

Electronic supplementary material to 'On the Prevalence of Condorcet's Paradox'

Reference Nb.

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1 The 2017 election in the Netherlands

We presented the data for the 2017 parliamentary election in the Netherlands and argued that even narrow majorities in pairwise comparisons do not constitute a sufficient indication of the likelihood of cyclical majorities.

To elaborate our argument analytically, we first introduce a new form of representation for the frequency of symmetric and asymmetric preference orderings.

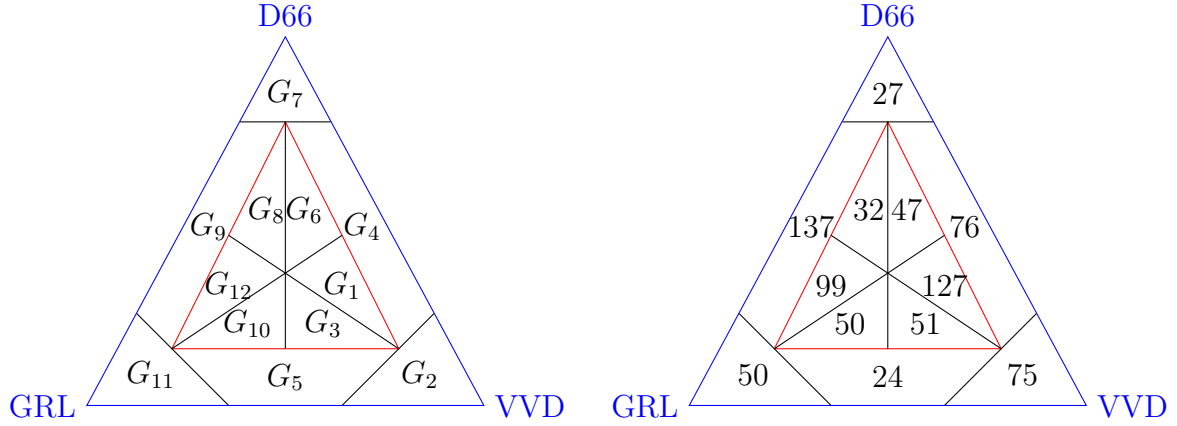


Figure 1: Preference triangles for the asymmetric ('Saari triangle', in red) and the symmetric part (blue) of the preference relations.

The left-hand side of Fig. 1 depicts the 12 possible orderings. The inner triangle, coloured in red, is the well-known Saari-triangle (?), which is defined on the asymmetric (strict) part of the preference relations. The blue-coloured triangle surrounding the Saari triangle encompasses the six orderings with one indifference relation.

Note that in bootstrapping, the values in the twelve areas of Fig. 1 are redistributed through sampling with replacement from the existing sample. In contrast, the random-noise procedure integrates the values from the outer triangle into the inner triangle, with subsequent adjustments taking place within the inner triangle.

Table 1 shows the binary relations of respondents in each of the groups G_1 to G_{12} .

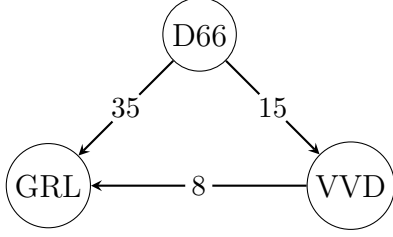
G_i	VVD D66	VVD GRL	D66 GRL	G_i	VVD D66	VVD GRL	D66 GRL
G_1	$\succ$	$\succ$	$\succ$	G_7	$\prec$	$\sim$	$\succ$
G_2	$\succ$	$\succ$	$\sim$	G_8	$\prec$	$\prec$	$\succ$
G_3	$\succ$	$\succ$	$\prec$	G_9	$\prec$	$\prec$	$\sim$
G_4	$\sim$	$\succ$	$\succ$	G_{10}	$\succ$	$\prec$	$\prec$
G_5	$\succ$	$\sim$	$\prec$	G_{11}	$\sim$	$\prec$	$\prec$
G_6	$\prec$	$\succ$	$\succ$	G_{12}	$\prec$	$\prec$	$\prec$

Table 1: Binary preference relations of respondents in groups G_1 to G_{12} .

For example, VDD|D66 denotes the pairwise comparison between VDD and D66. If respondents in a respective group prefer the VDD to D66, then this is indicated by $\succ$. If they prefer D66 over VDD, we denote this by $\prec$. $\sim$ denotes an indifference. Thus, G_1 encompasses all individuals i for whom $VVD \succ_i GRL$, $VVD \succ_i D66$, and $D66 \succ_i GRL$.

The right-hand side of Figure 1 merely replaces the groups by the respective numbers from our data evaluation, such that 127 respondents can assigned to G_1 , 75 to G_2 and so on.

The Data in Fig. 1 can be represented by the following margin graph:



The (net) majority of 15 in favour of D66 over VVD is calculated by $VVD|D66 \equiv |(G_1 + G_2 + G_3 + G_5 + G_{10}) - (G_6 + G_7 + G_8 + G_9 + G_{12})|$.

The numbers in the right-hand side triangles show that the centrist party (D66) is significantly less often ranked bottom ($G_3 + G_{10} + G_5 = 125$) than the VDD ($G_8 + G_9 + G_{12} = 268$) and the GRL ($G_1 + G_4 + G_6 = 250$). This finding remains robust if we consider also the cases where two parties are regarded as indifferent and both worse than a third party (for D66 for example: $G_2 + G_{11}$). In this particular case, this empirical approximation on single-peakedness leads to a robust existence of a Condorcet winner.

2 Countries and Election Years Included in Analysis

	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21
Albania										x												x				
Argentina																				x						
Australia	x								x			x						x						x		
Austria													x					x				x				
Belarus						x							x													
Belgium				x				x																x		
Brazil							x				x				x				x				x			
Bulgaria						x													x							
Canada		x							x				x							x				x		
Chile				x						x				x								x				
Costa Rica																							x			
Croatia												x														
Czech Republic	x						x				x				x			x								
Czechia																						x				x
Denmark			x			x						x												x		
El Salvador																								x		
Estonia																x										
Finland								x				x								x				x		
France							x					x					x					x				
Germany			x				x			x				x				x					x			x
Great Britain		x								x										x		x		x		
Greece														x			x			2				x		
Hong Kong			x		x				x				x				x				x					
Hungary			x				x																x			
Iceland				x				x				x		x				x			x	x				
India																								x		
Ireland							x					x				x					x					
Israel	x							x			x							x							x	
Italy											x												x			

[illegible]

3 Full List of Condorcet Winner and Condorcet Loser Parties in Parliamentary Elections

Country	Year	Condorcet winner candidate/party	Condorcet loser candidate/party
Albania	2005	Democratic Party of Albania (PD)	Agrarian Party (PAA)
Albania	2017	Socialist Party of Albania (PS)	Libra Party (LIBRA)
Argentina	2015	Front for the Victory (FPV)	Progressives (Pro)
Australia	1996	Liberal Party (LP)	Australian Greens (AG)
Australia	2004	Liberal Party (LP)	One Nation Party (ONP)
Australia	2007	Australian Labor Party (ALP)	National Party of Australia (NPA)
Australia	2013	Liberal Party (LP)	Australian Greens (AG)
Australia	2019	Liberal Party (LP)	One Nation Party (ONP)
Austria	2008	Soc. Dem. Party of Austria (SPÖ)	Dinkhauser List
Austria	2013	Soc. Dem. Party of Austria (SPÖ)	Alliance for the Future of Austria (BZÖ)
Austria	2017	Austrian People's Party (ÖVP)	Peter Pilz List (PILZ)
Belarus	2001	Communist Party of Belarus	United Civil Party
Belarus	2008	The BNF Party	United Civil Party
Belgium-Flanders	1999	Live Differently (AGALEV) / Green	Flemish Block/ Importance (VB)
Belgium-Wallonia	1999	Confederated Ecologists (ECOLO)	National Front (FN)
Belgium	2003	Socialist Party Differently (SP)	Confederated Ecologists (ECOLO)
Belgium-Flanders	2019	Christian Democratic - Flemish (CD-V)	Flemish Block (VB)
Belgium-Wallonia	2019	Confederated Ecologists (ECOLO)	People's Party (PP)
Brazil	2002	Workers Party (PT)	Brazilian Labor Party (PTB)
Brazil	2006	Workers Party (PT)	Brazilian Labor Party (PTB)
Brazil	2010	Workers Party (PT)	Democrats (DEM)
Brazil	2014	Workers Party (PT)	Republic Party (PR)
Brazil	2018	Workers Party (PT)	Brazilian Republican Party (PRB)
Bulgaria	2001	National Movement for Stability and Progress (NDS)	Euroleft (BE)
Bulgaria	2014	Citizens for European Development of Bulgaria (GERB)	Movement for Rights and Freedoms (DPS)
Canada	1997	Liberal Party (LIB)	Bloc Quebecois (BQ)
Canada	2004	Liberal Party (LIB)	Bloc Quebecois (BQ)
Canada	2008	Conservative Party (CP)	Bloc Quebecois (BQ)
Canada	2011	Conservative Party (CP)	Bloc Quebecois (BQ)
Canada	2015	Liberal Party (LIB)	Bloc Quebecois (BQ)
Canada	2019	Liberal Party (LIB)	Bloc Quebecois (BQ)
Chile	2005	Party for Democracy (PPD)	Independent Democratic Union (UDI)
Chile	2009	Christian Democratic Party (PDC)	Communist Party of Chile (PCCh)
Chile	2017	National Renewal (RN)	Political Evolution (Evopoli)
Costa Rica	2018	Citizens' Action Party (PAC)	Social Christian Republican Party (PRSC)
Croatia	2007	Croatian Democratic Union (HDZ)	Croatian Democratic Alliance of Slavonia and Baranja (HDSSB)
Czech Republic	1996	Civic Democratic Party (ODS)	Communist Party of Bohemia and Moravia (KSCM)
Czech Republic	2002	Czech Social Democratic Party (CSSD)	Communist Party of Bohemia and Moravia (KSCM)
Czech Republic	2006	Green Party (SZ)	Communist Party of Bohemia and Moravia (KSCM)
Czech Republic	2010	Public Affairs (VV)	Communist Party of Bohemia and Moravia (KSCM)
Czech Republic	2013	Action of Dissatisfied Citizens (ANO)	Civic Democratic Party (ODS)
Czech Republic	2017	Action of Dissatisfied Citizens (ANO)	TOP 09 (TOP 09)
Czech Republic	2021	Action of Dissatisfied Citizens (ANO)	Czech Pirate Party (Pirati)
Denmark	1998	Social Democrats (Sd)	Danish People's Party (DF)
Denmark	2001	Venstre, Denmark's Liberal Party (V)	Unity List - Red-Green Alliance (EL)

Country	Year	Condorcet winner party	Condorcet loser party
Denmark	2007	Social Democrats (Sd)	Unity List - Red-Green Alliance (EL)
Denmark	2019	Social Democrats (Sd)	The New Right (NB)
Estonia	2011	Social Democratic Party (SDE)	Estonian People's Union (ER a)
Finland	2003	Social Democratic Party of Finland (SDP)	Swedish People's Party in Finland (RKP - SFP)
Finland	2007	Center Party of Finland (KESK)	Left Alliance (VAS)
Finland	2011	Social Democratic Party of Finland (SDP)	Christian Democrats (KD)
Finland	2015	Center Party of Finland (KESK)	—
Finland	2019	Social Democratic Party of Finland (SDP)	Blue Reform (SIN)
France	2007	Union for a Popular Movement (UMP)	National Front (FN)
Germany	1998	Social Democratic Party (SPD)	Left Party (DIE LINKE)
Germany	2002	Social Democratic Party (SPD)	The Republicans (REP)
Germany	2005	Social Democratic Party (SPD)	National Democratic Party (NPD)
Germany	2009	Christian Democratic Party (CDU)	Left Party (DIE LINKE)
Germany	2013	Christian Democratic Party (CDU)	Alternative for Germany (AfD)
Germany	2017	Christian Democratic Party (CDU)	Alternative for Germany (AfD)
Germany	2021	Social Democratic Party (SPD)	Alternative for Germany (AfD)
Great Britain	1997	Labor (Lab)	Conservatives (Con)
Great Britain	2005	Labor (Lab)	Conservatives (Con)
Great Britain	2015	Conservatives (Con)	United Kingdom Independence Party (UKIP)
Great Britain	2017	Labor (Lab)	Plaid Cymru (PC)
Great Britain	2019	Conservatives (Con)	Plaid Cymru (PC)
Greece	2009	Pan-Hellenic Socialist Movement (PASOK)	Popular Orthodox Rally (La.O.S)
Greece	2012	Democratic Left (DIMAR)	Golden Dawn (LS - XA)
Greece	2015	Coalition of the Radical Left (SYRIZA)	Golden Dawn (LS - XA)
Greece	2019	New Democracy (ND)	Greek Solution
Hong Kong	1998	Democratic Party (DP)	Citizen's Party
Hong Kong	2000	Democratic Party (DP)	Citizen's Party
Hong Kong	2004	Democratic Party (DP)	Democratic Alliance for Betterment of Hong Kong (DAB)
Hong Kong	2008	Civic Party (CPP)	League of Social Democrats (LSD)
Hong Kong	2012	{ Democratic Party (DP) AND Hong Kong Federation of Trade Unions (HKFTU) }	People Power (PP)
Hong Kong	2016	Democratic Party (DP)	ALLinHKG
Hungary	1998	Fidesz-Hungarian Civic Party Alliance Party (Fidesz - MPP)	Hungarian Justice and Life Party (MIEP)
Hungary	2002	Hungarian Socialist Party (MSZP)	Hungarian Justice and Life Party (MIEP)
Hungary	2018	Fidesz - KDNP	Democratic Coalition (DK)
Iceland	1999	Independence Party (Sj)	Liberal Party (FF)
Iceland	2003	Independence Party (Sj)	Liberal Party (FF)
Iceland	2007	Independence Party (Sj)	Icelandic Movement (IL)
Iceland	2009	Social Democratic Alliance (Sam)	Liberal Party (FF)
Iceland	2013	Progressive Party (F)	Pirate Party (Pi)
Iceland	2016	Left-Green Movement (VG)	Progressive Party (F)
Iceland	2017	Left-Green Movement (VG)	Center Party (M)
India	2019	Indian People's Party (BJP)	All India Trinamool Congress (AITC)
Ireland	2002	Fianna Fail (FF)	Sinn Fein (SF)
Ireland	2007	Fianna Fail (FF)	Sinn Fein (SF)
Ireland	2011	Fine Gael (FG)	United Left Alliance (ULA)
Ireland	2016	Fine Gael (FG)	Sinn Fein (SF)
Israel	1996	Israeli Labor Party (MHH)	Sfarad's Keepers of the Torah (Shas)
Israel	2003	Likud - The Consolidation (L)	Sfarad's Keepers of the Torah (Shas)
Israel	2006	Forward (Kadima)	Sfarad's Keepers of the Torah (Shas)
Israel	2013	There is a Future (YA)	Sfarad's Keepers of the Torah (Shas)
Israel	2020	Likud - The Consolidation (L)	Joint List

Country	Year	Condorcet winner party	Condorcet loser party
Italy	2006	National Alliance (AN)	Communist Refoundation Party (PRC)
Italy	2018	Five Star Movement (M5S)	Free and Equal (LeU)
Japan	1996	Liberal Democratic Party (LDP)	New Party Harbinger (NPH)
Japan	2004	Democratic Party of Japan (DPJ)	Japanese Communist Party (JCP)
Japan	2007	Democratic Party of Japan (DPJ)	Japanese Communist Party (JCP)
Japan	2013	Liberal Democratic Party (LDP)	Green Wind
Japan	2017	Liberal Democratic Party (LDP)	Japanese Communist Party (JCP)
Kenya	2013	The National Alliance (TNA)	United Democratic Front (Forum) (UDFP)
Latvia	2010	Union of Greens and Farmers (ZZS)	For Human Rights in United Latvia (PCTVL)
Latvia	2011	Unity (V)	Latvia's First Party/ /Latvian Way (LPP/LC)
Latvia	2014	Union of Greens and Farmers (ZZS)	Latvian Association of the Regions (LRA)
Latvia	2018	Union of Greens and Farmers (ZZS)	Latvian Russian Union (LKS)
Lithuania	2016	Lithuanian Farmers and Greens Union (LVZS)	(Lithuanian) Poles Election Action Christian Families Alliance
Lithuania	2020	Homeland Union-Conservatives / Lithuanian Christian Democrats	(Lithuanian) Poles Election Action - Christian Families Alliance
Mexico	1997	Democratic Revolution Party (PRD)	Cardenista Party (PFCRN)
Mexico	2000	Alliance for Change	Authentic Party of the Mexican Revolution (PARM)
Mexico	2003	National Action Party (PAN)	Citizen's Movement (MC)
Mexico	2006	National Action Party (PAN)	Soc. Dem.Party (PSD)
Mexico	2009	Institutional Revolutionary Party (PRI)	Soc. Dem.Party (PSD)
Mexico	2012	Institutional Revolutionary Party (PRI)	New Alliance Party (PANAL)
Mexico	2015	Institutional Revolutionary Party (PRI)	Citizen's Movement (MC)
Mexico	2018	National Regeneration Movement (MORENA)	Institutional Revolutionary Party (PRI)
Montenegro	2012	Coalition "For a European Montenegro"	Croatian Civic Initiative (HGI)
Montenegro	2016	Democratic Party of Socialists (DPS)	Bosniak Party (BS)
Netherlands	1998	Labor Party (PvdA)	Reformed Political Alliance (GPV)
Netherlands	2002	Christian Democratic Appeal (CDA)	Reformed Political Party (SGP)
Netherlands	2006	Christian Democratic Appeal (CDA)	Party for Freedom (PVV)
Netherlands	2010	Democrats 66 (D66)	Party for Freedom (PVV)
Netherlands	2017	Democrats 66 (D66)	Party for Freedom (PVV)
Netherlands	2021	Democrats 66 (D66)	Forum for Democracy (FvD)
New Zealand	1996	Labor Party (Lab)	Christian Coalition
New Zealand	2002	Labor Party (Lab)	Jim Anderton's Progressive Party (PP)
New Zealand	2008	National Party (NP)	Jim Anderton's Progressive Party (PP)
New Zealand	2011	National Party (NP)	MANA Movement (MANA)
New Zealand	2014	National Party (NP)	Internet MANA (IP - MANA)
New Zealand	2017	National Party (NP)	MANA Movement (MANA)
New Zealand	2020	Labor Party (Lab)	Conservative Party (CP)/ New Conservative (NC)
Norway	1997	Labor Party (Ap)	Progress Party (FrP)
Norway	2001	Conservative Party (H)	Progress Party (FrP)
Norway	2005	Labor Party (Ap)	Red Electoral Alliance (RV)
Norway	2009	Labor Party (Ap)	Red Party (R)
Norway	2013	Conservative Party (H)	Red Party (R)
Norway	2017	Conservative Party (H)	Red Party (R)
Peru	2000	Possible Peru	Peruvian Aprista Party (PAP)
Peru	2001	Possible Peru	Andean Renaissance / National United Renaissance
Peru	2006	Peruvian Aprista Party (PAP)	National Restoration (RN)
Peru	2011	Peru Wins (UPP)	Peruvian Aprista Party (PAP)

Country	Year	Condorcet winner party	Condorcet loser party
Peru	2016	Popular Force (FP)	Direct Democracy
Peru	2021	Popular Action (AP)	Popular Renewal (RP)
Philippines	2004	Lakas - Christian-Muslim Democrats (LAKAS-CMD)	Democratic Action (AD)
Philippines	2010	Liberal Party (LP)	New Nation- Volunteers for a New Philippines (VNP)
Philippines	2016	Philippine Democratic Party (PDP-LABAN)	People's Reform Party (PRP)
Poland	1997	Solidarity Electoral Action (AWS)	Movement for Reconstruction of Poland (ROP)
Poland	2001	Coalition Of The Alliance Of The Democratic Left - The Union of Labor	Solidarity Electoral Action (AWS)
Poland	2005	Law and Justice (PiS)	Democratic Party (PD)
Poland	2007	Civic Platform (PO)	Left and Democrats (LiD)
Poland	2011	Civic Platform (PO)	Palikots Movement
Poland	2019	Law and Justice (PiS)	Confederation Liberty and Independence
Portugal	2002	Socialist Party (PS)	Portuguese Communist Worker's Party (PCTP/MRPP)
Portugal	2005	Socialist Party (PS)	Democratic and Social Centre - People's Party (CDS-PP)
Portugal	2009	Socialist Party (PS)	Unitarian Democratic Coalition (CDU)
Portugal	2015	Socialist Party (PS)	Democratic Republican Party (DRP)
Portugal	2019	Socialist Party (PS)	Democratic and Social Centre - People's Party (CDS-PP)
Republic of Korea	2000	Millennium Democratic Party (MDP)	New Korean Party of the Hope (NKPH)
Republic of Korea	2004	Our Party	National Integration 21
Republic of Korea	2008	New Frontier Party (NFP)	New Progressive Party (NPP)
Republic of Korea	2012	Democratic United Party (DUP)	
Republic of Korea	2016	Democratic Party of Korea (DP)	Justice Party (JP)
Romania	1996	Romanian Democratic Convention (CDR)	Democratic Union of Hungarians in Romania (UDMR)
Romania	2004	Democratic Party (PD)	Democratic Union of Hungarians in Romania (UDMR)
Romania	2012	Social Liberal Union (USL)	Democratic Union of Hungarians in Romania (UDMR)
Romania	2016	Romanian Party of Social Democracy (PSD)	Our Romania Alliance (ANR)
Russian Federation	1999	Unity Inter-Regional Movement	Zhirinovsky Bloc
Serbia	2012	Serbian Progressive Party (SNS)	Liberal Democratic Party (LDP)
Slovakia	2010	Direction - Social Democracy (Smer)	Party Of The Hungarian Coalition (SMK)
Slovakia	2016	Slovak National Party (SNS)	Network (S) / Slovak Conservative Party (SKS)
Slovakia	2020	We are family (SR)	Kotleba - People's Party Our Slovakia (LsNS)
Slovenia	1996	{Liberal Democracy of Slov. (LDS) AND Slov. People's Party (SLS)}	Christian Democrats (SKD)
Slovenia	2004	Social Democratic Party (SDS)	New Slovenia - Christian People's Party (NSi)
Slovenia	2008	Social Democrats (SD)	New Slovenia - Christian People's Party (NSi)
Slovenia	2008	United List of Social Democrats (ZLSD)	New Slovenia - Christian People's Party (NSi)
Slovenia	2011	Social Democrats (SD)	Slovenian National Party (SNS)
Slovenia	2011	United List of Social Democrats (ZLSD)	Slovenian National Party (SNS)
South Africa	2009	African National Congress (ANC)	Freedom Front Plus (VF Plus)
South Africa	2014	African National Congress (ANC)	Freedom Front Plus (VF Plus)
Spain	1996	Spanish Socialist Workers' Party (PSOE)	Basque Nationalist Party (PNV)
Spain	2000	People's Party (PP)	Basque Nationalist Party (PNV)
Spain	2004	Spanish Socialist Workers'	People's Party (PP)

Country	Year	Condorcet winner party	Condorcet loser party
Spain	2008	Party (PSOE) Spanish Socialist Workers' Party (PSOE)	Republican Left of Catalonia (ERC)
Sweden	1998	Sweden's Social Democratic Worker's Party (SAP)	Liberal People's Party (FP) / Liberals (L)
Sweden	2002	Sweden's Social Democratic Worker's Party (SAP)	Moderate Party (M)
Sweden	2006	Sweden's Social Democratic Worker's Party (SAP)	Sweden Democrats (SD)
Sweden	2014	Sweden's Social Democratic Worker's Party (SAP)	Sweden Democrats (SD)
Sweden	2018	Sweden's Social Democratic Worker's Party (SAP)	Sweden Democrats (SD)
Switzerland	1999	Radical Democratic Party (FDP/PLR)	Green Party (GPS/PES)
Switzerland	2003	Social Democratic Party (SP/PS)	Swiss People's Party (SVP/UDC)
Switzerland	2007	Christian Democratic People's Party (CVP / PDC)	Evangelical People's Party (EVP / PEP)
Switzerland	2011	Christian Democratic People's Party (CVP / PDC)	Swiss People's Party (SVP / UDC)
Taiwan	1996	Kuomintang of China (KMT)	New Party (NP)
Taiwan	2001	Democratic Progressive Party (DPP)	New Party (NP)
Taiwan	2012	Kuomintang of China (KMT)	People First Party (PFP)
Taiwan	2016	Democratic Progressive Party (DPP)	Taiwan Solidarity Union (TSU)
Taiwan	2020	Democratic Progressive Party (DPP)	People First Party (PFP)
Thailand	2001	Thai Rak Thai Party (TRT)	Justice and Freedom Party
Thailand	2007	People's Power Party (PPP)	Referendum Party
Thailand	2011	For Thais Party (PPT)	Power of Choburi Party
Thailand	2019	For Thais Party (PPT)	People's Nation Party
Tunisia	2019	Heart of Tunisia	Dignity Coalition
Turkey	2011	Justice and Development Party (AKP)	Peace and Democratic Party (BDP)
Turkey	2015	Justice and Development Party (AKP)	Patriotic Party (VP)
Turkey	2018	Justice and Development Party (AKP)	Peoples' Democratic Party (HDP)
Ukraine	1998	Communist Party of Ukraine	Social-Democratic Party
USA	1996	Democratic Party (DEM)	Reform Party (REF)
USA	2004	Democratic Party (DEM)	Reform Party (REF)
Uruguay	2009	Broad Front (FA)	Popular Assembly
Uruguay	2019	Broad Front (FA)	Open Cabildo

4 Full List of Condorcet Winner and Condorcet Loser Candidates/Parties in Presidential Elections

Country	Year	Condorcet winner candidate/party	Condorcet loser candidate/party
Argentina	2015	Daniel Scioli (FPV)	Nicolas del Cano (FIT)
Belarus	2001	Sergej Gajdukkevich (LDP)	Vladimir Goncharik (UDO)
Brazil	2002	Luiz I. Lula da Silva (PT)	Jader Barbalho (PMDB)
Brazil	2006	Luiz I. Lula da Silva (PT)	Christovam Buarque (PDT)
Brazil	2010	Dilma Rousseff (PT)	Ciro Gomes (PSB)
Brazil	2014	Dilma Rousseff (PT)	Ronaldo Caiado (DEM)
Brazil	2018	Jair Bolsonaro (PSL)	Henrique Meirelles (MDB)
Chile	1999	Ricardo Lagos (PPD)	Gladys Marín Millie (PCCh)
Chile	2009	Marco Enríquez-Ominami (MEO)	Jorge Arrate (PCCh)
Chile	2017	Sebastian Pinera (RN)	Eduardo Artes (UPA)
Costa Rica	2018	Carlos A. Quesada (PAC)	Rodolfo H. Gómez (PRSC)
El Salvador	2019	Nayib Bukele (GAN)	Josué Alvarado (Vamos)
France	2002	Jacques Chirac (RPR)	Jean-Marie Le Pen (FN)
France	2012	François Hollande (PS)	François Bayrou (MoDem)
France	2017	Emmanuel Macron (LaREM)	Marine Le Pen (FN)
Kenya	2013	Uhuru Kenyatta (TNA)	Musalisa Mudavadi (UDFP)
Lithuania	1997	Valdas Adamkus (Independent)	Rimantas Smetona (JL)
Mexico	2000	Cuauhtémoc C. Solórzano (PRD)	Vicente Fox (PAN)
Mexico	2006	Felipe Calderón Hinojosa (PAN)	Roberto Campa Cifrián (PANAL, PNA)
Mexico	2012	Enrique Peña Nieto (PRI)	Gabriel Ricardo Quadri de la Torre (PANAL, PNA)
Mexico	2018	Andrés M. López Obrador (PRD / MORENA)	Jaime H. Rodríguez Calderón (Independent)
Peru	2000	Alberto Fujimori (Peru 2000)	Abel Salinas (PAP)
Peru	2001	Lourdes Flores Nano (UN)	Ciro Galvez (Andean Renaissance)
Peru	2011	-	Verónica Mendoza (Frente Amplio / JP)
Peru	2016	Pedro Castillo (PL)	Cesar Acuna Peralta (APP)
Peru	2021	Hernando de Soto (AvP)	Daniel Urresti (PP)
Philippines	2010	Benigno Cojuangco Aquino III (LP)	Jesus N.P. Perlas (Independent)
Philippines	2016	Rodrigo Roa Duterte (PDP-LABAN)	Jejomar Binay (UNA)
Romania	1996	Emil Constantinescu (CDR)	Mircea Ionescu-Quintus (PNL)
Romania	2009	Mircea Geoana (PSD)	Hunor Kelemen (UDMR)
Romania	2014	Klaus Werner Iohannis (PNL)	Hunor Kelemen (UDMR)
Serbia	2012	Tomislav Nikolić (SNS)	Čedomir Jovanović (LDP)
Taiwan	1996	Lee Tung-Hui (KMT)	Peng Ming Min (DPP)
Taiwan	2004	Lai Ching-te (DPP)	New Party (NP)
Taiwan	2008	Ma Ying-Jeou (KMT)	Frank Hsieh (DPP)
Taiwan	2012	Ma Ying-Jeou (KMT)	James Soong (PFP)
Taiwan	2016	Tsai Ing-Wen (DPP)	Eric Chu (KMT)
Taiwan	2020	Tsai Ing-Wen (DPP)	Han Kuo-Yu (KMT)
Tunisia	2019	Nabil Karoui (Heart of Tunisia)	Zouheir Maghzaoui (People's Movement)
Turkey	2018	Recep Tayyip Erdoğan (AKP)	Pervin Buldan (HDP)
Uruguay	2009	José Mujica (FA)	Raúl Rodríguez L. da Silva (Popular Assembly)
Uruguay	2019	Luis Lacalle Pou (PN)	Ernesto Talvi (Colorado Party)

5 Cyclical Majorities in Bootstrap and Random-Noise Replications

The table shows only the cases where either at least one bootstrap replication indicates a cyclical majority or at least one of the random-noise replication. If neither bootstrap nor random-noise exhibit a Condorcet paradox across the respective 10,000 replications, we omit the cases.

Table 5: *Bootstrap and Random-Noise Replications indicating cyclical majorities (in % of the total replications).*

Case	Bootstrap	Random Noise
Brazil_2018	0.00%	0.30%
Canada_2011	0.02%	0.00%
Canada_2019	0.00%	0.60%
Chile_2005	0.01%	0.00%
Chile_2009	2.58%	0.90%
Chile_2017	6.95%	5.00%
Croatia_2007	1.20%	5.20%
Czech.Republic.Czechia_2006	0.12%	0.00%
Czech.Republic.Czechia_2010	0.03%	0.00%
Czech.Republic.Czechia_2021	0.24%	0.00%
Finland_2019	0.37%	0.10%
Great.Britain_2017	0.00%	0.10%
Hong.Kong_2008	0.05%	0.00%
Hong.Kong_2012	8.23%	0.00%
Iceland_2003	11.29%	1.70%
Italy_2006	4.79%	6.10%
Latvia_2011	4.71%	0.00%
Latvia_2018	7.78%	0.00%
Mexico_2015	0.01%	0.00%
Netherlands_2017	0.01%	0.00%
Peru_2001	0.65%	0.00%
Peru_2006	0.08%	0.00%
Peru_2011	18.32%	11.30%
Peru_2021	0.15%	0.00%
Philippines_2004	0.00%	0.90%
Poland_2005	0.00%	0.10%
Poland_2019	0.05%	0.00%
Republic.of.Korea_2016	0.03%	0.00%
Romania_2009	6.43%	1.80%
Slovakia_2020	0.01%	0.00%
Sweden_2018	0.14%	0.00%
Switzerland_2011	3.23%	0.00%
Tunisia_2019	0.37%	0.10%
Hong Kong_2000	0.00%	0.10%
Hong Kong_2004	0.00%	0.10%
Hong Kong_2012	0.00%	3.40%