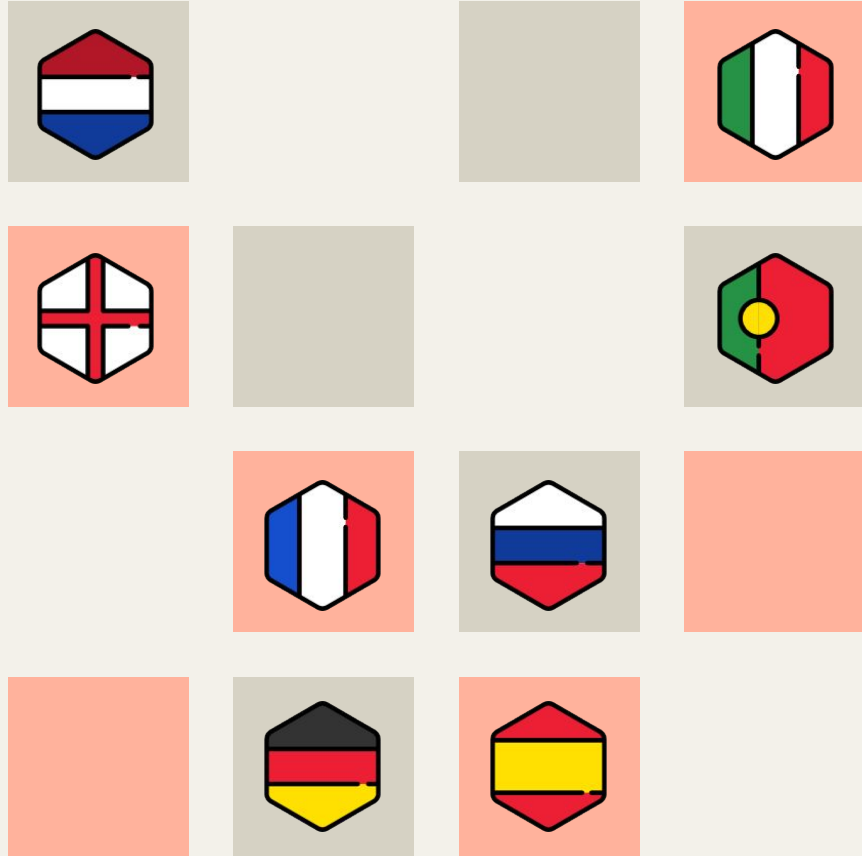# Mobility Network among Professional ⚽ Football Clubs

SMM638
Group 5

Homophily - Choice - Performance
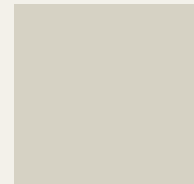
Homophily

The tendency for people to seek out or be attracted to those who are similar to themselves

Choice

Homophily acts as a bias that allow shortcut in decision making, choice based on the shared similarity

Performance

Researchers have argued around whether homophily behavior affects performance (e.g. constrain information variety; positively related to investment pay-off)
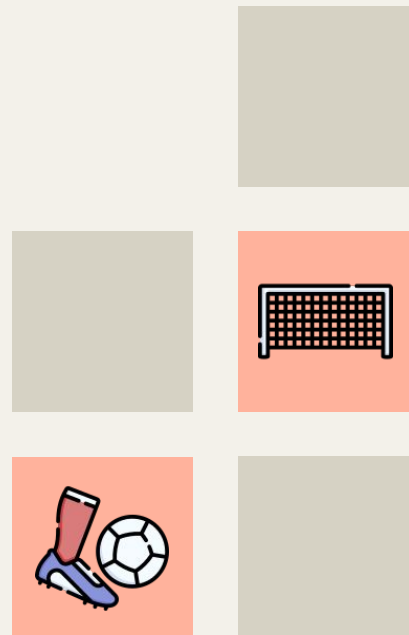
Football Dataset

Transfers of football players between Tier 1 leagues in 8 countries

- Premier League (England)
- Eredivisie (Netherlands)
- Ligue 1 (France)
- 1 Bundesliga (Germany)
- Serie A (Italy)
- Liga Nos (Portugal)
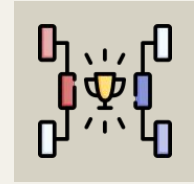- Premier Liga (Russia)
- Primera Division (Spain)

Aim of the project

- To find the extent of **inter-organizational (league) homophily** for football player trade between football clubs
- To find and understand the link exist between possible homophily and **teams performance**

Homophily - Findings

Team-level homophily in terms of NATIONALITY

Ideal Network

- All teams randomly trade players with each other regardless of any preference
- Probability of trade is based on number of teams

Real Network

- Link created when two teams trade a player in any season during 2010-2020
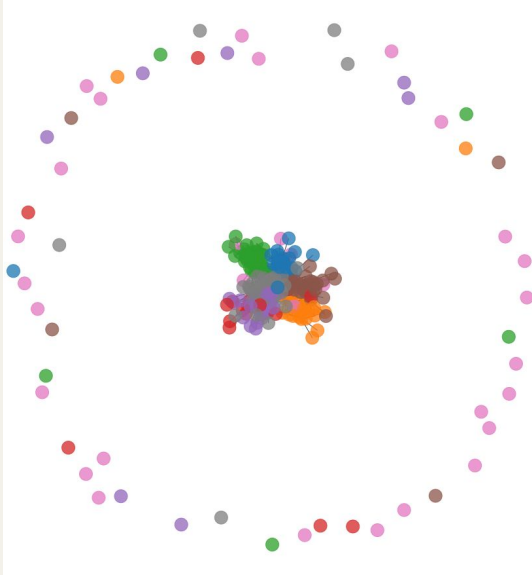- Separate inner and outer-nationality link to calculate the fractions

Hypothesis

- Fractions of cross-country trade in the real network are significantly less than in the ideal network

Homophily index is calculated by a mathematical equation

Network Visualization

2010 Summer Period

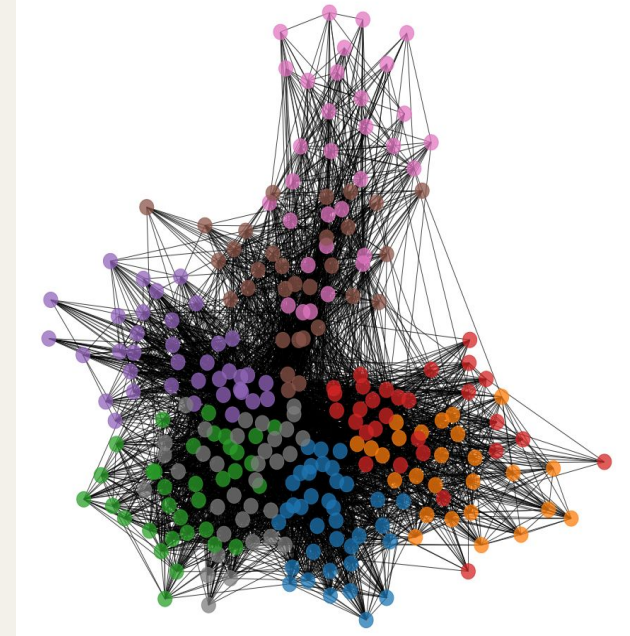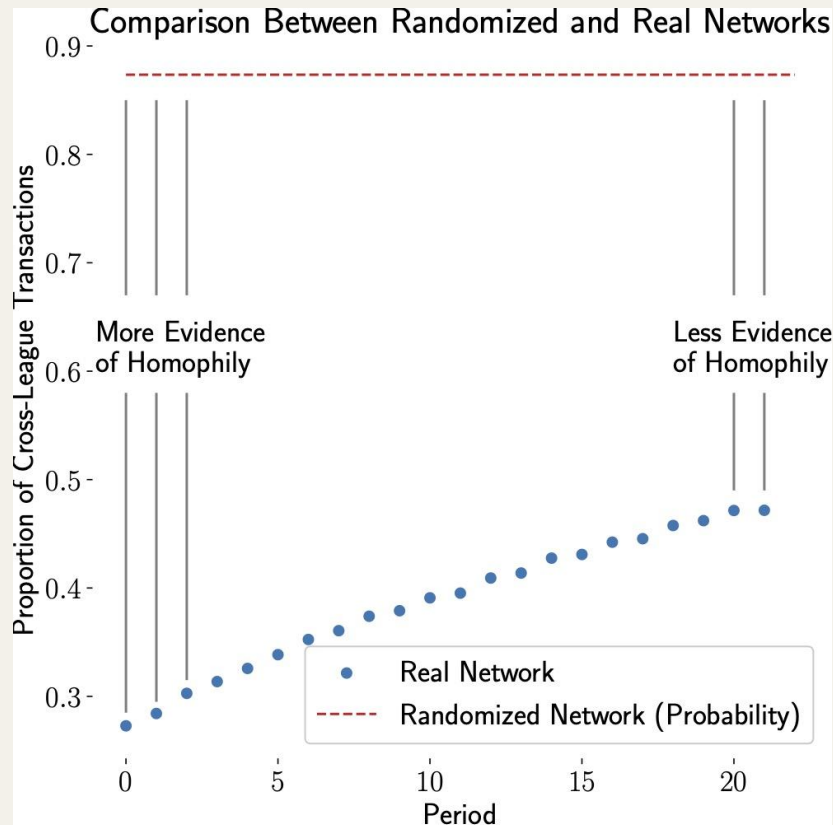<= 2020 Winter Period

- Formation of network overtime
- Adaptation of homophily choice for all Tier 1 teams in each country from base year 2010

- Most nodes trade with each others & form clusters in the network
- Visualize the difference in homophily choice among countries, e.g., pink (Russian) and purple node (Italian)

**Visualized homophily
&
demonstrate the effect on choice**

Homophily - Evidence

Comparison Between Randomized and Real Networks

(y-axis) Proportion of Cross-League Transactions

More Evidence of Homophily

Less Evidence of Homophily

• Real Network
- - - Randomized Network (Probability)

(x-axis) Period

Comparison

There is a gap between ideal network and real network for international trade for each period

Strong evidence

In real network - probability of forming non-homophily trade is far less in ideal network

Decrease in homophily level

The level decreases every period

Overall STRONG homophily effect on choice

Initial test for Top and Bottom teams

Explore relationship between homophily and performance aggregately
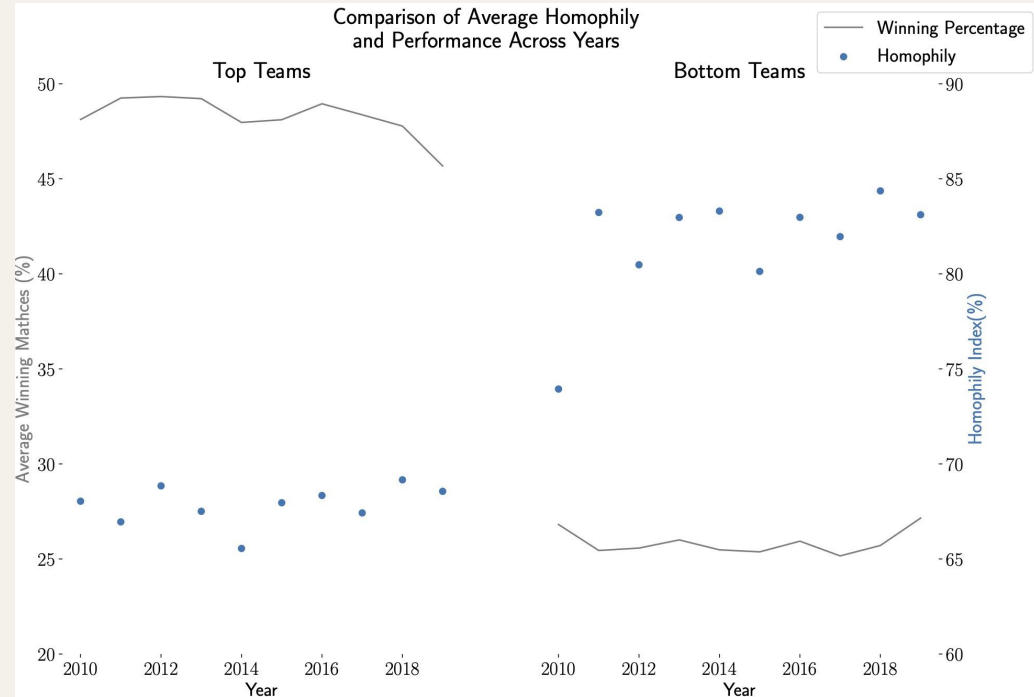
Graph interpretation

Different tendency of how homophily affects different ranking team performance

Scatter-line plot

No evident relationship to the change of performance related to homophily each year for both teams

Possibility that there is NO relationship between nationality homophily and performance

Comparison of Average Homophily and Performance Across Years

Homophily-Performance

Clubs	Total	Top	Bottom
Coefficient	0.4490	0.6336	0.3001
R²	0.700	0.786	0.878
AIC	175.3	-46.38	-1308
Newey-West coefficient	9.4374e-5	1.0633e-4	2.3677e-5

Regression test
- Positive coefficients
- Well-performing R^2
- Acceptable AIC values

After considering possible autocorrelation problem

Further confirmation of result in the initial research

N-W coefficients are nearly 0 for all 3 club categories

For all teams in Tier 1 league across 8 countries

Homophily-choice based on nationality **exist** with **STRONG** evidence

BUT does not affect teams' performance

Insights and Limitations

Insight analysis

- Can aid clubs and managers in the selection of players considered to be acquired even if results show no clear links between homophily and performance

- Can aid football lawmakers in nurturing domestic talent, e.g. with the existence of the 'Homegrown Player Rule' in some countries

Limitations

- Weight of ties not considered

- Limitation of resources for model building

- The connection of assumption and the real world

- Examination of whether transferred players actually play in starting 11 squad of the team

- Limitation of ties between the 8 European leagues even though some teams are composed players transferred from teams in other continents

Recommendation

Exploration of a wider scope of leagues

- This way our sample size would increase and we would be able to examine inter-continental ties rather than only in Europe

- It would be interesting to examine homophily and and its links to performance in lower league or youth (under 21) teams

Analysis of 'chemistry' at player-level

- Seeing if players of a particular nationality join teams which are composed of similar nationality players, coaches or managers

- The higher the 'chemistry', the better players would play as a team due to better communication and socialisation

Examining the existence of closure

- Seeing if domestic teams or top tier teams start acquiring players from the same countries e.g. Bundesliga teams acquiring US young talents

- Examining if we see more apparent trends in other leagues following suit