LET'S SAY AMEN FOR LATENT SPACE MODELS

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Response to Cranmer et al. (2016).

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1. REPLICATION RESULTS

Intercept/Edges		Logit	MRQAP	LSM	ERGM	LSM (Bilinear)
Conflicting policy preferences Business vs. NGO -0.86 -0.87* -1.37* -1.11* -1.38* Opposition/alliance 1.21* 1.14* 0.00 1.22* 1.07* Preference dissimilarity -0.07 -0.60 -1.76* -0.44 -0.78* Preference dissimilarity -0.07 -0.60 -1.76* -0.44 -0.78* Transaction costs 0.88* 0.75* 1.52* 0.90* 0.92* Joint forum participation 0.88* 0.75* 1.52* 0.90* 0.92* Influence 1.20* 1.29* 0.08 1.00* 1.10* Influence attribution 1.20* 1.29* 0.08 1.00* 1.10* Influence absolute diff. 0.02* [-0.41*, 0.55] (0.21) [0.70; 1.55] Influence absolute diff. -0.06* 0.04 -0.05* -0.01* (0.02) (0.02) [-0.03; 0.04] (0.04) [-0.70; 1.55] Influence absolute diff. 0.63* 0.68 -0.47 1.04*	Intercept/Edges	-4.44*	-4.24*	0.94*	-12 . 17*	-3.39*
Business vs. NGO		(0.34)		[0.11; 1.83]	(1.40)	[-4.40; -2.49]
Opposition/alliance (0.46) (-2.42, -0.41) (0.51) [-2.47, -0.47] (0.51) [-2.47, -0.47] (0.78) 1.07* Preference dissimilarity (0.07) -0.06 -1.76* -0.44 -0.78* Transaction costs (0.37) (0.26); -0.90; (0.39) [-1.53; -0.08] Joint forum participation 0.88* 0.75* 1.52* 0.90* 0.92* Influence (0.27) 1.29* 0.08 1.00* 1.10* Influence attribution 1.20* 1.29* 0.08 1.00* 1.10* Alter's influence indegree 0.10* 0.11* 0.01 0.21* [0.70; 1.55] Influence absolute diff. -0.03* -0.06* 0.04 -0.07* -0.07* Influence absolute diff. -0.03* -0.06* 0.04 -0.07* -0.07* Influence absolute diff. 0.63* 0.68* -0.47 1.04* 0.55 Functional requirements 0.62* 0.60* -0.17* 0.07* 0.68* Ego	Conflicting policy preferences					
Opposition/alliance 1.21* 1.14* 0.00 1.22* 1.07* Preference dissimilarity (0.20) -0.70* -0.60 -1.76* -0.44 -0.78* Transaction costs (0.37) (0.27) (1.56*) -0.90* (0.39) [-1.53; -0.08] Transaction costs (0.27) (0.27) (0.87; 2.19] (0.28) [0.39; 1.47] Influence (0.27) (0.87; 2.19] (0.28) [0.39; 1.47] Influence attribution 1.20* 1.29* 0.08 1.00* 1.10* Influence attribution 1.20* 1.29* 0.08 1.00* 1.10* Alter's influence indegree 0.10* 0.11* 0.01 0.21* 0.11* Influence absolute diff. -0.03* -0.06* 0.04 -0.05* -0.07* Influence absolute diff. -0.03* -0.06* 0.04 -0.05* -0.07* Influence absolute diff. 0.63* 0.68 -0.47 1.04* 0.55 Functional requirements 0.02* <td>Business vs. NGO</td> <td>-0.86</td> <td>-0.87*</td> <td>-1.37[*]</td> <td>-1.11*</td> <td>-1.38*</td>	Business vs. NGO	-0.86	-0.87*	-1.37 [*]	-1 . 11*	-1.38*
Preference dissimilarity		(0.46)		[-2.42; -0.41]	(0.51)	[-2.41; -0.47]
Preference dissimilarity	Opposition/alliance	1.21*	1.14*	0.00	1.22*	1.07*
Transaction costs (0.37) [-2.60; -0.90] (0.39) [-1.53; -0.08] Joint forum participation 0.88* 0.75* 1.52* 0.90* 0.92* Influence (0.27) [0.87; 2.19] (0.28) [0.39; 1.47] Influence attribution 1.20* 1.29* 0.08 1.00* 1.10* Alter's influence indegree 0.00* 0.11* 0.01 0.21* [0.70; 1.55] Alter's influence absolute diff. 0.02* [-0.03; 0.04] (0.04) [0.07; 0.15] Influence absolute diff. 0.03* -0.06* 0.04 -0.05* -0.07* Influence absolute diff. 0.63* 0.68 0.04 -0.05* -0.07* Influence absolute diff. 0.63* 0.68 -0.47 1.04* 0.55 Influence absolute diff. 0.63* 0.68 -0.47 1.04* 0.55 Influence absolute diff. 0.63* 0.68 -0.47 1.04* 0.55 Influence absolute diff. 0.63* 0.68* -0.99* 0.79*		(0.20)			(0.20)	[0.72; 1.47]
Transaction costs Joint forum participation 0.88* 0.75* 1.52* 0.90* 0.92* (0.27) Influence Influence attribution 1.20* 1.29* 0.08 1.00* 1.10* (0.22) Alter's influence indegree 0.10* 0.11* 0.01 0.21* 0.11* 0.01 0.21* 0.11* (0.02) Influence absolute diff. 0.02)	Preference dissimilarity	-0.07	-0.60	-1.76*	-0.44	-0.78*
Joint forum participation		(0.37)		[-2.60; -0.90]	(0.39)	[-1.53; -0.08]
Influence Influence attribution 1.20* 1.29* 0.08 1.00* 1.10* (0.22) [-0.41; 0.55] (0.21) [0.70; 1.55] (0.22) [0.70; 1.55] (0.21) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.55] (0.22) [0.70; 1.00] (0.04) [0.70; 0.15] (0.70; 1.50] (0.22) [-0.01; 0.09] (0.01) [-0.11; -0.03] (0.24) [-0.08; 1.18] (0.25) [-0.08; 1.18] (0.25) [-0.08; 1.18] (0.26) [-1.08; 0.13] (0.34) [-0.08; 1.18] (0.26) [-1.31; 0.11] (0.17) [-0.38; 1.71] (0.26) [-0.08; 1.71] (0.22) [0.62; 1.47] (0.22) [0.62; 1.47] (0.22) [0.62; 1.47] (0.22) [0.62; 1.47] (0.23) [0.62; 1.47] (0.24) (0.25) (0.	Transaction costs					
Influence Influence attribution	Joint forum participation	0.88*	0.75*	1.52*	0.90^{*}	0.92*
Influence attribution		(0.27)		[0.87; 2.19]	(0.28)	[0.39; 1.47]
Alter's influence indegree	Influence					
Alter's influence indegree	Influence attribution	1.20*	1.29*	0.08	1.00*	1.10*
Co.02 Co.03; 0.04 (0.04) [0.07; 0.15] Influence absolute diff.		(0.22)		[-0.41; 0.55]	(0.21)	[0.70; 1.55]
Influence absolute diff.	Alter's influence indegree	0.10^{*}	0.11*	0.01	0.21*	0.11*
Alter = Government actor		(0.02)		[-0.03; 0.04]	(0.04)	[0.07; 0.15]
Alter = Government actor	Influence absolute diff.	-0.03*	-0.06*	0.04	-0.05*	-0.07 [*]
Functional requirements Ego = Environmental NGO 0.88* 0.99 -0.59 0.79* 0.68 (0.26) [-1.31; 0.11] (0.17) [-0.38; 1.71] Same actor type 0.74* 1.12* 1.17* 0.99* 1.03* [0.62; 1.47] Endogenous dependencies Mutuality 1.22* 1.00* (0.21) Outdegree popularity (0.21) Twopaths GWIdegree (2.0) GWESP (1.0) [-1.08; 0.13] (0.34) [-0.08; 1.18] [-1.08; 0.13] (0.34) [-0.08; 1.18] [-1.08; 0.13] (0.34) [-0.08; 1.18] [-1.08; 0.13] (0.34) [-0.08; 1.18] [-0.08; 1.18] [-0.08; 1.18] [-0.08; 1.18] [-0.08; 1.18] [-0.08; 1.18] [-0.08; 1.18] [-0.08; 1.18] [-0.08; 1.18] [-0.08; 1.18] [-0.08; 1.18] [-0.08; 1.18] [-0.08; 1.18] [-0.08; 1.18] [-1.08; 0.13] (0.34) [-0.08; 1.18] [-1.08; 0.13] (0.34) [-0.08; 1.18] [-0.08] [-0.59] [-0.59] [-0.59] [-0.59] [-0.59] [-0.59] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.38; 1.71] [-0.28] [-0.63; 1.71] [-0.29] [-0.63; 1.71] [-0.29] [-0.63; 1.71] [-0.29] [-0.63; 1.71] [-0.28; 1.71] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47] [-0.29] [-0.62; 1.47]		(0.02)		[-0.01; 0.09]	(0.01)	[-0.11; -0.03]
Functional requirements Ego = Environmental NGO 0.88* 0.99 -0.59 0.79* 0.68 (0.26) [-1.31; 0.11] (0.17) [-0.38; 1.71] Same actor type 0.74* 1.12* 1.17* 0.99* 1.03* (0.22) [0.63; 1.71] Endogenous dependencies Mutuality 1.22* 1.00* (0.25) Outdegree popularity (0.21) Outdegree popularity Twopaths -0.04* (0.02) GWldegree (2.0) GWESP (1.0) GWOdegree (0.5)	Alter = Government actor	0.63*	0.68	-0.47	1.04*	0.55
Ego = Environmental NGO		(0.25)		[-1.08; 0.13]	(0.34)	[-0.08; 1.18]
Count Coun	Functional requirements					
Same actor type 0.74* 1.12* 1.17* 0.99* 1.03* (0.22) [0.63; 1.71] (0.23) [0.62; 1.47] Endogenous dependencies Mutuality 1.22* 1.00* (0.25) (0.25) Outdegree popularity 0.95* (0.09) Twopaths -0.04* (0.02) GWIdegree (2.0) 3.42* (1.47) GWESP (1.0) 0.58* (0.16) GWOdegree (0.5)	Ego = Environmental NGO	0.88*	0.99	-0.59	0.79^{*}	0.68
Endogenous dependencies Mutuality 1.22* 1.00* (0.25) Outdegree popularity 0.95* (0.09) Twopaths GWIdegree (2.0) GWOdegree (0.5) [0.63; 1.71] (0.23) [0.62; 1.47] 0.81* (0.25) (0.25) (0.09) (0.09) (0.00) (0.00) (1.47) (1.47) (1.47) (0.16) (0.16) (0.16)		(0.26)		[-1.31; 0.11]	(0.17)	[-0.38; 1.71]
Endogenous dependencies Mutuality 1.22* 1.00* 0.81* (0.25) Outdegree popularity 0.95* (0.09) Twopaths -0.04* (0.02) GWldegree (2.0) 3.42* (1.47) GWESP (1.0) GWOdegree (0.5)	Same actor type	0.74^{*}	1.12*	1.17*	0.99^{*}	1.03*
Mutuality 1.22* 1.00* 0.81* (0.25) Outdegree popularity 0.95* (0.09) Twopaths -0.04* (0.02) GWIdegree (2.0) 3.42* (1.47) GWESP (1.0) 0.58* (0.16) GWOdegree (0.5)		(0.22)		[0.63; 1.71]	(0.23)	[0.62; 1.47]
(0.21) (0.25) Outdegree popularity 0.95* (0.09) Twopaths -0.04* (0.02) GWldegree (2.0) 3.42* (1.47) GWESP (1.0) 0.58* (0.16) GWOdegree (0.5) 8.42*	Endogenous dependencies					
Outdegree popularity 0.95* (0.09) Twopaths -0.04* (0.02) GWldegree (2.0) 3.42* (1.47) GWESP (1.0) 0.58* (0.16) GWOdegree (0.5)	Mutuality	1.22*	1.00*		0.81*	
Twopaths (0.09) GWldegree (2.0) GWESP (1.0) GWOdegree (0.5) (0.02) 3.42* (1.47) (1.47) (0.16) 8.42*		(0.21)			(0.25)	
Twopaths -0.04* (0.02) GWIdegree (2.0) 3.42* (1.47) GWESP (1.0) 0.58* (0.16) GWOdegree (0.5) 8.42*	Outdegree popularity				0.95^{*}	
GWIdegree (2.0) GWESP (1.0) GWOdegree (0.5) (0.02) (1.47) (1.47) (0.16) 8.42*					(0.09)	
GWIdegree (2.0) 3.42* (1.47) GWESP (1.0) 0.58* (0.16) GWOdegree (0.5) 8.42*	Twopaths				-0.04*	
GWESP (1.0) (1.47) GWOdegree (0.5) (0.16) 8.42*					(0.02)	
GWESP (1.0) 0.58* (0.16) GWOdegree (0.5) 8.42*	GWIdegree (2.0)				3.42*	
(0.16) GWOdegree (0.5) 8.42*					(1.47)	
GWOdegree (0.5) 8.42*	GWESP (1.0)				0.58*	
					(0.16)	
(2.11)	GWOdegree (o.5)				8.42*	
					(2.11)	

Table 1. * p < 0.05 (or o outside the 95% confidence interval).

2. CAPTURING NETWORK STUFF

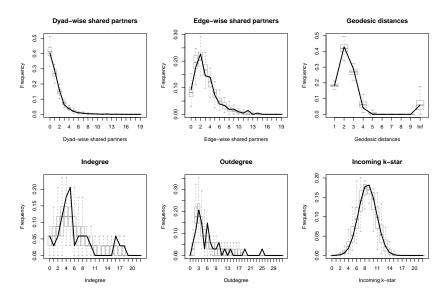


Figure 1. ERGM network stuff

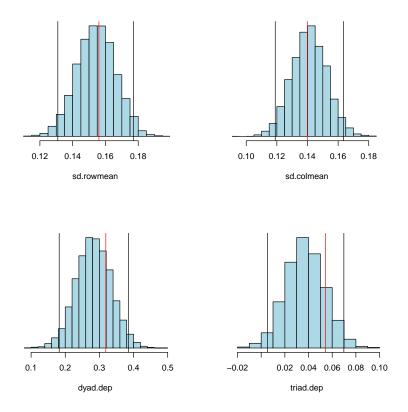


Figure 2. AMEN network stuff

3. TIE FORMATION PREDICTION

	AUC	AUC (PR)
LSM (Bilinear)	0.99	0.94
LSM	0.92	0.67
ERGM	0.91	0.70
MRQAP	0.88	0.67
Logit	0.88	0.67

Table 2. Area under the curve (AUC) comparison.

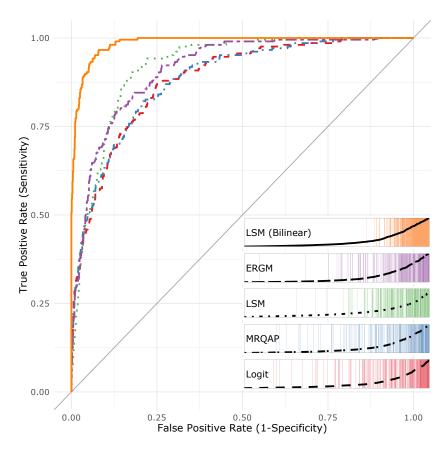


Figure 3. ROC and separation plots

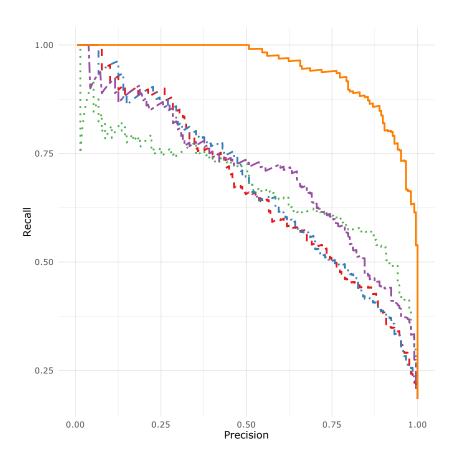


Figure 4. ROC Precision-Recall plots

REFERENCES

Cranmer, Skyler; Philip Leifeld; Scott McClurg & Meredith Rolfe (2016) Navigating the range of statistical tools for inferential network analysis. *American Journal of Political Science*.

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