CORRUPTION RESEARCH CENTER BUDAPEST

In respectable society: on how networks and institutionalised grand corruption interact in Hungary

Mihály Fazekas
University of Cambridge and Corruption Research Centre: mf436@cam.ac.uk, www.mihalyfazekas.eu
István János Tóth
Hungarian Academy of Sciences and Corruption Research Centre

Mitchell Centre for Social Network Analysis, University of Manchester, Manchester. 11/12/2013

Two main goals today

- Introducing a new ‚objective'corruption indicator
- Exploring the relationship between network position and corruption

PART I

MEASURING CORRUPTION

The measurement approach

- Perception indicators are not good enough
- Corruption experience surveys are of limited use
- Need for new indicators harnessing BIG DATA
- Indicator characteristics:
  - objective data describing actor behaviour
  - micro level
  - consistent comparisons across countries, organisations, and time
  - thorough understanding of corruption in its context

What are we trying to measure?

- Institutionalised grand corruption in public spending (~particularistic allocation of public resources)
  - Institutionalised=recurrent, stable
  - Grand=high-level politics and business
  - Corruption=particularism
  - Public spending=public procurement

A blueprint for measuring institutionalised grand corruption in PP

- CRI: Corruption risk index of the winner selection process in public procurement
- PII: Indicator of political interference in public procurement markets
- PCI: Indicator of political control of contractors
- WRI: Winner companies' risk index

Data sources

- Only official sources: administrative data
- Characteristics
  - Low random measurement error: official records, fine attached to errors, many people checking quality (still there are surprising data errors!)
  - High systematic error as publications are often gamed for corrupt purposes: we track and analyse errors

The data

- Hungary
- 2009-2012
- Public procurement announcements: http://www.kozbeszerzes.hu/
- Data extracted from online text files (i.e. crawler algorithms, text mining algorithms)
- 3.2% of GDP on transaction level, 300+ var per transaction

	2009	2010	2011	2012	**Total**
Total number of contracts awarded	10918	17914	14070	10342	53244
Total number of unique winners	3987	5617	5587	4923	13557
Total number of unique issuers	1718	2871	2808	2344	5519
Combined value of awarded contracts (million EUR) *	4604	3834	1856	1298	11592

*Notes: * = a 300 HUR/EUR uniform exchange rate was applied for exchanging HUF values.*

Composite indicator building I.

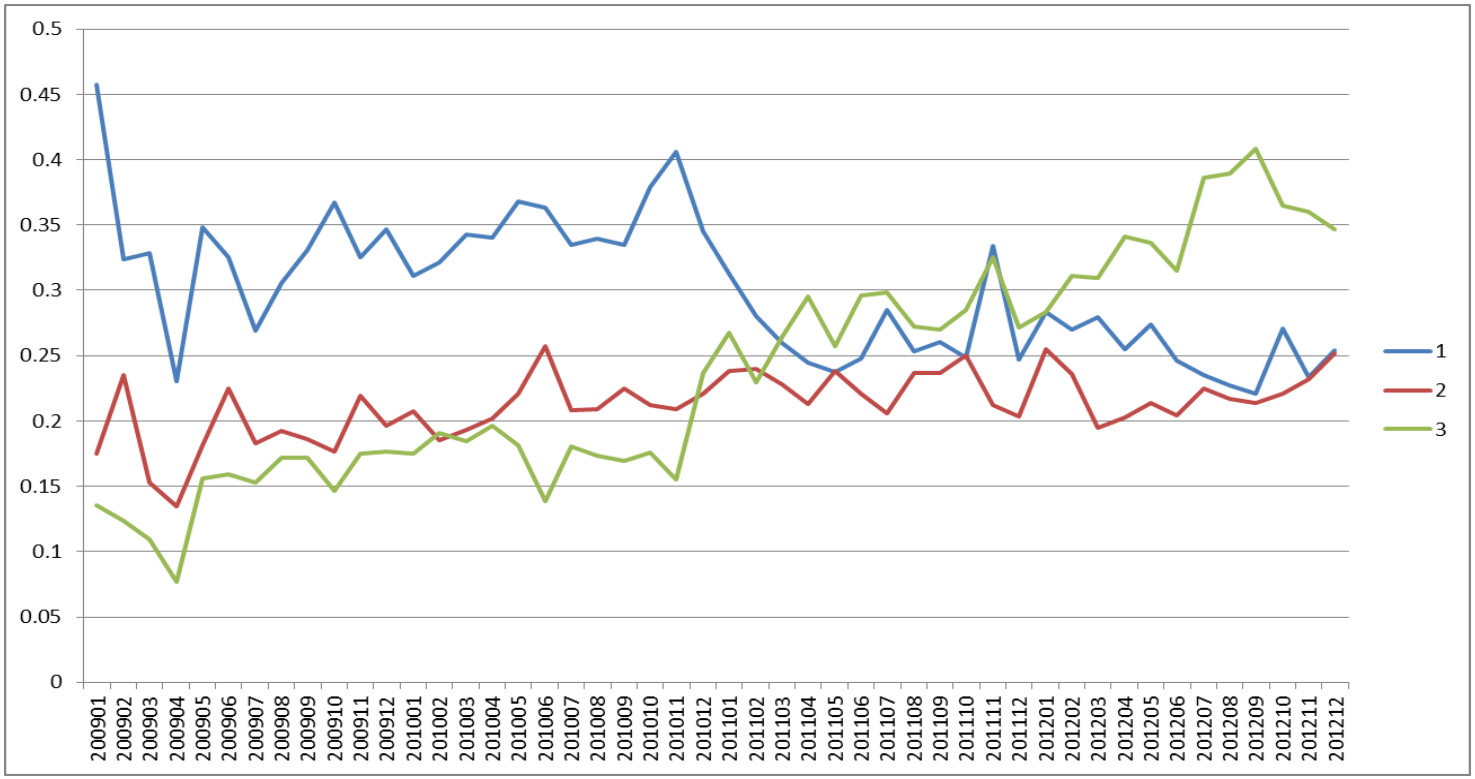
1.Wide set of potential components: 30

2.Narrowing down the list to the relevant components

phase	indicator name	indicator definition
submission	Single bidder contract	0=more than one bid received 1=ONE bid received
	Call for tender not published in official journal	0=call for tender published in official journal 1=NO call for tenders published in official journal
	Procedure type	0 =open procedure 1=invitation procedure 2=negotiation procedure 3=other procedures (e.g. competitive dialogue) 4=missing/erroneous procedure type
	Length of eligibility criteria	number of characters of the eligibility criteria MINUS average number of characters of the given market's eligibility criteria
	Exceptionally short submission period	0=normal submission period 1=accelerated submission period 2=exceptional submission period 3=exceptional submission period abusing a weekend 4=missing*
	Relative price of tender documentation	price of tender documentation DIVIDED BY contract value
	Call for tenders modification	0=call for tenders NOT modified 1=call for tenders modified
assessment	Exclusion of all but one bid	0=at least two bids NOT excluded 1=all but one bid excluded
	Weight of non-price evaluation criteria	proportion of NON-price related evaluation criteria within all criteria
	Annulled procedure re-launched subsequently***	0=contract awarded in a NON-annulled procedure 1=contract awarded in procedure annulled, but re-launched
	Length of decision period	number of days between submission deadline and announcing contract award
delivery	Contract modification	0=contract NOT modified during delivery 1=contract modified during delivery
	Contract lengthening	relative contract extension (days of extension/days of contract length)
	Contract value increase	relative contract price increase (change in contract value/original, contracted contract value)

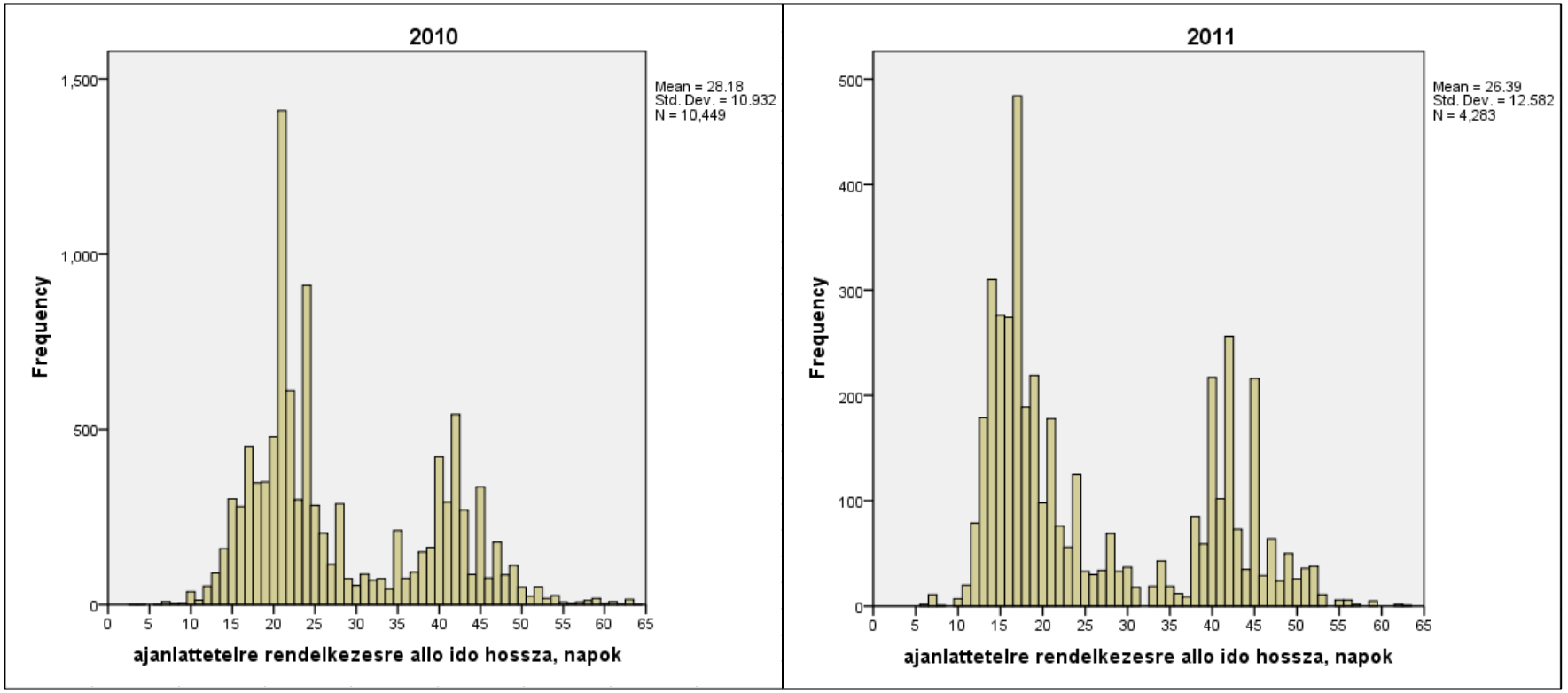
Example of corruption indicators

1. Number of submitted bids
2. Length of submission period



Example of corruption indicators

1. Number of submitted bids
2. Length of submission period

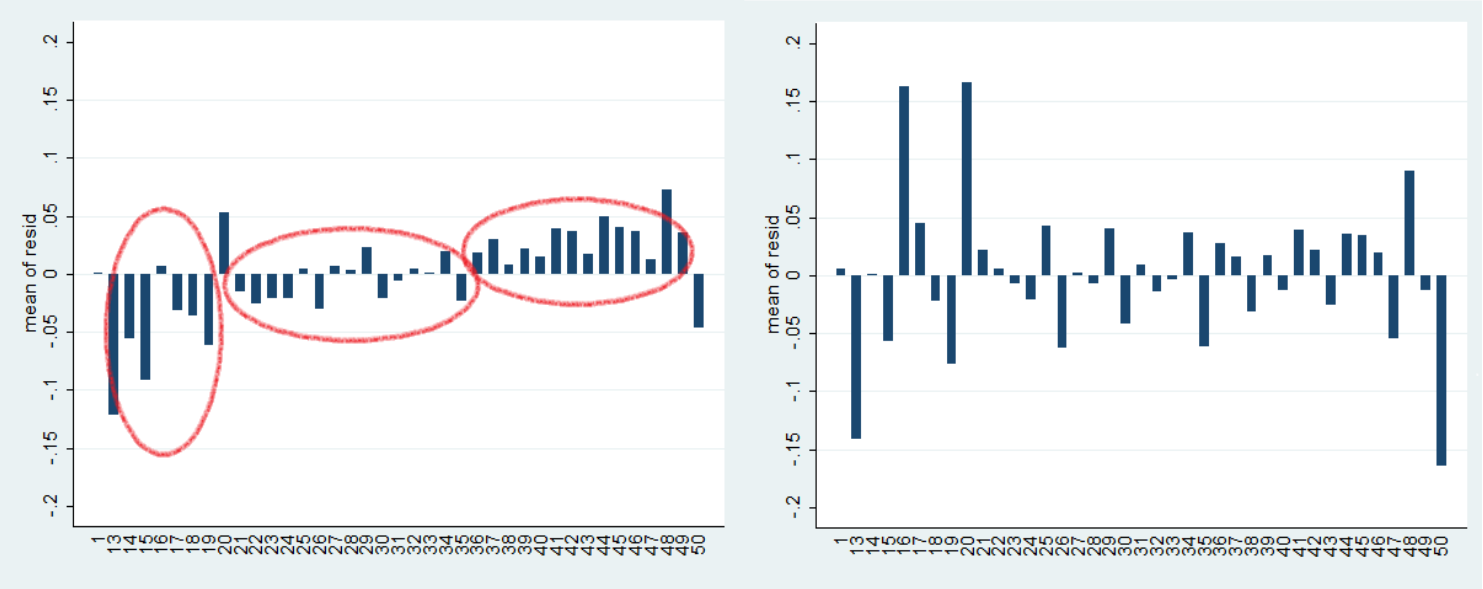


Composite indicator building II.

- Modelling particularistic rent extraction
  - Restriction of competition in order to
  - Recurrent contract award to ‚pre-selected' companies
- Outcome vars
  - Single bidder
  - Winner contract share
- Explanatory variables: corruption inputs
- Control variables:
  - Contract size
  - Type of market
  - Year
  - Authority type, xector, and status
  - Number of unique winners on the market

Corruption Risk Index (CRI)

- Regressions deliver component weights and thresholds
- Component categorisation (example: relative price of tender documentation)



- Full regression results in paper

Component weights

3.Final list of components:
14 items

4.Weights reflecting our limited understanding of the **exact** process

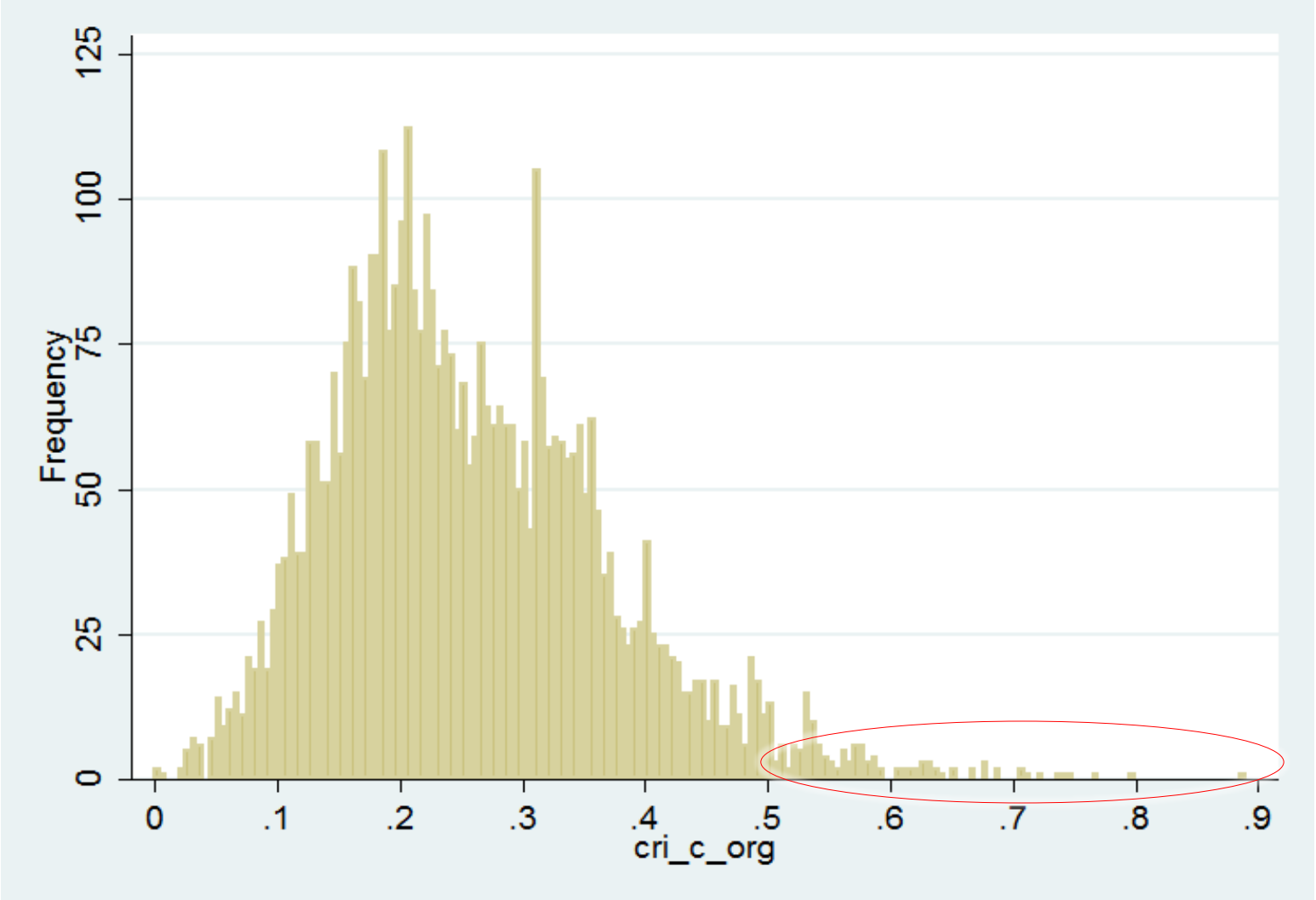
variable	component weight
single received/valid bid	0.096
no call for tenders published in official journal	0.096
procedure type	
ref. cat.=open procedure	0.000
1=invitation procedure	0.048
2=negotiation procedure	0.072
3=other procedures	0.096
4=missing/erroneous procedure type	0.024
length of eligibility criteria	
ref.cat.=length<-2922.125	0.000
1= -2922.125<length<=520.7038	0.024
2= 520.7038<length<=2639.729	0.048
3= 2639.729<length	0.072
4= missing length	0.096
short submission period	
ref.cat.=normal submission period	0.000
1=accelerated submission period	0.048
2=exceptional submission period	0.072
3=except. submission per. abusing weekend	0.096
4=missing submission period	0.024
relative price of tender documentation	0.000
ref.cat.= relative price=0	0.000
1= 0<relative price<=0.0004014	0.000
2= 0.0004014<relative price<=0.0009966	0.096
3= 0.0009966<relative price<=0.0021097	0.064
4= 0.0021097<relative price	0.032
5=missing relative price	0.000
call for tenders modification(only before 01/05/2010)	
weight of non-price evaluation criteria	0.000
ref.cat.= only price	0.000
2= 0<non-price criteria weight<=0.4	0.000
3= 0.4<non-price criteria weight<=0.556	0.048
4= 0.556<non-price criteria weight<1	0.096
5=only non-price criteria	0.000
procedure annulled and re-launched subsequently	0.096
length of decision period	
ref.cat.= 44<decision period<=182	0.000
1= decision period<=32	0.064
2= 32<decision period<=44	0.032
4= 182<decision period	0.096
5= missing decision period	0.000
contract modified during delivery	0.096
contract extension(length/value)	
ref.cat.= c.length diff.<=0 AND c.value diff.<=0.001	0.000
2= 0<c. length d.<=0.162 OR 0.001<c.value d.<=0.24	0.096
3= 0.162<c. length diff. OR 0.24<c.value diff.	0.000
4= missing (with contr. completion ann.)	0.048
5= missing (NO contr. completion ann.)	0.000
winner's market share	0.096

What kind of distributions arise?

average CRI

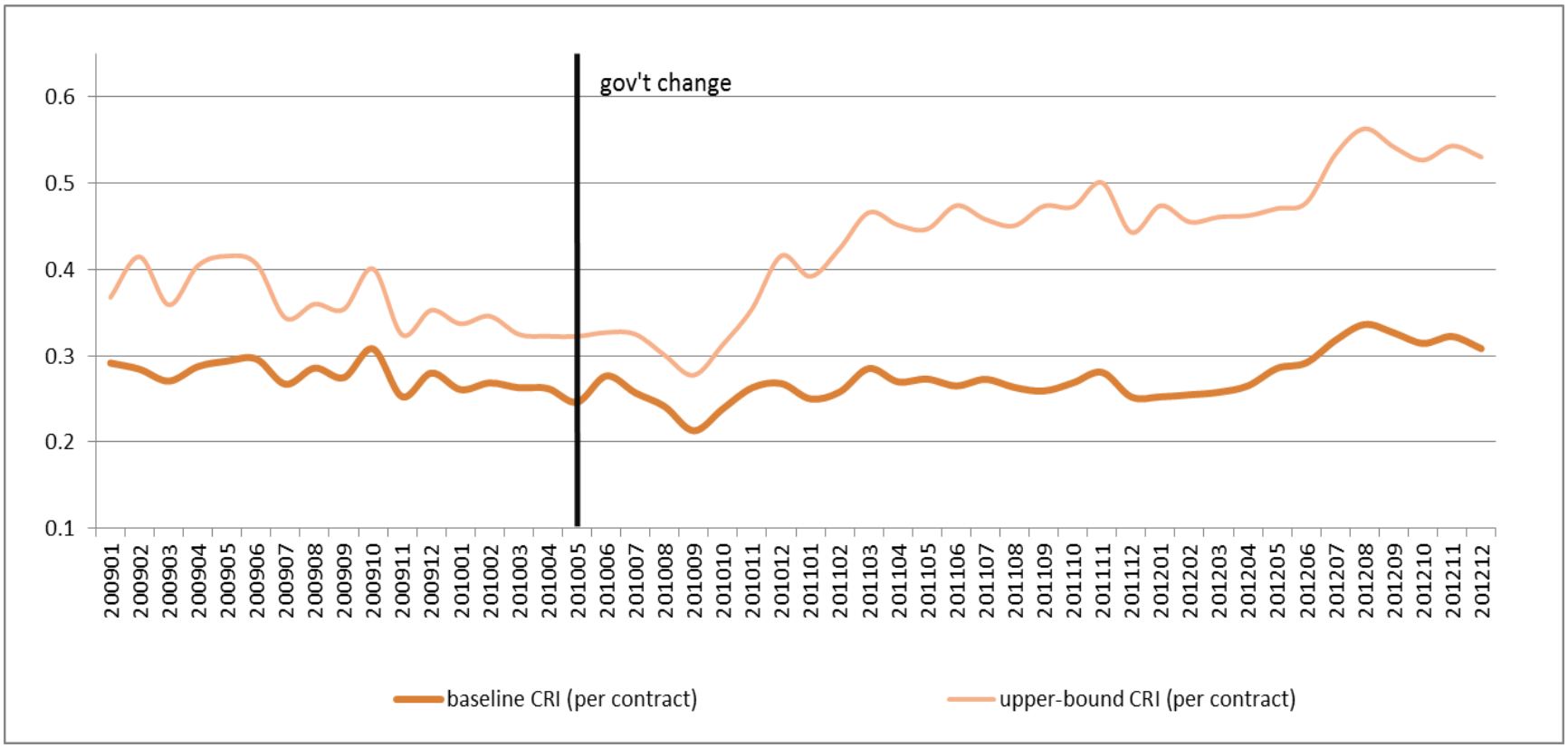
Per wining bidder

2009-2012



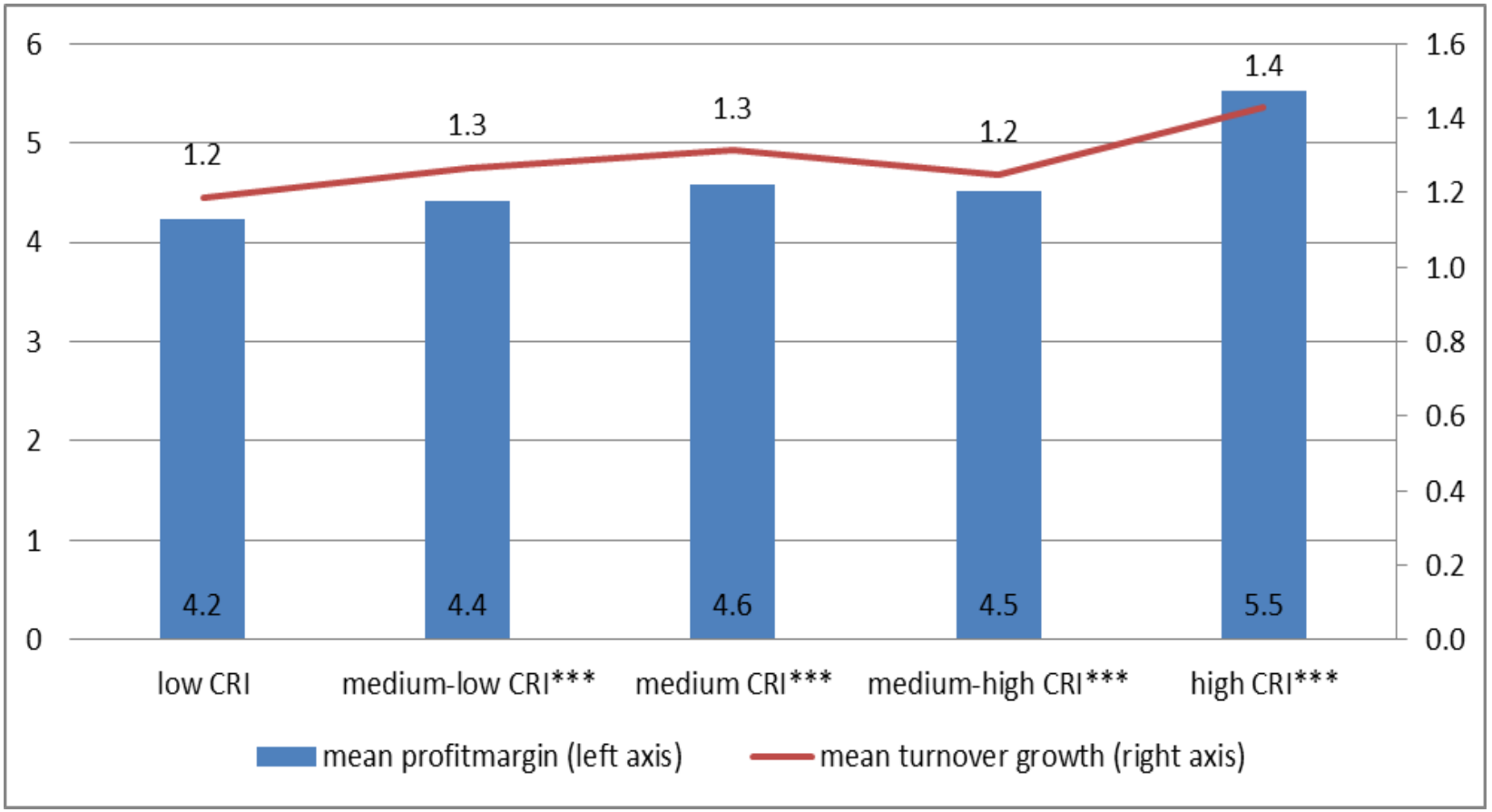
What kinds of time-series arise?

- CRI of the average contract awarded: 2009-2012



Aiming for validation 1.

- Profitability and turnover growth of winners, 2009-2012



Aiming for validation 2.

- Average CRI of politically connected and not-connected firms, 2009-2012

Group	N	Mean CRI	Std. Err.	Std. Dev.	95% Conf.Interval	
0=no political connection	2687	0.254	0.002	0.113	0.250	0.258
1=politically connected	1318	0.264	0.003	0.112	0.258	0.270
combined	4005	0.257	0.002	0.113	0.254	0.261
difference (CRI1-CRI0)		***0.010****	0.004		0.017	0.003

Aiming for validation 3.

- Government dependent market shares

Group	N	Mean CRI	Std. Err.	Std. Dev.	95% Conf.Interval	
0=success *not* linked to government change	428	0.205	0.006	0.120	0.193	0.216
1=success linked to government change	2481	0.214	0.002	0.111	0.210	0.219
combined	2909	0.213	0.002	0.112	0.209	0.217
difference (CRI1-CRI0)		***0.010****	0.006		0.021	-0.002

PART II

Organisational networks and corruption

Research questions

- Was high-level intitutionalised corruption systemic in Hungary throughout 2009-2012?
- If YES, what is the relationship between the structure of rent extraction and state/party organisation?
- Context:
  - Hungary: high corruption environment
  - 2009-2012: two/three governments
  - public procurement: highly affected area, key in linking public and private spheres

Related literature

- Corruption and networks:
  - Small-n studies: ego networks or networks of sentenced organised criminals (e.g. mafia)
- Theoretical models: e.g. Grzymala-Busse, Wedel, Szántó-Tóth
- Dark networks: e.g. Everton

→ **Very little directly relevant literature**

Surrogate ‚literature'

- Investigative journalists' reports
  - E.g. www.atlatszo.hu
- Media content analysis
- Interviews with participants

Hypotheses

H1:Systemic institutionalised grand corruption

$H1_0$: Institutionalised grand corruption is random and sporadic.

H2:Structure of rent extraction

$H2_0$: Structure of institutionalised grand corruption is independent of the structure of state/party organisation.

Systemic institutionalised grand corruption

- What we know already
  - Some organisations are more corurpt than others
  - Lots of money involved: 217,715 eur on average
- The **degree** of institutionalisation and systemization:
  - $H1_0$: **no** relationship between network position and CRI
  - $H1_a$: **some kind** of network position is associated with CRI

Structure of rent extraction

- Literature on state capture (e.g. Wedel and Grymala-Busse):
  - Captor networks simultaneously organise state/party and rent extraction to maximize benefits
- Broad patterns of state/party organisation:
  - MSzP: decentralised state/party
  - Fidesz: centralised state/party
- Degree of association between state/party and rent extraction structure:
  - $H2_0$: Centralisation of 2011-2012 **did not influence** the network position's impact on CRI
  - $H2_0$: Centralisation of 2011-2012 **influenced** the network position's impact on CRI

Full network data

- Three-mode: issuers, winners, brokers (+courts, losers)
- There are also links within the same mode:
  - Consortia
  - Centralised procurement
  - Same organisation is issuer as well as winner
  - Issuer owns the winner (e.g. local energy provider)
- Data also on individual officeholders (~25000 individuals)
- Time series (daily data)

Network data analysed here

- Two-mode: issuer-winner
- Only big actors: 5+ contracts of >100k HUF
  - top 20% of actors
- Two time periods: comparative statics
  - 2009-2010: previous gov.
  - 2011-2012: current gov.
- Weighted graph
- Nod attributes: type, location, pp size, main market

Network size

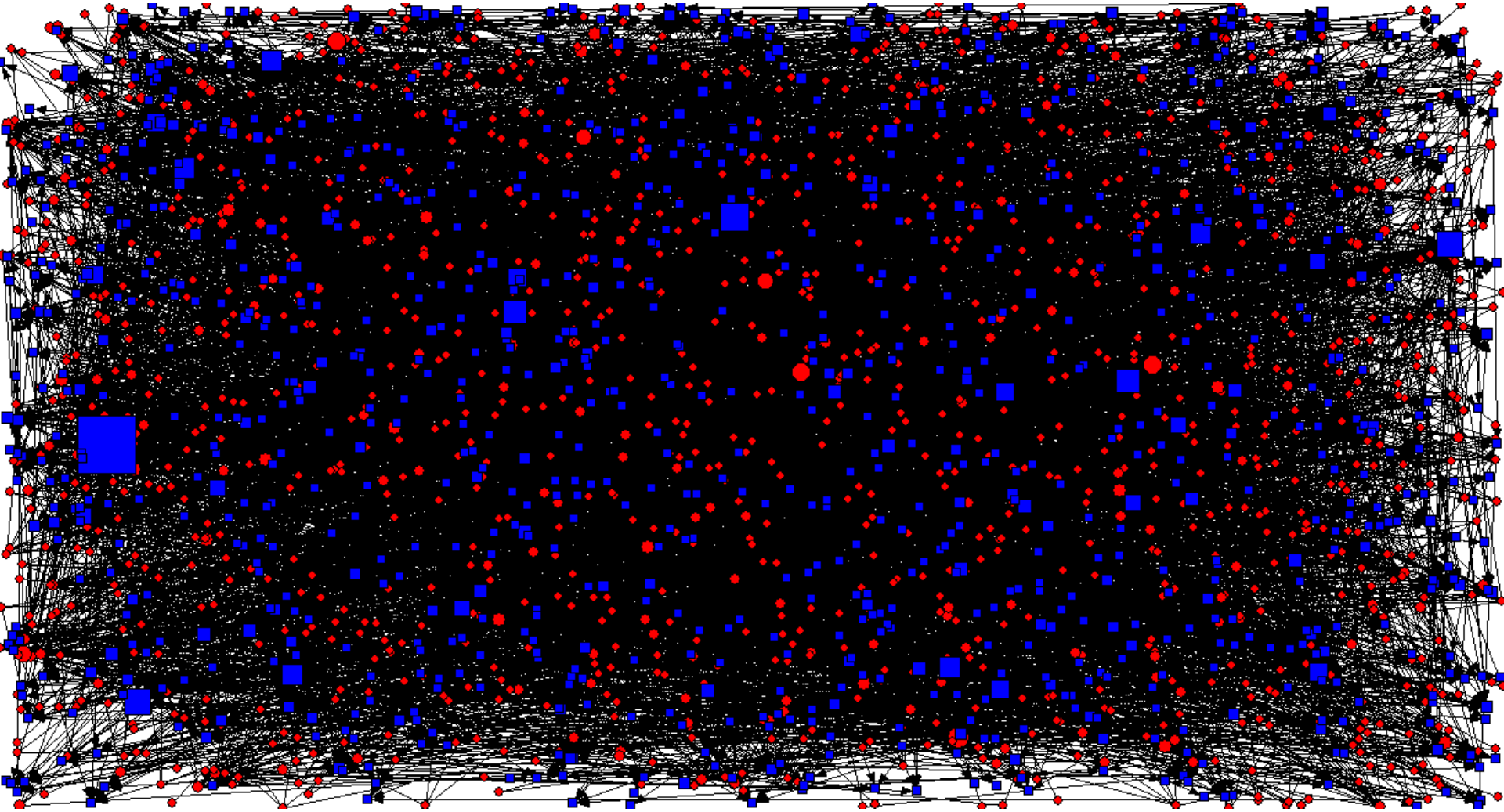
- Network size

	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%**

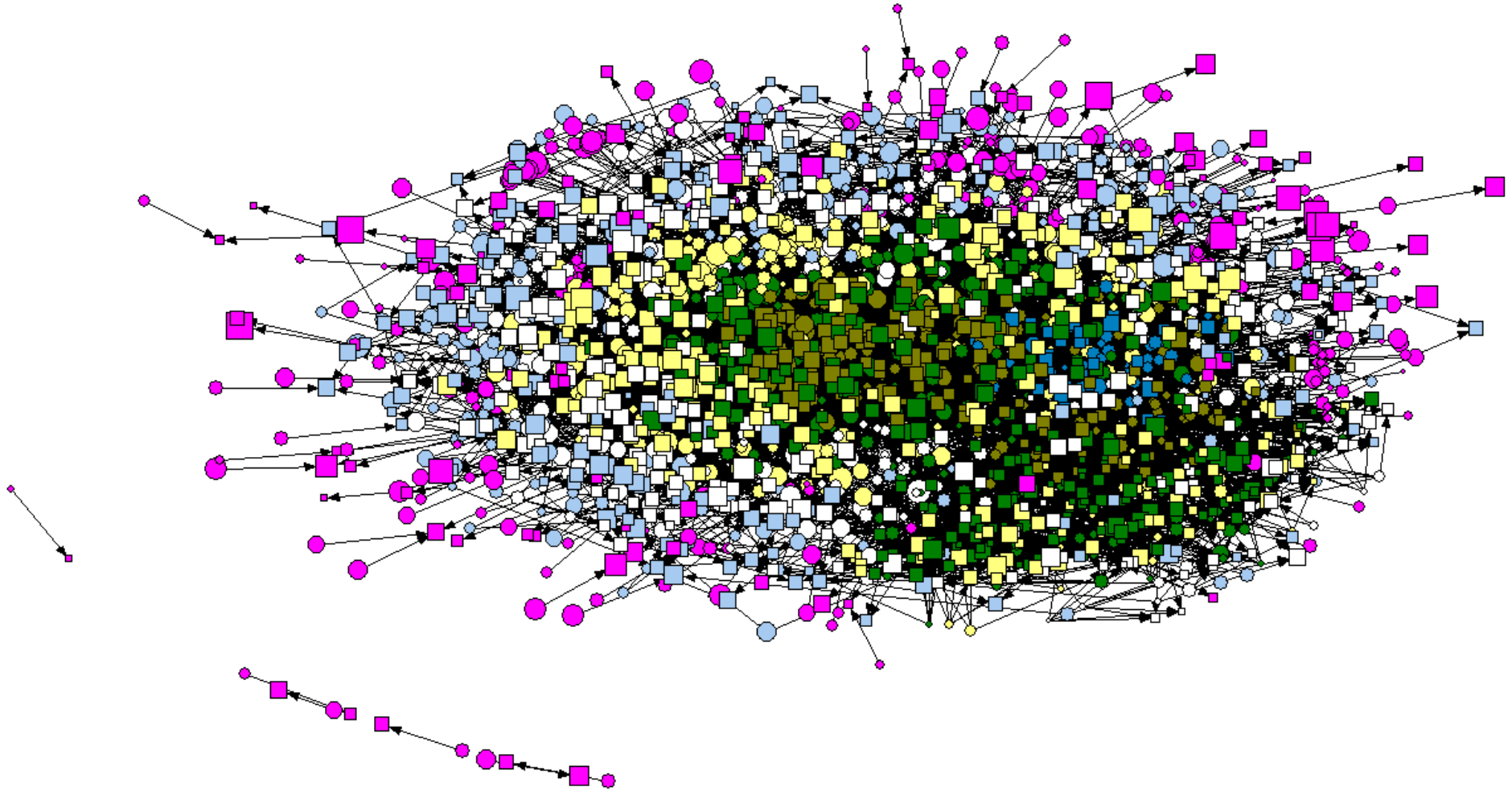
Total contract value
(% of GDP)

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

Complexity

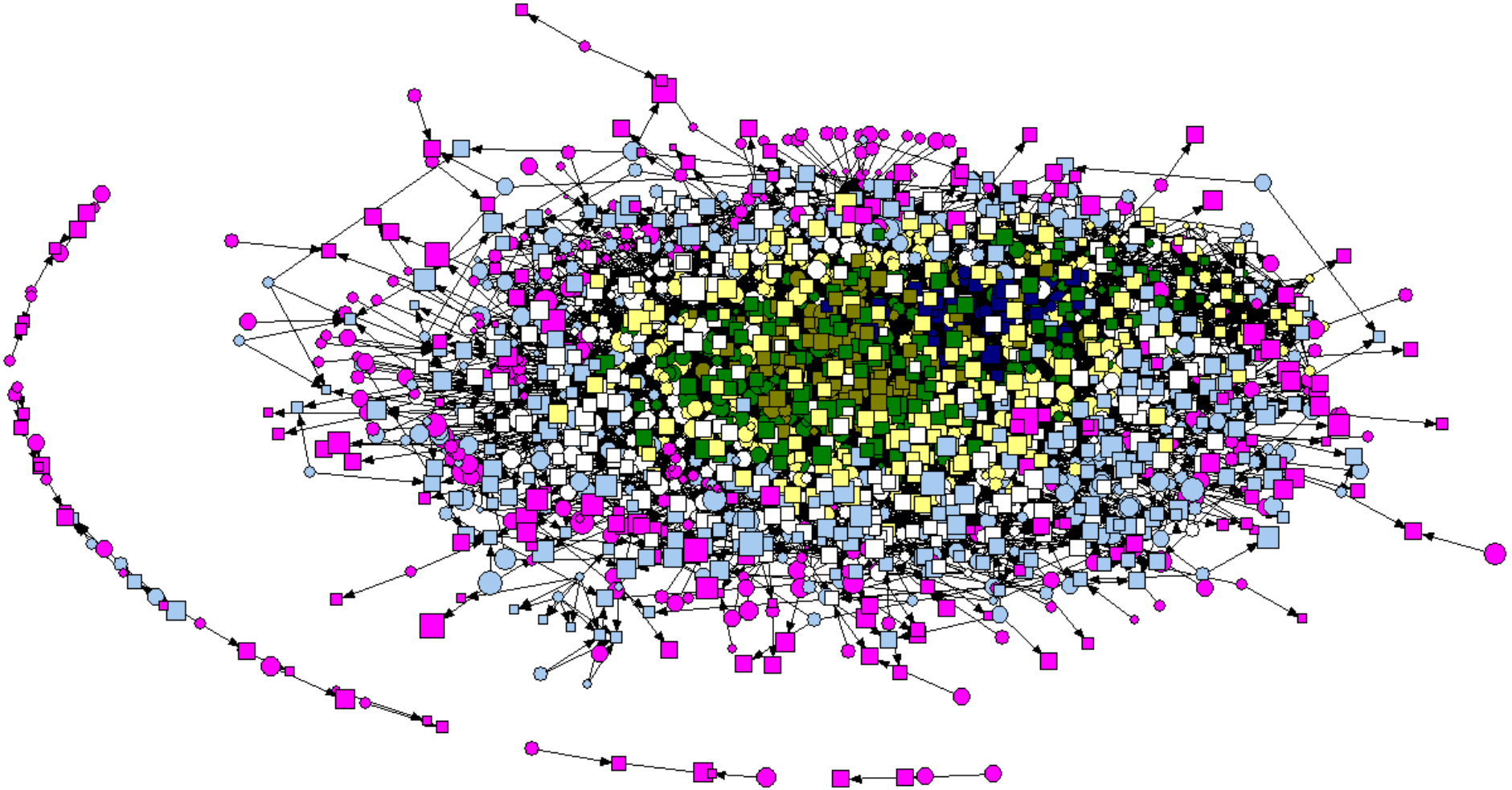


Network: 2009-2010



- Spring embedding, CRI, k-cores, weighted

Network: 2011-2012



- Spring embedding, CRI, k-cores, weighted

Network characteristics

- Little difference between the two periods overall

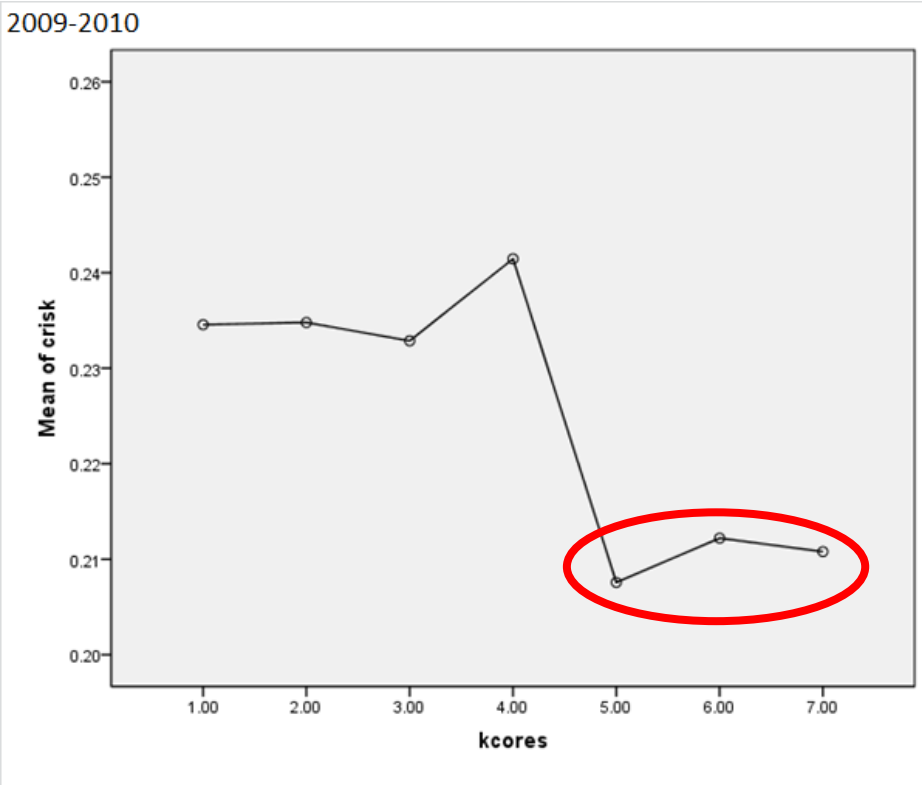
	Density	Avg. Dist.	Radius	Diameter	Fragment.	Transitiv.	Norm. Dist.
2009-2010	0.005	4.505	1	11	0.010	0.222	0.337
2011-2012	0.005	4.599	1	14	0.044	0.210	0.343

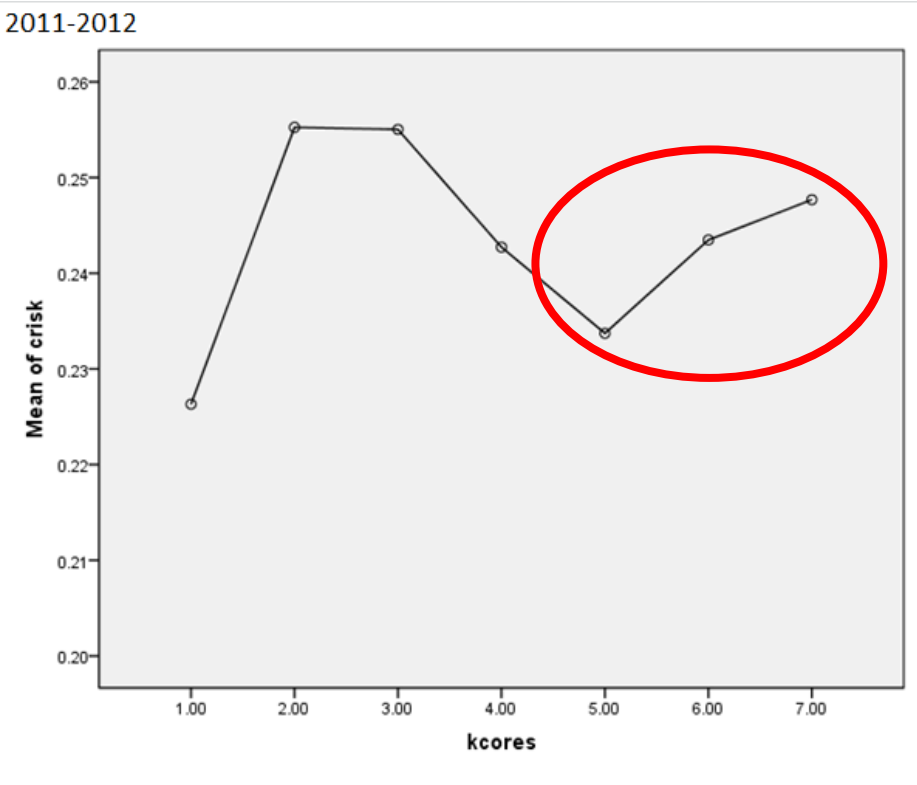
- CRI and centrality weakly related

		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

OLS on CRI-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

OLS on CRI-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

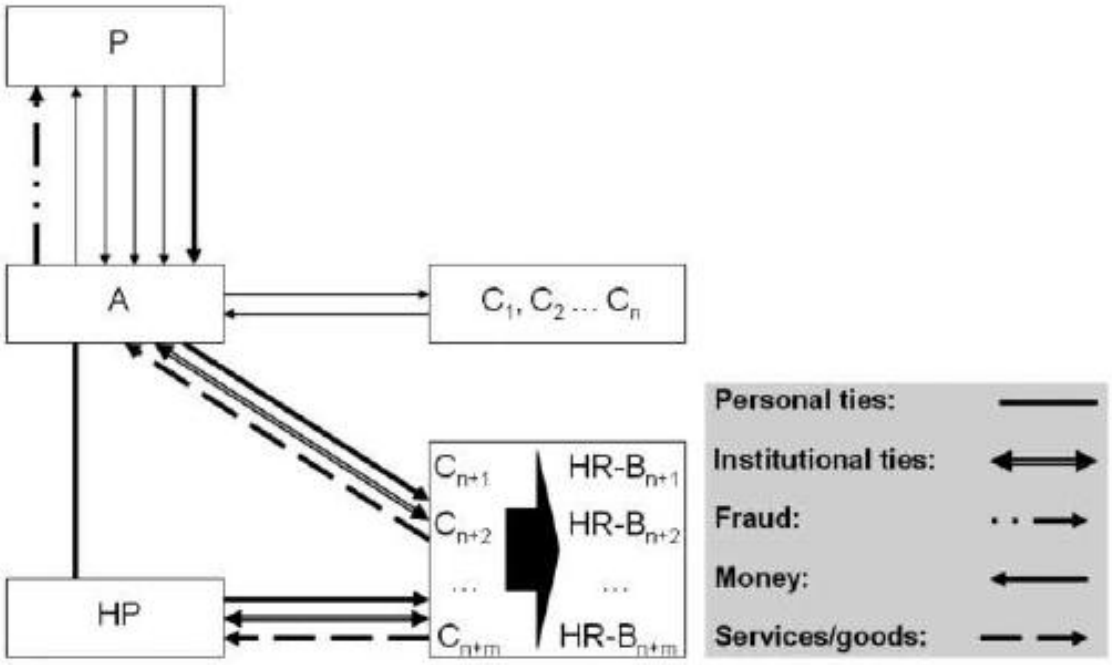
- H1: Institutionalised grand corruption is more systemic than random/sporadic
- H2: Structure of institutionalised grand corruption somewhat followed the structure of state/party organisation.

Further work

- Theory building:
  - Which kinds of network formations correspond to what kind of rent extraction
  - Understanding mechanisms
- Better data
  - Longer time series: 2005-2013
  - Further variables: financial accounts, political ties
  - Hidden ties and actors?!
- Better analytics
  - Time-series maybe?!
  - Individual level maybe?!
  - Identifying typical network formations

Further work

- Identification of typical corrupt network formations such as fraud network (Szántót-Tóth-Varga)



Key puzzle for further work

How can **structurally similar** network configurations arise shortly **after the change of government** in spite of a wholesale change of actors and policies?

Further information on our work

Corruption Research Center's homepage:
www.crcb.eu

Mihaly Fazekas' homepage:
www.mihalyfazekas.eu

References

- Everton, S. F. (2012). Disrupting Dark Networks. Cambridge, UK: Cambridge University Press.
- Fazekas, M., Chvalkovska, J., Skuhrovec, J., Tóth, I. J., & King, L. P. (2013). Are EU funds a corruption risk? The impact of EU funds on grand corruption in Central and Eastern Europe. CRC-WP/2013:03, Budapest: Corruption Research Centre.
- Fazekas, M., Tóth, I. J., & King, L. P. (2013). Hidden Depths.The Case of Hungary. In A. Mungiu-Pippidi (Ed.), *Controlling Corruption in Europe vol. 1* (pp. 74–82). Berlin: Barbara Budrich Publishers.
- Fazekas, M., Tóth, I. J., & King, L. P. (2013). Anatomy of grand corruption: A composite corruption risk index based on objective data. CRC-WP/2013:02, Budapest: Corruption Research Centre.
- Fazekas, M., Tóth, I. J., & King, L. P. (2013). Corruption manual for beginners: Inventory of elementary “corruption techniques” in public procurement using the case of Hungary. CRC-WP/2013:01,Corruption Research Centre, Budapest.
- Grzymala-Busse, A. (2008). Beyond Clientelism : Incumbent State Capture and State Formation. Comparative Political Studies, 41(4/5), 638–673.
- Szántó, Z., Tóth, I. J., & Varga, S. (2012). The social and institutional structure of corruption: some typical network configurations of corruption transactions in Hungary. In B. Vedres & M. Scotti (Eds.), Networks in Social Policy Problems. Cambridge, UK: Cambridge University Press.
- Wedel, J. R. (2001). Corruption And Organized Crime In Post-Communist States: New Ways Of Manifesting Old Patterns. Trends in Organized Crime, 7(1), 3–61.