MAGYAR TUDOMÁNYOS AKADÉMIA
KÖZGAZDASÁG- ÉS REGIONÁLIS
TUDOMÁNYI KUTATÓKÖZPONT
KÖZGAZDASÁG-TUDOMÁNYI INTÉZETE

Social network fragmentation enlarges income inequalities

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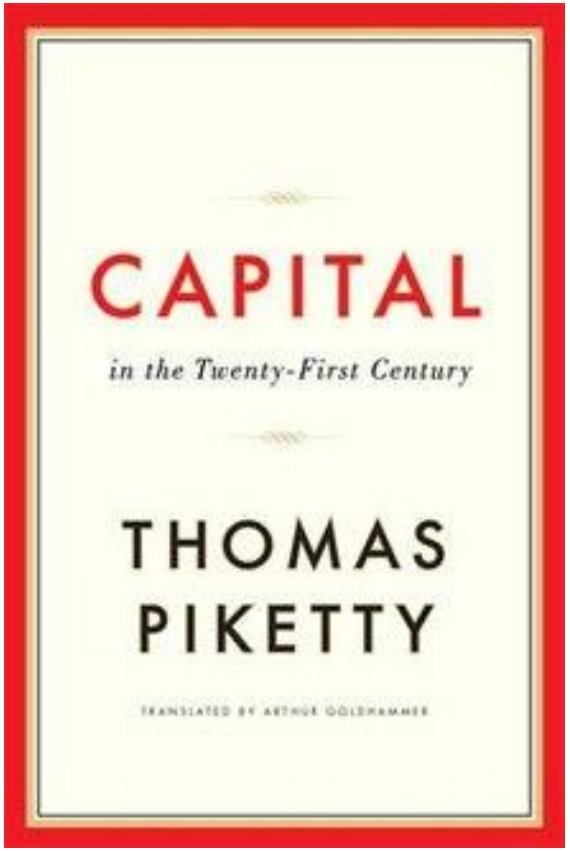
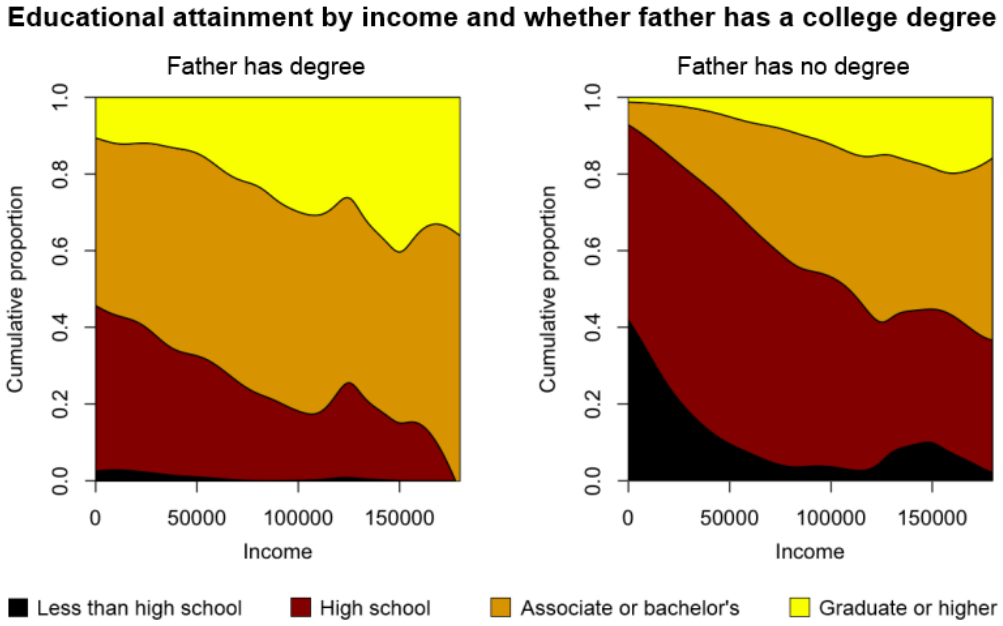
[4] IBS, [5] BME

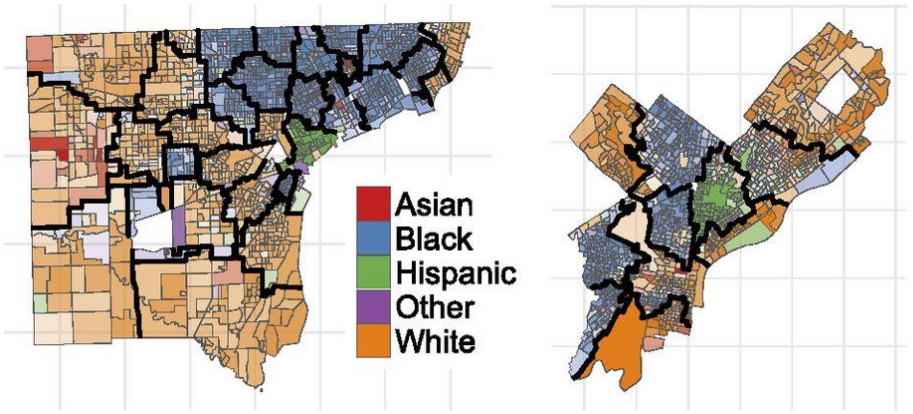
MRTT, 10.18. 2018. Kecskemét

Inequalities on the rise

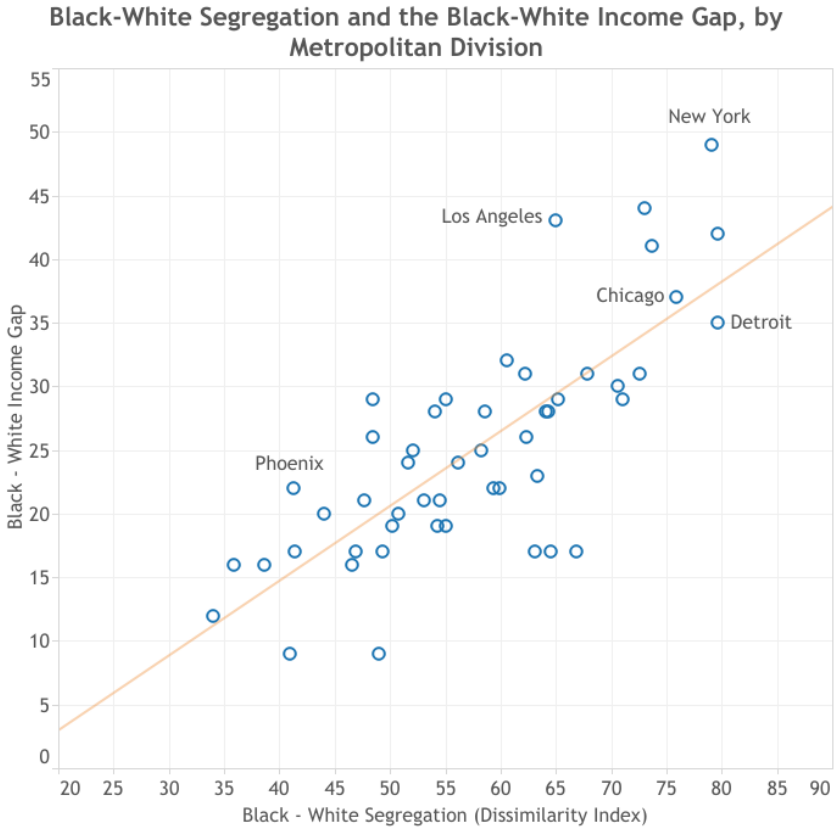


Deeply rooted sources of inequalites





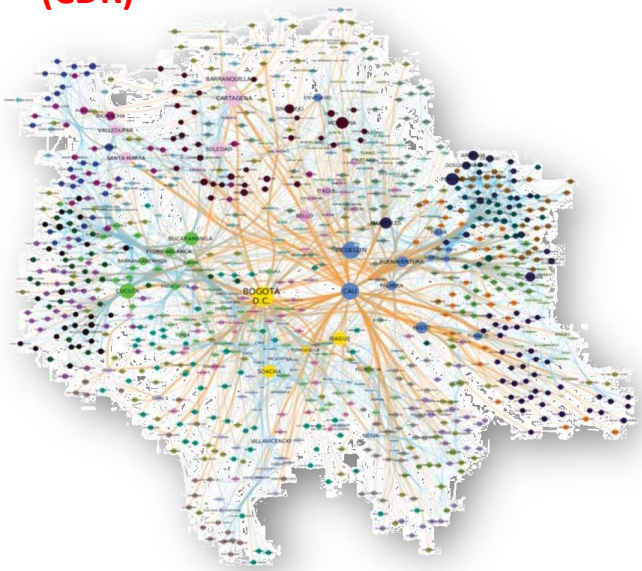
(a) Detroit, $k = 34$ (b) Philadelphia, $k = 11$



Philip S. Chodrow PNAS 2017;114:44:11591-11596

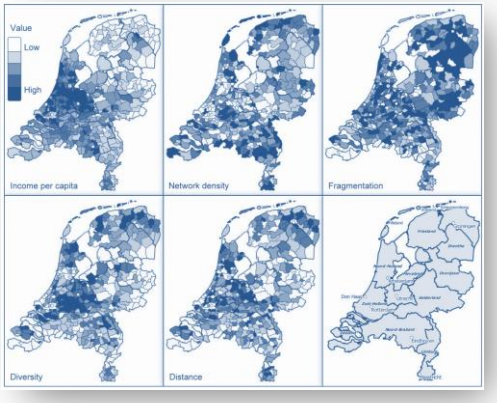
How do social networks influence inequalities?

COLOMBIAN MUNICIPALITIES (CDR)



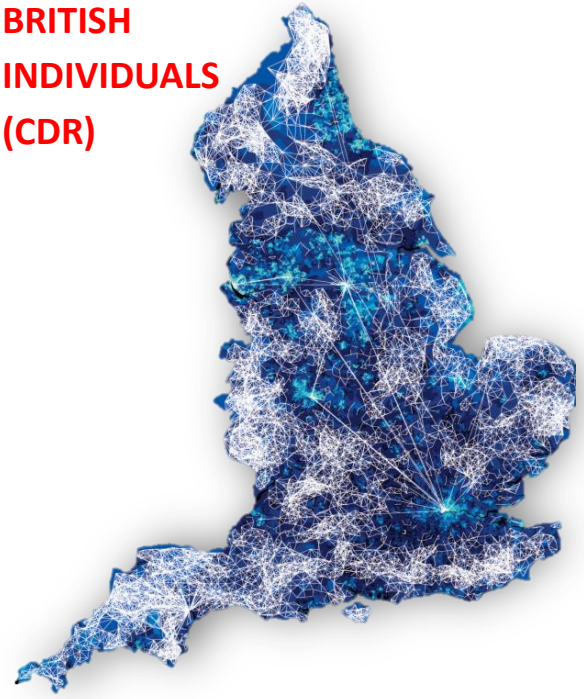
Coscia-Cheston-Hausman (2017). HKS WP

DUTCH MUNICIPALITIES (OSN)

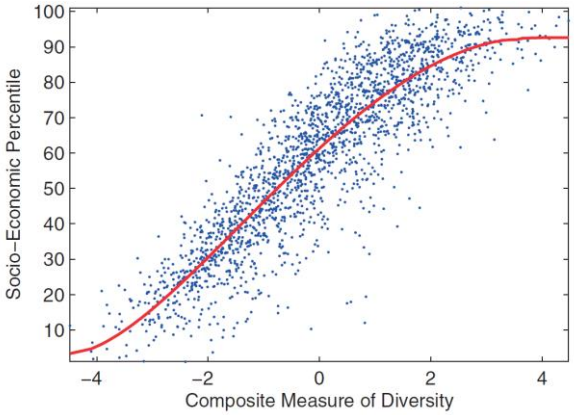


Norbutas-Corten (2018) Social Networks

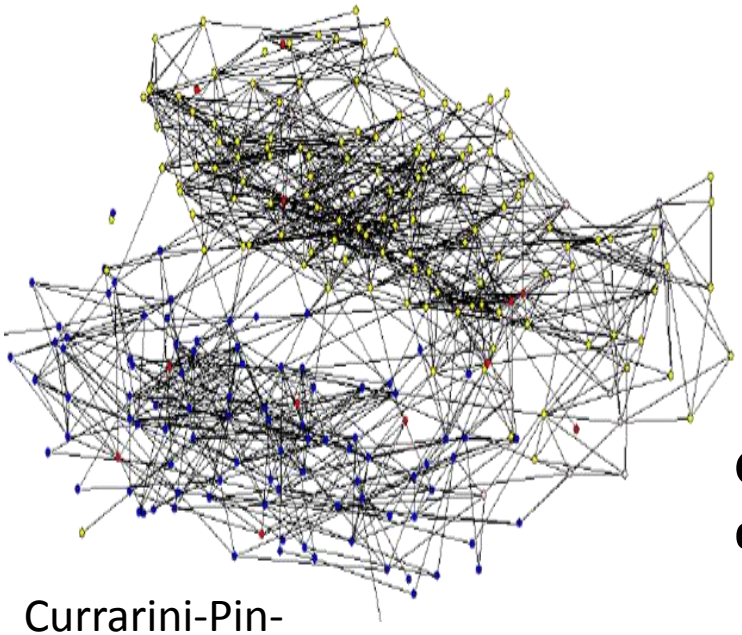
BRITISH INDIVIDUALS (CDR)



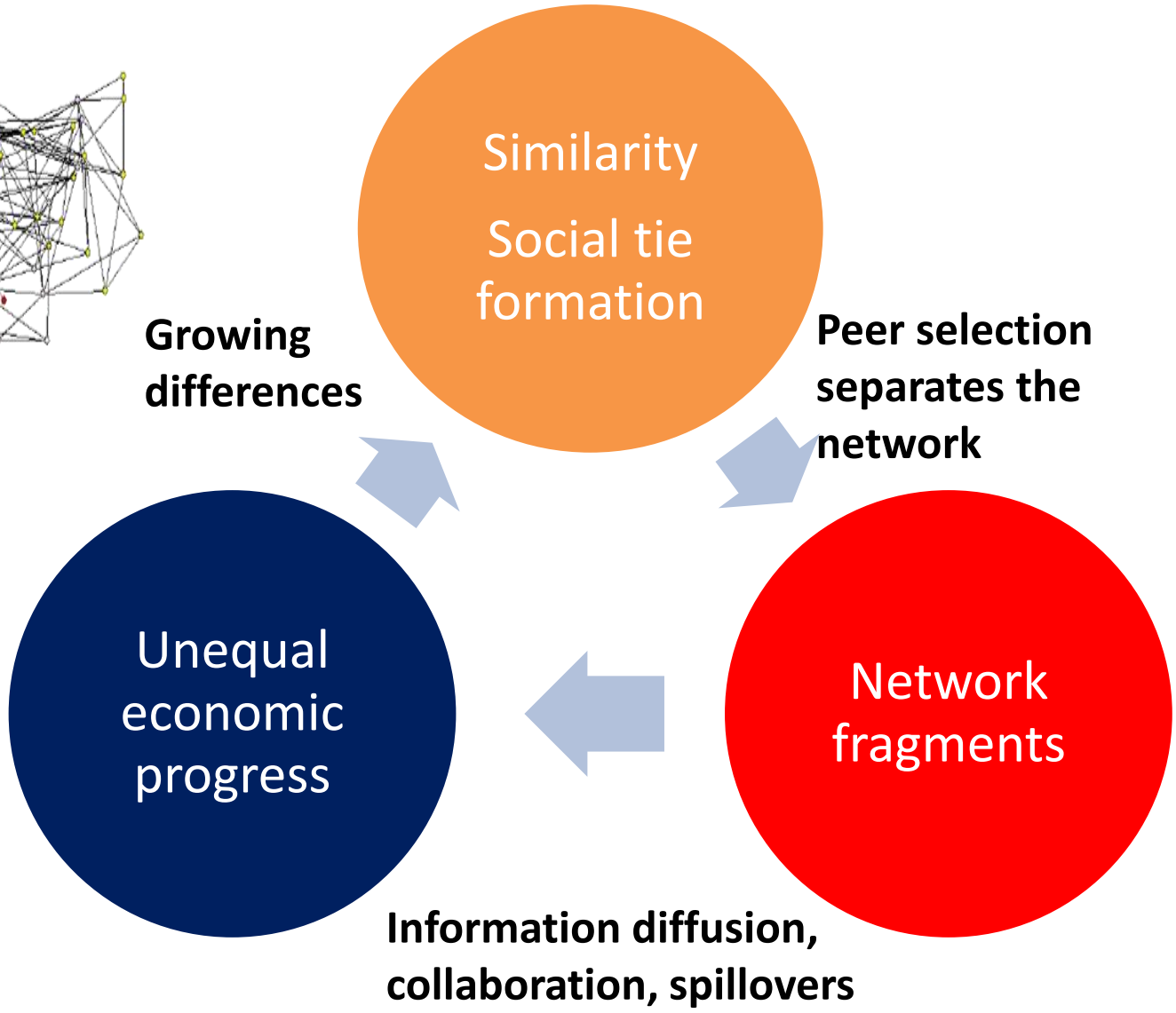
Eagle-Macy-Claxton (2010) Science



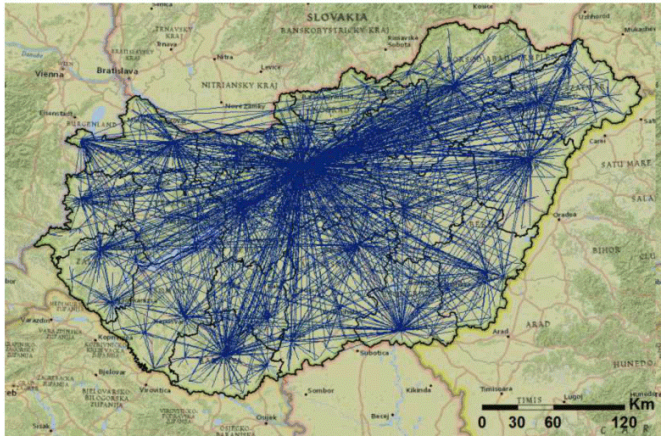
Endogenous Network Inequalities

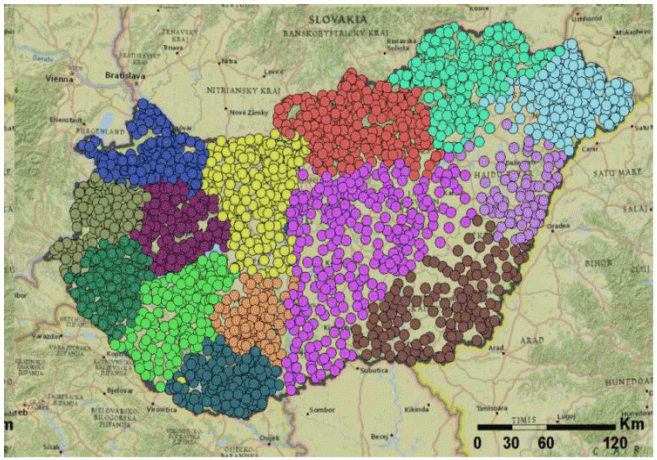


Currarini-Pin-Jackson (2009) Econometrica

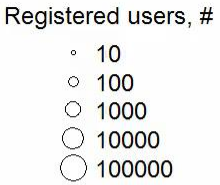


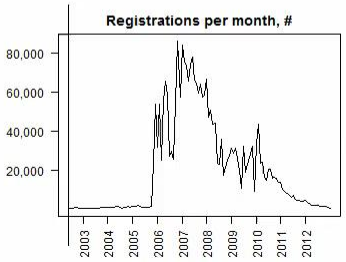
Data - iWiW

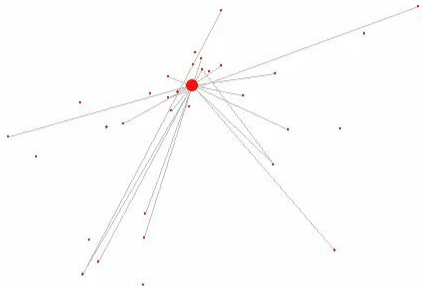


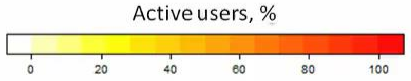


- 2.7 million individuals in 2557 towns
- pre-Facebook: no friend recommendation
- offline social connections reported online



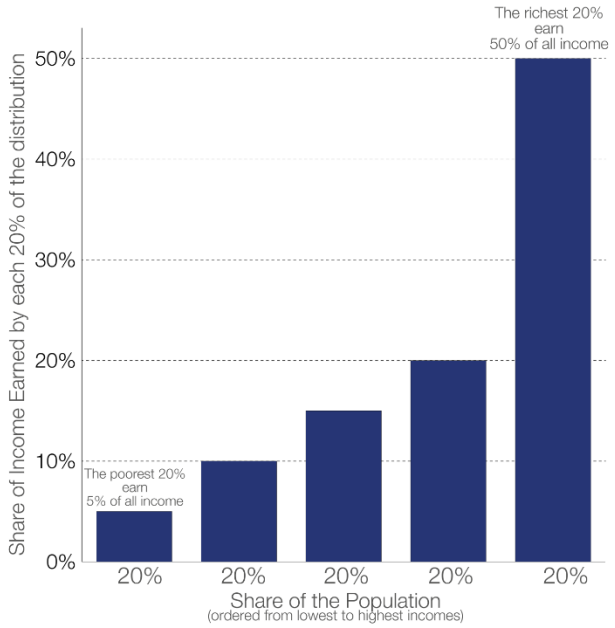


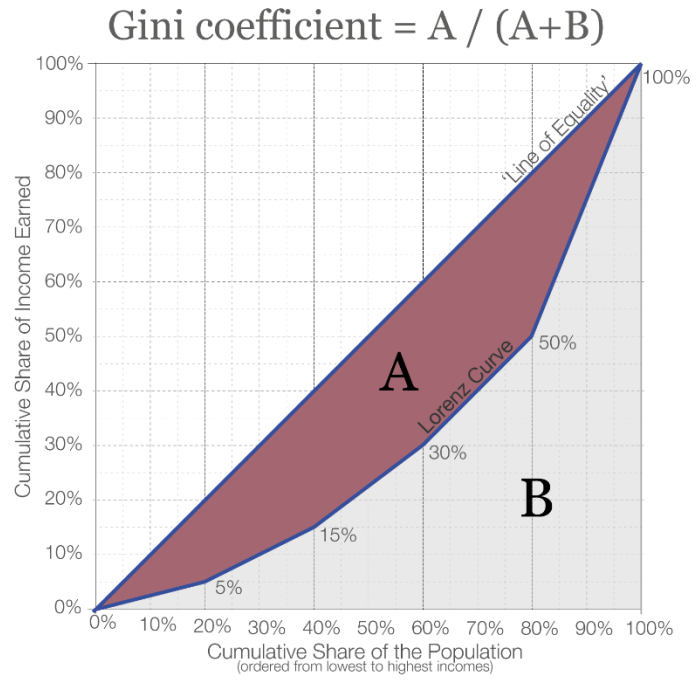




Data on inequality

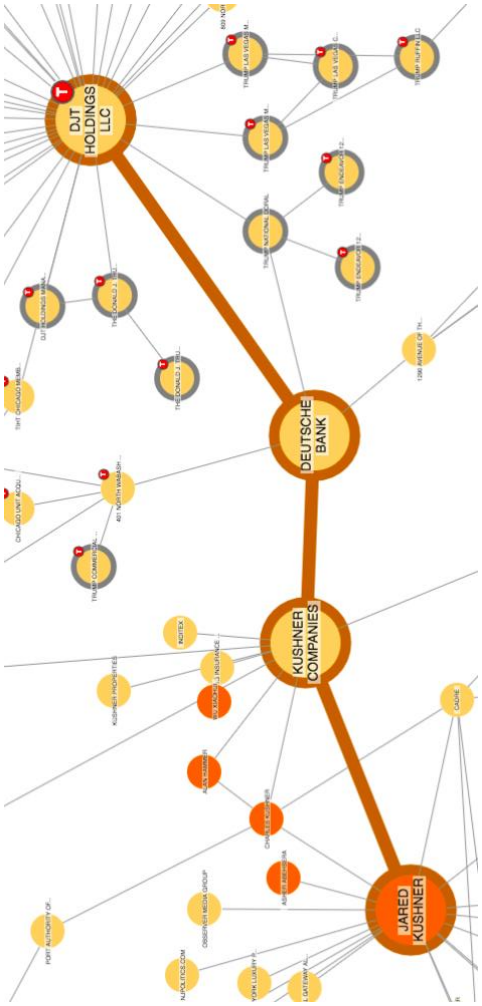
- TEIR: wage groups – population, gross income
- Towns that have more than 2,500 inhabitants (Budapest excluded)
- 2011, 2016



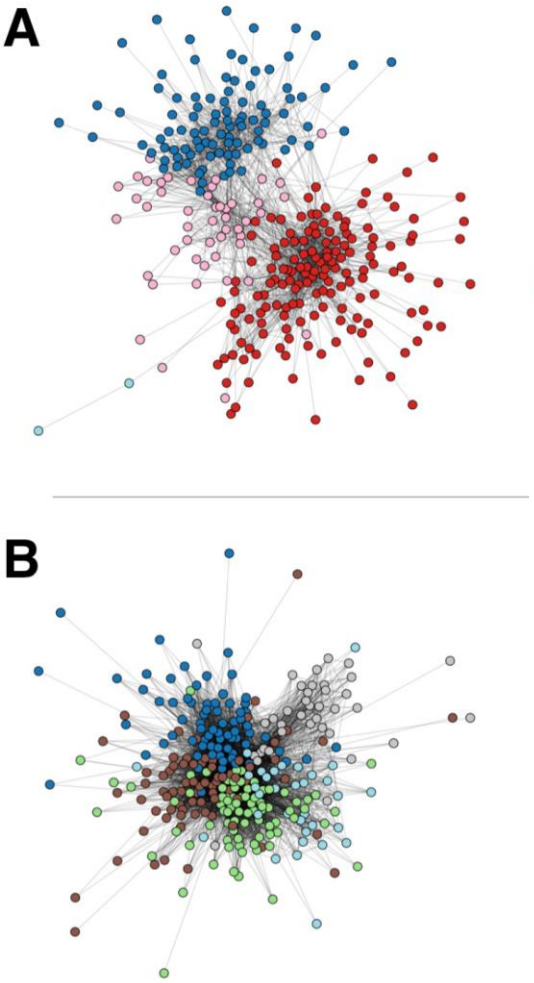


Social network variables

Average path length

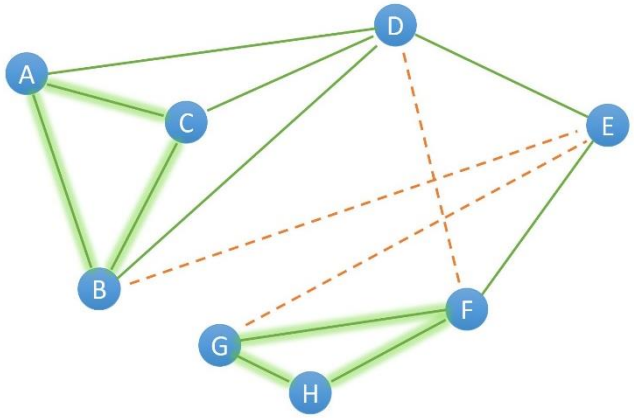


Fragmentation



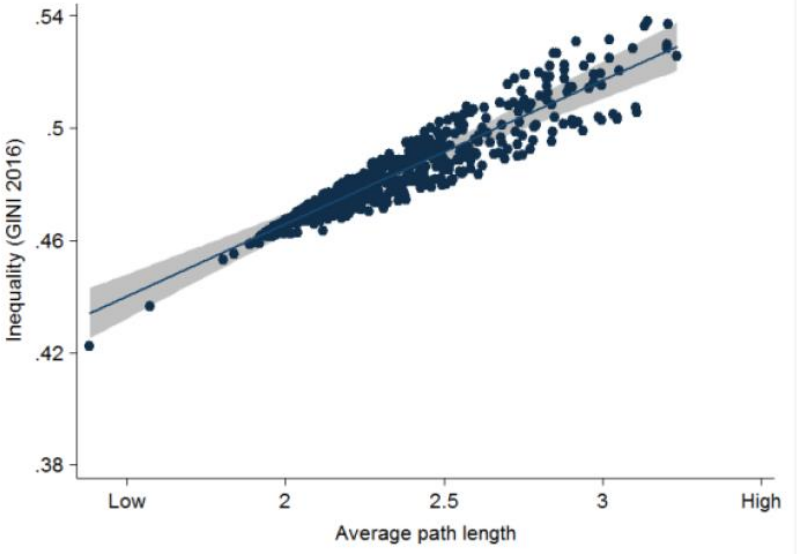
Wachs et al. 2018

Transitivity

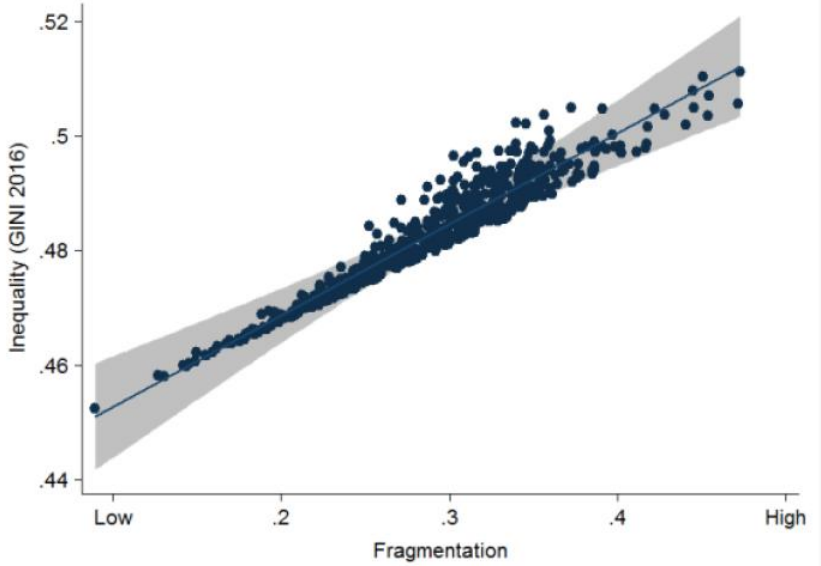


Network variables and inequality

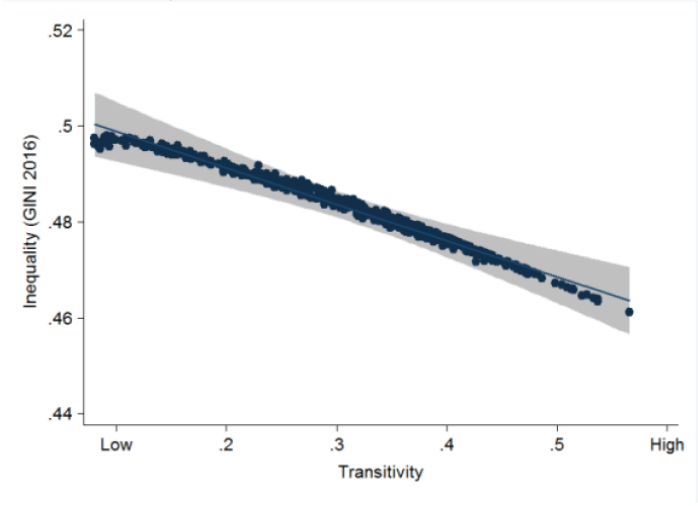
$$\text{GINI}_{i,2016} = \alpha + \beta_1 \text{Path Length}_i + \text{logpop}_i + \varepsilon_i$$



$$\text{GINI}_{i,2016} = \alpha + \gamma_1 \text{Fragmentation}_i + \text{logpop}_i + \varepsilon_i$$

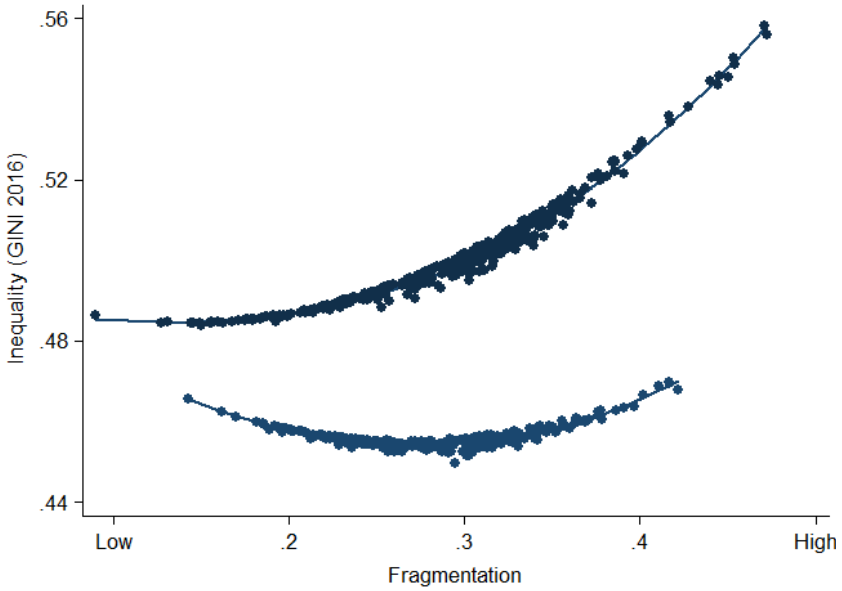


$$\text{GINI}_{i,2016} = \alpha + \delta_1 \text{Transitivity}_i + \text{logpop}_i + \varepsilon_i$$

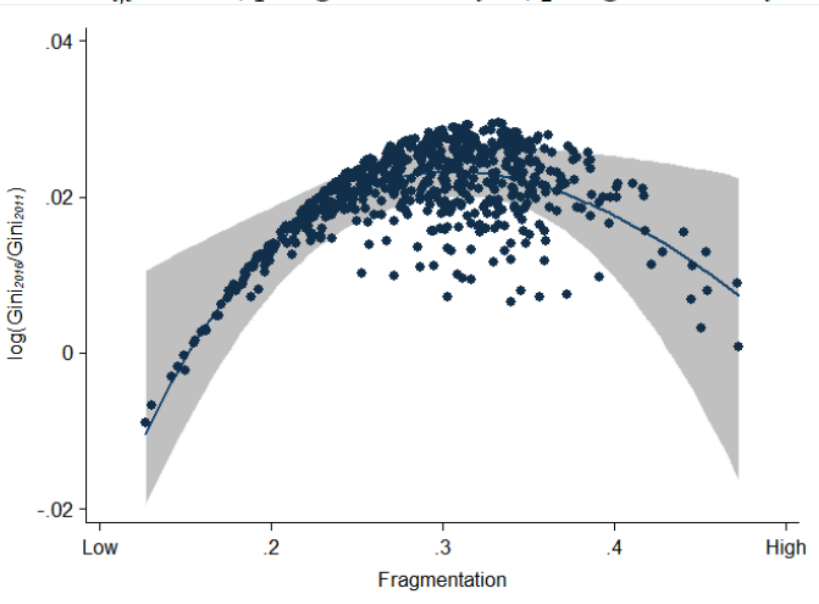


Social network fragmentation enlarges income inequalities

$$\mathrm{GINI}_{i,2016} = \alpha + \gamma_1 \mathrm{Fragmentation}_i + \gamma_2 \mathrm{Fragmentation}_i^2 + \mathrm{GINI}^{\mathrm{D}}_{\mathrm{i},2011} + \gamma_3 \left(\mathrm{GINI}^{\mathrm{D}}_{\mathrm{i},2011} \times \mathrm{Fragmentation}_i\right) + \mathrm{logpop}_i + \varepsilon_i$$

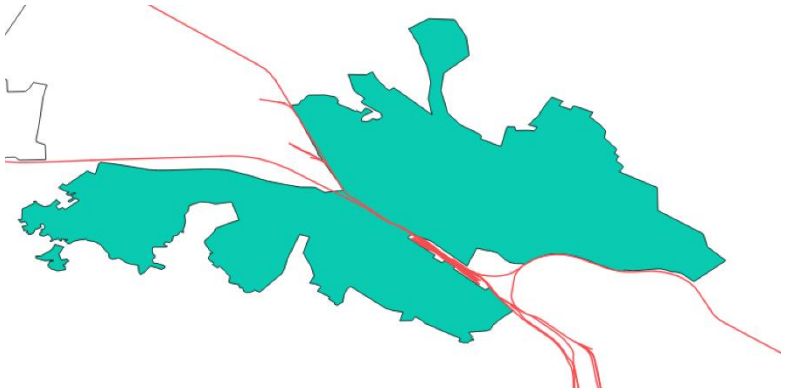


$$\Delta\mathrm{GINI}_{i,t} = \alpha + \gamma_1 \mathrm{Fragmentation}_i + \gamma_2 \mathrm{Fragmentation}_i^2 + \mathrm{logpop}_i + \varepsilon_i$$

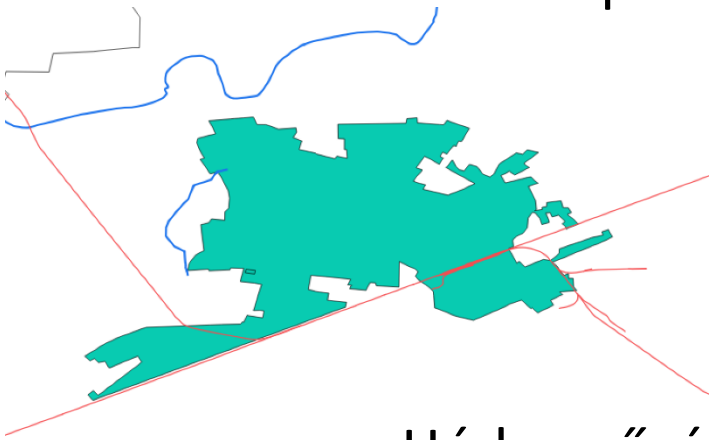


Sources of network fragmentation

1. RDI (rail-road-river division)



Sopron



Hódmezővásárhely

2. Educational fragmentation

Coefficient of variance of math scores at 6th grade

3. Political fractionalization

Coefficient of variation of Fidesz share in voting districts

4. Religious fractionalization

Entropy of religious population across different churches

IV estimation – 2SLS

$$\gamma_i \widehat{\text{Fragmentation}}_i = \pi_0 + \pi_1 \text{Educationalal fragmentation}_i + \pi_2 \text{Geographical fragmentation}_i + \pi_3 \text{Religious fractionalization}_i + \pi_4 \text{Political fractionalization}_i + v$$

$$\text{GINI}_{i,2016} = \gamma_0 + \gamma_1 \widehat{\text{Fragmentation}}_i + \text{logpop}_i + u$$

	Dependent variable GINI_{2016}					
	(1) OLS	(2) 2SLS	(3) OLS	(4) 2LSL	(5) OLS	(6) 2SLS
Average path length	0.0750***	0.103***				
	(0.010)	(0.014)				
Fragmentation			0.138***	0.495***		
			(0.031)	(0.087)		
Transitivity					-0.0926***	-0.235***
					(0.034)	(0.062)
log population	-0.00987***	-0.0167***	0.00381**	-0.00769**	-0.00222	-0.0183***
	(0.003)	(0.004)	(0.002)	(0.003)	(0.004)	(0.007)
Constants	0.394***	0.388***	0.409***	0.407***	0.531***	0.716***
	(0.012)	(0.012)	(0.012)	(0.014)	(0.045)	(0.081)
R^2	0.199	0.177	0.084	-0.209	0.055	0.020
adj. R^2	0.197	0.174	0.081	-0.213	0.052	0.017
Wald F test for weak IV		13.10		54.84		41.39
N	591	591	591	591	591	591

Statistics robust to heteroscedasticity, standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.01

Conclusions

- Network fragmentation has multiple sources and is deeply rooted in the history of society.

- If income inequalities are present, fragmented social networks increase them further.

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2017-2022

Thank you for your attention!

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Question of representativity

Real vs. OSN age distribution