Social Network Analysis
Examples; Data Types

http://www.stats.ox.ac.uk/ snijders/sna_course.htm

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May 2012

This course is taught by Tom Snijders and Felix Reed-Tsochas.

Introductory books on social network analysis

(in addition to those mentioned by Felix Reed-Tsochas)

- Stanley Wasserman and Katherine Faust , *Social Network Analysis: Methods and Applications.*
  Cambridge University Press, 1994.
  (The traditional standard reference.)
- Peter Carrington, John Scott, Stanley Wasserman (eds.),
  Models and Methods in Social Network Analysis.
  Cambridge University Press, 2005.
  (Containing major new developments since 1994.)
- Wouter de Nooy, Andrej Mrvar, and Vladimir Batagelj.
  Exploratory Social Network Analysis with Pajek, 2nd edition.
  Cambridge University Press, 2011.
  (Good treatment of many network concepts,
  oriented to the free software Pajek.)

Introductory books (continued)

- Charles Kadushin, *Understanding Social Networks.* Oxford University Press, 2012.
  (Excellent sociological introduction, little maths.)
- John Scott, *Social Network Analysis: A Handbook.* 2nd edition. Sage, 2000.
  (A shorter introduction for social scientists.)
- Duncan Watts, *Six Degrees. The Science of a Connected Age.* W.W. Norton, 2003.
  (A popular account linking work about networks by physicists and computer scientists with social science work about network analysis.)

Three examples

The first example is

F.R. Pitts (1979),

The medieval trade network of Russia revisited.

Social Networks, 1, 285-292.

This highlights betweenness.

Further background reading is

L. Freeman (1979),

Centrality in social networks: Conceptual clarification.

Social Networks, 1, 215-239.

Figure 1. *Russian trade routes in the 12th - 13th centuries.*

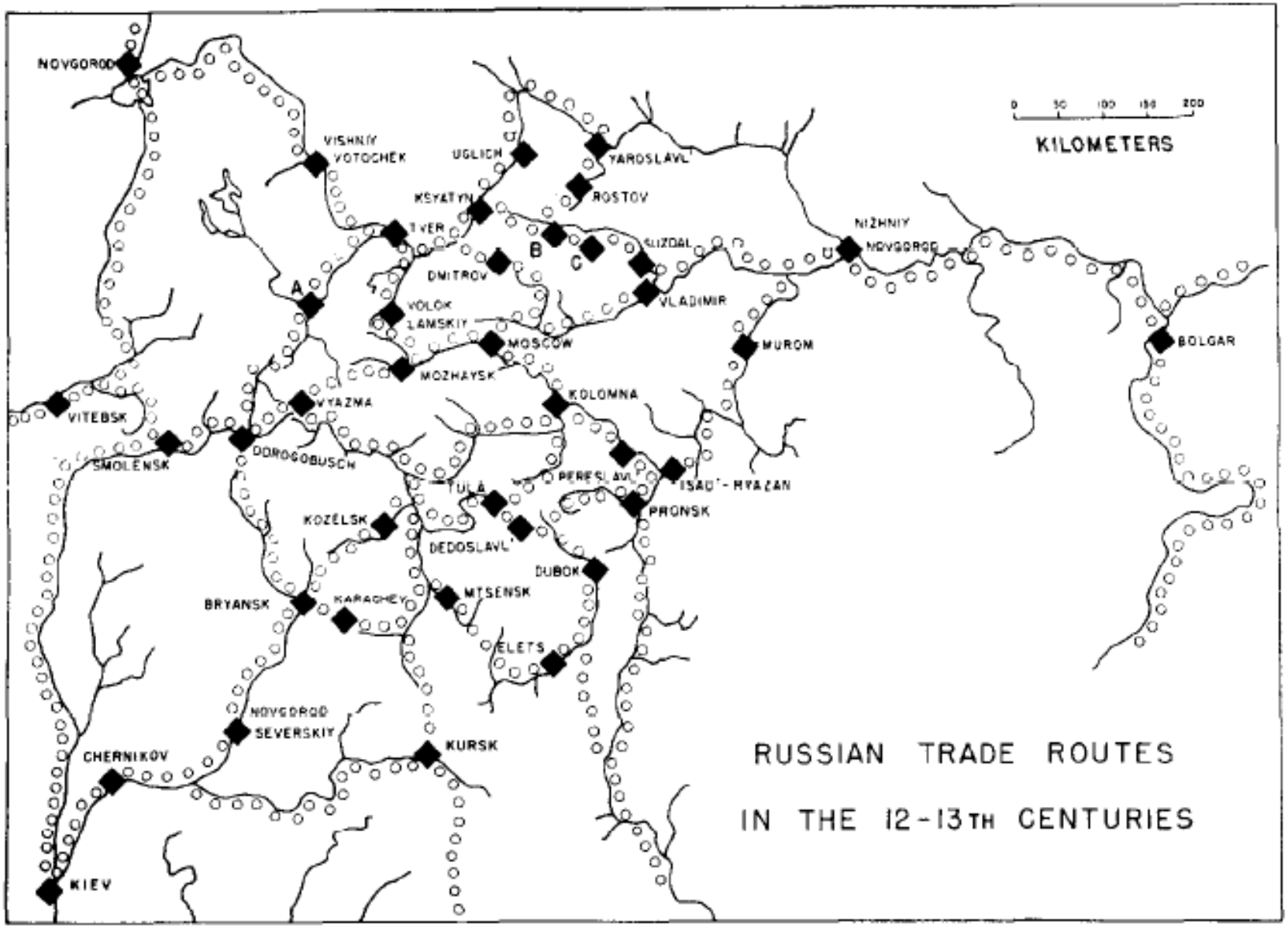
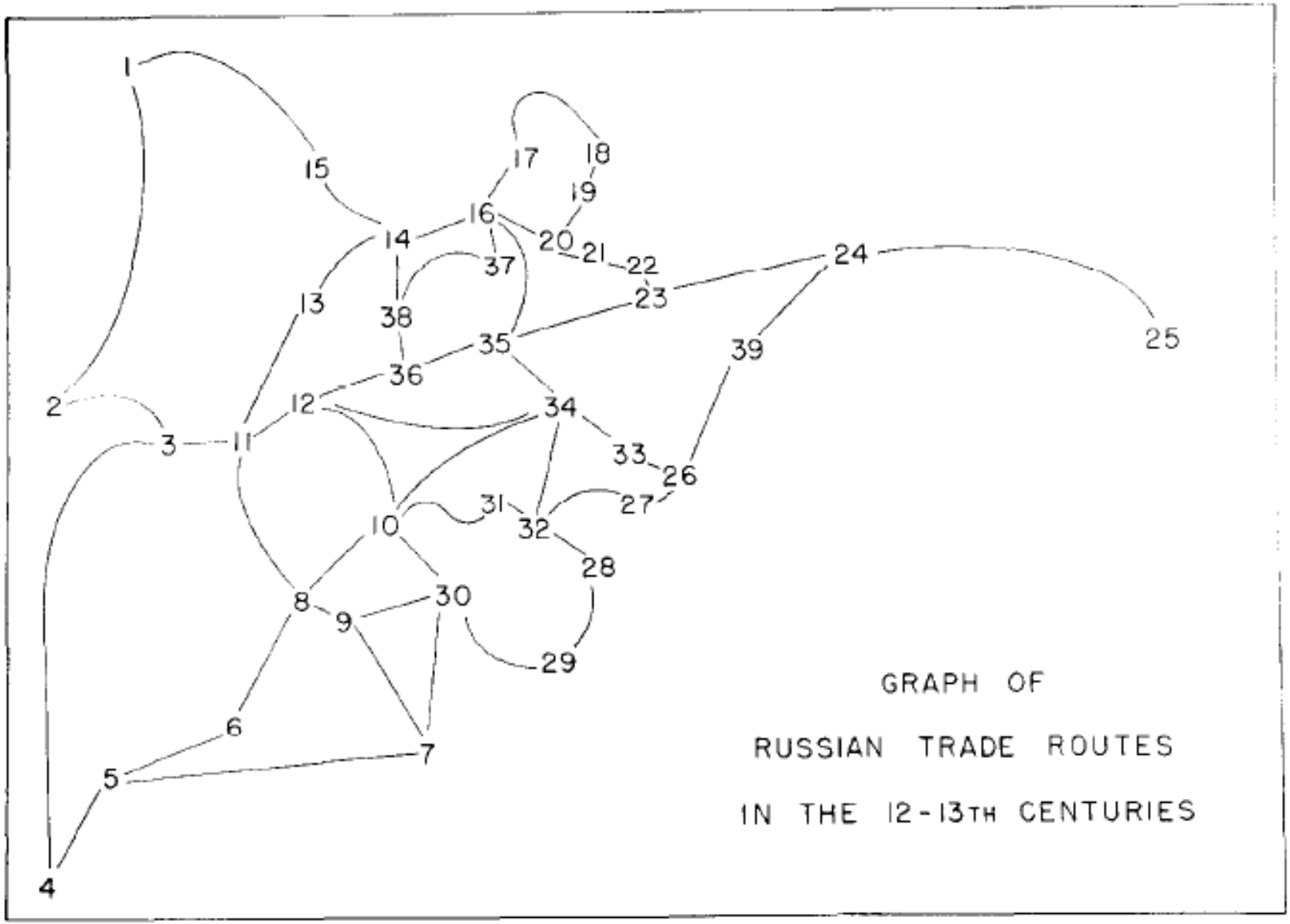


Figure 2. *Graph of Russian trade routes in the 12th - 13th centuries.*



The second example is from

Marc Flandreau and Clemens Jobst,
“The Ties that Divide: A Network Analysis of the International Monetary System, 1890-1910",
The Journal of Economic History, 65 (2005), 977–1007.

This highlights centrality, blockmodeling,
and the core-periphery structure.

The network is defined as follows:

$i \rightarrow j$ if in 1900, the currency of country j
was quoted in the money exchange in country j.

Descriptives of the 1900 exchange network:

45 countries; density 0.110; average degree 4.8;

Dyad count proportions $p_N = 0.827, p_A = 0.125, p_M = 0.047$
where
M = mutual (1,1), A = asymmetric (0,1) or (1,0), N = null (0,0).
Therefore proportion of ties being reciprocated is

$$2p_M/(2p_M + p_A) = 2 \times 0.047/(2 \times 0.047 + 0.125) = 0.43 \ ,$$

much higher than the density
(the density would be expected if all ties were independent).

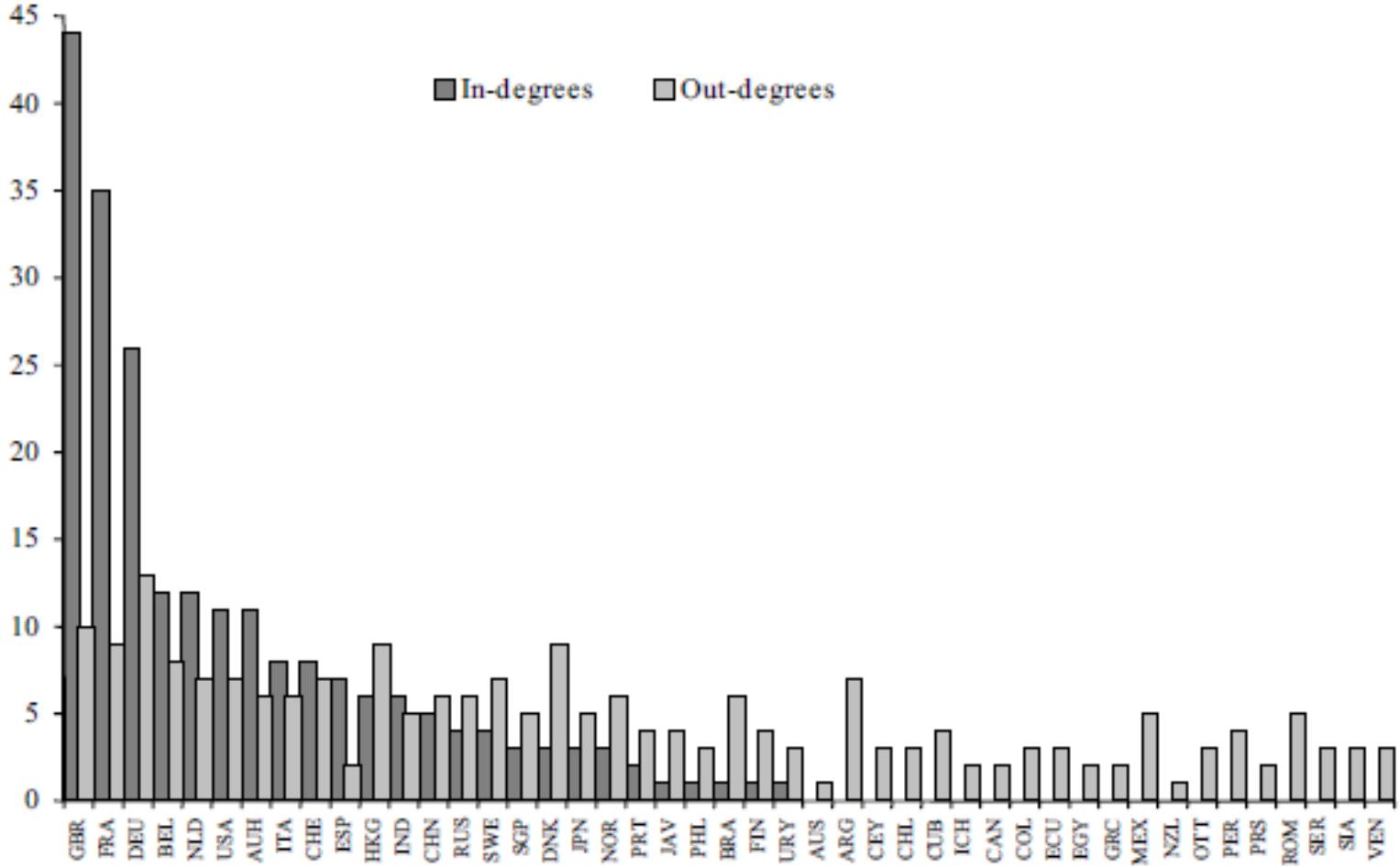


FIGURE 2
IN- AND OUT-DEGREES IN 1900: UNWEIGHTED

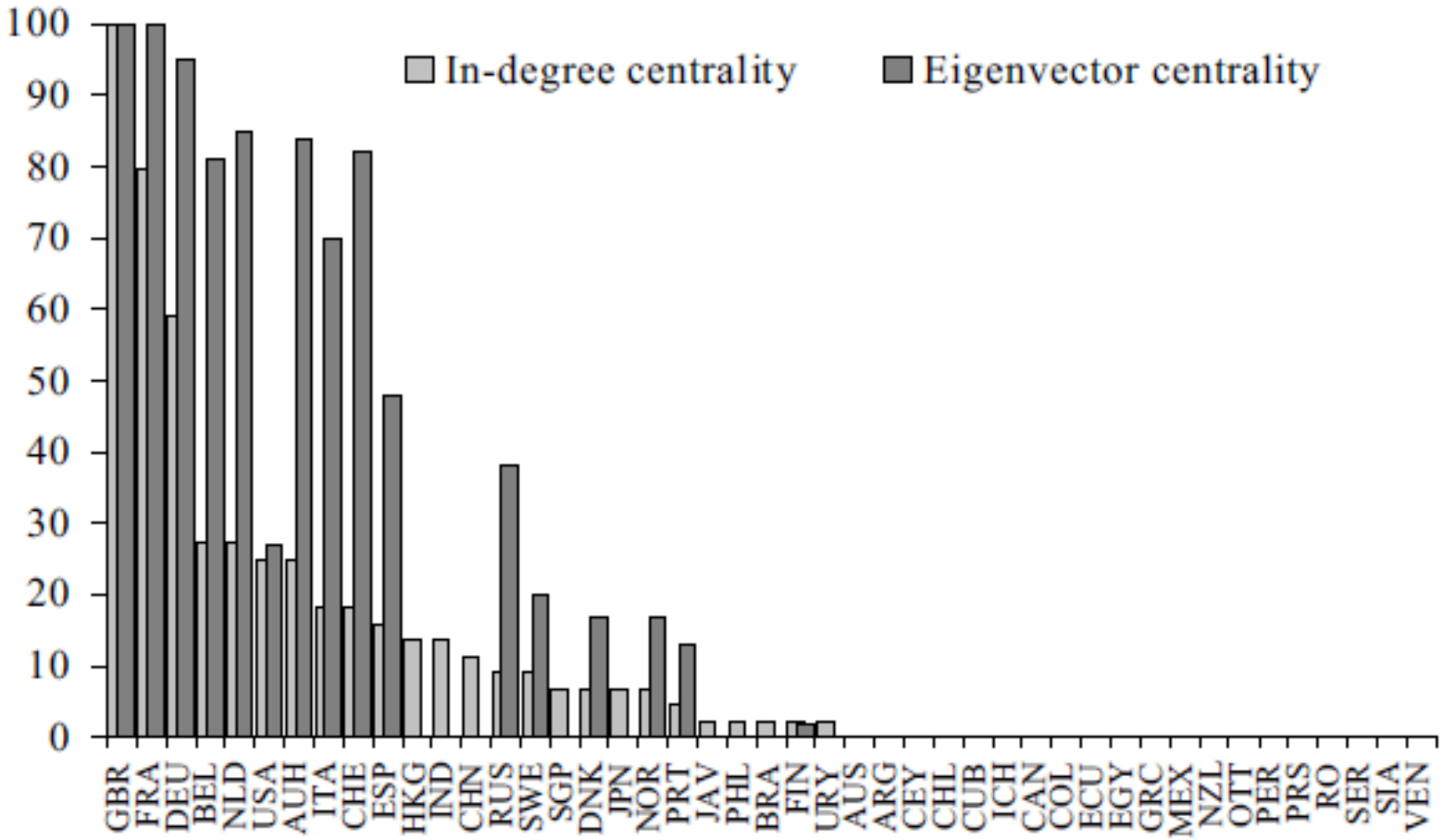


FIGURE 3
IN-DEGREES IN 1900: WEIGHTED

Stochastic blockmodeling led to three groups:

Group 1: GBR, DEU, FRA

Group 2: AUH, BEL, CHE, ESP, ITA, NLD, RUS, USA

Group 3: PRT, CHN, HKG, IND, SGP, ARG, AUS, BRA, CAN, CEY, CHL, COL, CUB, DNK, ECU, EGY, FIN, GRC, ICH, JAV, JPN, MEX, NOR, NZL, OTT, PER, PHL, PRS, ROM, SER, SIA, SWE, URY, VEN

This is a three-tier core-periphery system.

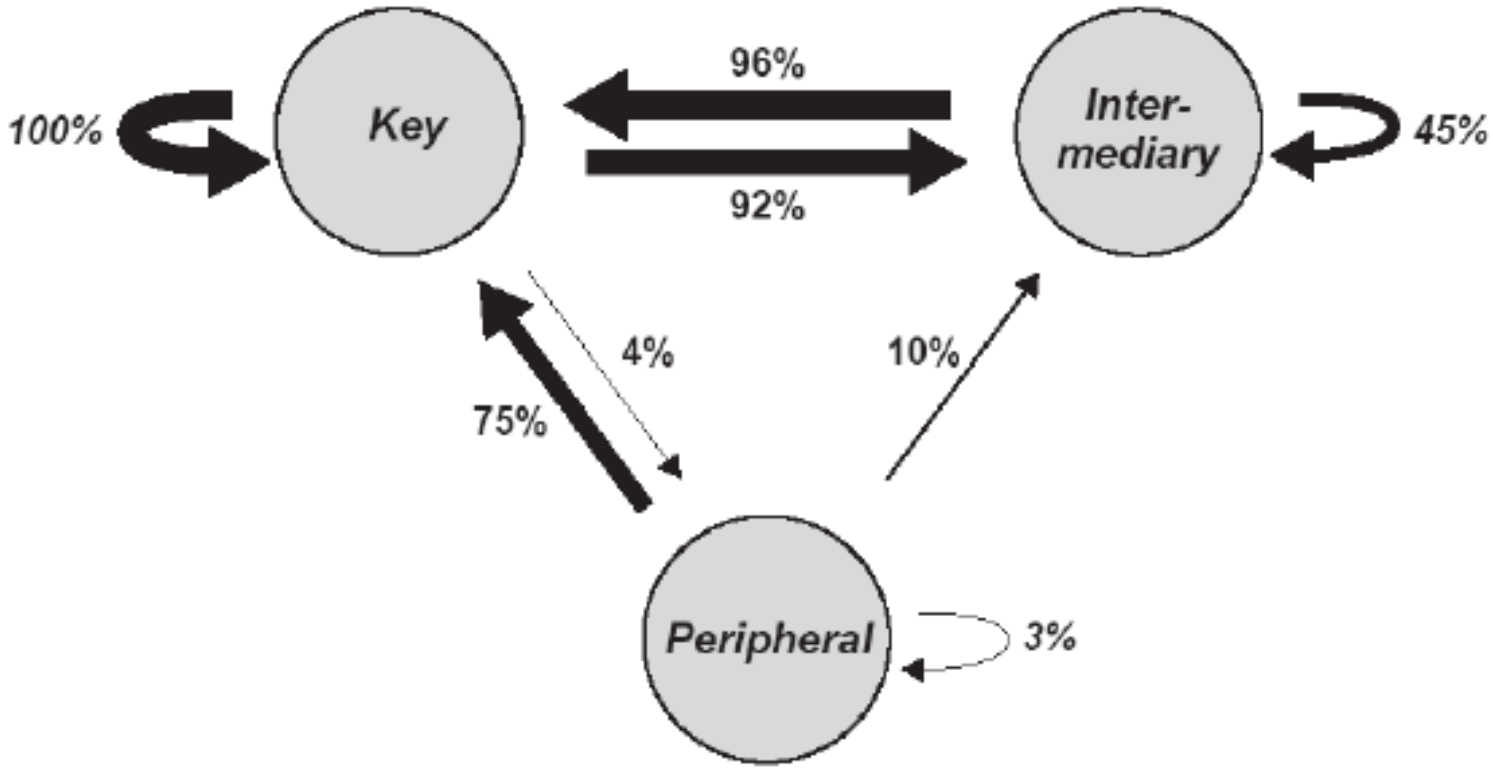


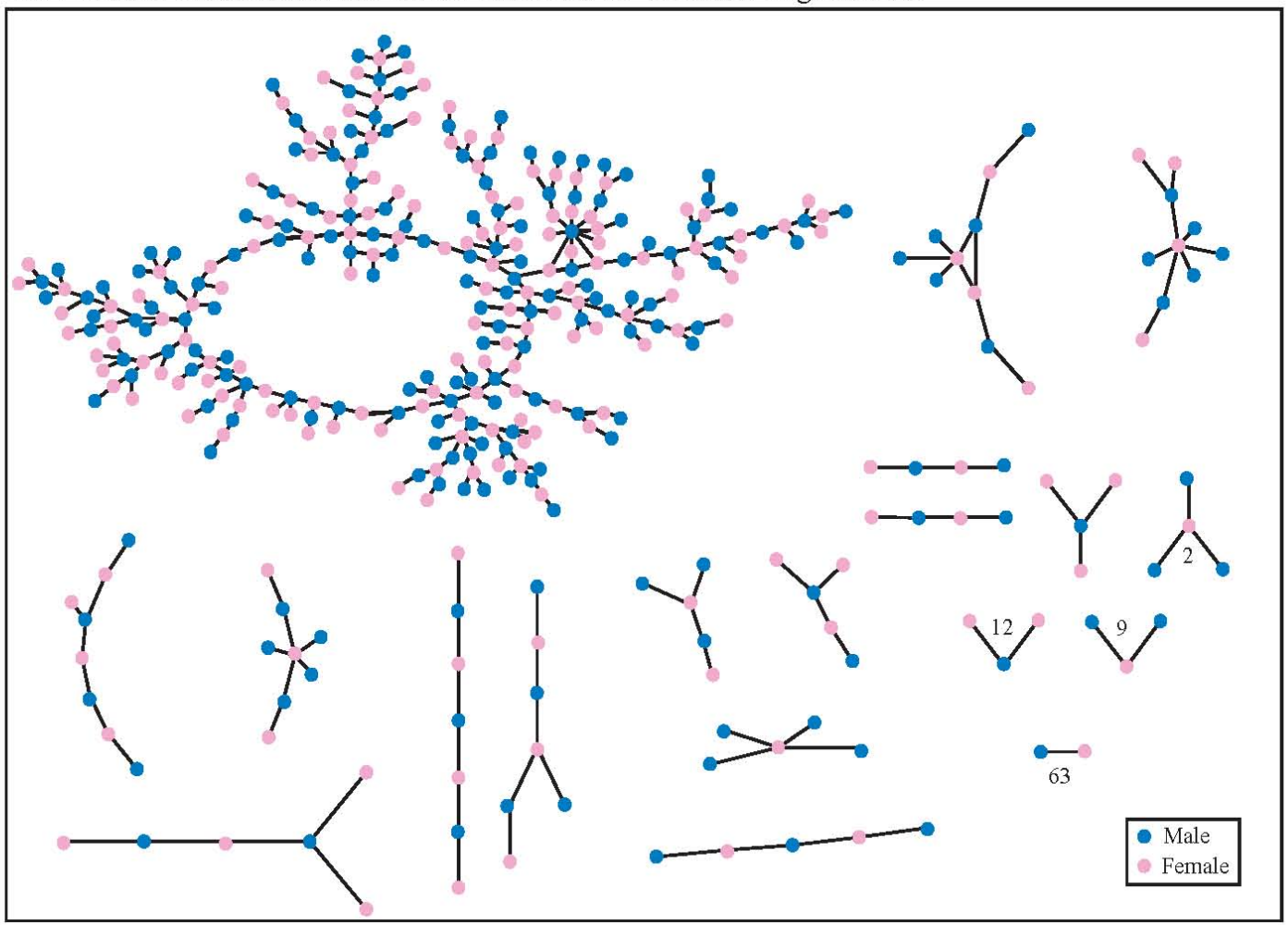
FIGURE 5
A SIMPLE MODEL OF THE INTERNATIONAL MONETARY SYSTEM IN 1900

The third example is

Peter S. Bearman, James Moody, and Kate Stovel (2004),
Chains of Affection:
The Structure of Adolescent Romantic and Sexual Networks.
The American Journal of Sociology, 110, 44-91.

This highlights stochastic modeling of networks
based on simple rules.

The Structure of Romantic and Sexual Relations at "Jefferson High School"



Each circle represents a student and lines connecting students represent romantic relations occuring within the 6 months preceding the interview. Numbers under the figure count the number of times that pattern was observed (i.e. we found 63 pairs unconnected to anyone else).

Network data

1. Complete networks

   The network boundary problem.
2. Personal networks
3. Sampled networks
4. Longitudinal: network panel, continuous observation, ...

Network data collection

1. *Complete networks:*

   network surveys; archival data; 'ethnographic' observation;

   automatic collection from the web

2. *Personal networks:*

   name generators; e.g., GSS :

   Looking back over the past 6 months,

   who are the people with whom you discussed matters important to you?

   More extensive, different generators:

   role-relations, interactions, affective, exchange.

3. *Sampled networks:*

   snowball sampling, link-tracing designs.

   Milgram, 6 degrees of separation.

4. Experiments.