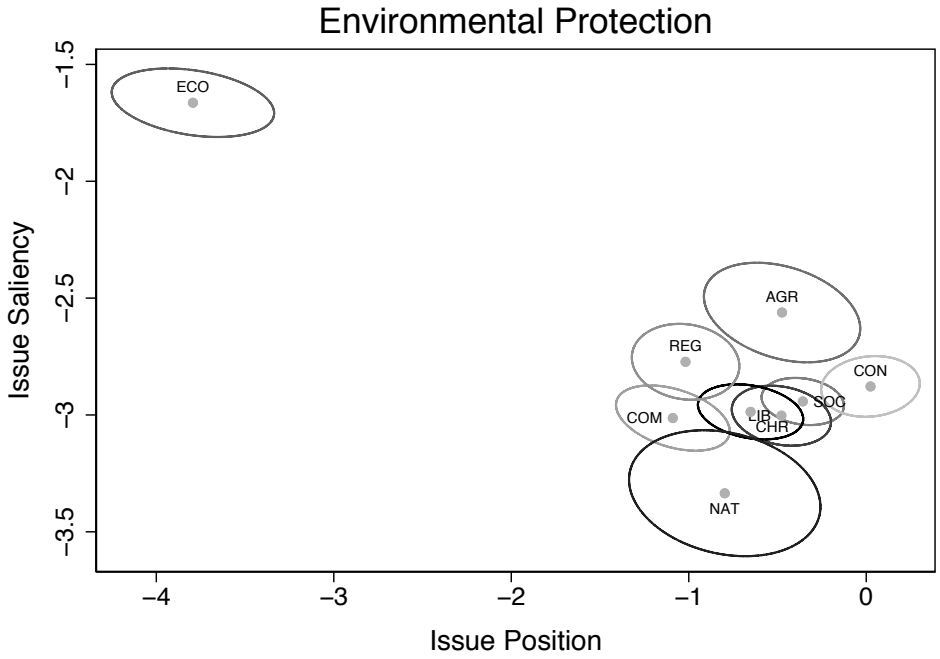


Figure D3. *Environmental Protection, by Party Family*

The estimates on the *Environmental Protection* dimension show clear differences between Green parties and every other party family. Not surprisingly, Greens stress this issue more than any other type of party (stressing it as much as economic issues), and they tend to be extreme on the environmental protection side of the dimension. There is also differentiation between the other parties (though this perhaps gets somewhat lost in the figure because of the skew caused by the Green party family estimates). For example, Communists are more pro-environment than Socialists, which are more pro-environment than Conservatives.

Estimates for the *Internationalism and European Integration* dimension are also not that surprising. Most mainstream parties cluster together on the pro-internationalism and pro-integration side of this dimension. These parties are separated from three party families that either tend to talk frequently about national sovereignty, such as Nationalists, or have hostile attitudes towards the European Union. Agrarian parties (which are most prevalent in Scandinavia) have often taken positions against further EU integration, as have Communist parties, which typically portray the EU as a vehicle for harsh free-market capitalism. Notably, this is the only issue on which Nationalists and Communists share common ground.

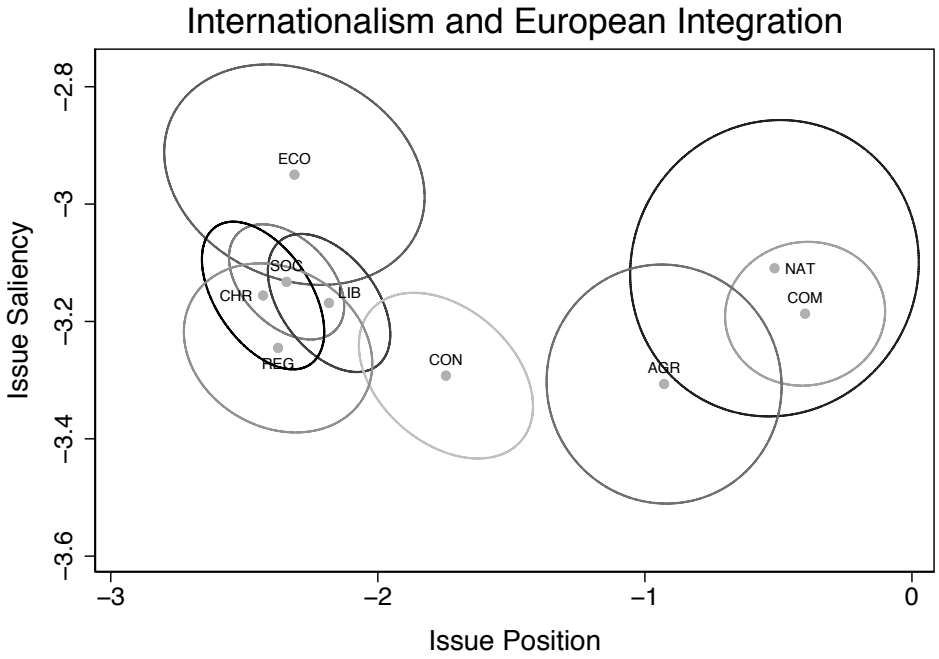


Figure D4. *Internationalism and European Integration, by Party Family*

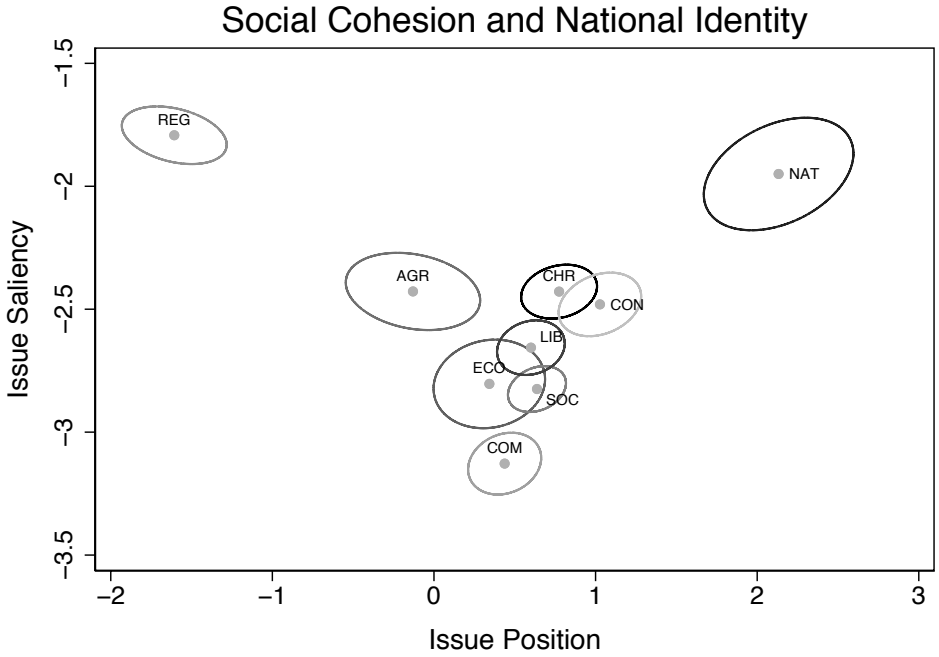


Figure D5. *Social Cohesion and National Identity, by Party Family*

On the *Social Cohesion and National Identity* dimension, the clearest differences are between Ethnic/Regionalist parties and Nationalists. Both party families emphasize these issues nearly as much as economic issues. Nationalists tend to make positive statements about national identity, as well as negative statements about cultural diversity, and they tend to take a zero-tolerance approach to law and order issues (which is intimately connected to their hostile views towards immigrant communities and ethnic minorities). In contrast, regionalist parties highlight the virtues of multiculturalism and advocate for greater autonomy for minority groups, especially where they are geographically concentrated.

Finally, estimates on the *Conflict and Military Power* dimension differentiate party families that extol the virtues of a strong military from those that advocate peaceful solutions to international problems, such as Green parties or (to a lesser extent) Socialists, or parties that tend to associate large militaries with (capitalist) imperialism, such as Communist parties (which stress this issue more than any other party family). Agrarians, Liberals, and Christian Democratic parties are relatively centrist on this dimension, whereas Conservative and Nationalist party families take very similar stances on the right (both advocating greater military strength).

In sum, at least with respect to broadly-defined party families, the saliency and position estimates on the six predefined policy dimensions do appear to have significant face validity. A more extensive investigation is warranted, nonetheless, to assess whether the estimates accurately describe the positions of individual parties and track changes in issue priorities and policy positions over time.

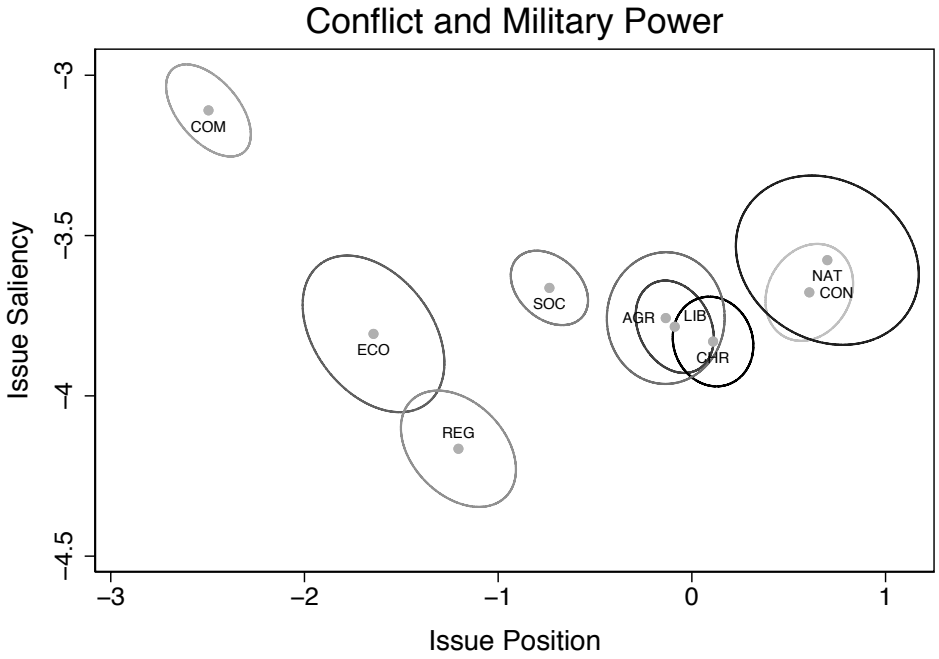


Figure D6. *Conflict and Military Power, by Party Family*

APPENDIX E: Assignment of Government Ministries to Policy Dimensions

Matching policy dimensions to specific ministries obviously requires knowledge of ministerial competences. Bäck, Debus and Dumont (2011), in their classification of 13 ministerial posts that have been present (more or less) in all Western European countries in the post-war period, followed what they described as a "maximalist" approach, in which they assigned numerous MARPOR categories to a ministry "to get the widest possible picture of the policy jurisdiction of the portfolio" (Bäck, Debus and Dumont 2011, 453).[5] They also allowed for the repetition of categories across ministries. We follow a similar strategy, although since we have predefined policy dimensions, we associate ministers with those rather than with MARPOR categories.[6]

We have classified ministries onto specific policy dimensions based on the sorts of issues that fall within their particular remit, which we assessed based on information gathered from a variety of sources, such as historical descriptions provided by the ministries themselves, formal legislative documents detailing the organization of the government and policy competences of each department, and the types of government bills and directives introduced by the ministers in the legislature. Ministries that have significant policymaking responsibility in different policy areas are assigned to multiple policy dimensions.

In this appendix, we list (a) the major ministries in our sample of countries (necessarily by broad policy area rather than by specific names, since these vary dramatically across countries and years), (b) the policy dimensions assigned to them, and (c) the typical sorts of issues on these dimensions for which ministers are primarily responsible. Not all ministries can be assigned to these policy dimensions. For example, those ministers without portfolio who are not tasked with a specific policy area cannot be assigned to any dimension. The

5 The portfolios included in their study were Foreign Affairs, Interior, Justice, Finance, Economic Affairs, Defense, Labor, Education, Health, Agriculture, Industry, Environment, and Social Affairs.

6 A fundamental premise of our argument, unlike that of Bäck, Debus and Dumont (who were testing a saliency theory of party competition), is that the utility a party derives from receiving (or not receiving) a ministry is a function of the *distance* between the party's ideal point and the (expected) policies produced by the coalition party controlling the ministry. Naturally, to measure distance between parties, we have to define a space on which we can place them; the role of the MARPOR categories is to give substance to that space (i.e., coding positions using these categories allows us to say what "further right" or "further left" actually means with respect to positions on the corresponding dimension).

post of Prime Minister represents a special case. Even though prime ministers control no government department, per se, it is plausible to think that they could insert themselves into the affairs of those departments, particularly on the issues they care a lot about, since (at least formally) all ministries are accountable to them. Accordingly, we assign prime ministers to all six policy dimensions.

Policy Dimensions and Typical Issues	***Ministerial Posts***
(1) Economic Regulation and State Services Regulation of industry and markets, privatization, state-subsidized social services and insurance schemes (pensions, disability, health, unemployment), housing, social assistance, income and sales taxes, minimum incomes, collective bargaining	Finance/Budget/Treasury Social Affairs/Welfare Health Labor Industry/Enterprise/Economic Affairs Energy Economic Planning Education Housing Transport/Telecoms/Public Works Agriculture/Fisheries/Forests Environment
(2) Traditional Morality Gay rights, same-sex marriage and adoption, gender equality, contraception, abortion, divorce, euthanasia	Justice Social Affairs Family Health Women's Affairs
(3) Environmental Protection Air, soil, and water pollution, nuclear power, emissions standards, sustainable industrial growth, climate change	Environment Energy Agriculture/Fisheries/Forests Industry/Enterprise/Economic Affairs

(4) Internationalism and European Integration	Foreign Affairs
	Foreign Trade
European integration, international cooperation,	Foreign Aid
foreign trade, international human rights,	EU Affairs
development aid	
(5) Social Cohesion and National Identity	Justice
	Interior
Immigration, law and order, civil rights,	Immigration and Identity
decentralization, minority protections	Regional and Local Government
(6) Conflict and Military Power	Foreign Affairs
	Defense
Military conflict, nuclear arsenal, national defense,	Foreign Aid
decolonization, colonial relations	Overseas Territories

APPENDIX F: Model of Government Formation

To construct our measure of bargaining power (see the main text, also Appendix G), we rely on a model developed in a recent study by Kayser, Orlowski and Rehmert (N.d.)—hereafter, KOR—that builds on previous work by Martin and Stevenson (2001, 2010). Like these earlier studies, KOR use a conditional logit model to calculate the probability that a particular coalition is chosen (out of the set of all potential coalitions), where the probability is modeled as a function of 9 size-related, policy-related, and contextual factors. We present the conditional logit model estimates below.

The size variables measure whether the largest party is in the potential coalition, whether the potential coalition controls a minority of legislative seats, whether it is minimal winning, and the number of parties it contains. The policy variables measure the ideological range of the potential coalition, whether it contains the median legislator, and the presence of anti-establishment sentiment. Finally, the contextual variables measure whether the potential coalition is the incumbent and the extent to which parties in the potential coalition have a shared history of working together.

While we use the set of variables suggested by KOR, we continue to use the Martin and Stevenson measures for several of them. Specifically, we use the Martin and Stevenson (2010) measures for the three ideological variables (which they construct using MARPOR data), as these are more established (and more fine-grained) than those used by KOR. And we use the Martin and Stevenson (2010) measure of cabinet history (or "familiarity"), which we see as more substantively grounded than the KOR measure.

Table F1. *Determinants of Government Formation*

Explanatory Variables	**Estimates**
Largest Party in Coalition	1.199 ***
	(0.166)
Minority Government	-1.481 ***
	(0.233)
Minimal Winning Coalition	0.644 ***
	(0.162)
Number of Parties in Coalition	-0.616 ***
	(0.084)
Ideological Divisions in Coalition	-0.026 ***
	(0.004)
Median Party in Coalition	0.409 ***
	(0.145)
Anti-System Presence in Coalition	-0.041 **
	(0.021)
Status Quo	2.561 ***
	(0.138)
Familiarity	1.586 ***
	(0.401)

Displayed are maximum likelihood coefficient estimates and standard errors from a conditional logit model. Dependent variable: Binary indicator for whether a potential government was chosen. N: 498 bargaining situations (163,998 potential governments). Significance levels : $*$: 10% $**$: 5% $***$: 1%.

APPENDIX G: Calculation of Bargaining Power (Example)

As noted in the main text, we construct our measure of government party bargaining power in the following steps:

(1) using the coefficients from the KOR model (SI Appendix F), we predict the *probability of formation* for each potential government in each of our 308 bargaining situations, including the coalition that was actually chosen;

(2) for each government party in the chosen coalition, we calculate the party's probability of being included in an *alternative* coalition by summing the formation probabilities of all *non-chosen* potential coalitions in which that party is a member;

(3) we *normalize* each government party's exit probability by dividing it by the sum of exit probabilities across all government parties.

In this appendix, we illustrate how to follow these steps to construct our bargaining power measure using a simple example: Germany following the 2002 elections, which produced a legislature with only 5 parties. In Table G1, we list all 31 potential governments that could have formed after this election (column 1), highlighting the chosen one in bold: the two-party coalition of the SPD and the Greens (the Schröder II cabinet). In column 2, we list the seat shares of all potential governments (the first five rows in the data are single-party governments, and thus reflect the individual seat shares for the 5 parties), and in the note to the table, we list the MARPOR left-right party positions.[7] Columns 3–11 display the characteristics of the potential governments in the order they are presented in SI Appendix F. Column 12 indicates the chosen government, and column 13 lists the *predicted probability of formation* in **Step (1)** above. In the conditional logit model, the predicted probability of coalition i being selected in a given bargaining situation is,

$$\pi_i = \frac{exp(\sum_k X_{ik}\beta_k)}{\sum_i exp(\sum_k X_{ik}\beta_k)},$$

[7] Although these variables are not predictors in the government formation model, we list them because they are building blocks for several of those covariates: largest party status, minority status, minimal winning status, ideological divisions, and median party status.

where β_k refers to the vector of coefficients from SI Appendix F, and X_{ik} represents the associated vector of values of the k variables for potential coalition i. The denominator, which sums the numerator across *all* potential coalitions in the bargaining situation, assures that the predicted probabilities sum to one in the bargaining situation.

In **Step (2)**, for each government party (here, the SPD and Greens) we sum the predicted formation probabilities in column 13 across all potential coalitions in which the party is a member *excluding* the chosen one. Thus, this is each party's *exit probability*. For example, for the Green party, the probabilities across the 15 alternative governments in which it is a member sum to about 0.07, meaning that it has roughly a 1 in 14 chance of getting into another government. For the SPD, the probabilities across the 15 alternative coalitions in which it is a member sum to slightly more than 0.17, meaning that it has roughly a 1 in 6 chance of getting into another government.

In **Step (3)**, we normalize the measure so that it sums to one (thereby putting it on the same metric as portfolio share, the other component of the undercompensation variable). Thus, the bargaining power of the Greens is approximately $\frac{.07}{.24} = 0.29$, while for the SPD, it is approximately $\frac{.17}{.24} = 0.71$.[8]

[8] We should note that an alternative measure of bargaining power, the *normalized Banzhaf index* (discussed in footnote 27 in the main text; see also SI Appendix J), indicates that the SPD and Greens are *equal* in power, as they each belong to the same number of minimal winning coalitions. Our measure, however, accounts for the fact that the SPD has several other characteristics that have been shown empirically to be advantageous in coalition bargaining: it is ideologically central (as it is the median party), and it is the largest legislative party (making it more likely to be appointed the formateur).

Coalition	Seats	Largest Party	Minority	Minimal Winning	Number of Parties	Ideological Divisions	Median Party	Anti-System Presence	Status Quo	Familiarity	Chosen Government	Formation Probability
41113	0.0912	0	1	0	1	0	0	2.229	0	1	0	0.007
41221	0.00332	0	1	0	1	0	0	1.184	0	1	0	0.007
41320	0.416	1	1	0	1	0	1	1.615	0	1	0	0.034
41420	0.0779	0	1	0	1	0	0	1.009	0	1	0	0.007
41521	0.411	0	1	0	1	0	0	0.456	0	1	0	0.007
41113 41221	0.0945	0	1	0	2	7.893	0	2.229	0	0.932	0	0.003
41113 41320	**0.507**	**1**	**0**	**1**	**2**	**17.53**	**1**	**2.229**	**1**	**0.705**	**1**	**0.778**
41113 41420	0.169	0	1	0	2	18.02	0	2.229	0	0.503	0	0.001
41113 41521	0.502	0	0	1	2	34.19	0	2.229	0	0.703	0	0.008
41221 41320	0.420	1	1	0	2	25.43	1	1.615	0	0.984	0	0.009
41221 41420	0.0813	0	1	0	2	25.92	0	1.184	0	0.922	0	0.002
41221 41521	0.415	0	1	0	2	42.09	0	1.184	0	0.984	0	0.001
41320 41420	0.494	1	1	0	2	0.492	1	1.615	0	0.734	0	0.012
41320 41521	0.828	1	0	1	2	16.66	1	1.615	0	0.500	0	0.046
41420 41521	0.489	0	1	0	2	16.17	0	1.009	0	0.732	0	0.002
41113 41221 41320	0.511	1	0	0	3	25.43	1	2.229	0	0.696	0	0.014
41113 41221 41420	0.172	0	1	0	3	25.92	0	2.229	0	0.484	0	0.000
41113 41221 41521	0.506	0	0	0	3	42.09	0	2.229	0	0.694	0	0.002
41113 41320 41420	0.585	1	0	0	3	18.02	1	2.229	0	0.548	0	0.013
41113 41320 41521	0.919	1	0	0	3	34.19	1	2.229	0	0.416	0	0.007
41113 41420 41521	0.580	0	0	0	3	34.19	0	2.229	0	0.545	0	0.002
41221 41320 41420	0.498	1	1	0	3	25.92	1	1.615	0	0.725	0	0.003
41221 41320 41521	0.831	1	0	0	3	42.09	1	1.615	0	0.496	0	0.007
41221 41420 41521	0.493	0	1	0	3	42.09	0	1.184	0	0.722	0	0.000
41320 41420 41521	0.905	1	0	0	3	16.66	1	1.615	0	0.425	0	0.011
41113 41221 41320 41420	0.589	1	0	0	4	25.92	1	2.229	0	0.541	0	0.006
41113 41221 41320 41521	0.922	1	0	0	4	42.09	1	2.229	0	0.413	0	0.003
41113 41221 41420 41521	0.584	0	0	0	4	42.09	0	2.229	0	0.539	0	0.001
41113 41320 41420 41521	0.997	1	0	0	4	34.19	1	2.229	0	0.359	0	0.003
41221 41320 41420 41521	0.909	1	0	0	4	42.09	1	1.615	0	0.422	0	0.003
41113 41221 41320 41420 41521	1	1	0	0	5	42.09	1	2.229	0	0.357	0	0.002

Table G1. *Potential Coalitions in Germany, 2002*

MARPOR party codes: 41113 (B90/Greens), 41221 (PDS/Left), 41320 (SPD), 41420 (FDP), 41521 (CDU/CSU). MARPOR left-right scores: 41113 (-13.43), 41221 (-21.33), 41320 (4.10), 41420 (4.59), 41521 (20.76).

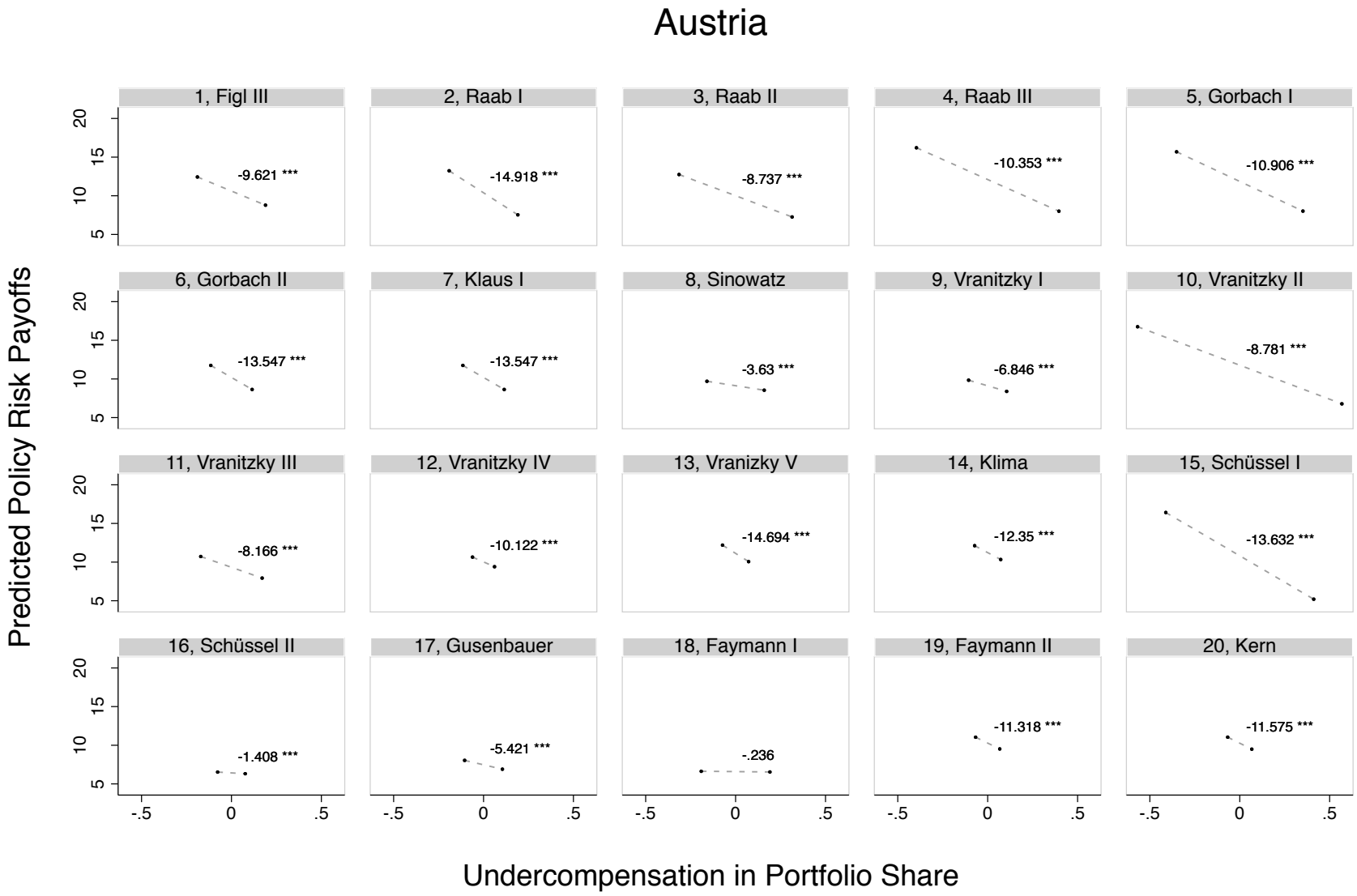
APPENDIX H: Heterogeneity in the Undercompensation Effect

A multilevel random coefficients model allows us to address possible heterogeneity in the effects of the covariates by providing estimates of both the *overall* (or *average/fixed*) intercept and slope coefficients of interest as well as the extent to which the intercepts and slope coefficients at the level of the cluster *deviate* from the average estimates. Using the estimated variance components of the model, we can calculate best linear unbiased predictions (BLUPs) of the random deviations, and then use the BLUPs to generate predicted random intercepts and random slope coefficients for individual bargaining situations.

In the graphs below (which are arranged alphabetically by country, and chronologically by government), we display predicted policy risk payoffs (on the y-axis) for the 910 parties in our sample of 308 bargaining situations. To generate the predictions, the theoretical variable (*Undercompensation in Portfolio Share [ups]*) is set to the actual value for each government party (on the x-axis), and the control variable (*Distance from the Coalition Center of Gravity [dccg]*) is set to its mean value across the full sample. Letting α represent the intercept, β the coefficient on the theoretical variable, and γ the coefficient on the control variable, the predicted policy risk payoff for a party c in a bargaining situation s is simply:

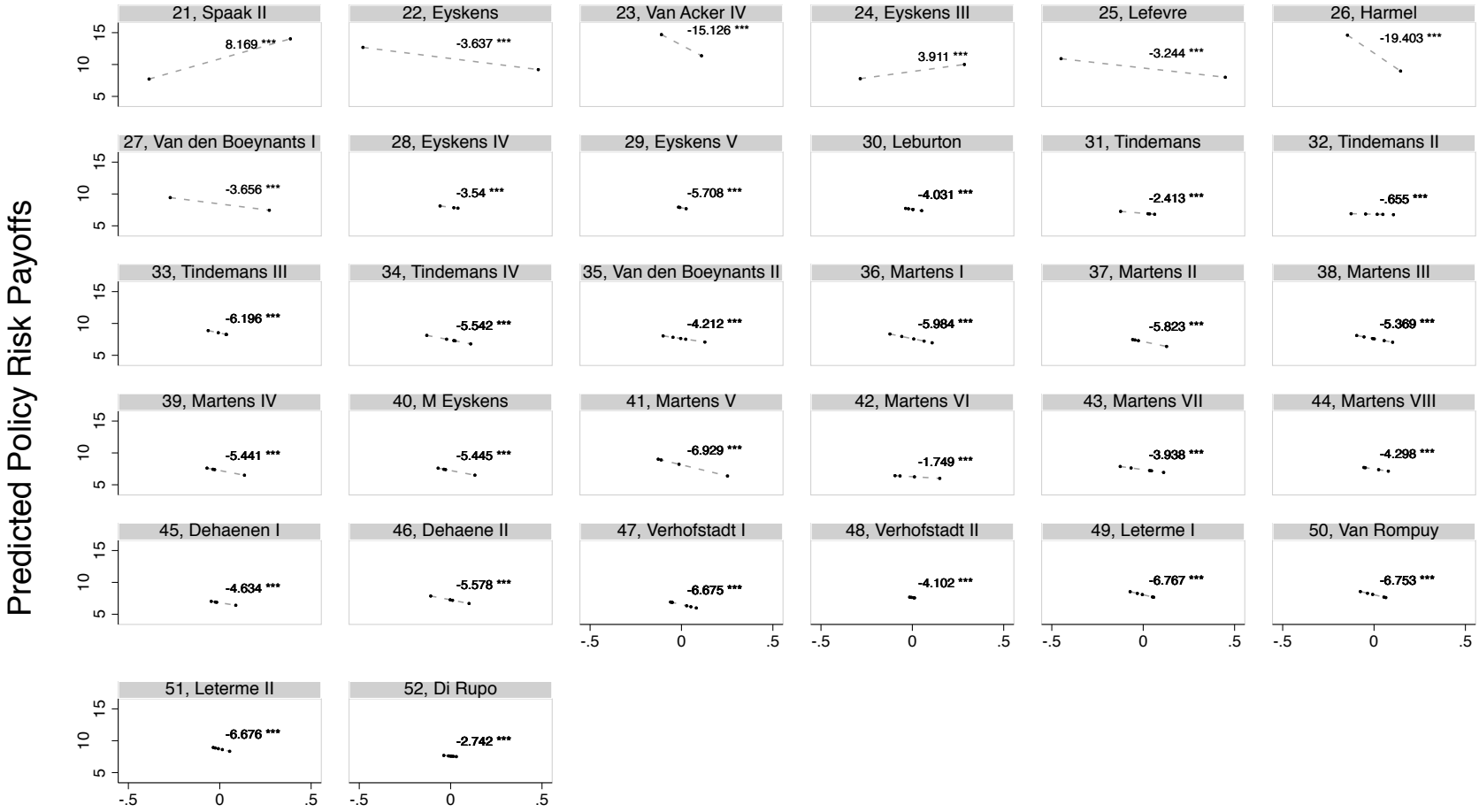
$$(\alpha + \alpha_s^{BLUP}) + (\beta + \beta_s^{BLUP})ups_c + (\gamma + \gamma_s^{BLUP})dccg_c.$$

Inside the plot region of each graph is the predicted random coefficient estimate for *Undercompensation in Portfolio Share*—i.e., $(\beta + \beta_s^{BLUP})$, the fixed intercept plus the situation-specific random deviation—which describes the slope of the dashed line.

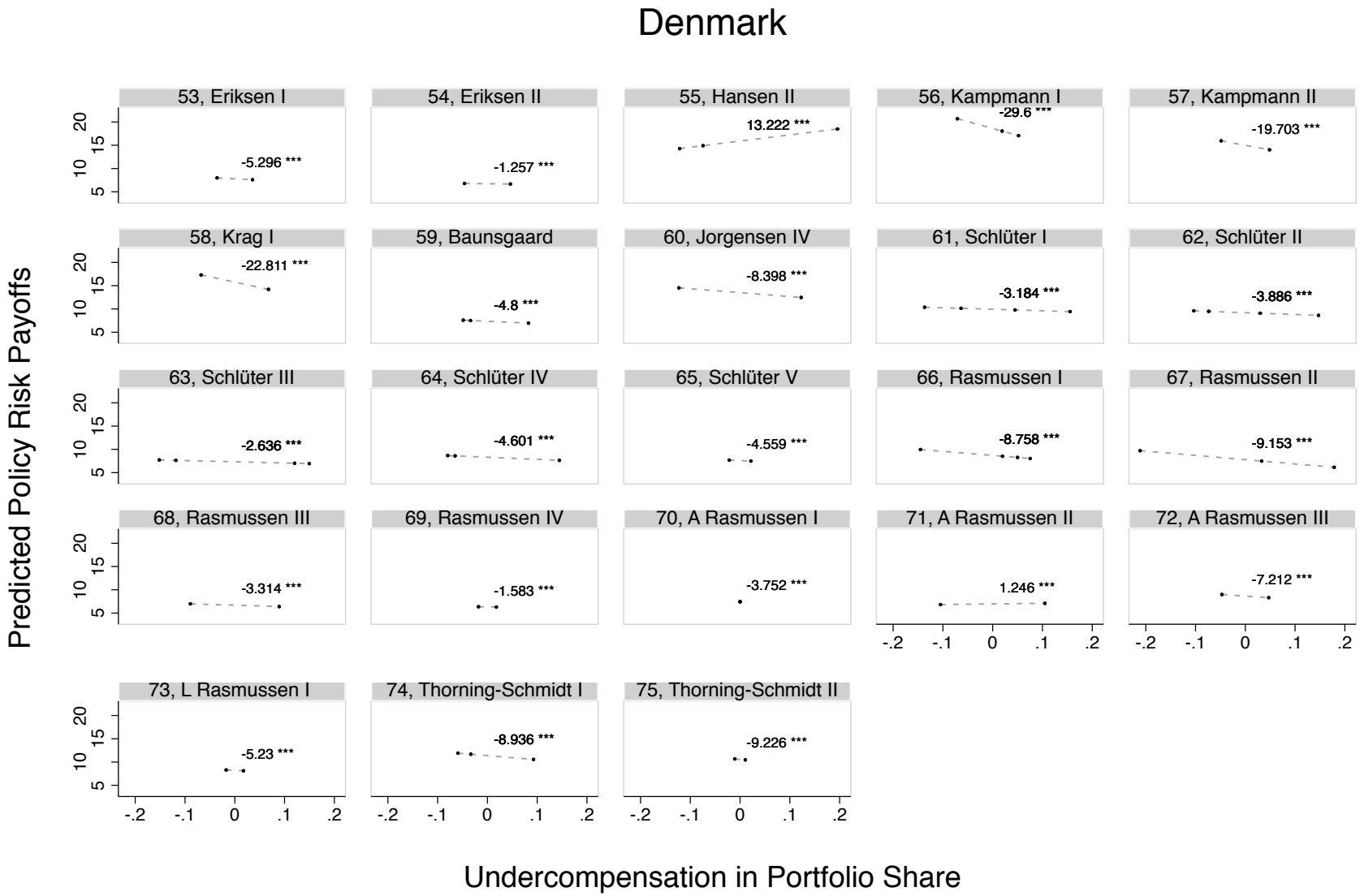


Note: The variable *Distance from Coalition Center of Gravity* is set to its mean sample value. Displayed in the plot region of each graph is the random coefficient estimate for *Undercompensation in Portfolio Share*. Significance levels: * : 10% ** : 5% *** : 1%.

Belgium

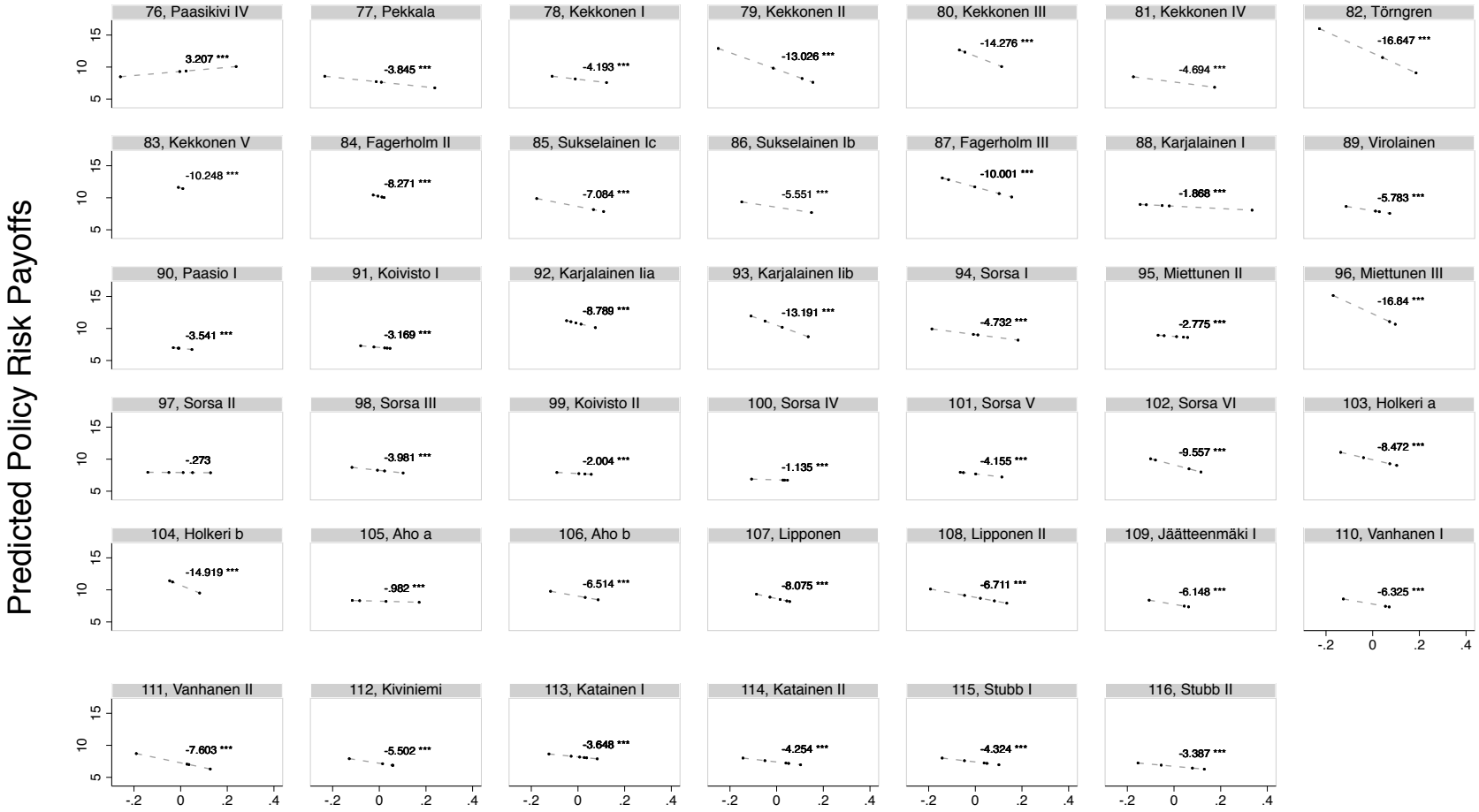


Note: The variable *Distance from Coalition Center of Gravity* is set to its mean sample value. Displayed in the plot region of each graph is the random coefficient estimate for *Undercompensation in Portfolio Share*. Significance levels: * : 10% ** : 5% *** : 1%.



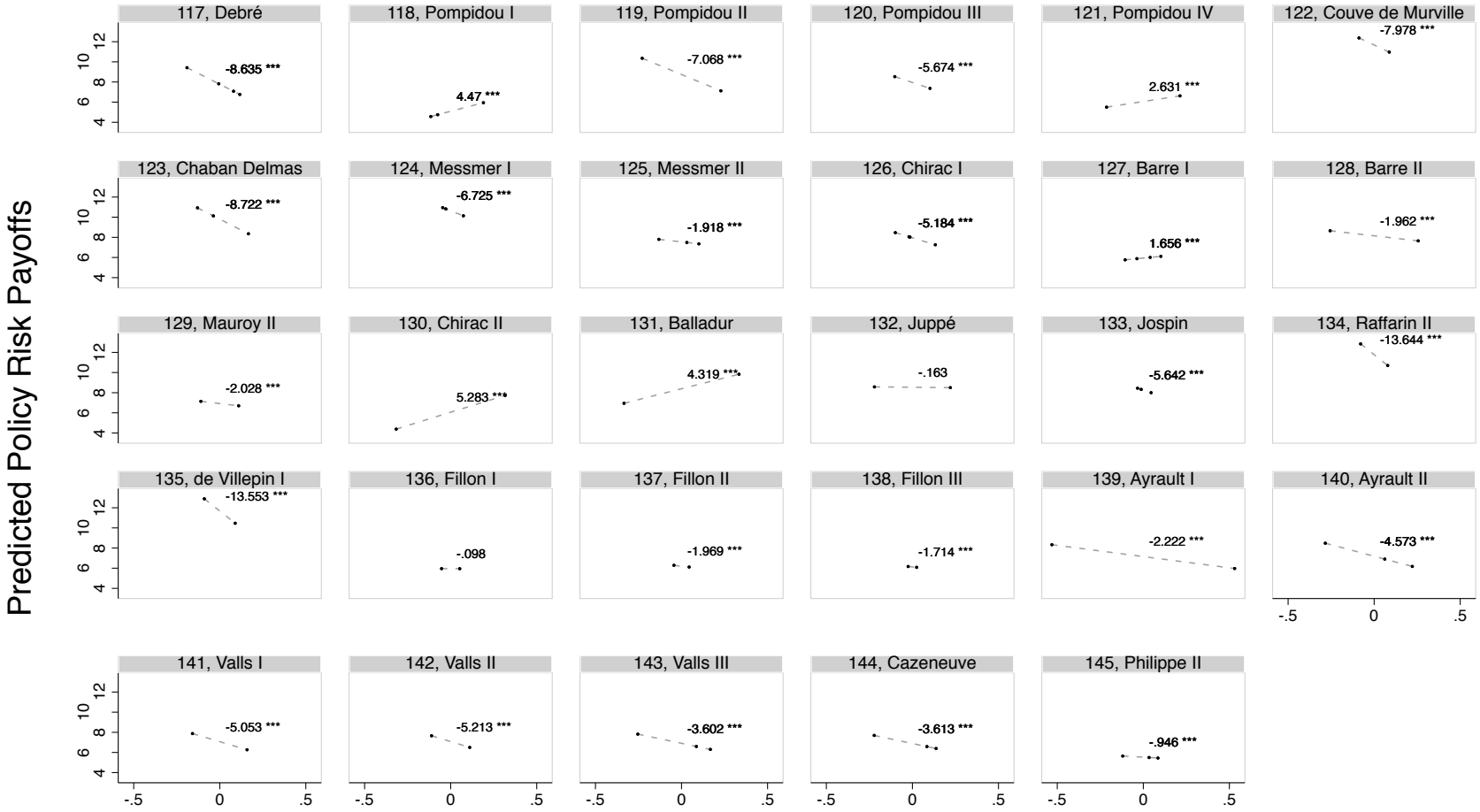
Note: The variable *Distance from Coalition Center of Gravity* is set to its mean sample value. Displayed in the plot region of each graph is the random coefficient estimate for *Undercompensation in Portfolio Share*. Significance levels: * : 10% ** : 5% *** : 1%.

Finland



Note: The variable *Distance from Coalition Center of Gravity* is set to its mean sample value. Displayed in the plot region of each graph is the random coefficient estimate for *Undercompensation in Portfolio Share*. Significance levels: * : 10% ** : 5% *** : 1%.

France



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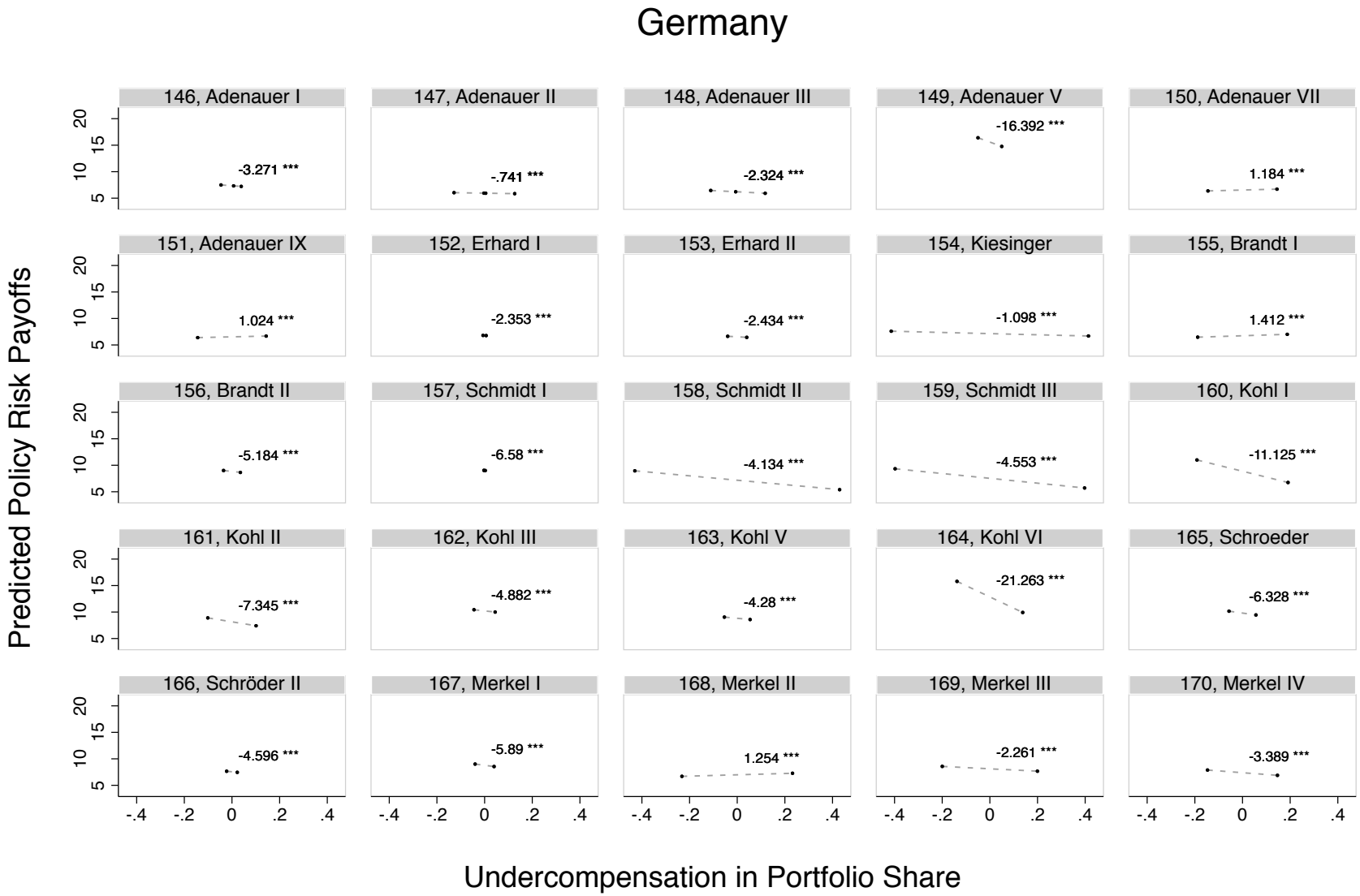

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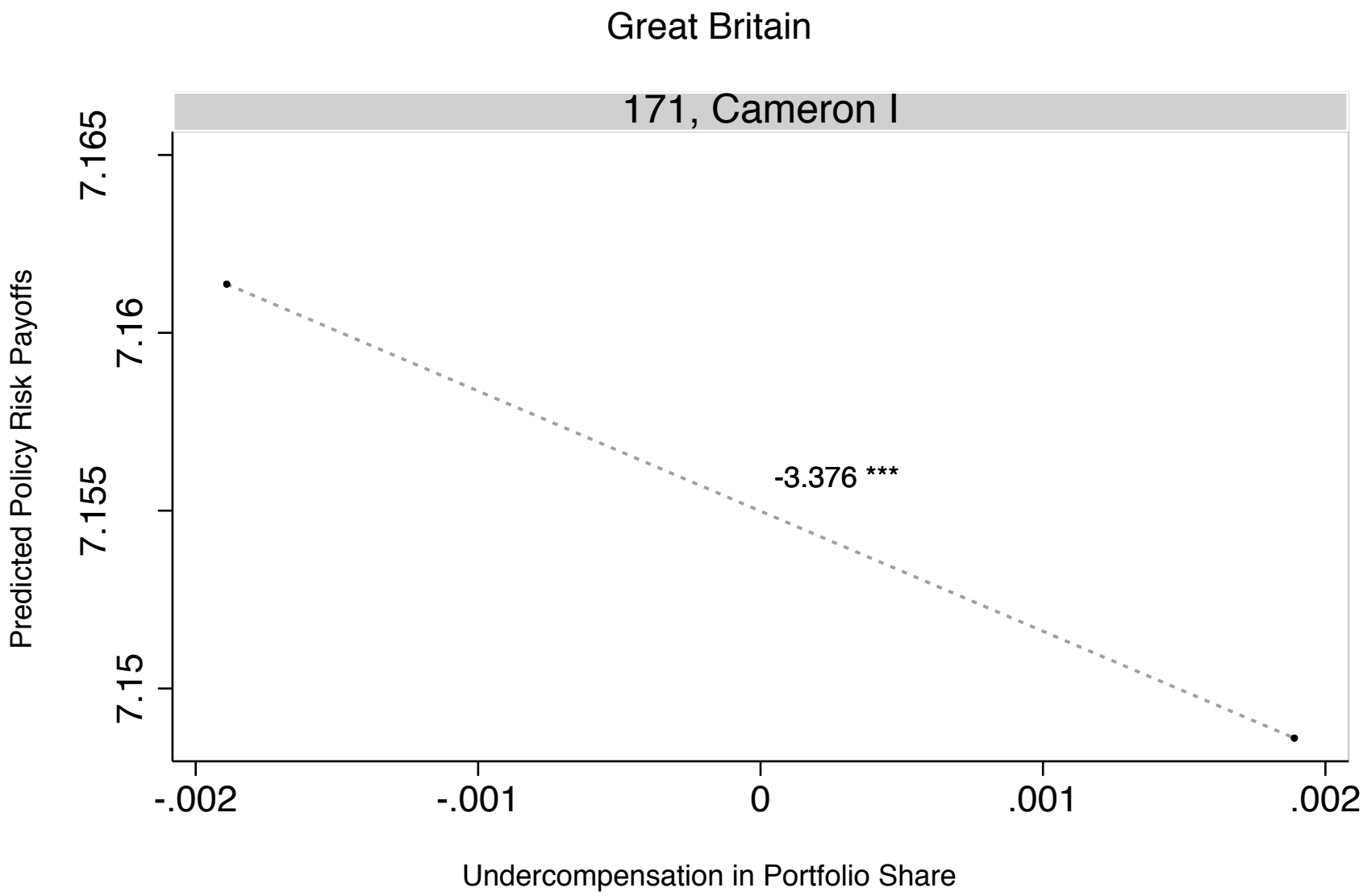
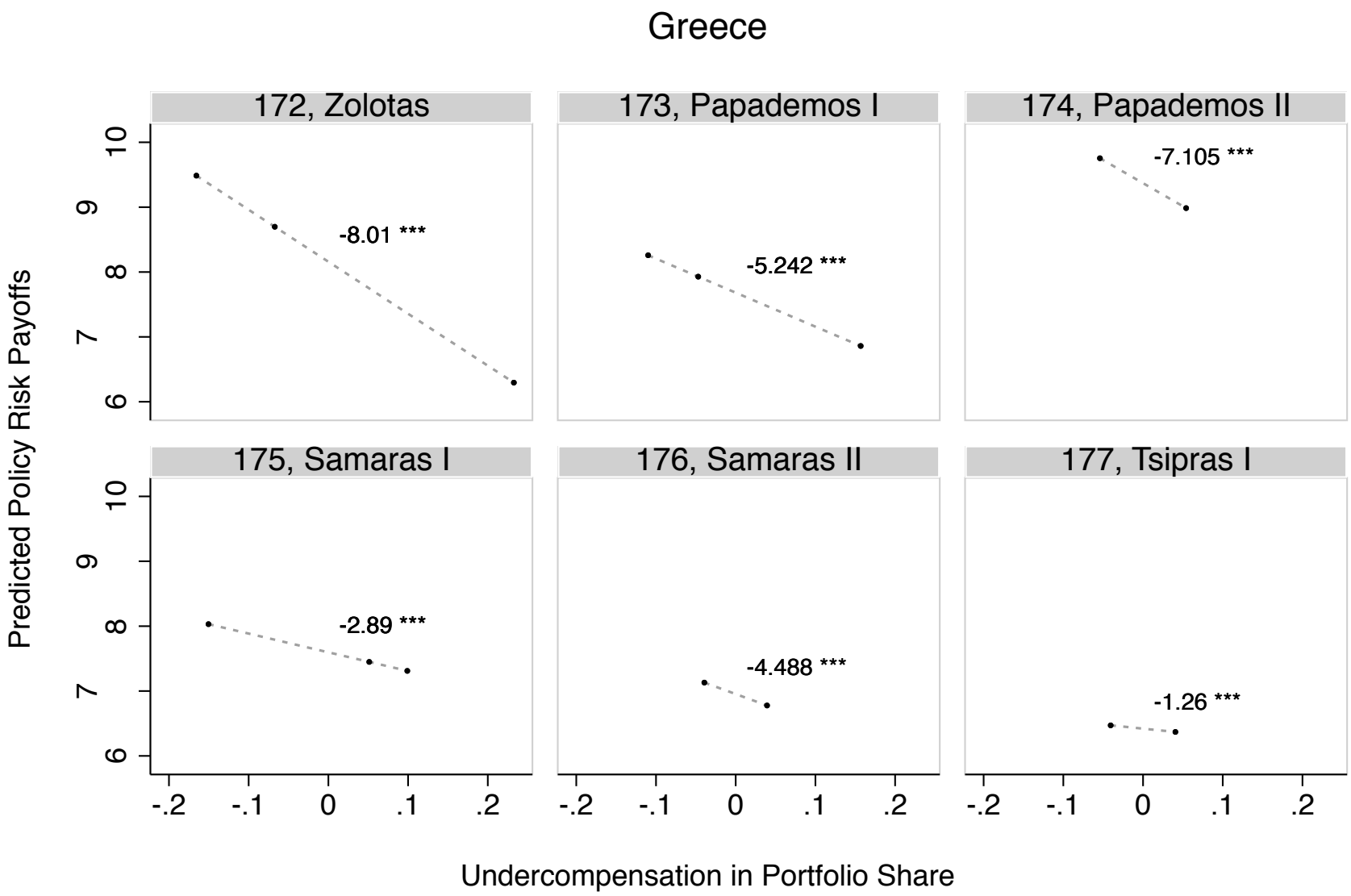
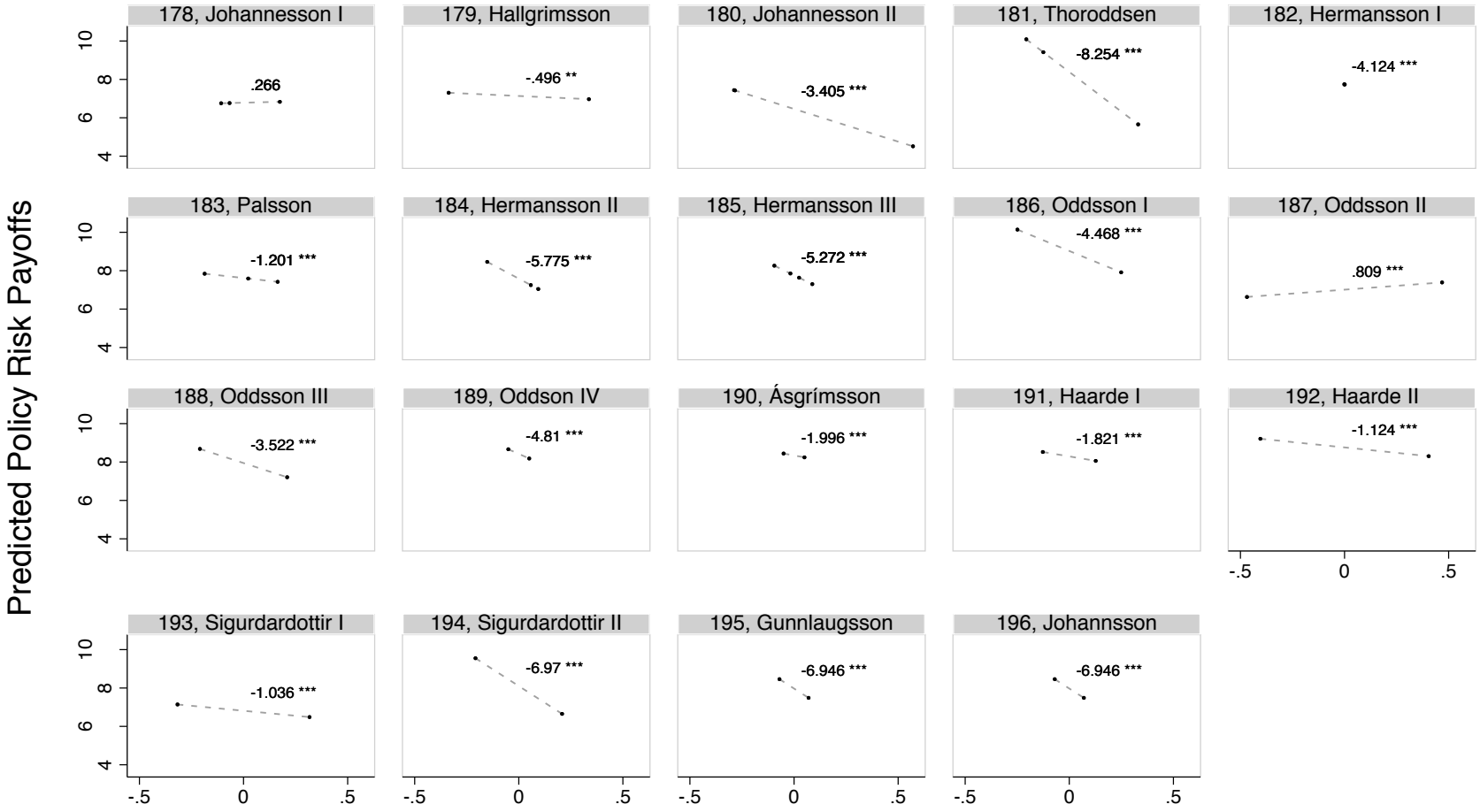


Note: The variable *Distance from Coalition Center of Gravity* is set to its mean sample value. Displayed in the plot region of each graph is the random coefficient estimate for *Undercompensation in Portfolio Share*. Significance levels: * : 10% ** : 5% *** : 1%.

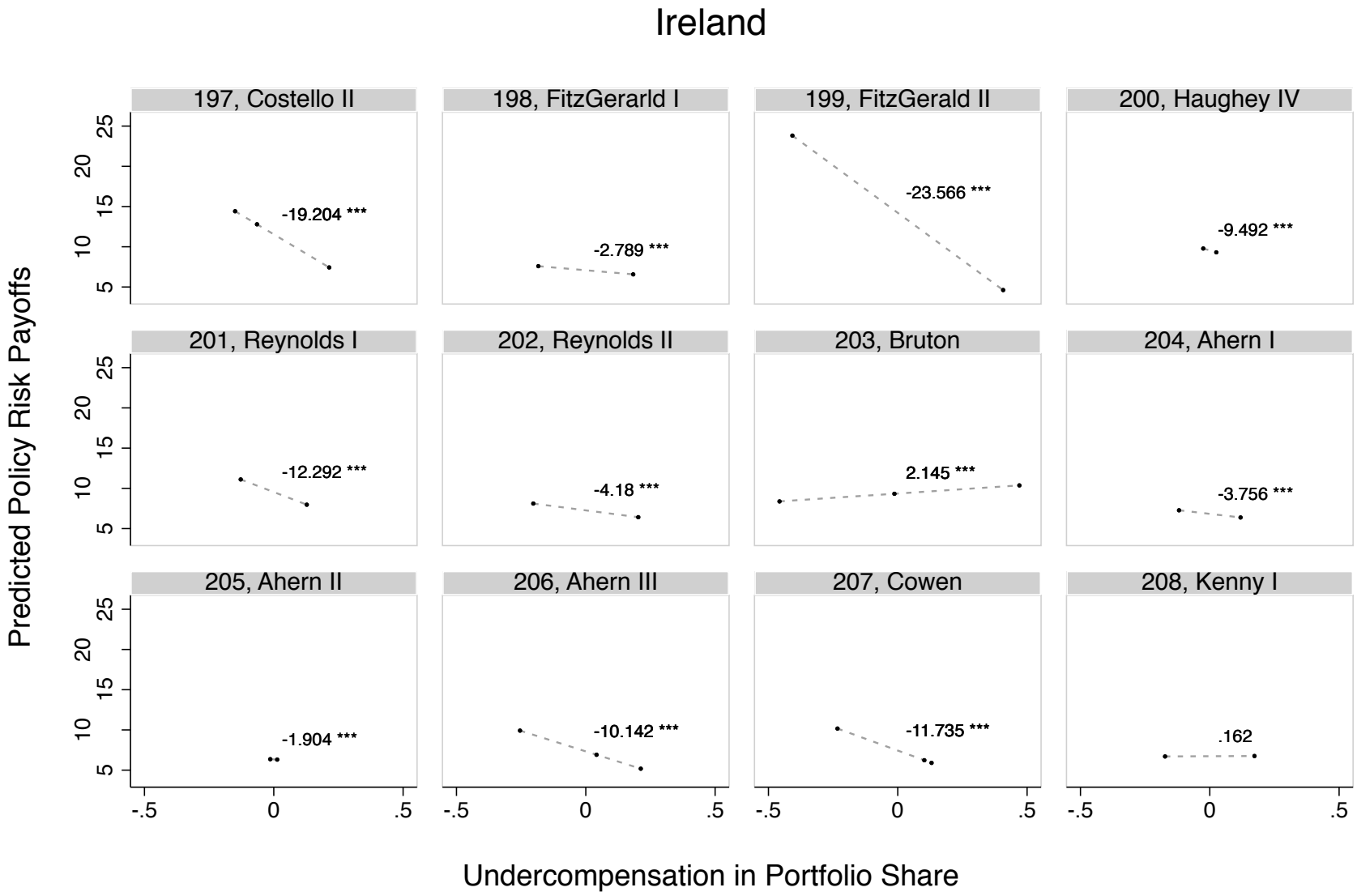


Note: The variable *Distance from Coalition Center of Gravity* is set to its mean sample value. Displayed in the plot region of each graph is the random coefficient estimate for *Undercompensation in Portfolio Share*. Significance levels: * : 10% ** : 5% *** : 1%.

Iceland



Note: The variable *Distance from Coalition Center of Gravity* is set to its mean sample value. Displayed in the plot region of each graph is the random coefficient estimate for *Undercompensation in Portfolio Share*. Significance levels: * : 10% ** : 5% *** : 1%.



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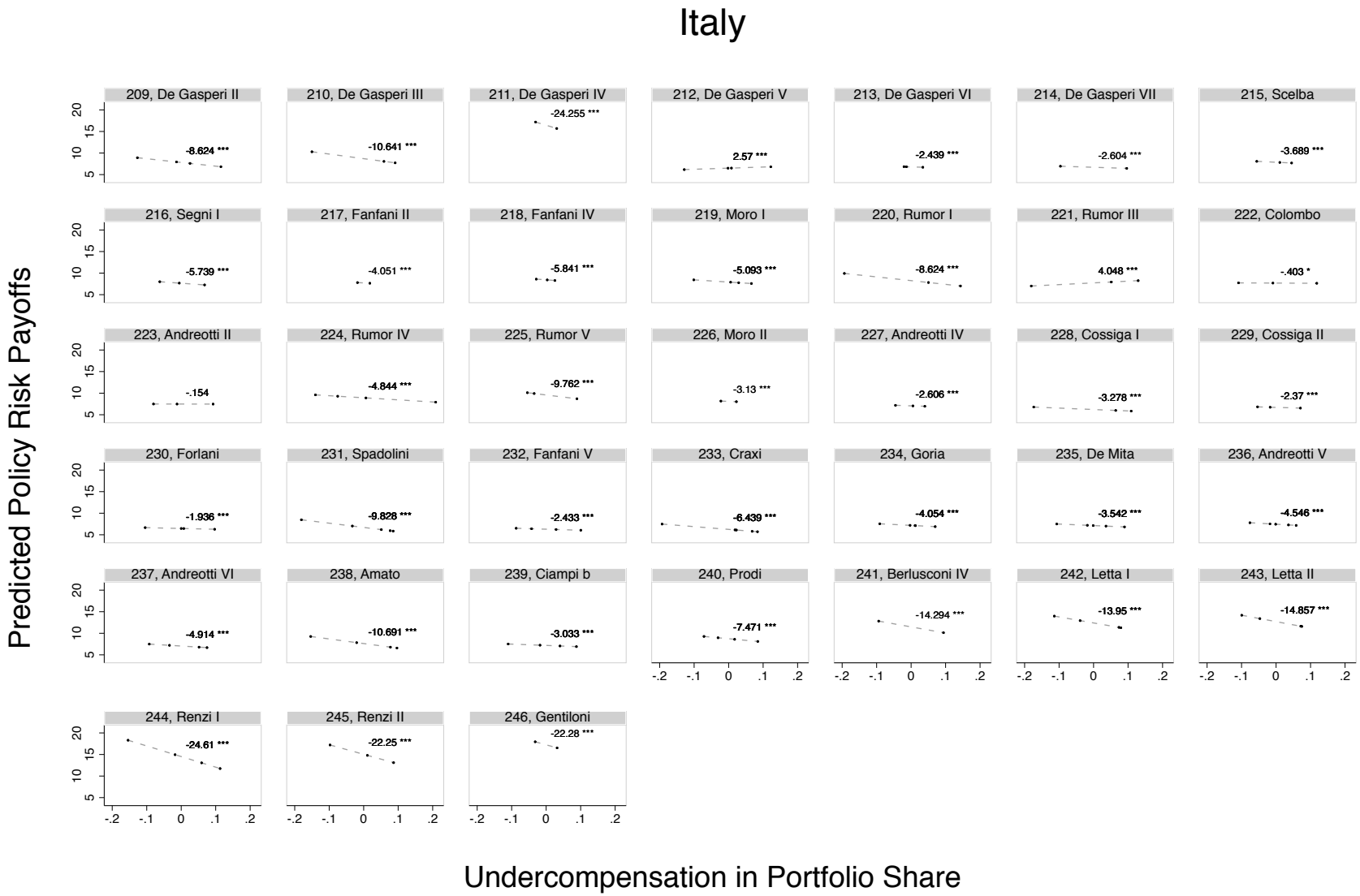
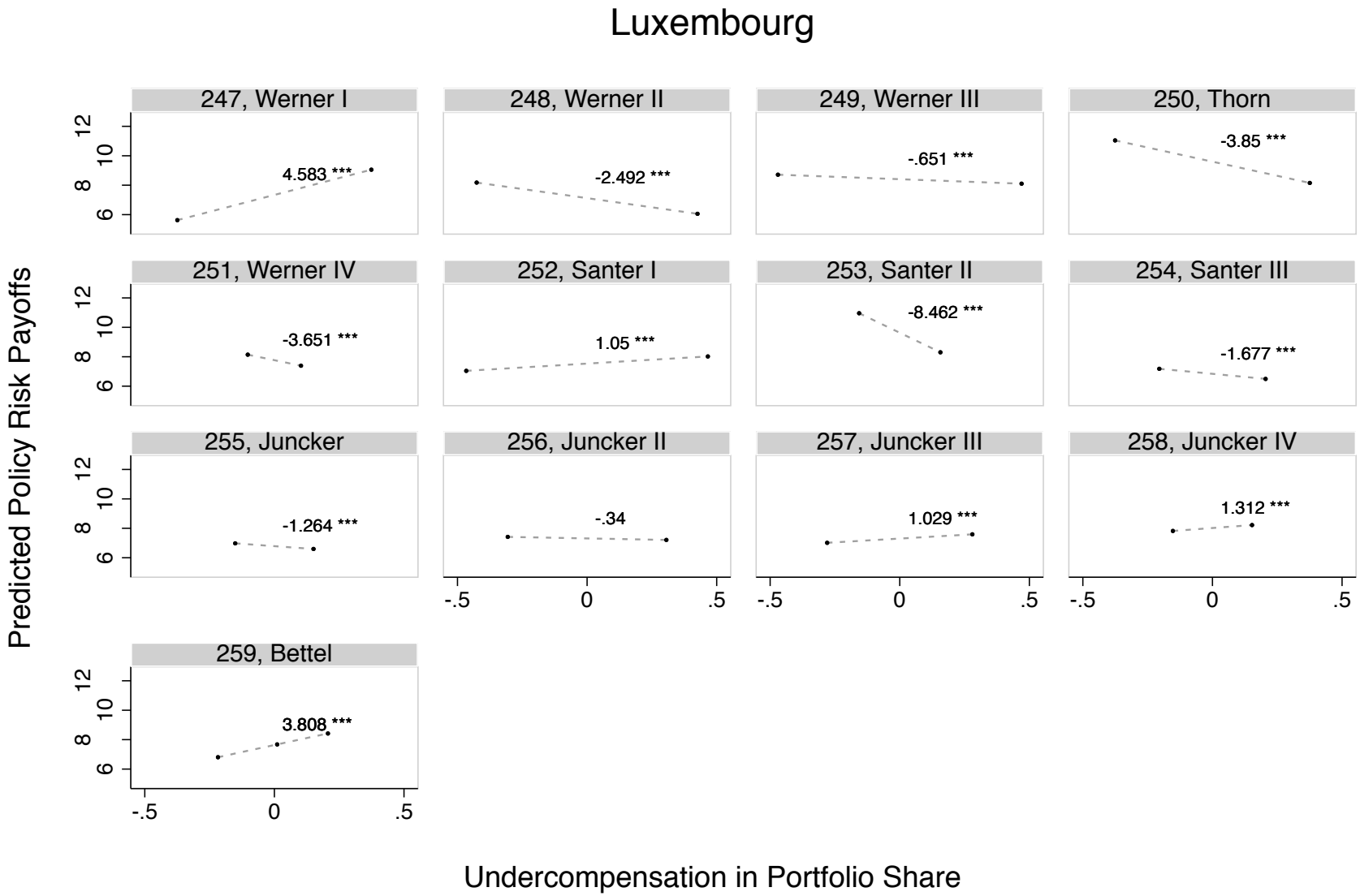
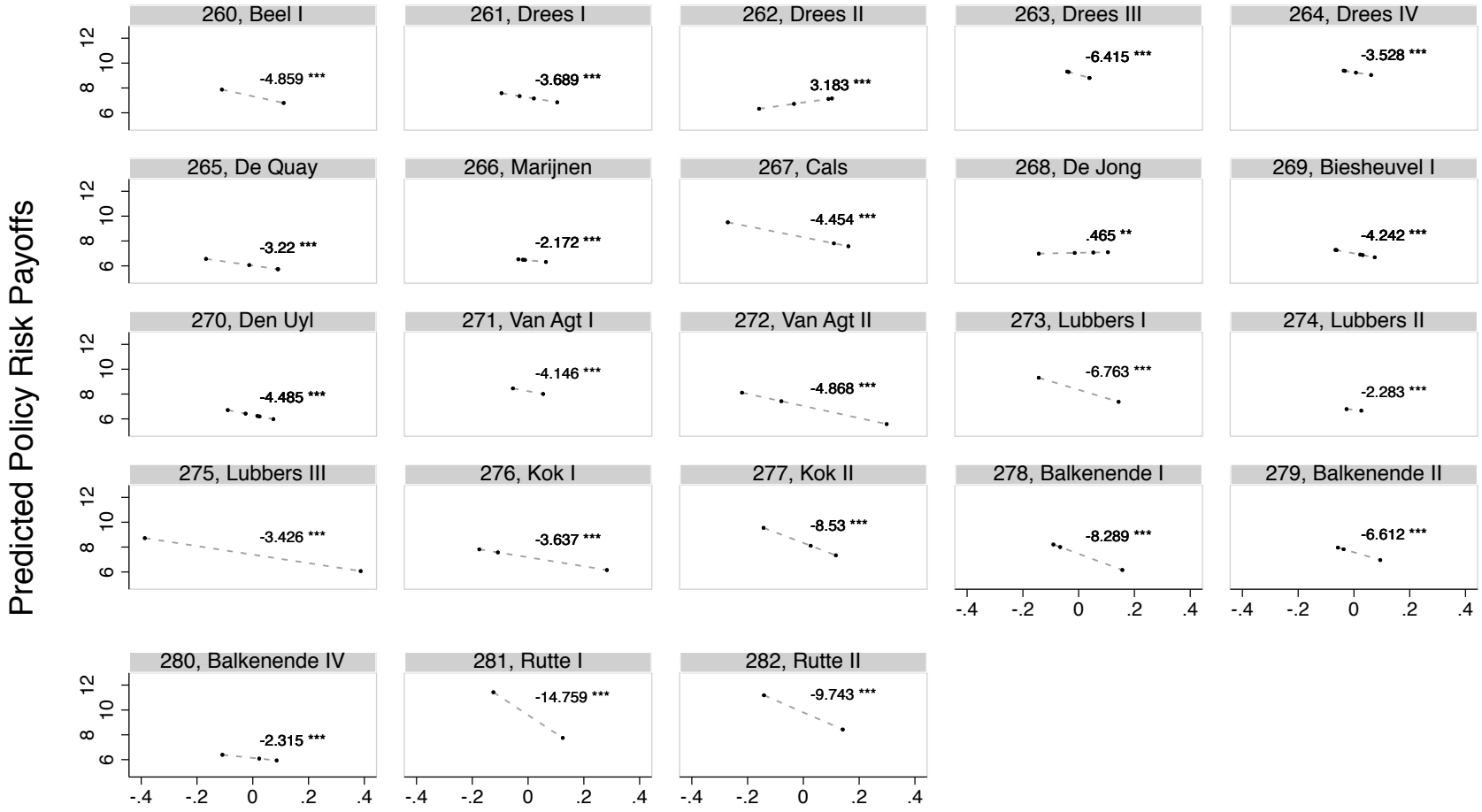


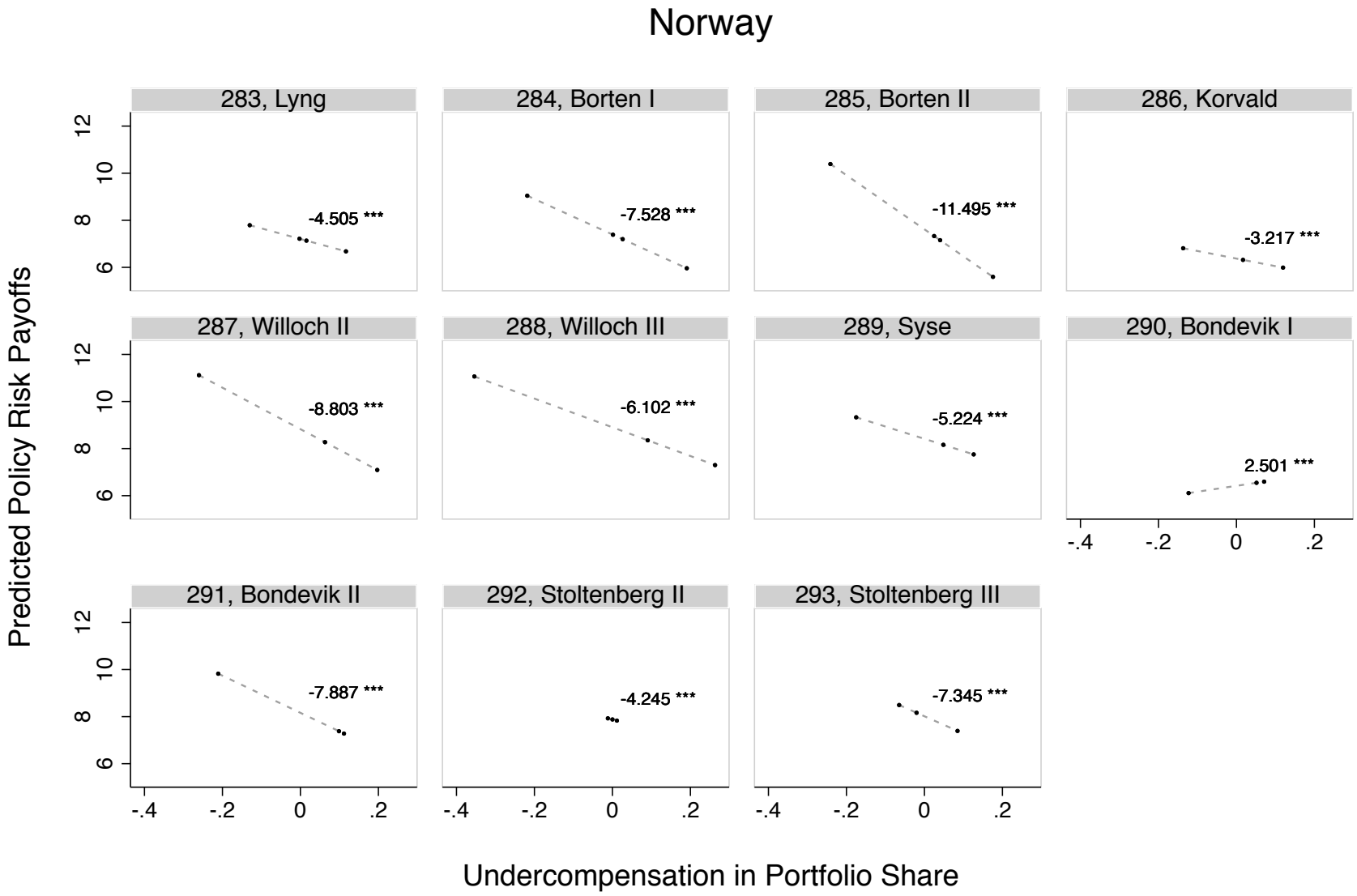
Note: The variable *Distance from Coalition Center of Gravity* is set to its mean sample value. Displayed in the plot region of each graph is the random coefficient estimate for *Undercompensation in Portfolio Share*. Significance levels: * : 10% ** : 5% *** : 1%.



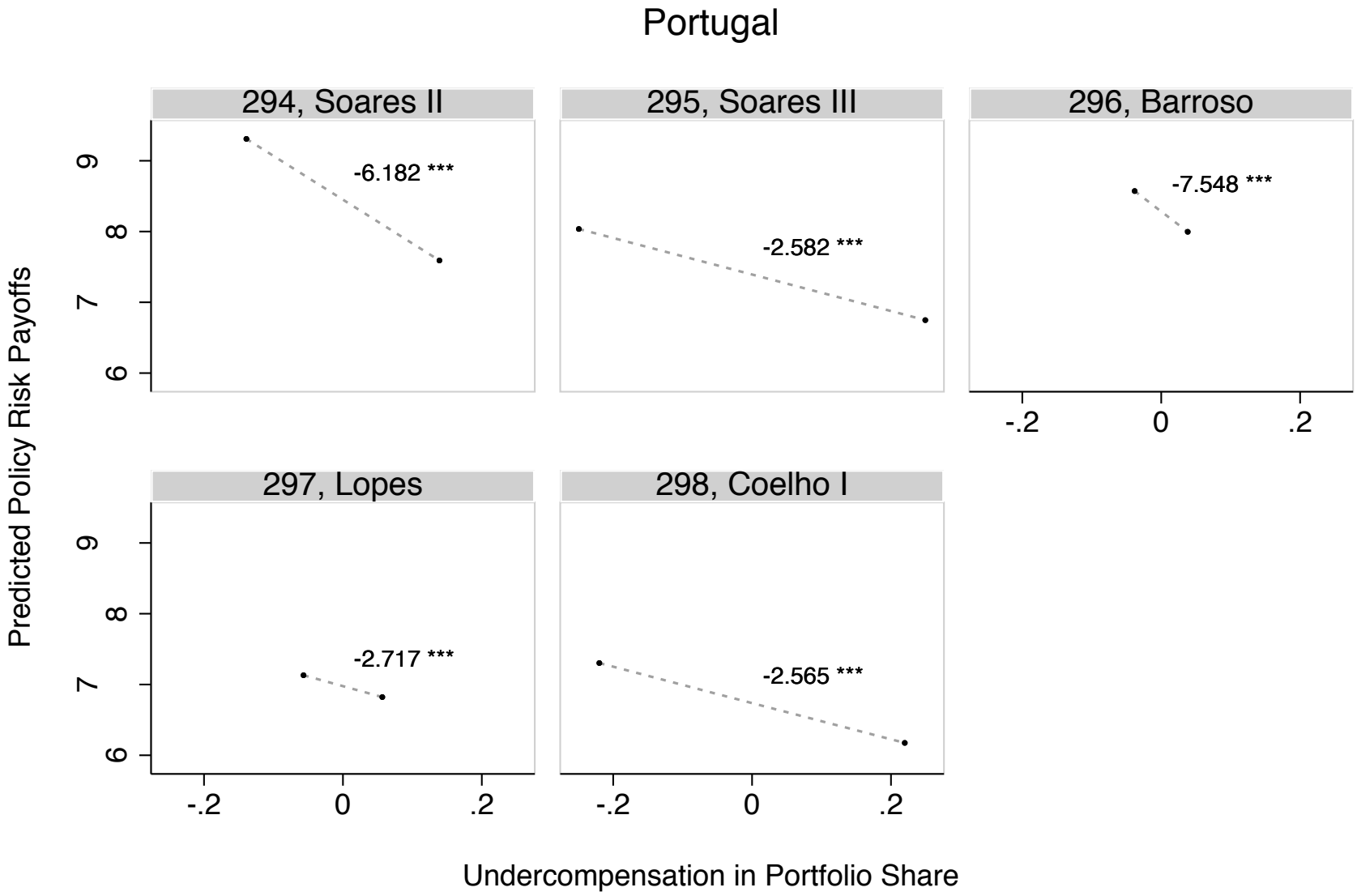
Note: The variable *Distance from Coalition Center of Gravity* is set to its mean sample value. Displayed in the plot region of each graph is the random coefficient estimate for *Undercompensation in Portfolio Share*. Significance levels: * : 10% ** : 5% *** : 1%.



Note: The variable *Distance from Coalition Center of Gravity* is set to its mean sample value. Displayed in the plot region of each graph is the random coefficient estimate for *Undercompensation in Portfolio Share*. Significance levels: * : 10% ** : 5% *** : 1%.



Note: The variable *Distance from Coalition Center of Gravity* is set to its mean sample value. Displayed in the plot region of each graph is the random coefficient estimate for *Undercompensation in Portfolio Share*. Significance levels: * : 10% ** : 5% *** : 1%.



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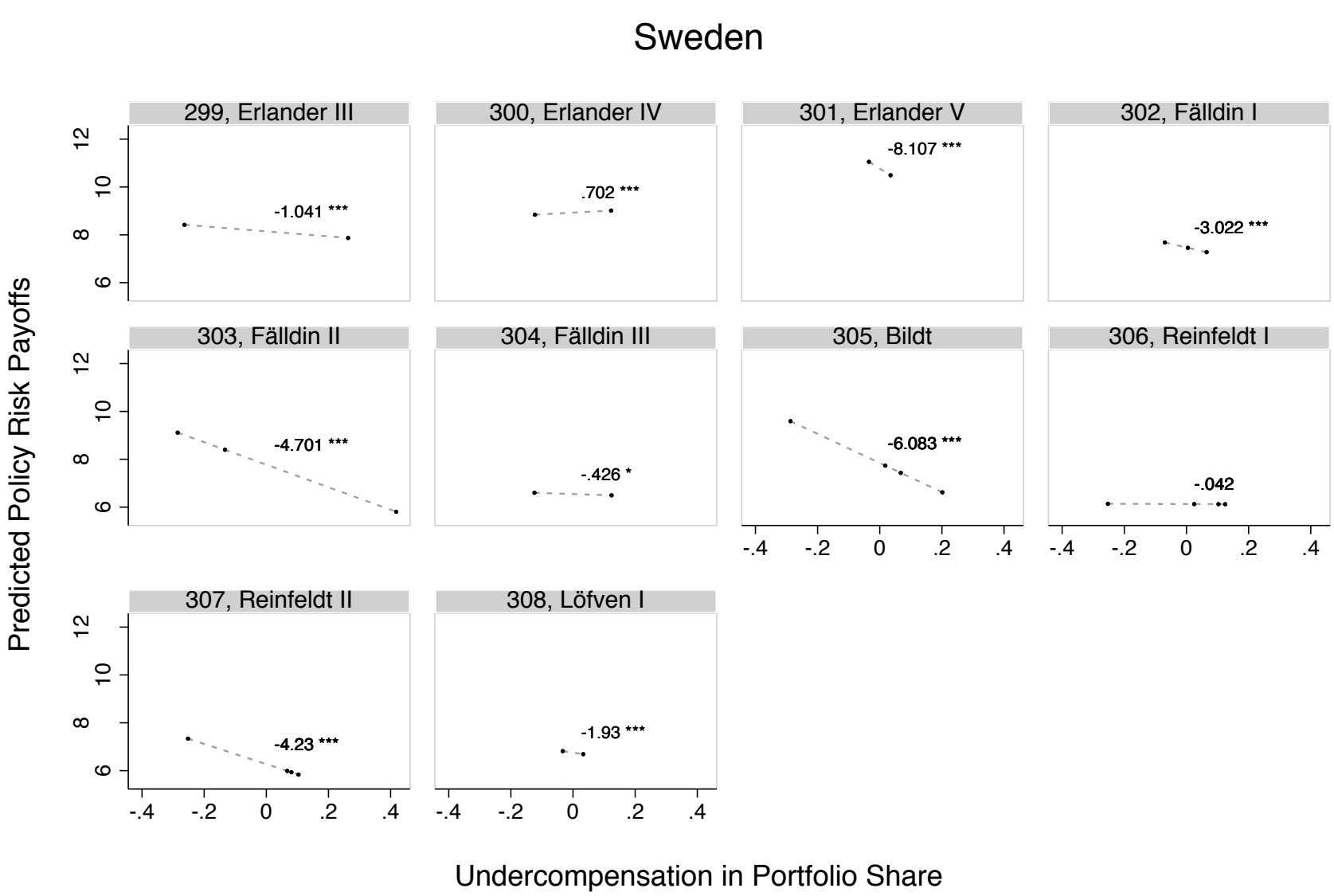

Note: The variable *Distance from Coalition Center of Gravity* is set to its mean sample value. Displayed in the plot region of each graph is the random coefficient estimate for *Undercompensation in Portfolio Share*. Significance levels: * : 10% ** : 5% *** : 1%.

APPENDIX I: Measurement Error Sensitivity Analysis

One component of our undercompensation variable—bargaining power—is itself an *estimate* produced by another model (specifically, the model of government formation shown in SI Appendix F). As such, it is clearly measured with some degree of error, which could lead to biased parameter estimates in our model of policy risk. Our preferred approach to dealing with the issue of measurement error is to conduct a *sensitivity analysis* (see, e.g., Blackwell, Honaker and King 2017), which we do in three steps. First, we create a number of multiple alternative datasets based on the point estimates and standard errors from the government formation model. More specifically, for each of the 9 government formation model covariates shown in SI Appendix F, we randomly draw a coefficient estimate from a normal distribution that has a mean equal to the corresponding covariate's coefficient estimate and a standard deviation equal to its standard error, and we then use these new estimates to generate new predictions of coalition formation probabilities. Second, using these new predictions, we calculate for each government party new relative exit probabilities (i.e., new estimates of bargaining power), and consequently new estimates of *Undercompensation in Portfolio Share*. We repeat these two steps 100 times to produce 100 alternative datasets. Third, we reestimate our model on each of these datasets and compare the results to those from Table 3 in the main text. We present the results of the sensitivity analysis in Figure 7 in the text.

APPENDIX J: Estimation of Table 3 using Normalized Banzhaf Index

In this appendix, we conduct an ancillary analysis in which we substitute a leading alternative index of bargaining power for our model-derived measure. Specifically, we compute the *normalized Banzhaf power index* for the 910 parties in our sample, which is equal to the number of times a party is a pivotal member in the set of winning (i.e., majority) coalitions in the legislature divided by the total number of times any party is pivotal (this ratio is then normalized so that it sums to unity across government parties). We then recreate our undercompensation variable by subtracting portfolio share from the normalized Banzhaf index of bargaining power.

In Table J1 below, we present estimates from our multilevel model using this alternative power measure (note, however, that we have to assume two restrictions on the covariance parameters in this case, as noted in table). Although we prefer our more comprehensive measure of bargaining power for substantive reasons, we are reassured by the striking similarity between the results using the normalized Banzhaf index and those from Table 3 in the main text.

Table J1. *Effect of Portfolio Undercompensation on Policy Risk*

Explanatory Variables	**Estimates**
Undercompensation in Portfolio Share (Banzhaf index) (*upsb*)	-5.684 ***
	(1.005)
Distance from Coalition Center of Gravity (*dccg*)	0.797 ***
	(0.039)
Intercept (α)	3.661 ***
	(0.295)
$\sigma^2(upsb)$	88.024
	(16.967)
$\sigma^2(dccg)$	0.098
	(0.020)
$\sigma^2(\alpha)$	10.531
	(1.727)
$\sigma(dccg, \alpha)$	-0.998
	(0.171)
$\sigma^2(residual)$	4.076
	(0.354)

Displayed are maximum likelihood coefficient estimates and standard errors from a multilevel random coefficients model (with no constraints imposed on the covariance matrix, except for $\sigma(upsb, \alpha)$ and $\sigma(upsb, dccg)$, which are not estimable and are thus constrained to zero). Dependent variable: Portfolio-adjusted policy risk payoffs. N: 910 coalition parties (nested in 308 bargaining situations). A likelihood ratio test against a linear model with fixed coefficients leads us to reject the null hypothesis of no difference between the models ($p < 0.001$). Significance levels for level-one parameters: $*$: 10% $**$: 5% $***$: 1%.

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