Supplementary Materials:

Immigration and public support for political systems in Europe

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1. Survey questions used to measure institutional trust

Institutional trust is measured using nationally-aggregated survey responses to questions asking about trust or confidence in: national parliaments or MPs, political parties, the judiciary or legal system, the civil service or public administration, and police. Questions asking about trust in other actors or institutions are not included, because these operate at the sub- or supra-national levels (e.g., trust in the EU), focus on governments, not regimes (e.g., trust in government), or are not generally perceived as institutions of the political system (e.g., trust in labor unions and religious authorities). The text of the included survey questions is below.

1. Trust in National Parliaments

   (a) Consolidation of Democracy in Eastern and Central Europe: In order to get ahead people need to have confidence and to feel that they can trust themselves and others. To what degree do you think you trust the following: totally, to a certain point, little, or not at all – The Parliament ('Totally'; 'To a certain point' coded as 1; otherwise 0).

   (b) Central and Eastern Eurobarometer: I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it? – The [country] parliament ('Tend to trust' coded as 1; otherwise 0).

   (c) European Social Survey: Using this card, please tell me on a score of 0-10 how much you personally trust each of the institutions I read out. 0 means you do not trust an institution at all, and 10 means you have complete trust – [Country]'s parliament (6-10 coded as 1; otherwise 0).

   (d) Eurobarometer: I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it? – The [nationality] parliament ('Tend to trust' coded as 1; otherwise 0).

   (e) Eurobarometer: Please tell me how much you personally trust each of the following institutions using a scale from 1 to 10 where 1 means you do not trust the institution at all and 10 means you trust it completely – The [nationality] parliament (6-10 coded as 1; otherwise 0).

   (f) European Values Study: Please look at this card and tell me, for each item listed, how much confidence you have in them, is it a great deal, quite a lot, not very much or none at all? – Parliament ('a great deal', 'quite a lot' coded as 1; otherwise 0).

   (g) International Social Survey Programme: How much confidence do you have in – Parliament ('Complete confidence', 'A great deal of confidence', and 'Some confidence' coded as 1; otherwise 0).

   (h) World Values Survey: Please look at this card and tell me, for each item listed, how much confidence you have in them, is it a great deal, quite a lot, not very much or none at all? – Parliament ('a great deal', 'quite a lot' coded as 1; otherwise 0).

2. Trust in the Legal / Justice System

   (a) Central and Eastern Eurobarometer: I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it? – The justice (the [national] legal) system ('Tend to trust' coded as 1; otherwise 0).

(b) Eurobarometer: Please tell me how much you personally trust each of the following institutions using a scale from 1 to 10 where 1 means you do not trust the institution at all and 10 means you trust it completely – The justice (the [national] legal) system ('Tend to trust' coded as 1; otherwise 0).

(c) International Social Survey Programme: How much confidence do you have in – Courts and the legal system ('Complete confidence', 'A great deal of confidence', and 'Some confidence' coded as 1; otherwise 0).

(d) New Europe Barometer: To what extent do you trust each of these political institutions to look after your interests? Please indicate on a scale with 1 for no trust at all and 7 for great trust – Courts (5–7 coded as 1; otherwise 0).

3. Trust in Political Parties

(a) Central and Eastern Eurobarometer: I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it? – Political parties ('Tend to trust' coded as 1; otherwise 0)

(b) Eurobarometer: I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it? – Political parties ('Tend to trust' coded as 1; otherwise 0)

(c) European Quality of Life Survey: Please tell me how much you personally trust each of the following institutions. Please tell me on a scale of 1 to 10, where 1 means that you do not trust at all, and 10 means that you trust completely. – The political parties (6–10 coded as 1; otherwise 0)

(d) European Social Survey: Using this card, please tell me on a score of 0-10 how much you personally trust each of the institutions I read out. 0 means you do not trust an institution at all, and 10 means you have complete trust – Political parties (6–10 coded as 1; otherwise 0)

(e) European Values Study: Please look at this card and tell me, for each item listed, how much confidence you have in them, is it a great deal, quite a lot, not very much or none at all? – The political parties ('a great deal', 'quite a lot' coded as 1; otherwise 0)

(f) New Europe Barometer: To what extent do you trust each of these political institutions to look after your interests? Please indicate on a scale with 1 for no trust at all and 7 great trust – Political parties (5–7 coded as 1; otherwise 0)

(g) World Values Survey: Please look at this card and tell me, for each item listed, how much confidence you have in them, is it a great deal, quite a lot, not very much or none at all? – The political parties ('a great deal', 'quite a lot' coded as 1; otherwise 0)

4. Trust in MPs

(a) New Europe Barometer: To what extent do you trust each of these political institutions to look after your interests? Please indicate on a scale with 1 for no trust at all and 7 for great trust – Members of Parliament (5–7 coded as 1; otherwise 0).

5. Trust in the Civil Service

(a) Central and Eastern Eurobarometer: I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it? – Civil service ('Tend to trust' coded as 1; otherwise 0).

(b) Eurobarometer: I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it? – Public administration ('Tend to trust' coded as 1; otherwise 0).

(c) Eurobarometer: I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it? – Civil service ('Tend to trust' coded as 1; otherwise 0).

(d) European Values Study: Please look at this card and tell me, for each item listed, how much confidence you have in them, is it a great deal, quite a lot, not very much or none at all? – The civil services ('a great deal', 'quite a lot' coded as 1; otherwise 0).

(e) World Values Survey: Please look at this card and tell me, for each item listed, how much confidence you have in them, is it a great deal, quite a lot, not very much or none at all? – The civil services ('a great deal', 'quite a lot' coded as 1; otherwise 0).

6. Trust in the Police

(a) Central and Eastern Eurobarometer: I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it? – The police ('Tend to trust' coded as 1; otherwise 0).

(b) Consolidation of Democracy in Eastern and Central Europe: In order to get ahead people need to have confidence and to feel that they can trust themselves and others. To what degree do you think you trust the following totally, to a certain point, little, or not at all – The police ('Totally'; 'To a certain point' coded as 1; otherwise 0).

(c) Eurobarometer: I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it? – The police ('Tend to trust' coded as 1; otherwise 0).

(d) European Quality of Life Survey: Please tell me how much you personally trust each of the following institutions. Please tell me on a scale of 1 to 10, where 1 means that you do not trust at all, and 10 means that you trust completely. – The police (6–10 coded as 1; otherwise 0).

(e) European Social Survey: Using this card, please tell me on a score of 0-10 how much you personally trust each of the institutions I read out. 0 means you do not trust an institution at all, and 10 means you have complete trust – The police (6–10 coded as 1; otherwise 0).

(f) European Values Study: Please look at this card and tell me, for each item listed, how much confidence you have in them, is it a great deal, quite a lot, not very much or none at all? – The police ('a great deal', 'quite a lot' coded as 1; otherwise 0).

(g) New Europe Barometer: To what extent do you trust each of these political institutions to look after your interests? Please indicate on a scale with 1 for no trust at all and 7 for great trust – Police (5–7 coded as 1; otherwise 0).

(h) World Values Survey: Please look at this card and tell me, for each item listed, how much confidence you have in them, is it a great deal, quite a lot, not very much or none at all? – The police ('a great deal', 'quite a lot' coded as 1; otherwise 0).

2. Survey questions used to measure democratic satisfaction and support

I use Claassen's estimates of democratic satisfaction and support. The newest versions are available at `http://chrisclaassen.com/data.html`. See the supplementary materials to Claassen and Magalhães (2022) for the survey questions that are used for satisfaction and support.

3. The Bayesian dynamic latent variable model

Claassen (2019) develops six versions of a dynamic latent variable model for estimating cross-national public opinion, recommending the fifth and sixth of these. While both perform well, the simpler fifth model is used to measure support for democracy in Claassen (2020). The sixth model, which adds item discrimination parameters, is used here to measure trust, satisfaction, and democratic support.

This model employs a beta-binomial link function between observed, nationally-aggregated survey responses y_{ikt} for each country i, year t, and survey questions k, and the probabilities of offering a supportive response π_{ikt}.

$$y_{ikt} \sim \text{Beta-Binomial}(s_{ikt},\ \pi_{ikt},\ \phi) \tag{1}$$

These probabilities are modeled as a function of the latent country-year opinion estimates of interest θ_{it}, item bias parameters λ_k, item discrimination parameters γ_k, and item-country bias parameters δ_{ik}.

$$\pi_{ikt} = \text{logit}^{-1}(\delta_{ik} + \lambda_k + \gamma_k \theta_{it}) \tag{2}$$

The latent estimates are then modeled as evolving over time via a random walk process.

$$\theta_{it} \sim \text{N}(\theta_{i,t-1},\ \sigma_\theta^2) \tag{3}$$

The models are fit using Bayesian MCMC methods. Several computational refinements, compared the model developed by Claassen (2019), are included. First, I allow for ragged country-by-year arrays to accommodate the varying length of national latent opinion time-series (due to the varying years in which survey measurement commenced). I also make use of non-centered parameterizations for all variance terms, e.g., σ_θ. Non-centered parameterizations include standard-normally distributed redundant parameters, e.g., v_{ik}^δ which shift variance and covariance terms away from zero, making MCMC sampling more efficient:

$$\delta_{ik} = \sigma_\delta^2 \times v_{ik}^\delta \tag{4}$$

The item-country variances are given weakly-informative half-Normal priors, e.g., $\sigma_\delta \sim$ N$^+(0,\ 1)$. The variance-covariance matrix for the item intercepts λ and slopes γ is split into two variances and correlation term, with the former receiving a half-Normal $(0, 1)$ prior and the latter an LKJ (2) prior. Item intercepts and slopes are identified by setting their expectations: the former at the log of the mean proportion expressing trust in institutions, and the latter at 0.5. The beta-binomial dispersion parameter ϕ receives a gamma$(3,\ 0.04)$ prior. Since latent opinion is modeled as a function of its value in the previous year, I estimate initial values for each country in the year preceding the first estimates based on data. These initial values receive a N$(0,\ 1)$ prior.

Stan software, which implements Hamiltonian Monte Carlo sampling (Carpenter et al. 2017), is employed to fit these models. Four parallel chains, with randomly selected starting values drawn from a Uniform $(-1, 1)$ distribution, are run, with 500 warmup and 500 post-warmup samples each. The 2,000 post-warmup samples are saved and analyzed further.

Convergence of the MCMC models is assessed using a variety of diagnostics, including traceplots of multiple parameters (Figure S1) and Gelman-Rubin R-hat statistics (Figure S2). These

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Figure S1. Traceplots, selected parameters, estimation of institutional trust
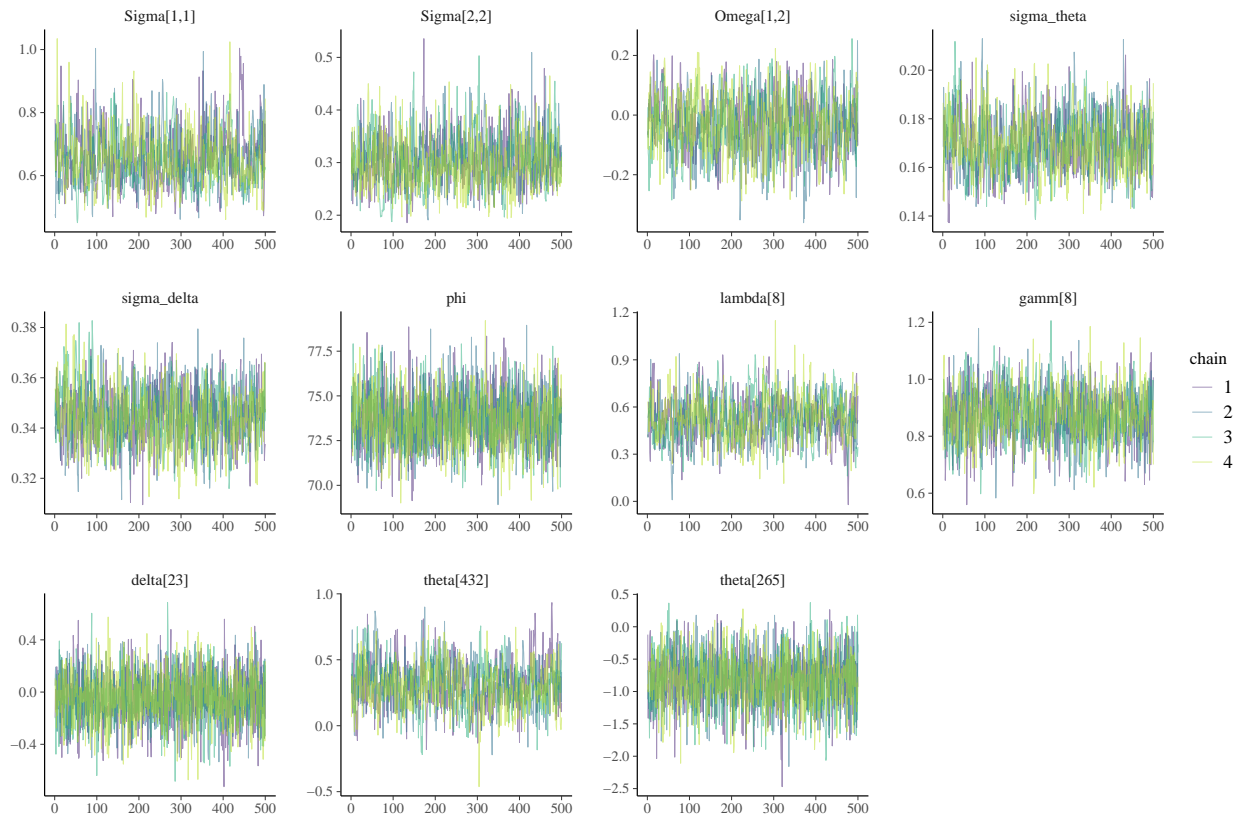
Figure S2. Distribution of R-hat statistics, estimation of institutional trust
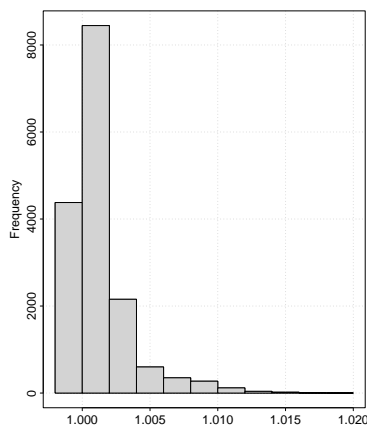
indicate convergence. Simulated outcomes (both counts and proportions) were compared with the actual aggregated survey data (Figure S3). These show that the models fit the observed survey data.

Since the measurement model includes item slopes / discrimination parameters γ, these can be examined to verify if all items do indeed correlate with the underlying latent variable of institutional trust. The item-classification curves, which show the average proportion of a sample

Figure S3. Posterior predictive plots, estimation of institutional trust
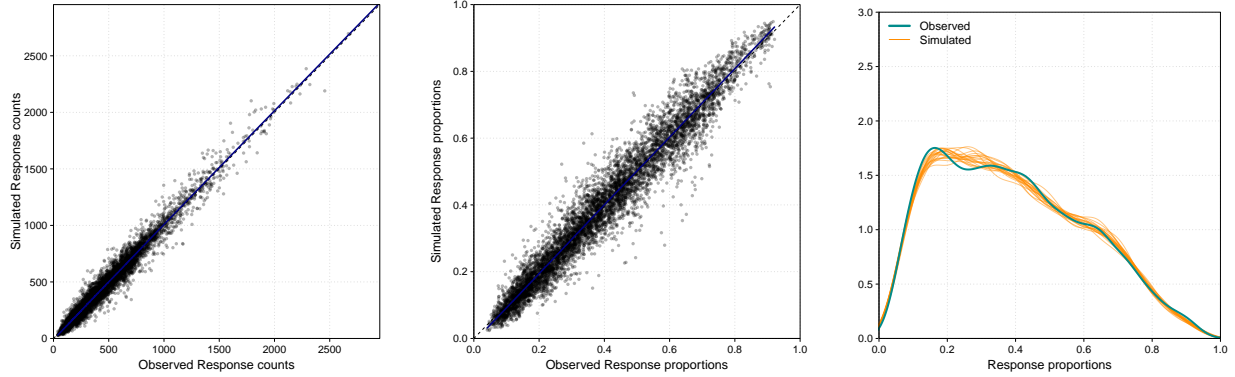
(a) Comparison between observed trust survey responses and those simulated from the model, as counts

(b) Comparison between observed trust survey responses and those simulated from the model, as proportions

(c) Comparison between observed distribution of trust survey responses and 20 distributions simulated from the model

agreeing with an item (y-axis) across the values of the latent variable (x-axis), are presented in Figure S4. It can be seen that all items show a positive effect on institutional trust. There are however certain items which are weaker than others: the EVS trust in political parties and CEEB trust in civil service items do not have a strong impact on latent trust. Nevertheless, since their slopes are clearly greater than zero, it was decided to retain such items.

Figure S4. Item classification curves, institutional trust
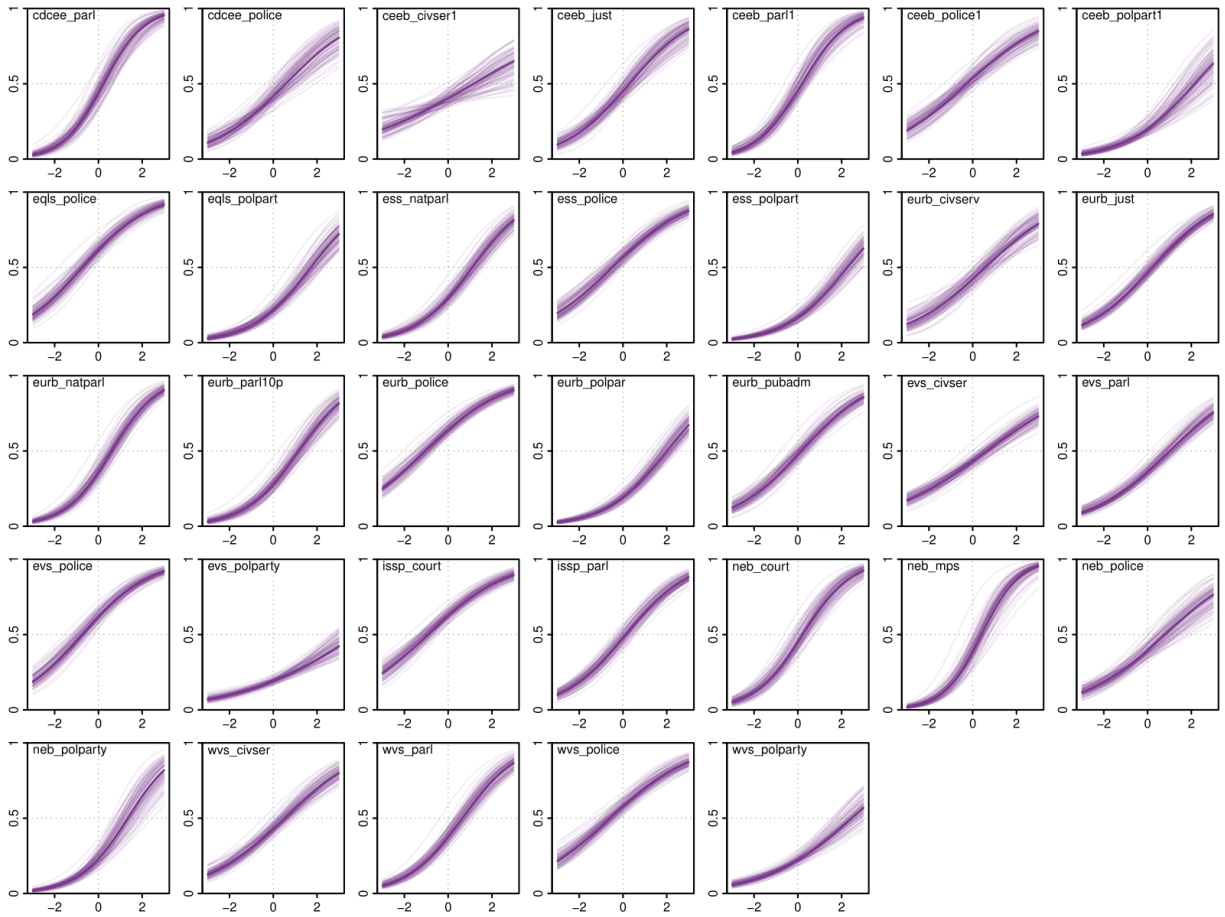
These curves show the relationship between the aggregated response proportions for each item and the underlying latent variable of institutional trust

4. Method used to produce long-run simulations of immigration and increasing diversity

I use simulations to show how the short-run effects reported in our regression models unfold and accumulate (or dissipate) over time (see Table 2 in the main paper). These simulations follow the method laid out by Williams and Whitten (2012) for simulating long run effects in a TSCS context. I begin by setting all independent variables to zero, which is the country mean given our use of country fixed effects. I plug these values into each model and run the system of equations for 100 time periods (i.e., years). This allows predicted effects in one time period to feed into the next period's equation via the lagged dependent variables.

Given that increases in immigration mechanically produce increases in diversity, I further allow the latter to rise each year based on estimates obtained from a simple demographic model, which estimates the foreign born population share (i.e., diversity) at a particular time as a function of the previous year's foreign born population share and immigration rate, as well as country fixed effects.

After 100 time periods, I calculate the effects of an increase in immigration (and therefore also diversity) by increasing the value of the immigration rate by one standard deviation and allowing both the opinion and demographic equations to run for 30 further years. Predicted effects of opinion and diversity feed forward via the inclusion of lagged dependent variables and the inclusion of simulated estimates of diversity in the opinion equation.

To incorporate uncertainty, I repeat this process 10,000 times, with each iteration being based on an independent draw from a multivariate normal distribution with the expectation being the vector of regression model coefficients and variance being the robust covariance matrix. This includes the uncertainty associated with model coefficients, which is appropriate for the in-sample counterfactual prediction I make here. Because I am also forecasting future values of demographics based on current values of immigration change, I additionally include the out-of-sample uncertainty for these demographic models; specifically, I add uncertainty based on the regression standard error for the demographic model.

5. Additional tables and figures

Table S1. Immigration and institutional trust, Western Europe

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Institutional trust$_{t-1}$	.273*	.146*	.080	.148*	.151*	−.031
	(.055)	(.050)	(.046)	(.060)	(.049)	(.056)
Institutional trust$_{t-2}$	−.403*	−.282*	−.270*	−.288*	−.288*	−.232*
	(.055)	(.049)	(.050)	(.061)	(.046)	(.060)
% foreign-born$_{t-1}$	.548	.836*	.117	.594	.873*	.595
	(.341)	(.285)	(.325)	(.423)	(.295)	(.356)
Immigration rate$_{t-1}$	.006	.028	.027			.011
	(.019)	(.022)	(.021)			(.031)
Δ GDP growth per capita$_{t0}$		.008	.009*	.005	.007	.007
		(.004)	(.004)	(.005)	(.004)	(.004)
GDP growth per capita$_{t-1}$		.023*	.025*	.020*	.022*	.024*
		(.003)	(.003)	(.004)	(.003)	(.004)
Unemployment rate$_{t-1}$		.000	−.002	.002	.002	−.002
		(.004)	(.005)	(.004)	(.004)	(.007)
Corruption$_{t-1}$		−.362	.035	.064	−.430	.829
		(.464)	(.429)	(.672)	(.439)	(.529)
Liberal democracy$_{t-1}$		.630	.343	.721	.693	.616
		(.771)	(.783)	(.790)	(.890)	(.699)
Far right seat share$_{t-1}$			.204*			
			(.095)			
Immigrant integration policy$_{t-1}$			.082*			
			(.025)			
Muslim immigration rate$_{t-1}$				.333*		
				(.071)		
Non-EU immigration rate					.064	
					(.043)	
Concern about immigration$_{t0}$						.089*
						(.022)
Country fixed effects	✓	✓	✓	✓	✓	✓
N observations	450	443	412	390	425	317
N countries	20	20	20	18	20	18

$^*p < 0.05$. Dynamic fixed effects error correction models of institutional trust, with Driscoll-Kraay standard errors in parentheses. Western European states only.

Table S2. Immigration and democratic satisfaction, Western Europe

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Satisfaction with democracy$_{t-1}$	.512*	.473*	.421*	.466*	.472*	.384*
	(.046)	(.048)	(.045)	(.055)	(.049)	(.059)
Satisfaction with democracy$_{t-2}$	−.602*	−.570*	−.542*	−.554*	−.569*	−.510*
	(.045)	(.045)	(.039)	(.056)	(.046)	(.055)
% foreign-born$_{t-1}$	.509	.661*	.156	.353	.522*	.416
	(.295)	(.240)	(.283)	(.223)	(.246)	(.435)
Immigration rate$_{t-1}$	−.016	−.005	−.005			−.015
	(.011)	(.013)	(.011)			(.012)
Δ GDP growth per capita$_{t0}$		.007*	.007*	.004	.005	.006*
		(.003)	(.003)	(.003)	(.003)	(.003)
GDP growth per capita$_{t-1}$		.007	.009*	−.002	.004	.009
		(.005)	(.005)	(.005)	(.005)	(.005)
Unemployment rate$_{t-1}$		−.001	−.002	.000	−.000	−.000
		(.004)	(.004)	(.005)	(.004)	(.004)
Corruption$_{t-1}$		−.199	.057	−.009	−.524	.330
		(.371)	(.358)	(.382)	(.324)	(.428)
Liberal democracy$_{t-1}$		.300	.171	−.463	.146	.264
		(.731)	(.757)	(.688)	(.811)	(.693)
Far right seat share$_{t-1}$			.069			
			(.065)			
Immigrant integration policy$_{t-1}$			.070*			
			(.020)			
Muslim immigration rate$_{t-1}$				.117*		
				(.043)		
Non-EU immigration rate					−.001	
					(.028)	
Concern about immigration$_{t0}$						.042*
						(.012)
Country fixed effects	✓	✓	✓	✓	✓	✓
N observations	434	434	412	381	416	317
N countries	20	20	20	18	20	18

*$p < 0.05$. Dynamic fixed effects error correction models of democratic satisfaction, with Driscoll-Kraay standard errors in parentheses. Western European states only.

Table S3. Immigration and democratic support, Western Europe

|	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Democratic support$_{t-1}$	.613*	.618*	.596*	.574*	.612*	.616*
	(.068)	(.067)	(.067)	(.077)	(.069)	(.059)
Democratic support$_{t-2}$	−.674*	−.680*	−.666*	−.640*	−.672*	−.702*
	(.059)	(.059)	(.058)	(.068)	(.060)	(.050)
% foreign-born$_{t-1}$	.114	.103	.095	.025	.097	.238*
	(.070)	(.084)	(.123)	(.078)	(.063)	(.106)
Immigration rate$_{t-1}$	−.000	−.001	−.003			−.008
	(.006)	(.007)	(.007)			(.008)
Δ GDP growth per capita$_{t0}$		.001	.001	.001	.000	.000
		(.001)	(.001)	(.001)	(.001)	(.001)
GDP growth per capita$_{t-1}$		−.001*	−.001	−.002*	−.002*	−.002*
		(.001)	(.001)	(.001)	(.001)	(.001)
Unemployment rate$_{t-1}$		−.001	−.001	.001	−.001	−.002*
		(.001)	(.001)	(.001)	(.001)	(.001)
Corruption$_{t-1}$		−.094	−.066	−.394	−.226*	−.085
		(.079)	(.089)	(.211)	(.114)	(.090)
Liberal democracy$_{t-1}$		−.026	−.088	−.179	−.082	−.131
		(.177)	(.156)	(.279)	(.182)	(.176)
Far right seat share$_{t-1}$			.035			
			(.053)			
Immigrant integration policy$_{t-1}$			.005			
			(.009)			
Muslim immigration rate$_{t-1}$				.050*		
				(.022)		
Non-EU immigration rate					−.009	
					(.014)	
Concern about immigration$_{t0}$						.008
						(.005)
Country fixed effects	✓	✓	✓	✓	✓	✓
N observations	.460	.462	.457	.446	.468	.523
N countries	20	20	20	18	20	18

*$p < 0.05$. Dynamic fixed effects error correction models of democratic support, with Driscoll-Kraay standard errors in parentheses. Western European states only.

Table S4. Bayesian unified models of trust, satisfaction and support incorporating measurement uncertainty

|	Trust		Satisfaction		Support	
	Posterior mean	Posterior S.D.	Posterior mean	Posterior S.D.	Posterior mean	Posterior S.D.
1st lag of DV	.795	(.079)	1.126	(.187)	−.127	(.096)
2nd lag of DV	−.103	(.073)	−.340	(.152)	.219	(.095)
% foreign born$_{t-1}$	−.014	(.056)	.463	(.548)	.471	(.276)
Immigration rate$_{t-1}$	.121	(.038)	.444	(.456)	−.019	(.147)
GDP growth$_{t-1}$	.024	(.020)	−.581	(.532)	−.065	(.115)
GDP growth$_{t0}$	.077	(.020)	1.732	(.970)	.309	(.072)
Unemployment rate$_{t-1}$	−.040	(.033)	−.587	(.441)	−.248	(.115)
Liberal democracy$_{t-1}$	−.116	(.060)	−.605	(.626)	−.261	(.234)
Corruption$_{t-1}$	−.151	(.108)	−.471	(.713)	−.275	(.444)

Results are based on Bayesian unified models that simultaneously measure the latent variable and estimate the effects of structural covariates, thereby including the measurement error of the former into the latter. See Claassen (2022) for details. Note that, due to missing values in covariates such as %foreign born, the three latent opinion variables are estimated here using smaller datasets of aggregated public opinions that the corresponding "two-step" models in the main paper. Country fixed effects included. The dependent variables are in levels, not differences.

Figure S5. Immigration rates and democratic satisfaction across Europe
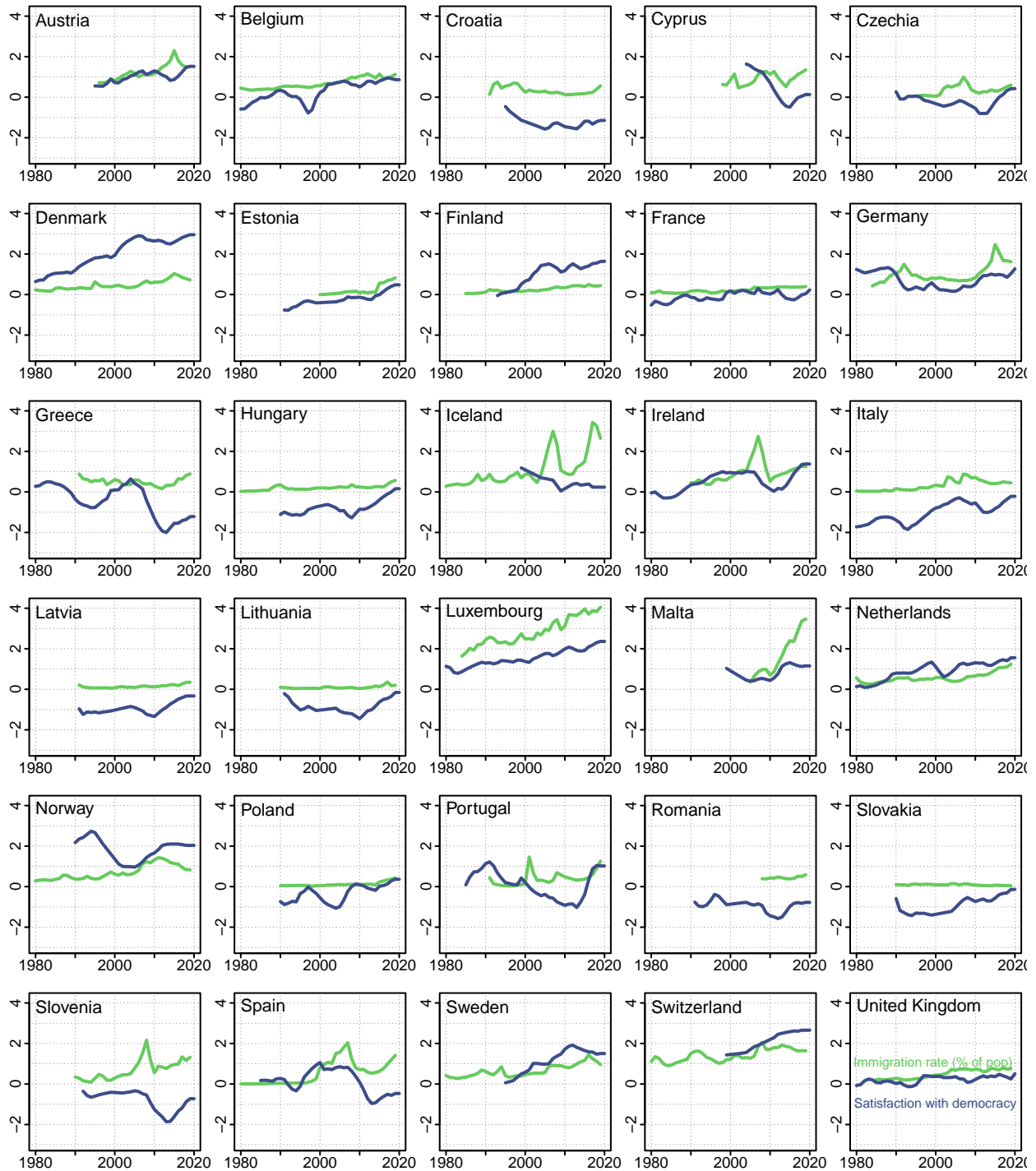
The annual rate of immigration as a percent of the national population is shown in green. Annual levels of democratic satisfaction shown in blue — this variable is standardized to have mean of zero and standard deviation of one.

Figure S6. Immigration rates and democratic support across Europe
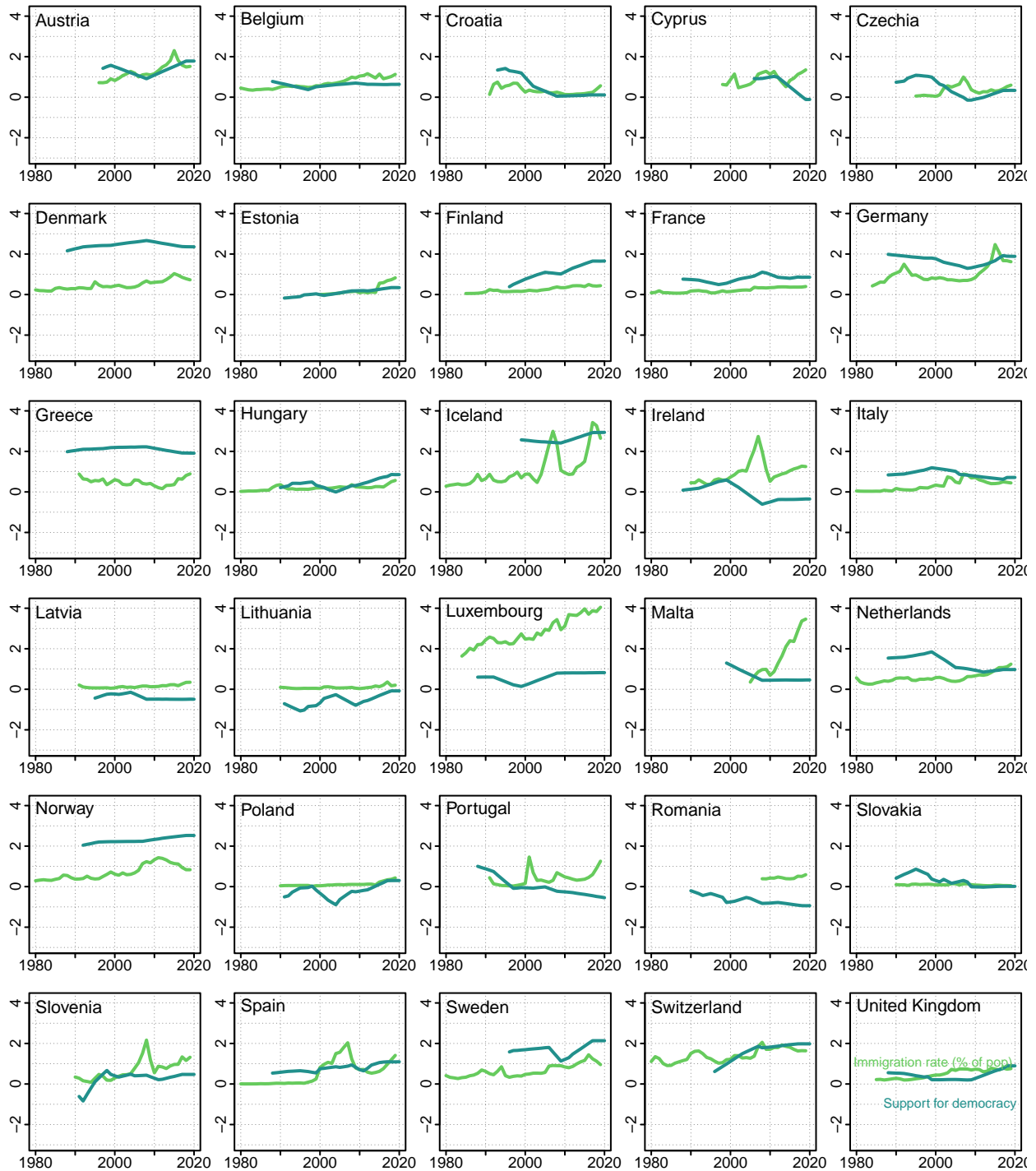
The annual rate of immigration as a percent of the national population is shown in green. Annual levels of democratic support shown in teal — this variable is standardized to have mean of zero and standard deviation of one.

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