Networks and grand corruption in Hungary. Exploratory analysis

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9th Annual Conference of the
Hungarian Network for Social Network Analysis.
Centre for Social Sciences HAS, Budapest, Országház utca 30.
10:45-11:00, 26th April 2013.

Research question

- How organisational networks shape grand corruption?

- Context:

  - Hungary: high corruption environment

  - 2009-2012: two governments

  - public procurement (actors: issuers and winners): highly affected area, key in linking public and private spheres

Relevance

- Policy relevance:

  - lot of taxpayer's money

  - Going at the heart of how power is exercised

- Scientific relevance

  - Measurement: unique, high potential

  - Theoretical: fit with models of state capture (potentially: how such networks evolve)

Definitions

- Corruption/particularism

- Grand/institutionalised corruption

- Corruption risk

Literature

- Corruption and networks:
    - Small-n studies: case studies
    - Perception surveys
    - *Objective data (data from actors' behaviour)*

- Theoretical models: e.g. Grzymala-Busse, Wedel, Szántó-Tóth

- Dark networks: e.g. Everton

Data from here…

… and from here

Data sources

- Only official sources: administrative data
- Characteristics
  - Low random measurement error: official records, fine attached to precision, many people checking quality (still there are surprising data errors!)
  - High systematic error as they are often gamed for purposes relevant to our research: we track this as much as possible

Database (MaKAB)

- Three-mode: issuers, winners, brokers (+courts, losers)
- There are also links within the same mode:
  - Consortia
  - Centralised procurement
  - Same organisation is procurer as well as winner
- Data also on individual officeholders
- Time series (daily data)

Database: some stats

- ## Scope of the database

	N contract	N issuer	N winner	total contract value (HUF)	**total contract value (% of GDP)**
2009-2010	28751	3486	7677	2,283,739,982,451	**4.1%**
2011-2012	28122	4027	9463	1,867,989,985,567	**3.6%**

- ## OECD (upper-bound) estimate of total PP (2008):

20% of HU GDP

- ## Similar databases in Cz and Sk cover 7-9% of GDP

Variables

- Corruption risk index (CRI)

$$CRI = (pr\_egyajtev + pr\_eljscore + pr\_s\_b + pr\_felth + pr\_bszla + pr\_hatid + pr\_najf + pr\_szm + pr\_pm + pr\_polconn + r\_mrktsh)/12$$

$$0 \leq CRI \leq 1$$

- (CRI_c) contracts; (CRI_I) issuers; (CRI_w) winners

Variables

- CRI reflects the characteristics of transactions some of which define the network

  - IN the network: contract award
  - OUT of the network: call for tenders, court decisions

- More info in:

Fazekas, Mihály, István János Tóth, and Lawrence P King, 2012. "When government serves the interests of the few: Corruption and state capacity in Hungarian public organisations." Hungarian Economic Association: Annual Conference 2012, Budapest: Hungarian Economic Association.

CRI: 2009-2012, total sample
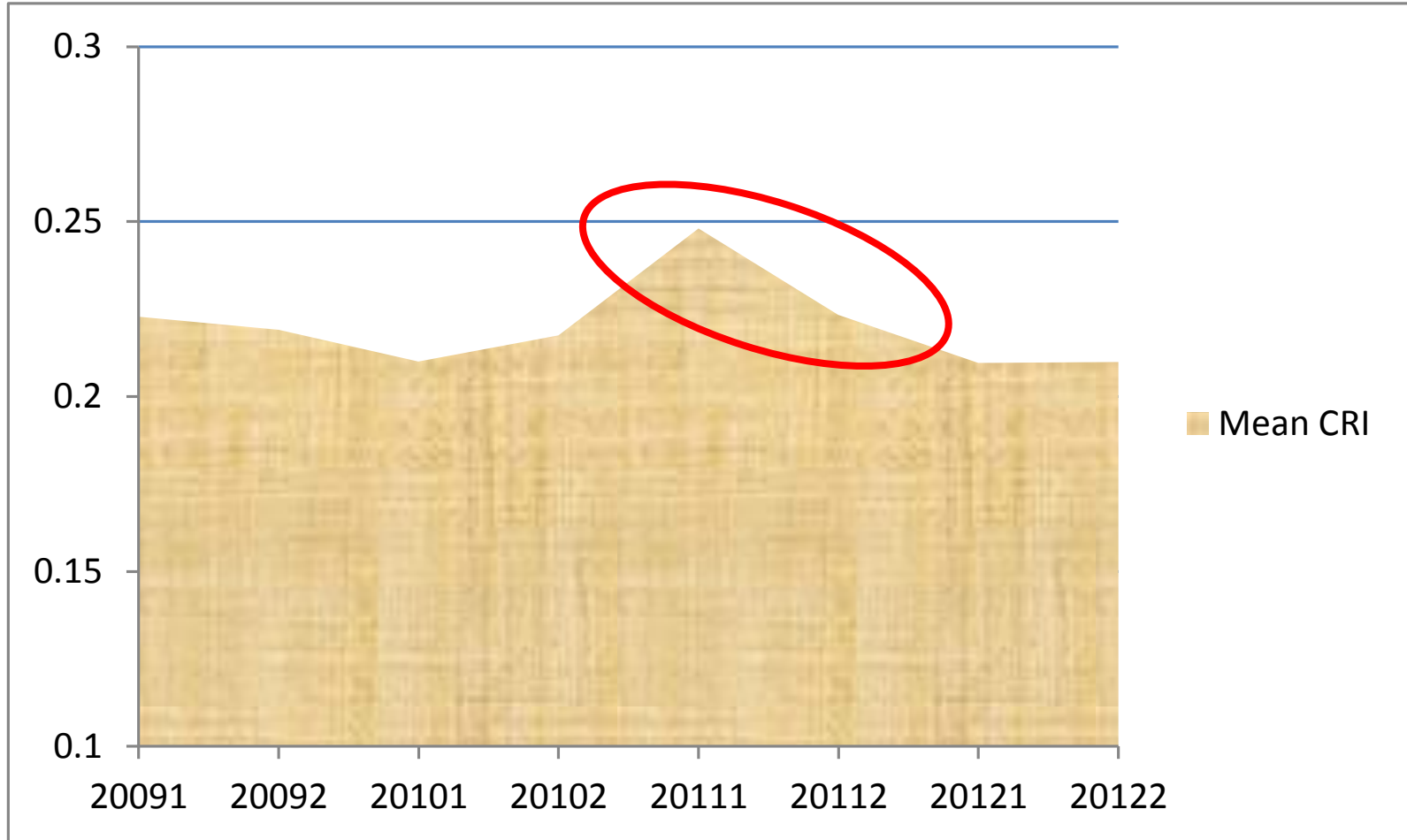
Marked increase in 2011, then decline to 2009-2010 average

Network data

- Two-mode: issuer-winner
- Only big actors: 5+ contracts of >100k HUF
  - top 20% of actors

- Two time periods
  - 2009-2010: previous gov.
  - 2011-2012: current gov.

- Weighted graph
- Nod attributes: type, location, pp size, main market

The BIG picture

- ## Network size

	N contract	N issuer	N winner	N tie	total contract value (HUF)	**total contract value (% of GDP)**
2009-2010	19587	1143	1333	7888	1,310,429,672,011	**2.3%**
2011-2012	16742	996	1279	6336	1,401,500,173,083	**2.7%**

Total contract value
(% of GDP)

	dataset		network sample
2009-2010	4.1%	→	2.3%
2011-2012	3.6%	→	2.7%

CRI: 2011-2012, issuers
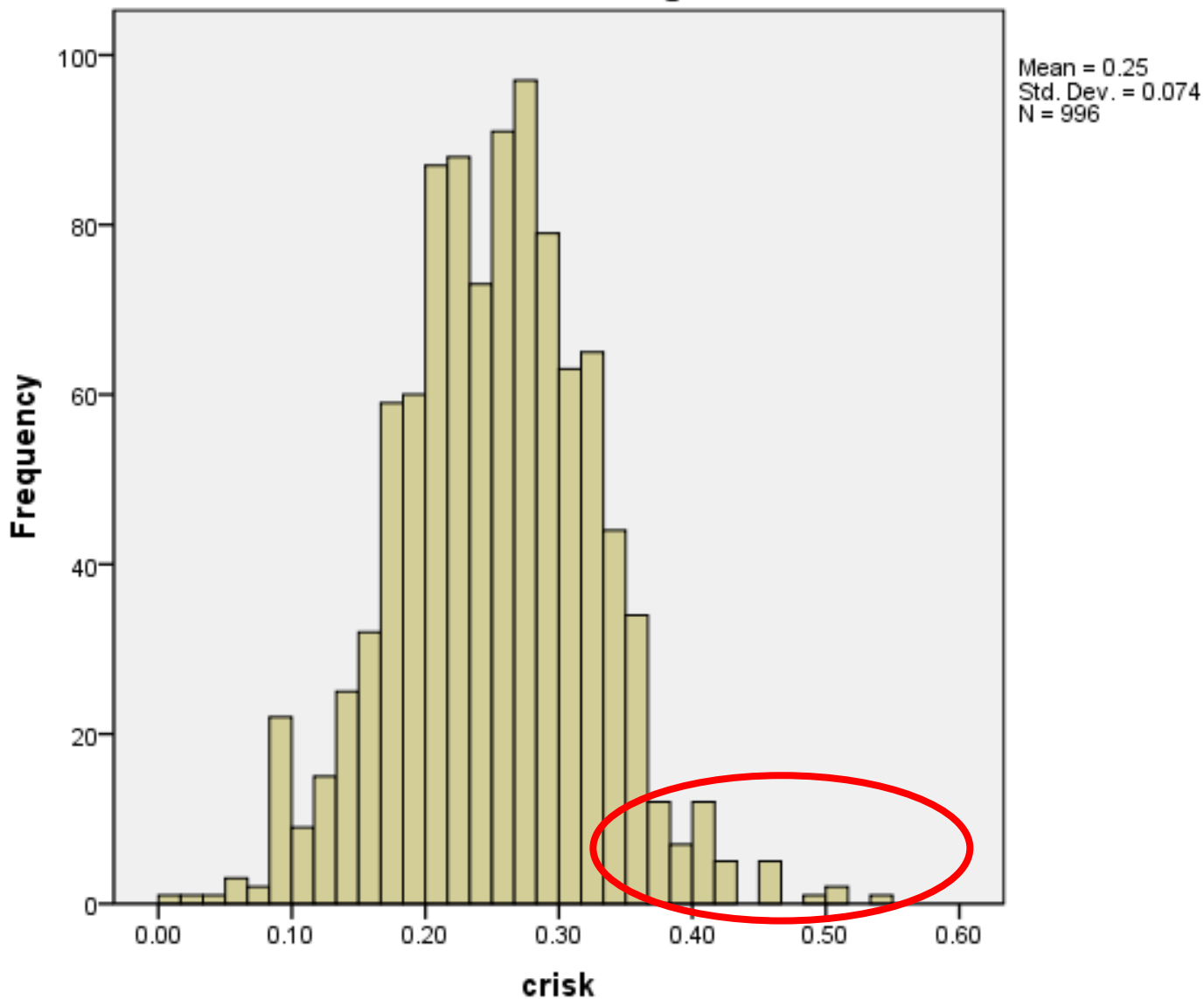
Complexity…
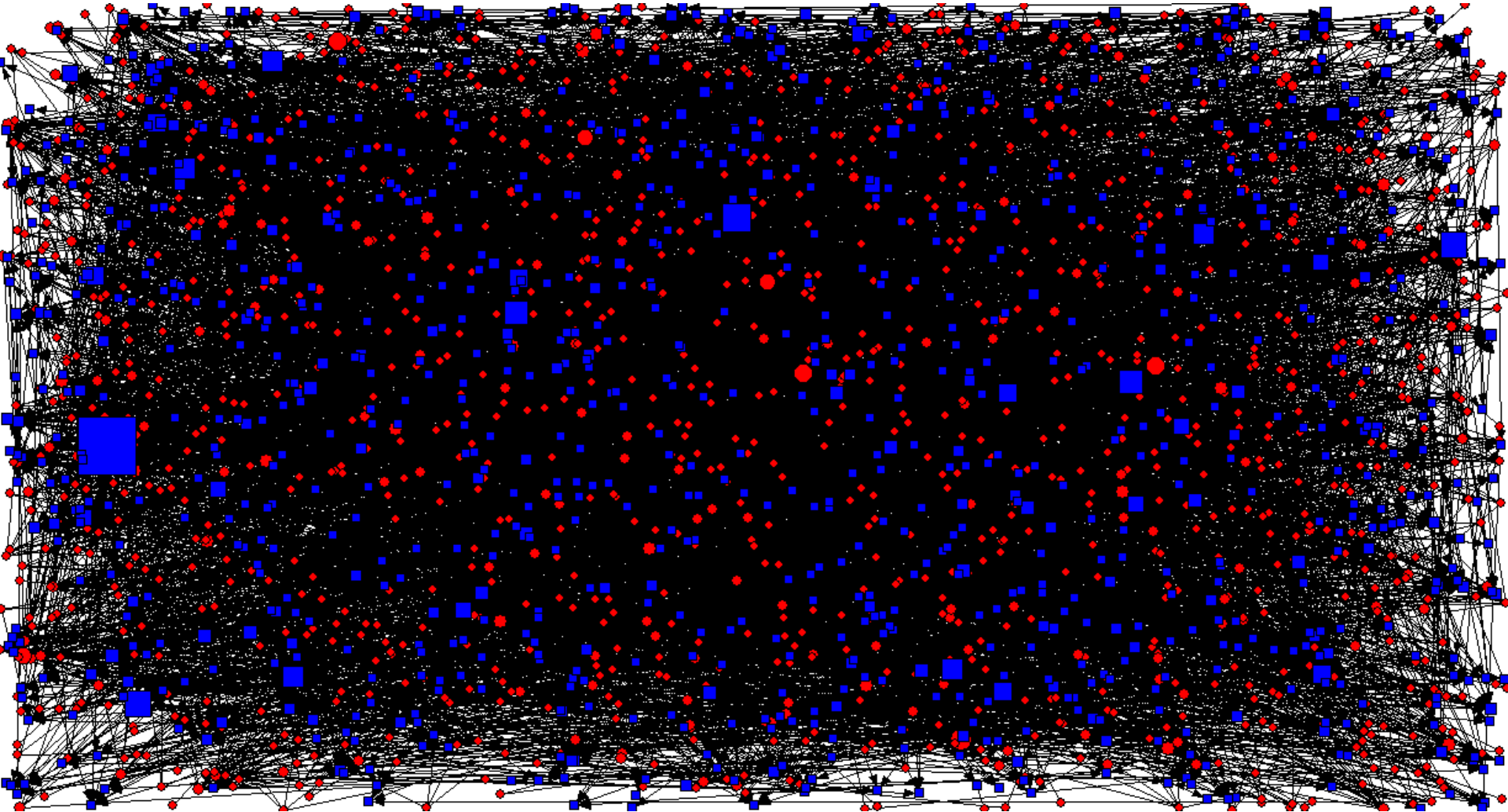
Network: 2009-2010
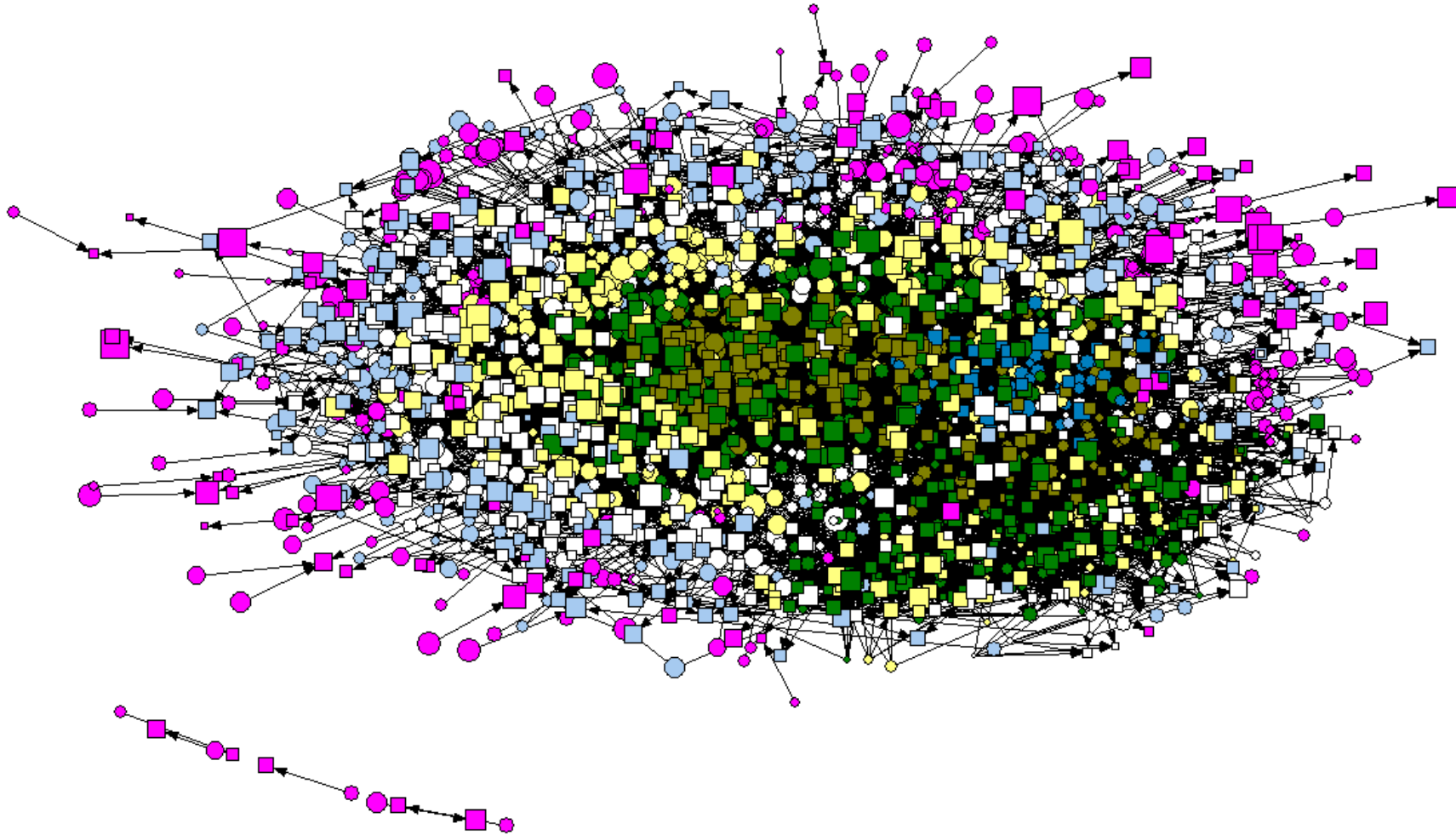
Spring embedding, CRI, k-cores, weighted

Network: 2011-2012
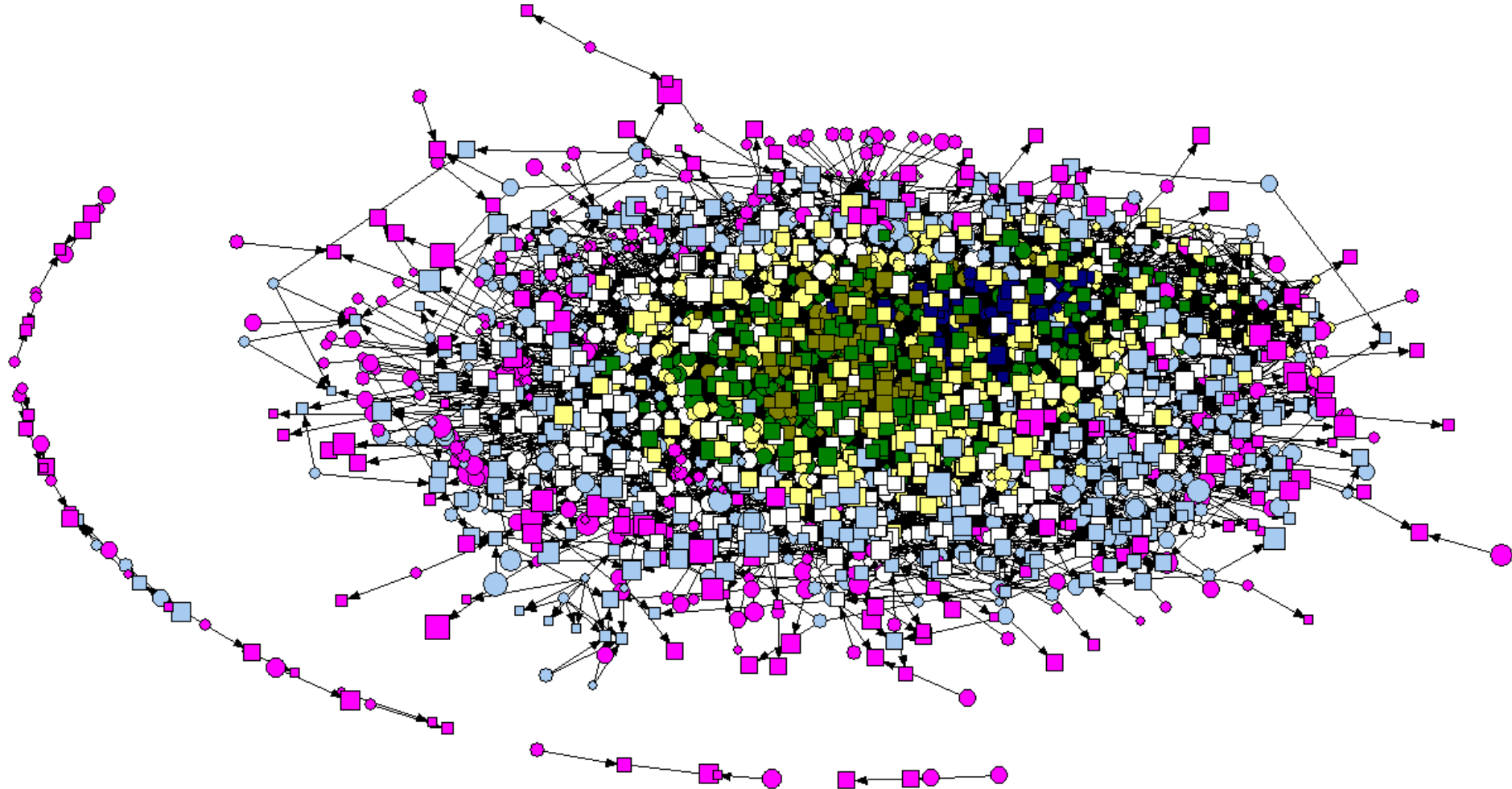
Spring embedding, CRI, k-cores, weighted

Bi-variate results: cohesion, centrality

- ## Little difference between the two periods overall

	Density	Avg. Dist.	Radius	Diameter	Fragment.	Transitiv.	Norm. Dist.
2009-2010	0.005	4.505	1	11	0.010	0.222	0.337
2011-2012	0.005	4.599	1	14	0.044	0.210	0.343

- ## CRI and centrality weakly related

		Spearman rank correlations with CRI			
		Degree	Closeness	Betweenness	Eigenvect
2009-2010	issuer	-0.125**	0.037	-0.011	-0.133**
	winner	-0.022	-0.005	0.007	-0.089**
2011-2012	issuer	-0.082**	-0.017	-0.041	-0.061
	winner	0.102**	0.047	0.092**	0.005

** Correlation is significant at the 0.01 level (2-tailed).

Bi-variate results: CRI vs k-cores

- Issuers and winners taken together
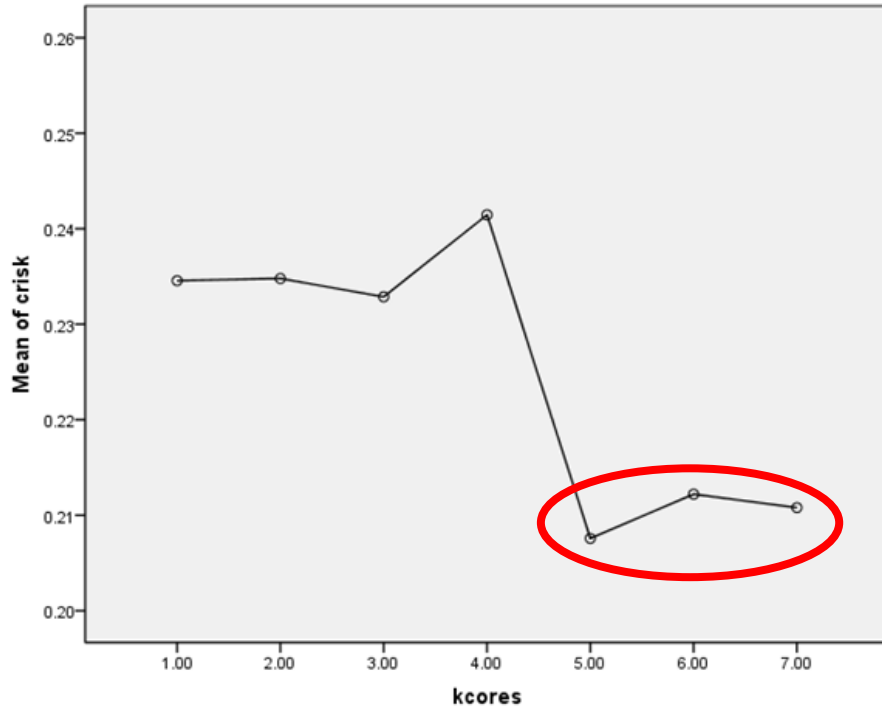
- Similar results for separate issuer, winner samples

Regression results: issuers

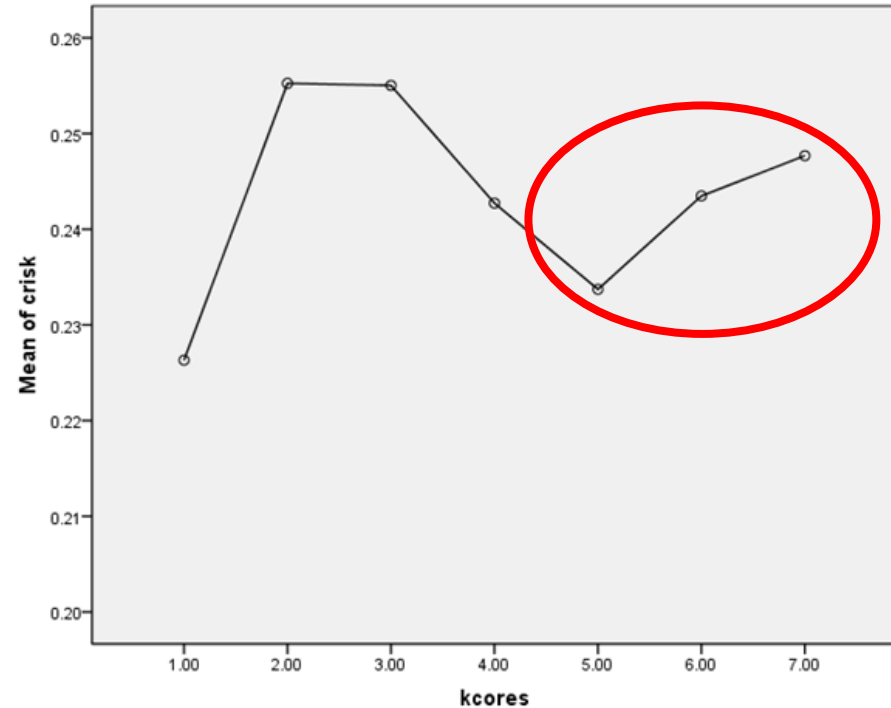| dep var.:corr. risk index	2009-2010			2011-2012		
	R2=0.18			*R2=0.09*		
	B	standard. B	Sig. (2-tailed)	B	standard. B	Sig. (2-tailed)
(Constant)	0.281	0.281	0.001	0.282	0.282	0.001
Betweenness	-1.617	-0.078	0.007			
Closeness				0.000	-0.060	0.121
kcores (ref.cat:kcores1)						
kcores2	-0.024	-0.106	0.076	0.000	-0.001	0.988
kcores3	-0.026	-0.135	0.046	-0.006	-0.036	0.488
kcores4	-0.016	-0.080	0.215	-0.006	-0.031	0.519
kcores5	-0.035	-0.177	0.007	-0.023	-0.105	0.022
kcores6	-0.042	-0.164	0.001	-0.013	-0.043	0.263
kcores7	-0.013	-0.025	0.406	0.012	0.024	0.487
control vars.: organisation type, region, pp size, main market sector						
bootstrap results are based on 800 bootstrap samples						

- Centrality and k-cores have negative impact
- Impact greatly weakens by 2011-2012

Regression results: winners

dep var.:corr. risk index	2009-2010			2011-2012		
	R2=0.12			*R2=0.08*		
	B	standard. B	Sig. (2-tailed)	B	standard. B	Sig. (2-tailed)
(Constant)	0.225	0.228	0.001	0.217	0.217	0.001
Betweenness	-1.898	-0.079	0.017			
Eigenvect				-0.150	-0.042	0.360
kcores (ref.cat:kcores1)						
kcores2	0.007	-0.027	0.37	0.037	0.174	0.001
kcores3	0.010	0.026	0.192	0.041	0.186	0.001
kcores4	0.025	0.049	0.006	0.039	0.169	0.001
kcores5	0.008	0.091	0.32	0.033	0.119	0.002
kcores6	0.007	-0.004	0.433	0.061	0.165	0.001
kcores7	0.034	-0.037	0.007	0.087	0.153	0.001
control vars.: region, pp size, main market sector						
bootstrap results are based on 800 bootstrap samples						

- k-cores have positive impact
- Impact greatly strengthens by 2011-2012

Conclusions

- WE GOT: measurable relationship between network characteristics and corruption risk

- WE DIDN'T GET: clear understanding of the mechanisms generating the relationships

Further work

- Interpretations

- Longer time series (2005-2012)
- Full dataset
- More attributes (i.e. political ties, net sales, profit. etc.)

- Proper time-series analysis

Thank you very much for your attention!

**The presentation can be downloaded at
http://www.crc.uni-corvinus.hu/index_e.html**