DIME

Database on Ideology, Money in Politics, and Elections Network Analysis Project

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US Federal Elections

Congress
(makes laws)

House
2 Yrs
per state
population

Senate
6 Yrs
2 per state

White House
(enacts laws)

President
4 Yrs
One person

In 2008

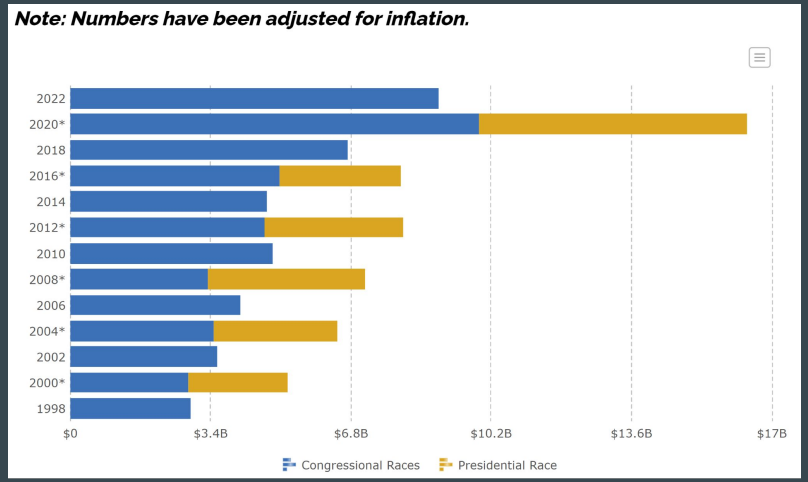
B. Obama	Vs.	J. McCain
Democrat		Republican
Left		Right
Liberal		Conservative

Committees

Money in Politics

Money in US Politics Background

Total Spending Rising over time



Source: OpenSecrets, "Total Cost of Election (1990-2022)", https://www.opensecrets.org/elections-overview/cost-of-election?cycle=2020&display=T&infl=Y

2010: Citizens United v. FEC & SpeechNow.org v. FEC

- unlimited committee spending
- unlimited donations to committees

Source: The Center for Public Integrity
https://publicintegrity.org/politics/the-citizens-united-decision-and-why-it-matters/

OpenSecrets, https://www.opensecrets.org/resources/learn/timeline

Money in US Politics Background

2011-2012

		Recipient				
		To each candidate or candidate committee per election	To national party committee per calendar year	To state/district/local party committee per calendar year	To any other political committee per calendar year[1]	Special limits
Donor	Individual may give	$2,500*	$30,800*	$10,000 (combined limit)	$5,000	$117,000* overall biennial limit: $46,200* to all candidates $70,800* to all PACs and parties[2]
	National party committee may give	$5,000	No limit	No limit	$5,000	$43,100* to Senate candidate per campaign[3]
	State, district or local party committee may give	$5,000 (combined limit)	No limit	No limit	$5,000 (combined limit)	
	PAC (multicandidate)[4] may give	$5,000	$15,000	$5,000 (combined limit)	$5,000	
	PAC (not multicandidate) may give	$2,500*	$30,800*	$10,000 (combined limit)	$5,000	
	Authorized campaign committee may give	$2,000[5]	No limit	No limit	$5,000	

*These contribution limits are indexed for inflation.

2007-2008

		Recipient				
		Candidate Committee	PAC[1]	State/district/local party committee[2]	National party committee[3]	Special limits
Donor	Individual	$2,300* per election [4]	$5,000 per year	$10,000 per year combined limit	$28,500* per year	Biennial limit of $108,200* overall biennial limit ($42,700* to all candidates and $65,500[5] to all PACs and parties)
	State, district and local party committee	$5,000 per election combined limit	$5,000 per year combined limit	Unlimited transfers to other party committees	Unlimited transfers to other party committees	
	National party committee	$5,000 per election	$5,000 per year	Unlimited transfers to other party committees	Unlimited transfers to other party committees	$39,900* to Senate candidate per campaign[6]
	PAC (multicandidate)[7]	$5,000 per election	$5,000 per year	$5,000 per year combined limit	$15,000 per year	
	PAC (not multicandidate) may give	$2,300* per election	$5,000 per year	$10,000 per year combined limit	$28,500* per year	

*These limits are indexed for inflation in odd-numbered years.

Source: FEC, Contribution Limits
https://www.fec.gov/help-candidates-and-committees/candidate-taking-receipts/contribution-limits/

Database on Ideology, Money in Politics, and Elections (DIME)

All Political Donations in US politics from 1979 to 2020
Collected by Adam Bonica

One contribution row with selected columns

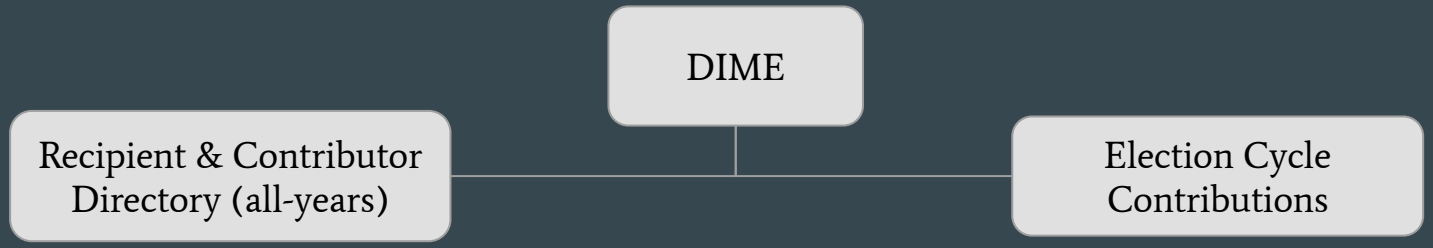
cycle	date	amount
2008	2007-06-30	5

bonica.cid	contributor.name	contributor .cfscore	contributor .type	contributor .state	contributor .occupation	occ .standardized	contributor .gender
935	democratic congressional campaign committee	-0.67	C	DC	NaN	NaN	NaN

bonica.rid	recipient.name	candidate .cfscore	recipient .type	recipient .state	seat	recipient .party
cand744	lewis, john robert	-0.88	CAND	GA	federal:house	100

Additional info in directories of contributors and recipients

Data Processing and Cleaning



Recipient Ids ⇔ Contributor Ids

1. Recipient & contributor nodes
   a. Multiple C_id → R_id (incomplete)
   b. Match C_id's together?
      i. John W Smith ≠ John H Smith (Fuzzy name matching a bad idea)
2. Sum all contributions between same nodes
   a. Duplicate contribution row entries (none in federal?)
   b. No multi-links
   c. link weight (total $ amount)

Anomalies

- Self-loops
- Negative contributions
- "-8" contributor Ids
- Many contributions between same nodes
- C_id/R_id in Directory, but not Contributions & vice versa

2008 - 2012 Basic Statistics

2008 President, Senate and Committees

2,417,413 nodes | 3,417,291 edges
Density: 5.85 E-7

- Avg. Degree: 2.83
- Avg. In-degree: 1.41
- Avg. Out-degree: 1.41

- Avg. Weighted Degree: 5283
- Avg. Weighted In-degree: 2641
- Avg. Weighted Out-degree: 2641

- Weak-GC %: 0.999 %
- Strong-GC %: 2.2 E-5 % (47 nodes)
- Avg. Path length (SGC): 2.81

- Highest Deg. : Obama, Barack (674K)

2012 President, Senate and Committees

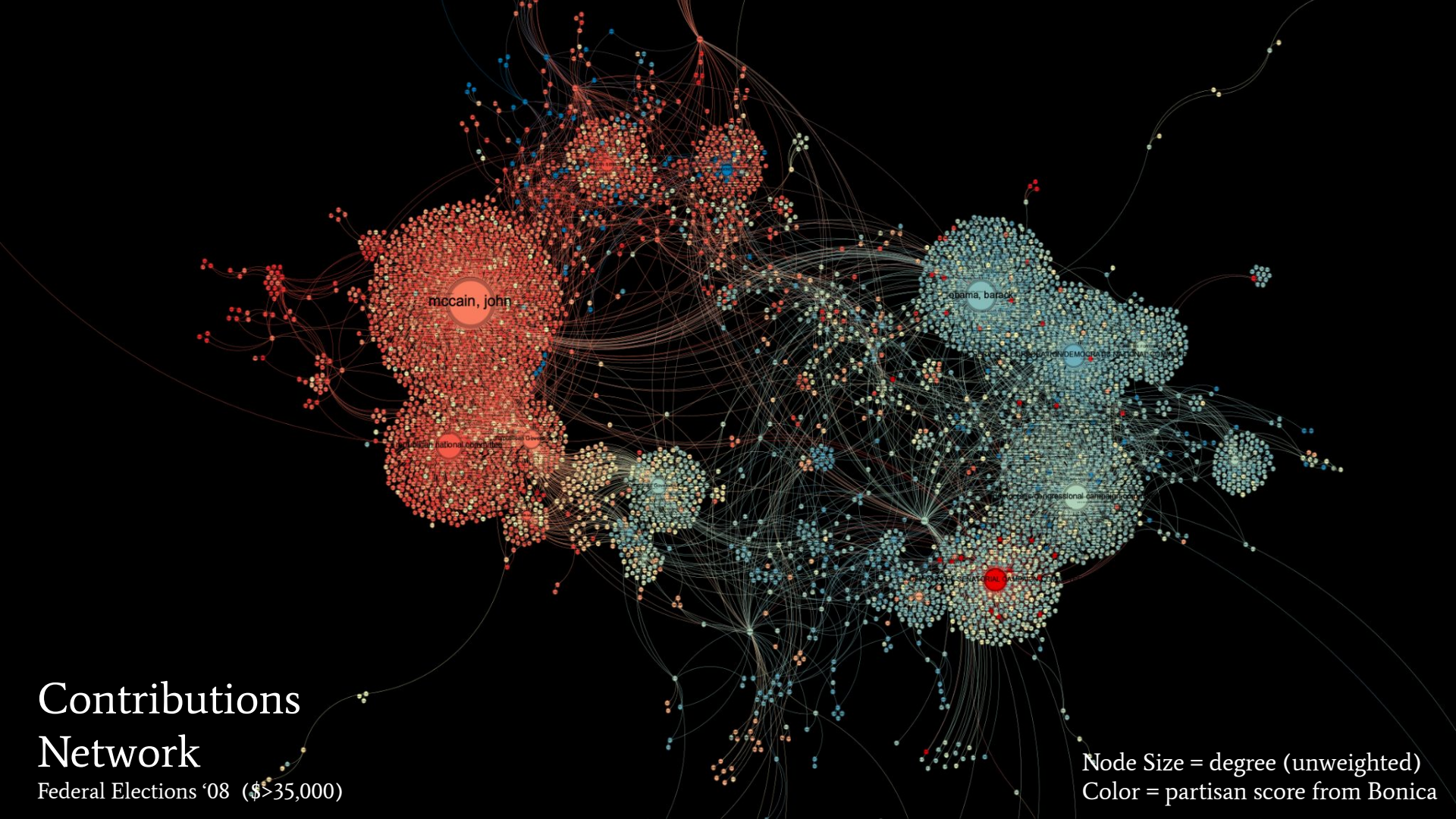
3,054,372 nodes | 5,418,592 edges
Density: 5.81 E-7

- Avg. Degree: 3.55
- Avg. In-degree: 1.77
- Avg. Out-degree: 1.77

- Avg. Weighted Degree: 6832
- Avg. Weighted In-degree: 3416
- Avg. Weighted Out-degree: 3416

- Weak-GC %: 0.999 %
- Strong-GC %: 9.5 E-5 % (290 nodes)
- Avg. Path length (SGC): 4.01

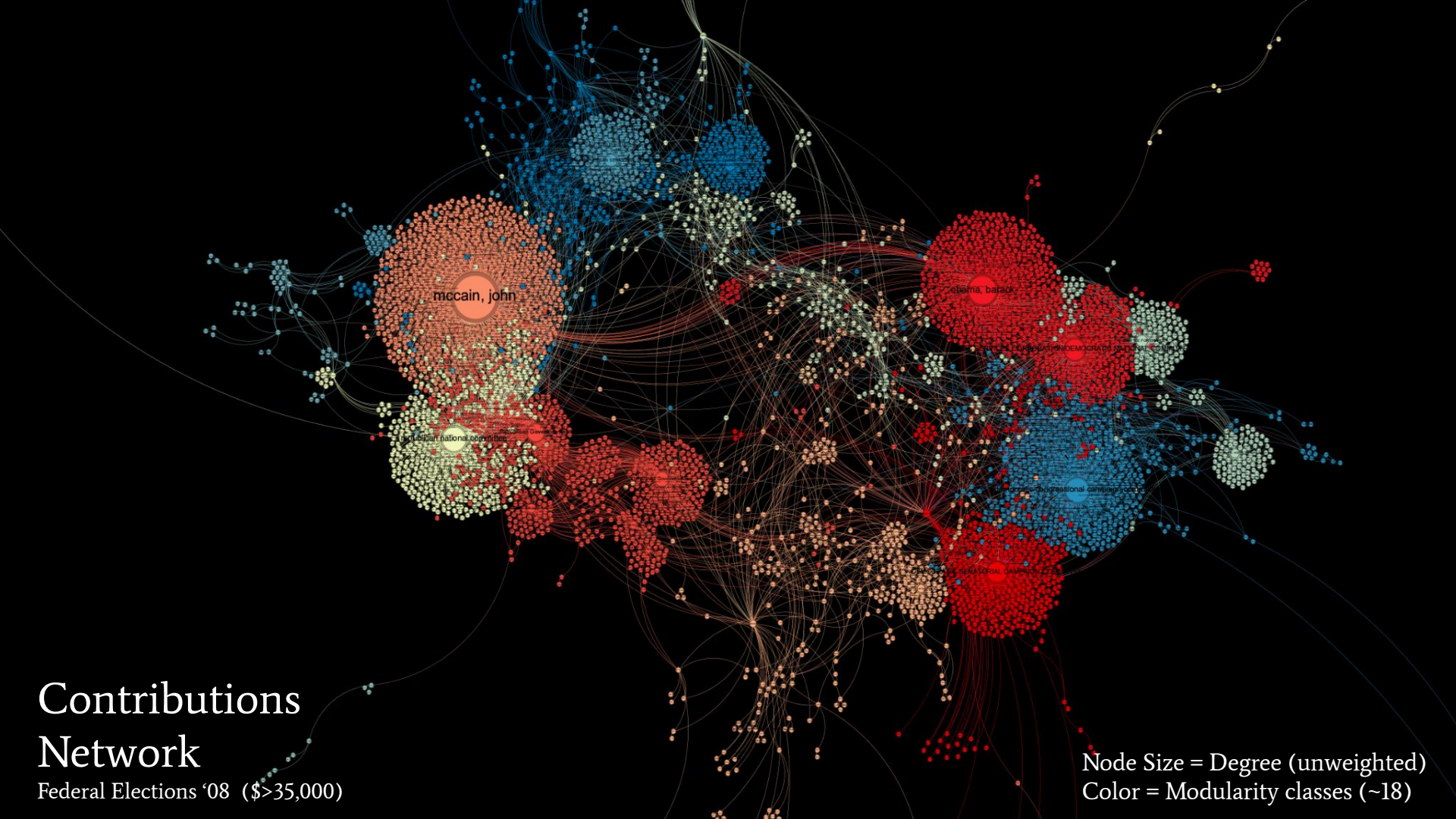
- Highest Deg. : Obama, Barack (808K)



Contributions Network

Federal Elections '08 ($>35,000)

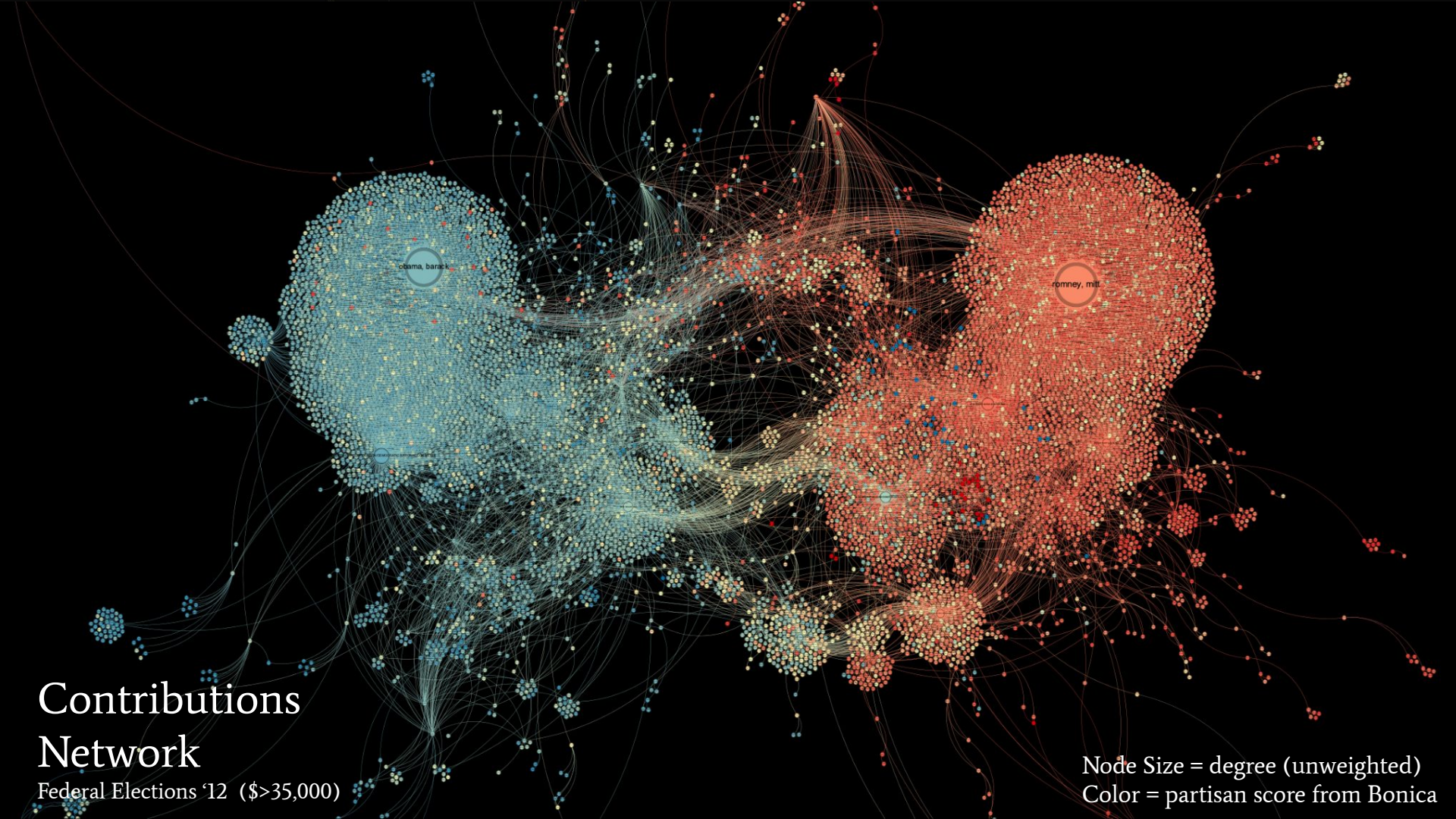
Node Size = degree (unweighted)
Color = partisan score from Bonica



Contributions Network

Federal Elections ‘08 ($>35,000)

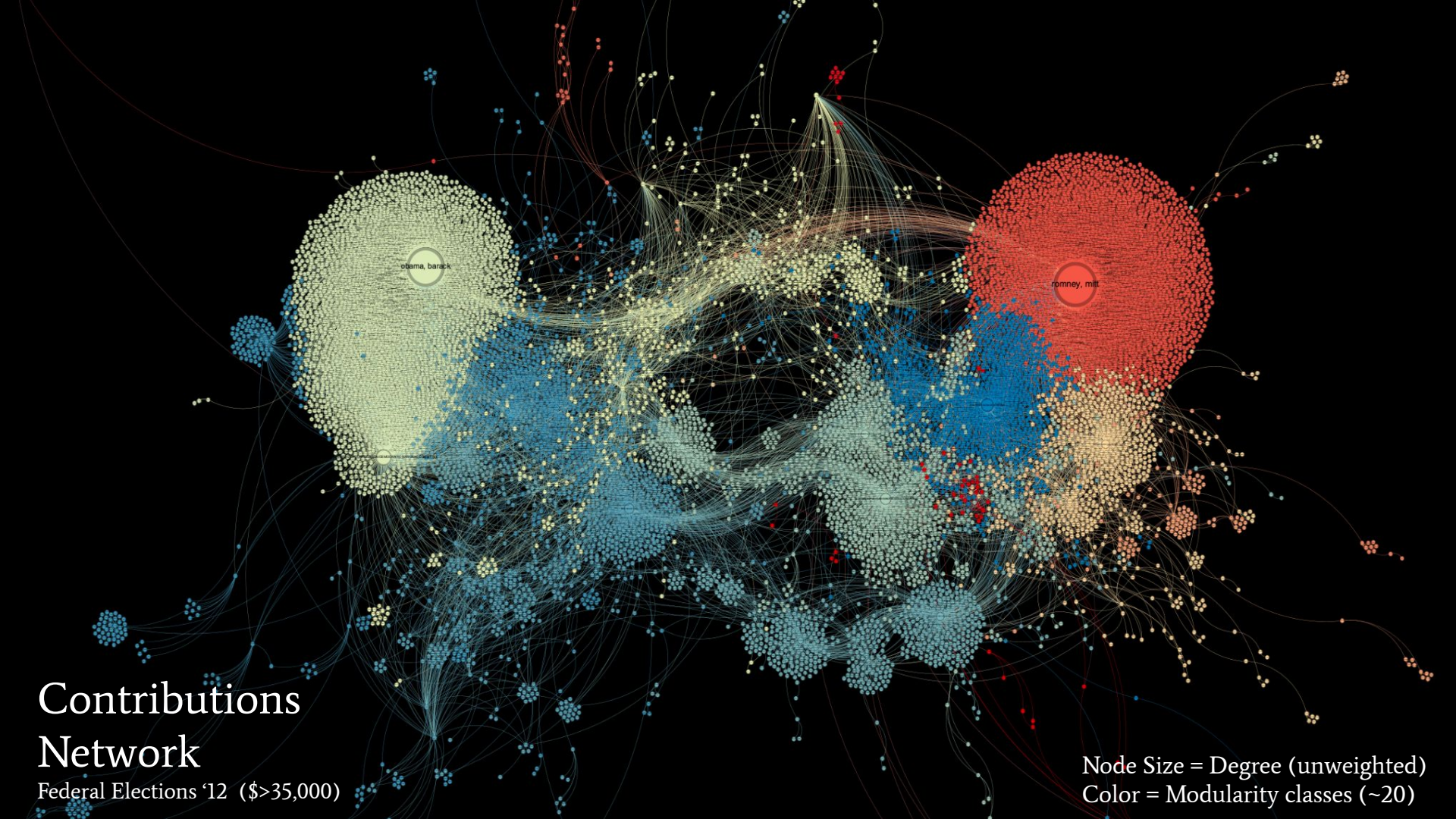
Node Size = Degree (unweighted)
Color = Modularity classes (~18)



Contributions Network

Federal Elections '12 ($>35,000)

Node Size = degree (unweighted)
Color = partisan score from Bonica

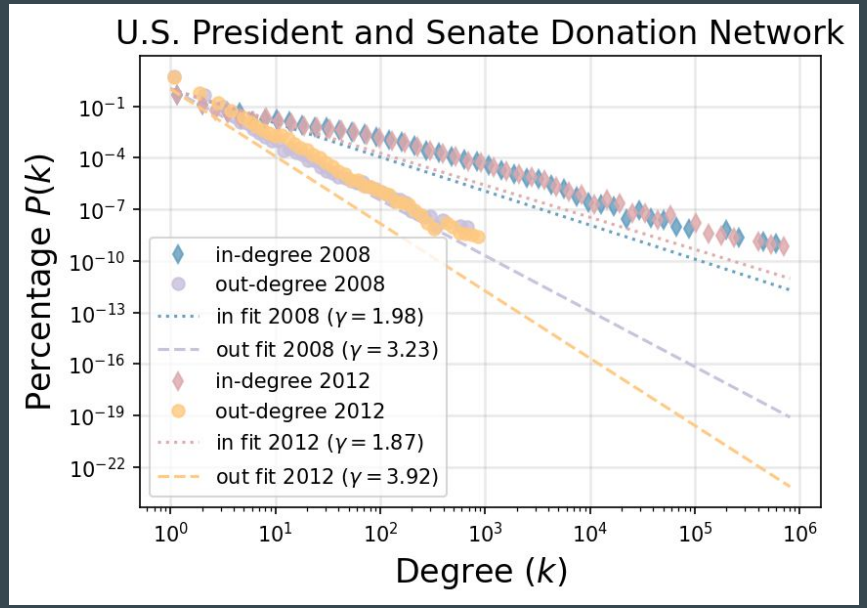


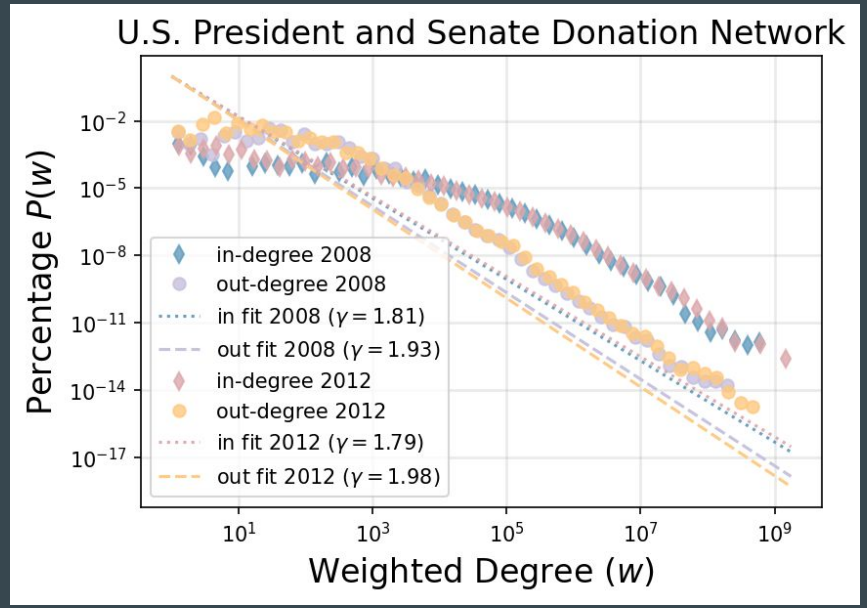
Contributions Network

Federal Elections '12 ($>35,000)

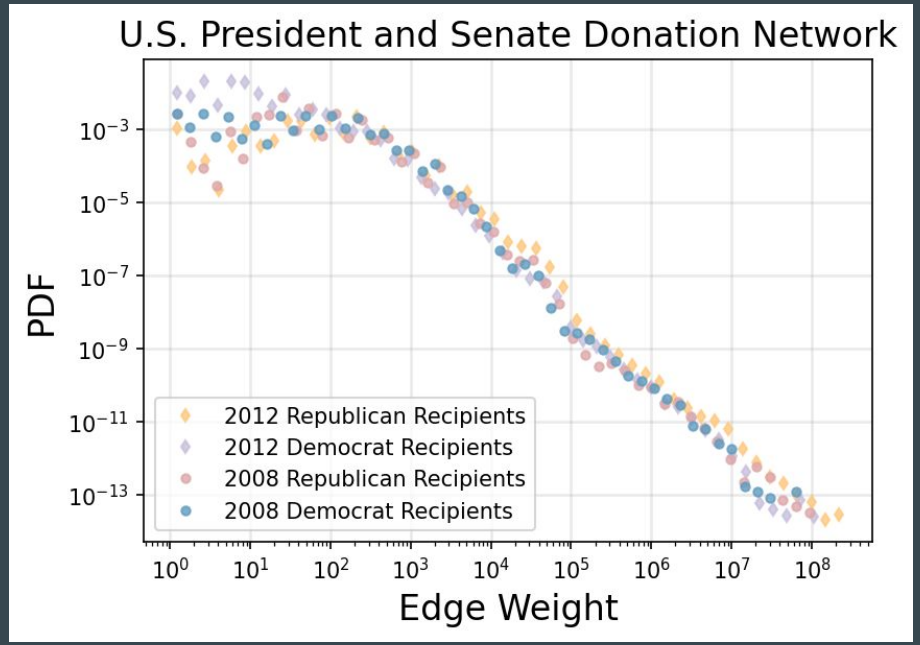
Node Size = Degree (unweighted)
Color = Modularity classes (~20)

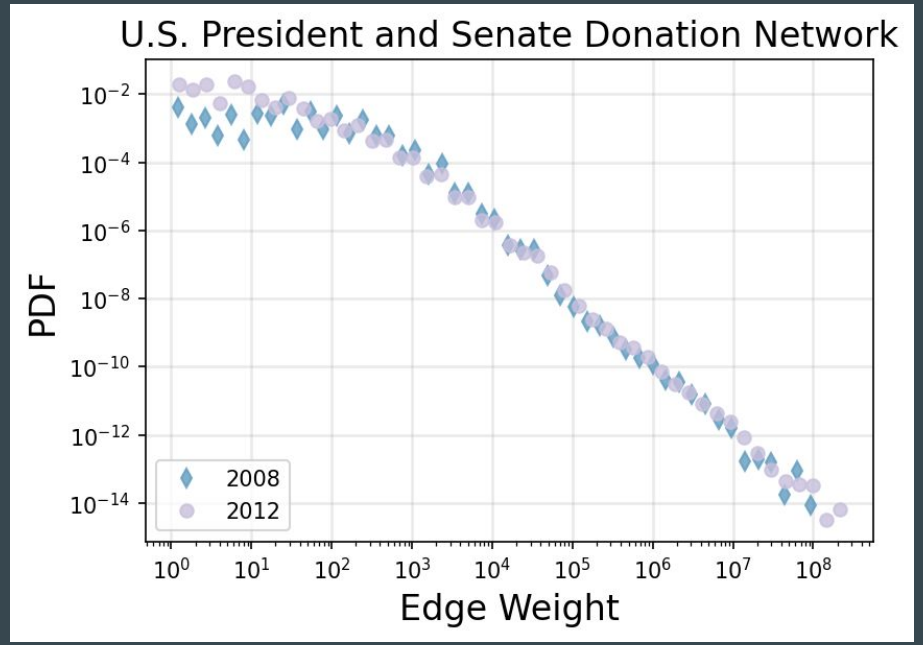
Degree Distributions





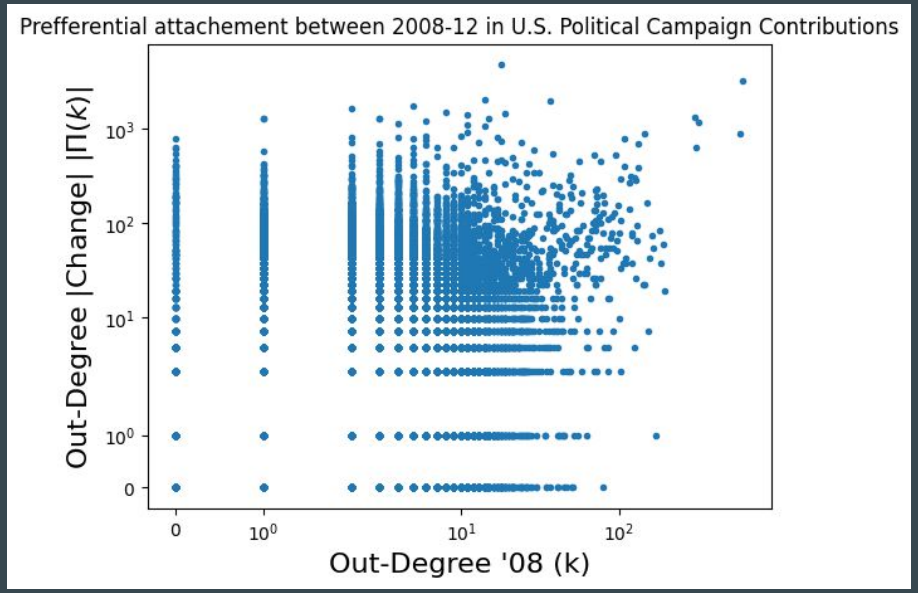
Partisan Edge Weight Distribution

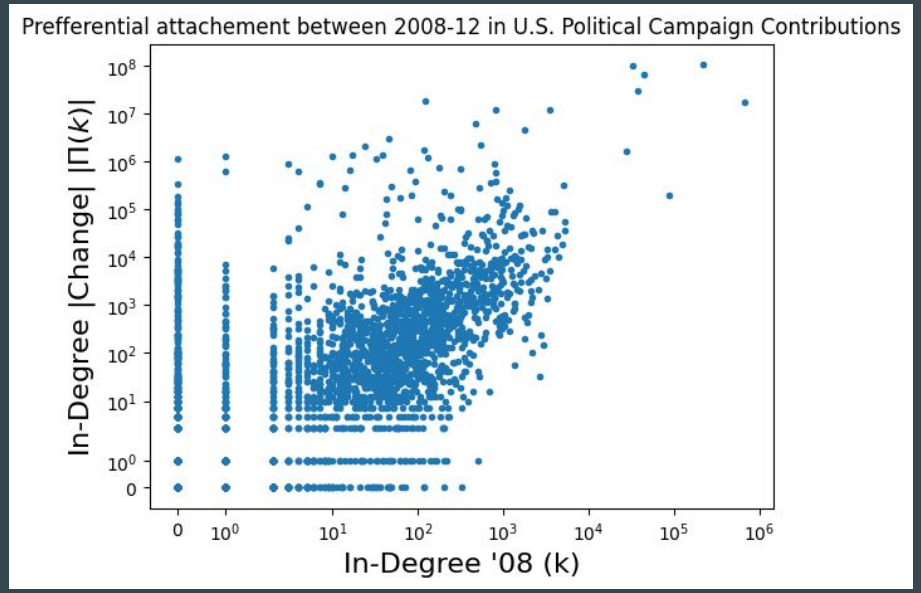




Preferential Attachment

Magnitude of Degree Change

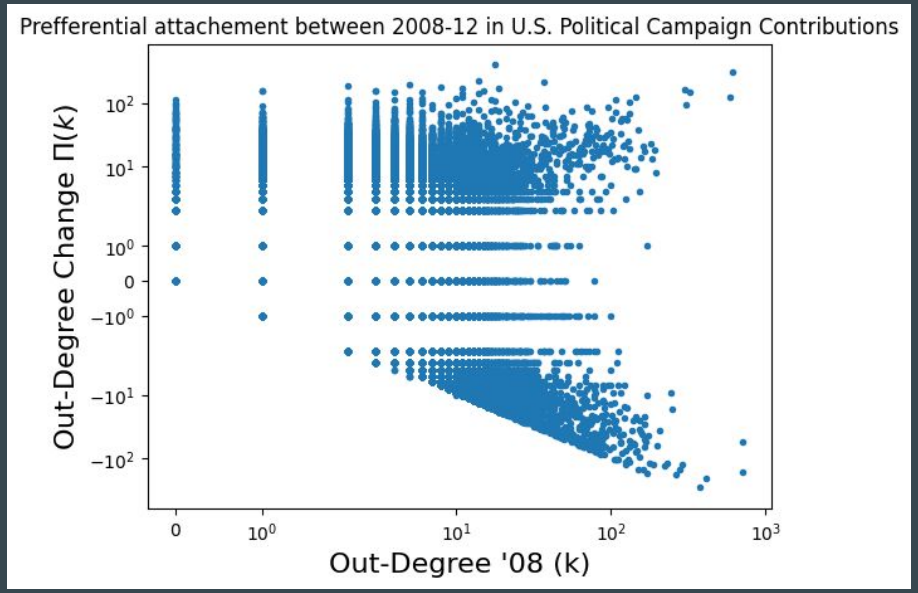


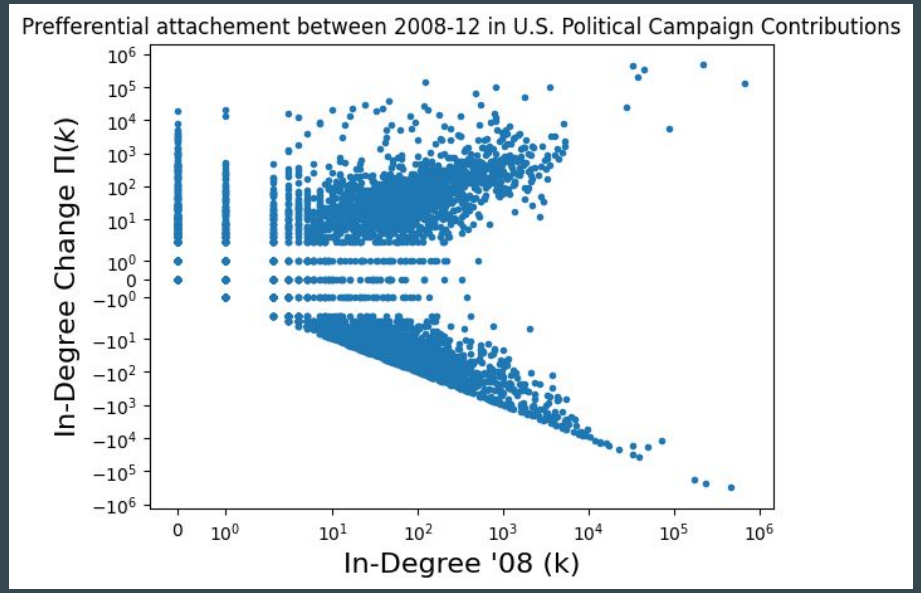


Sorry for lack of binning :(

Preferential Attachment

Real Degree Change





Sorry for lack of binning :(

Learnings

- Big Hubs
  - Not just restricted to Recipients but contributors as well (eg. Campaign Committees)
- Middle players - Two types
  - No sides taken - contributing to both Democrats & Republicans
  - Pooling - having both incoming - outgoing transactions
- Cf-score based Ideology
  - We use cf-score to help create a ranking based community structure in the network
  - Cf-score is already provided in the data, derived based on clustering algorithms
- Preliminary Hypothesis - Citizens United Act ’10
  - Expected higher and larger contributions in 2012 elections
  - Degree distributions looks pretty much similar but we do observe higher/larger contributions

Appendix

Data Source:

Bonica, Adam. 2023. Database on Ideology, Money in Politics, and Elections: Public version 3.0 [Computer file]. Stanford, CA: Stanford University Libraries. https://data.stanford.edu/dime

Database on Ideology, Money in Politics, and Elections (DIME)

2008 House and Committees

1,776,036 nodes | 2,539,674 edges

- Avg. Degree: 2.86
- Avg. In-degree: 1.43
- Avg. Out-degree: 1.43

- Avg. Weighted Degree: 5390
- Avg. Weighted In-degree: 2695
- Avg. Weighted Out-degree: 2695

- Density: 8.05 E-7
- Weak-GC %: 0.998 %
- Strong-GC %: 5.1 E-5 % (91 nodes)

2012 House and Committees

2,496,003 nodes | 4,826,803 edges

- Avg. Degree: 3.87
- Avg. In-degree: 1.93
- Avg. Out-degree: 1.93

- Avg. Weighted Degree: 6246
- Avg. Weighted In-degree: 3123
- Avg. Weighted Out-degree: 3123

- Density: 7.75 E-7
- Weak-GC %: 0.999 %
- Strong-GC %: 2.2 E-4 % (545 nodes)

Questions to answer, why do we care about the network

- How does the distribution of cf-score looks among the contributors and recipients? Is there is similarity among the two groups?
- Geography based contributions, if there exist influential groups having dominant contributions or contributions to other states (Remove)
- Are highly-connected (hubs) of either recipients or contributors, more or less ideologically polarized? (Able to answer) it's both
- How polarized is the network in general? (connections between far-distance cf-scores)
- Different contribution distributions for men vs. women candidates? (control for other factors, like type of seat?)
- Are all hubs high-profile seats (federal congress/president)?

Potential network formulations

For data size considerations, maybe only 2000? Or 2008?

1. Contributor -> recipient
    a. Likely a very one-way network? A few places where there are cycles, but not much...
2. Recipients connected if they have received money from the same contributor
    a. strength of link equal to number of same contributors? Weighted by contribution amounts?
3. Contributors linked if they have contributed to the same candidate/recipient

Database on Ideology, Money in Politics, and Elections (DIME)

All Political Donations in US politics from 1979 to 2020

Collected by Adam Bonica at Stanford

Total Dataset - All the years

- 36 million contributors (nodes)
- 193 thousand recipients (nodes)

Big

Election Cycle 2000 (contributions from 1999-2000)

- 7.5 million distinct contributions (links)
- 2.5 million contributors (nodes)
- 27 thousand recipients (nodes)

Still too Big

Where to go now?

- non-Fed elections no
- Compare 2 years (show preferential attachment?) done
- (dis)Assortativity sortof
- “Polarization” – nodes that contribute significantly to both sides
- conservative vs. liberal – topology - done
- wider range of amounts (grass-roots versus wealthy sourcing)
- Influential nodes – Robustness? (what would this really mean. They would just re-connect? What is ‘flowing’ other than money?)
- Non-high profile hubs?
- Contributor only network
- Recipient only network

Nodes with high

High betweenes highly correlated with degree.... Plot log (un)weighted-betweenes and degree

Assortativity

Make a configuration model (degree preserved, and calculate the same ones... dissasortativity, clustering,)

Preliminary Hypothesis Vs Observed

- Our initial objective was to showcase the effect of '**Citizens United Act '10'** on political contributions as it introduced super PACs with no limit on size of contributions
- We observe not much difference in the degree distributions over the two election cycles but there is a steep increase in higher amount contributions in 2012