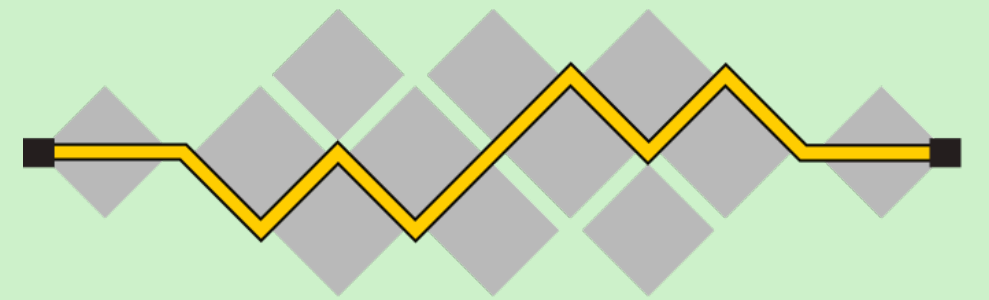


Communication Patterns in the IETF

Matthew Russell Barnes, Mladen Karan, Stephen McQuistin, Colin Perkins, Gareth Tyson, Ignacio Castro, Richard Clegg - 10/2023



I E T F[®]

- Social **graph** of **mailing list** interactions
- **Person IDs** collating similar **email addresses** together

Basic Statistics

10,319 nodes

557,236 edges

21/06/2012 - 17/04/2021

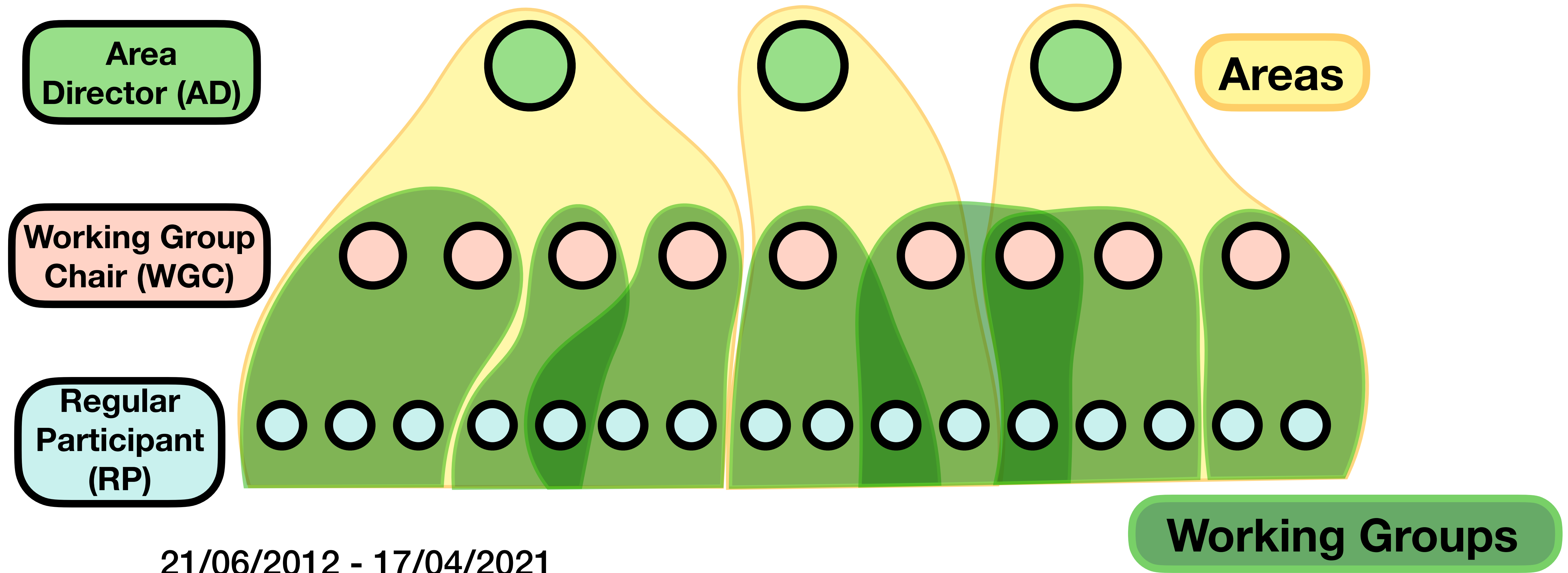
Active Nodes in Last Year



The Web We Weave: Untangling the Social Graph of the IETF, Proc. ICWSM, P. Khare et al. (2022)



Hierarchical Structure

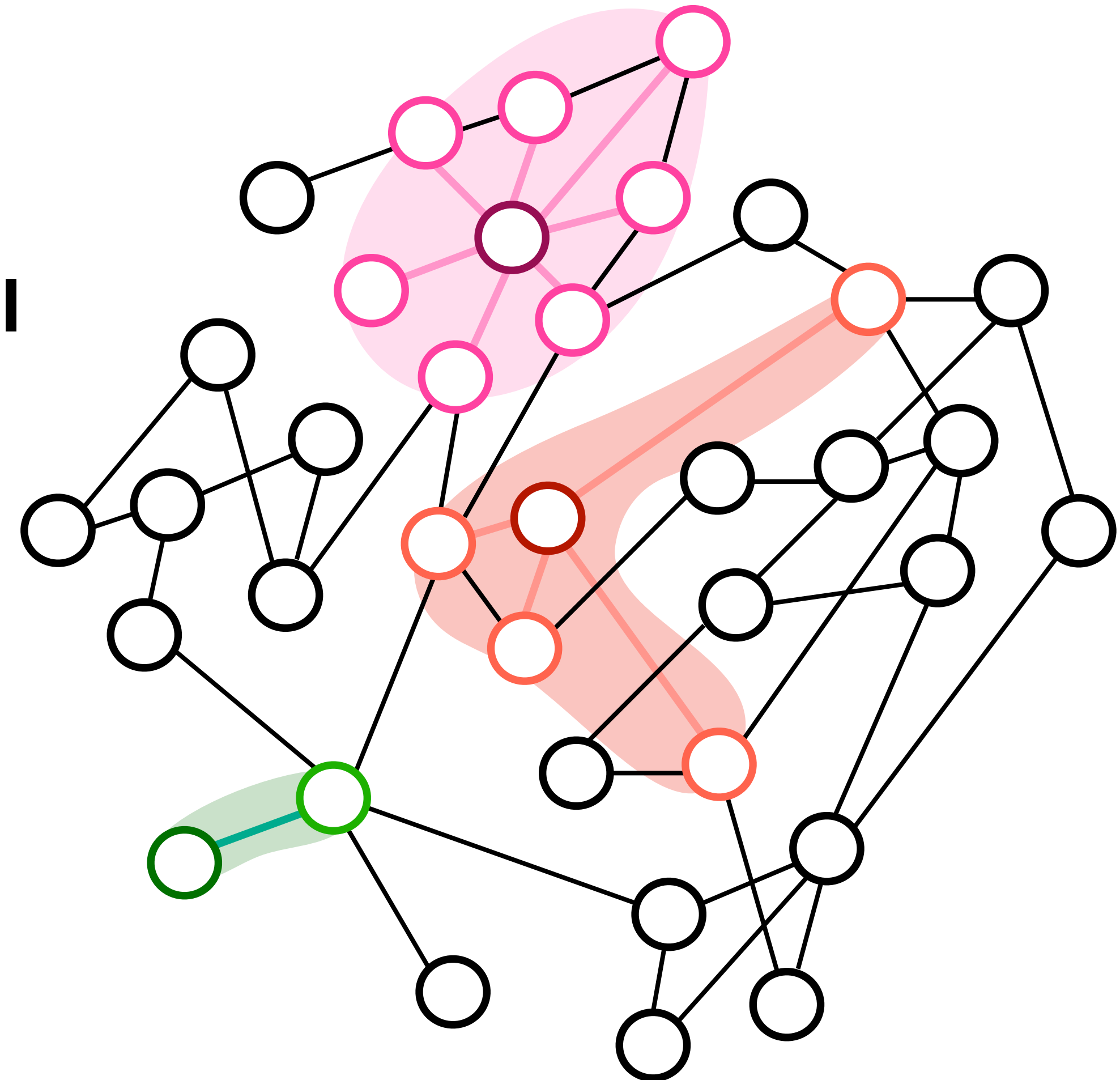


Key Question

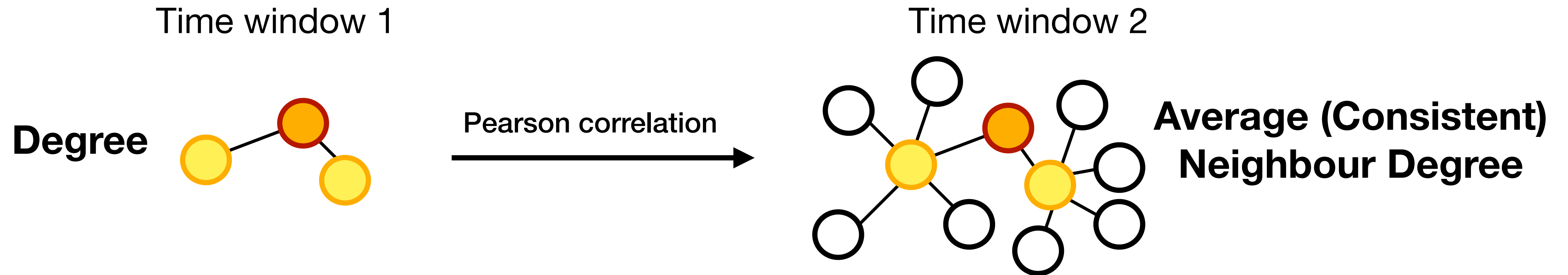
How does the **hierarchy** affect the **communication patterns** of the IETF?

Key Concepts

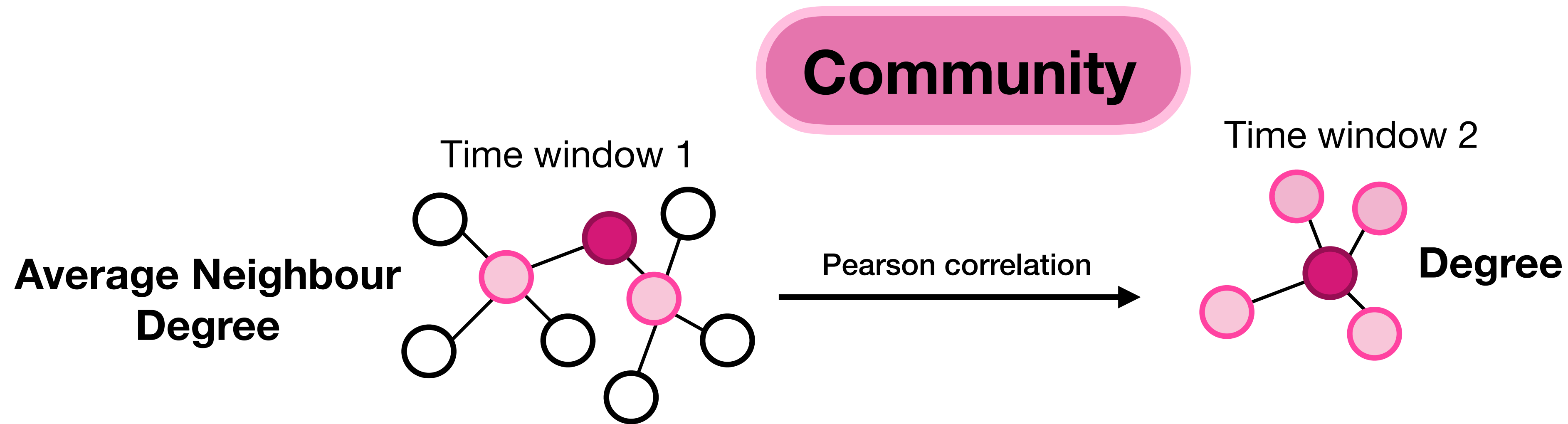
- **Degree**
 - Amount of **activity** of an **individual**
- **Average Neighbour Degree**
 - Average amount of **activity** of an individual's **connections**
- **Time Window**
 - Collation of the **activity** of **individuals** between two times



Philanthropy

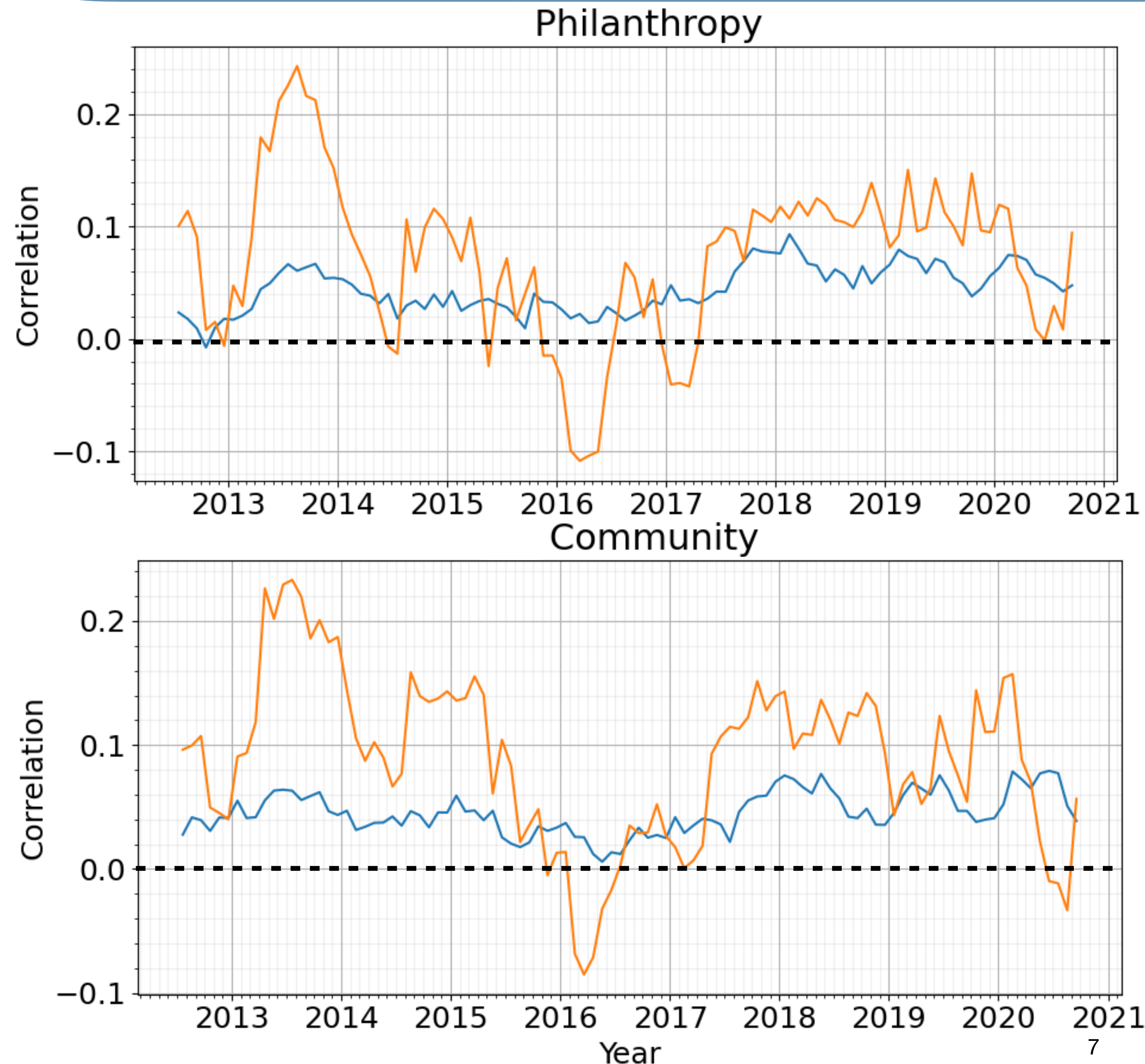


- **Positive Correlation** (*Philanthrope*)
 - **Active** individuals **help** neighbourhood discussion
 - **Inactive** individuals **dissuade** discussion
- **Negative Correlation** (*Prima Donna*)
 - Neighbourhoods are **stifled** by **active** individuals
 - Neighbourhoods **thrive** with **inactive** individuals



- **Positive** Correlation (*Communitarian*)
 - **Active** neighbourhoods **help** individual discussion
 - **Inactive** neighbourhoods **dissuade** discussion
- **Negative** Correlation (*Individualist*)
 - Individuals are **stifled** by an **active** neighbourhood
 - Individuals **thrive** in an **inactive** neighbourhood

How do people higher in the organisation hierarchy impact their most direct contacts?



- Increased effect **on** and **from** neighbours' degree
- Especially for **Community**
- Suggests a “**facilitator**” role for WGCs

Working group chairs - good facilitators?

- They are affected **positively** by **neighbours' activity**
- And **neighbours** are affected **positively** by them

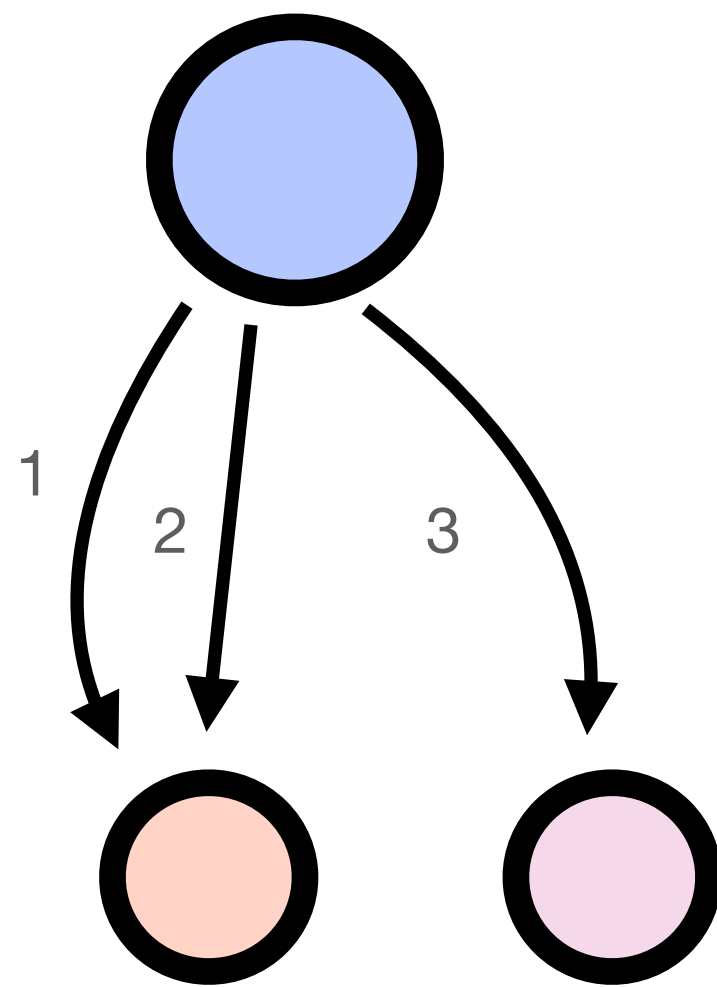
BUT

- No account is taken of **communication direction**
- Do **directed communication motifs** show a **difference**?

How do different **hierarchy levels** communicate with the **wider organisation**?

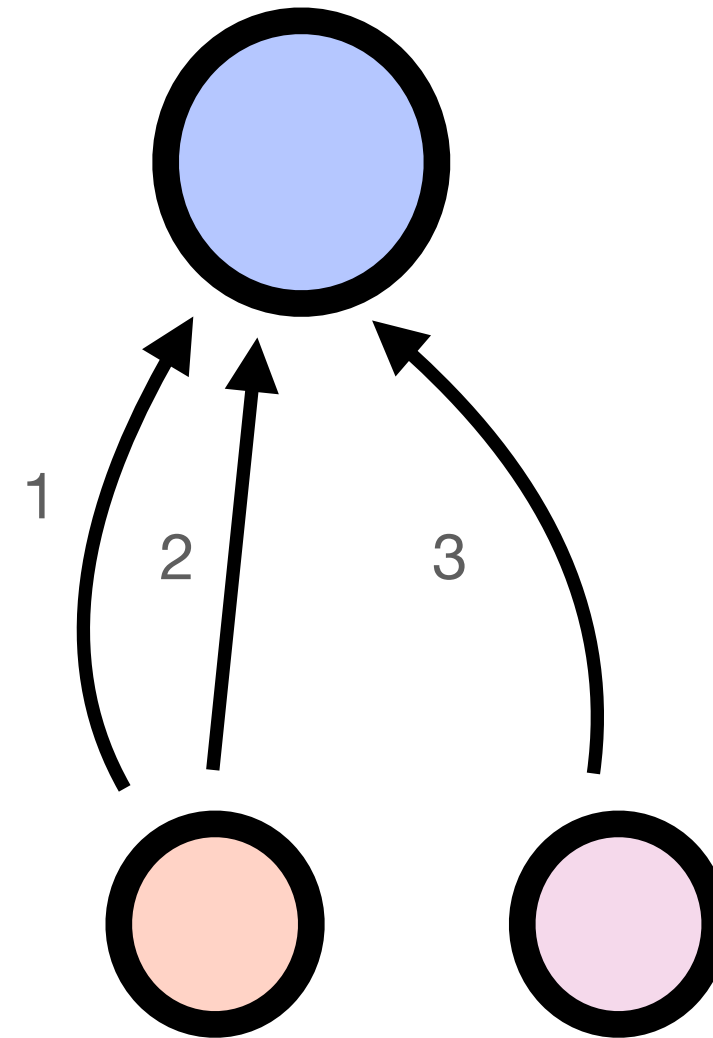
Temporal Three-Edge Motifs

Outward Star



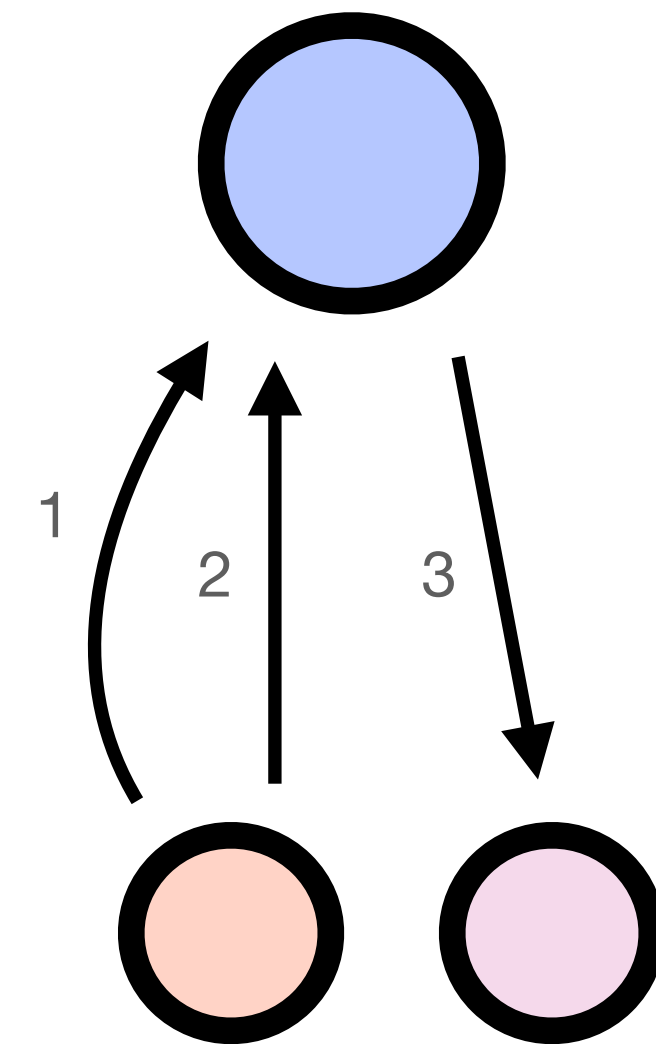
- Announcements
- Dissemination of Information

Inward Star



- Questions
- Condensing of Information

Mixed Star

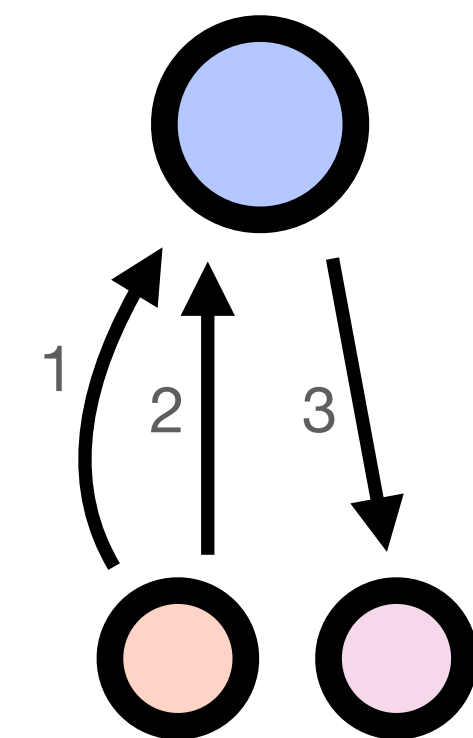
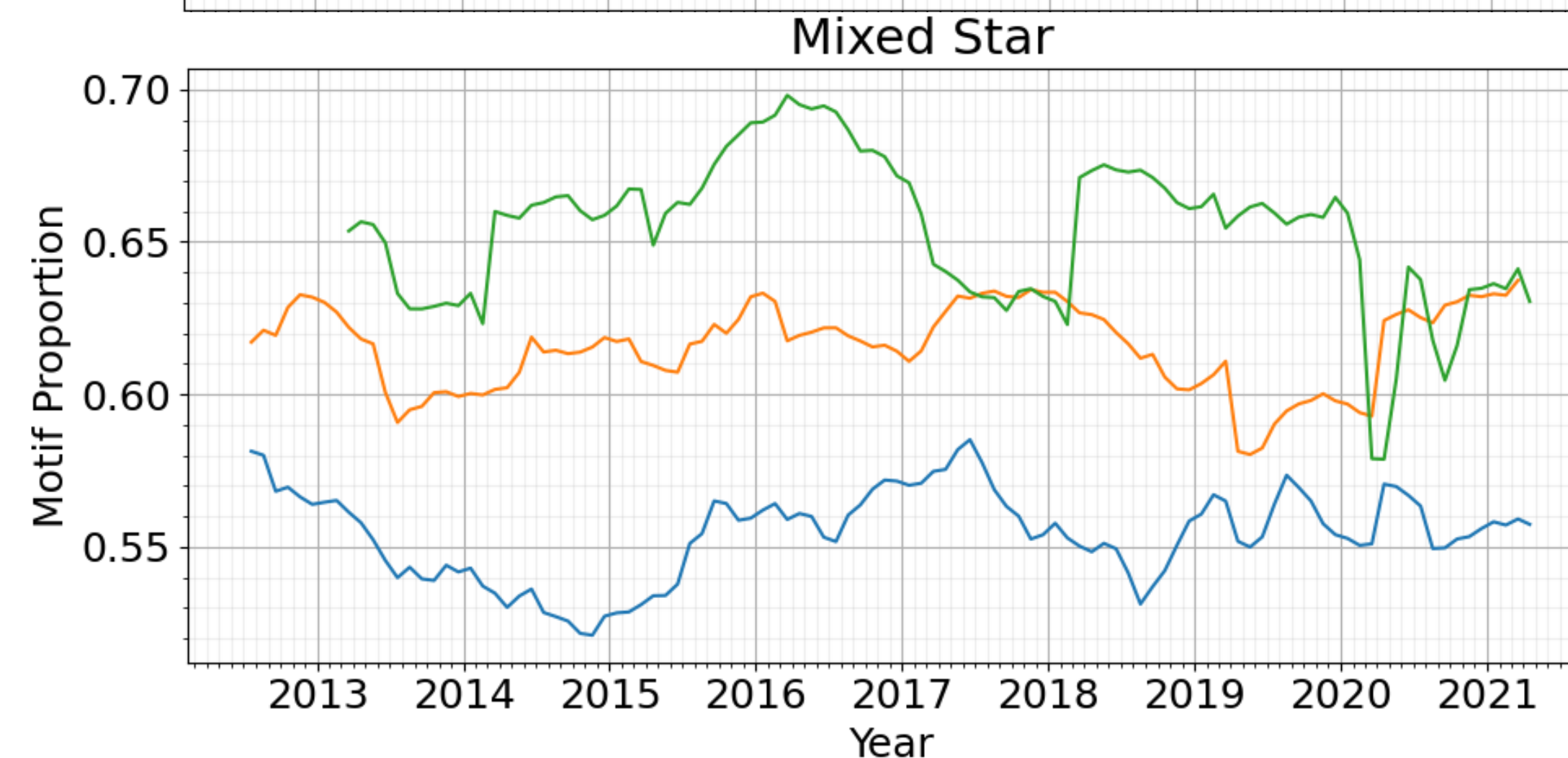
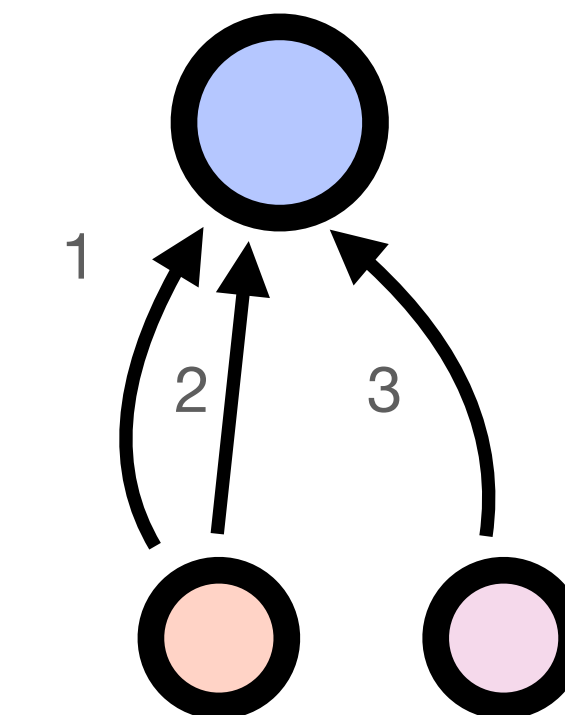
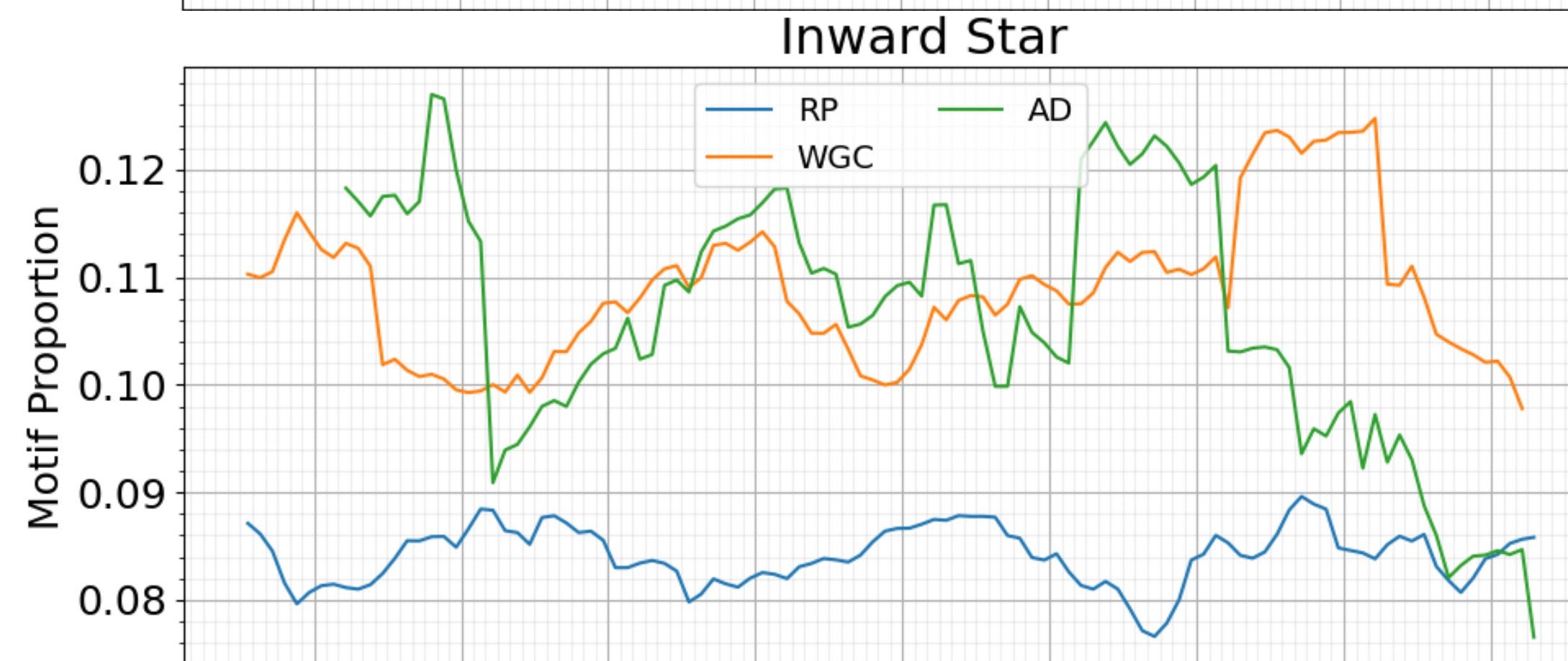
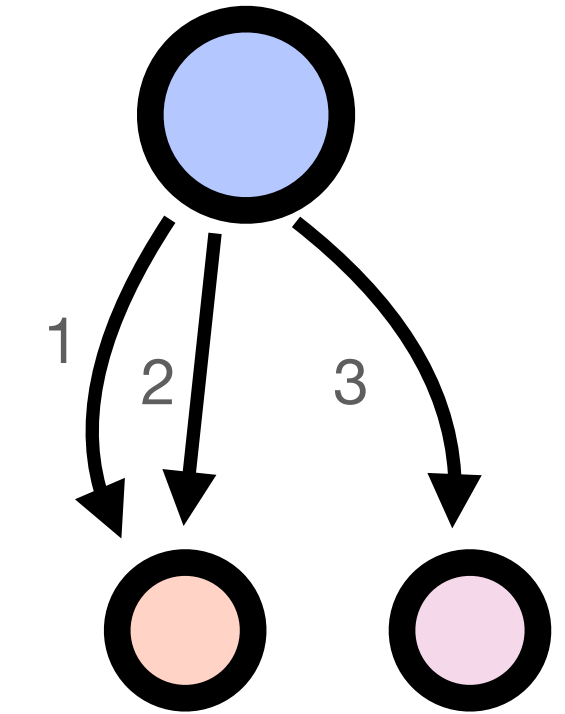
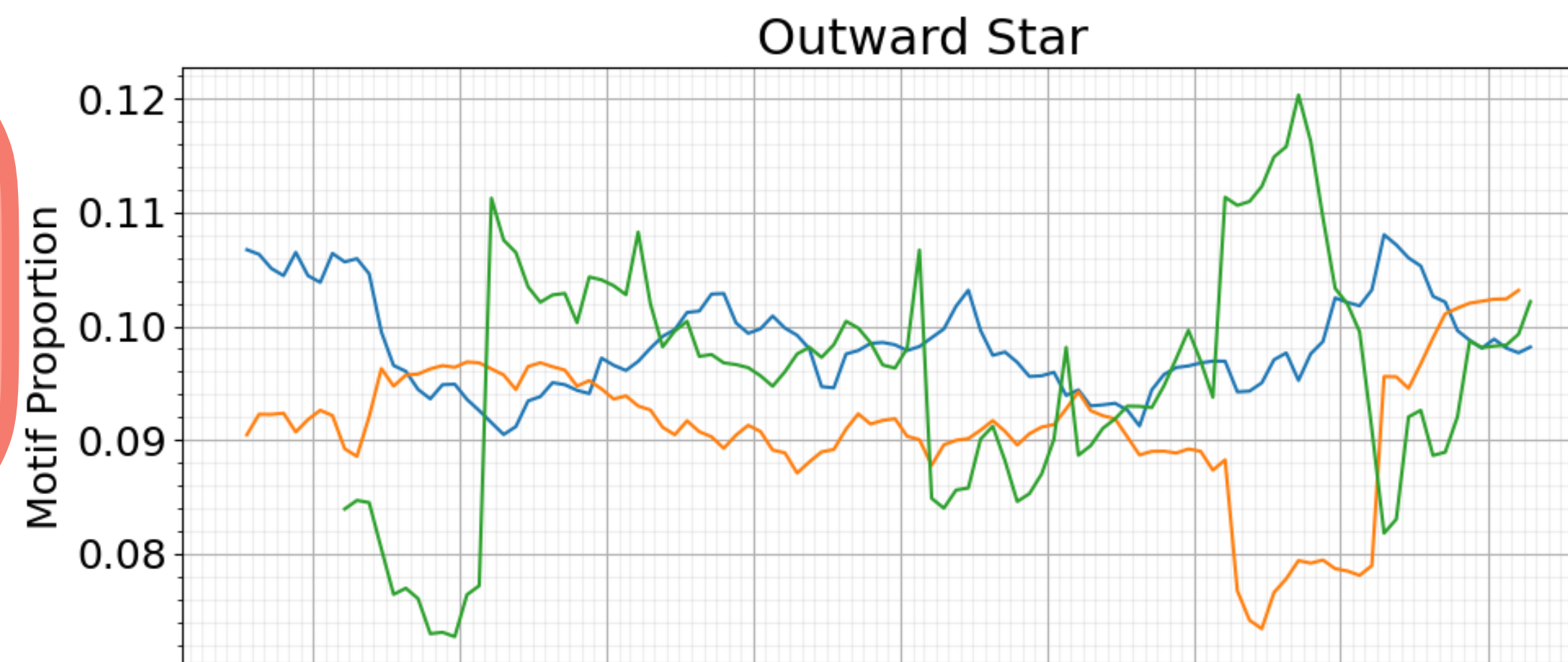


- Discussion
- Facilitation of Conversation

Organisation wide hierarchy level communication patterns

- Higher hierarchy levels experience a **larger** proportion of **incoming** and **mixed** email motifs than **lower** levels
- All levels have a **similar** proportion of **outgoing** email motifs

— Regular Participant
— Working Group Chair
— Area Director



Conclusions

- **Working group chairs are facilitators of discussion**
- In **working group** discussion, **regular participants** send **out more** than they **receive in**
- And, **area directors** and **working group chairs** are **condensers** of discussion

Any suggestions / questions?

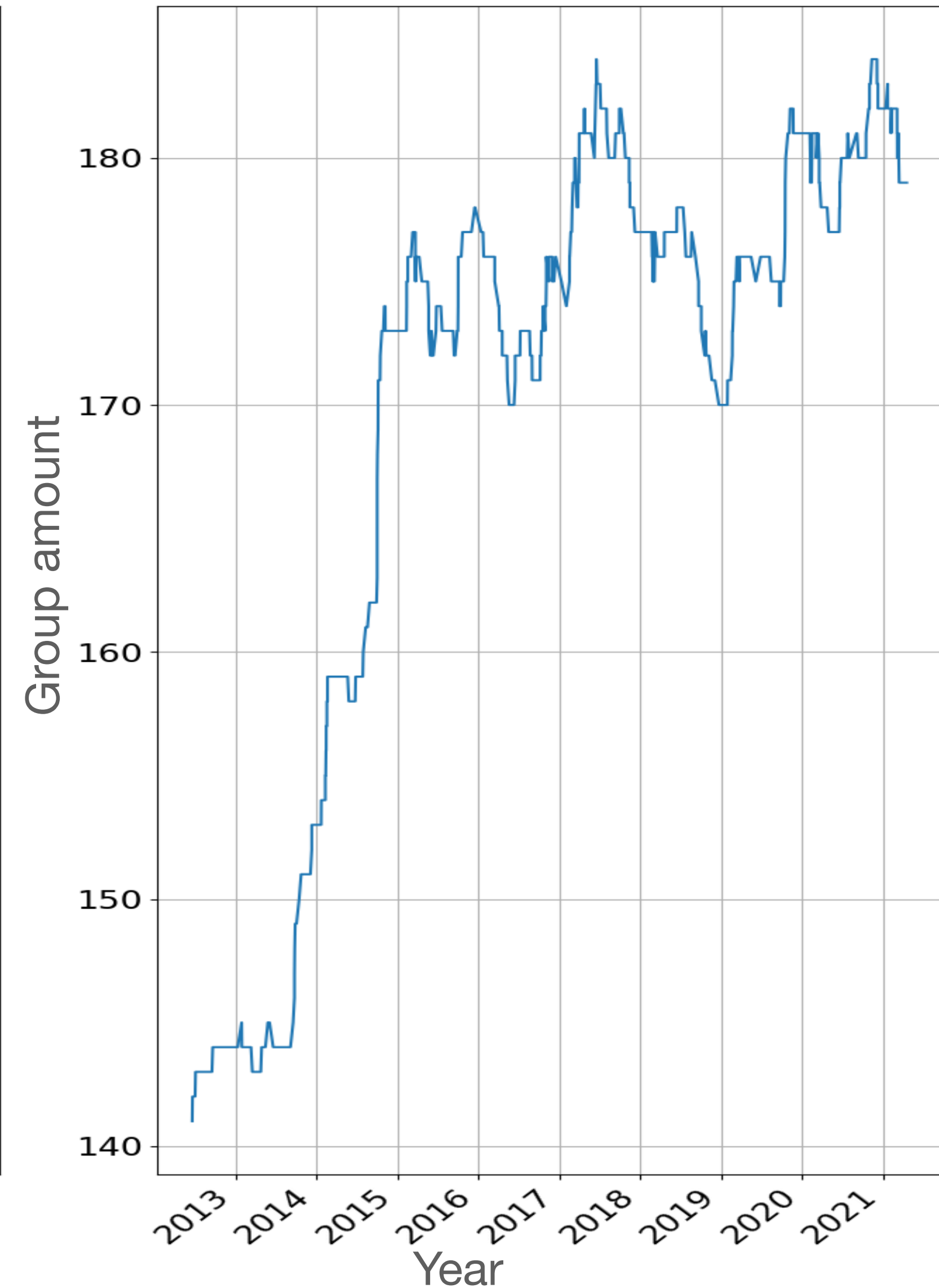
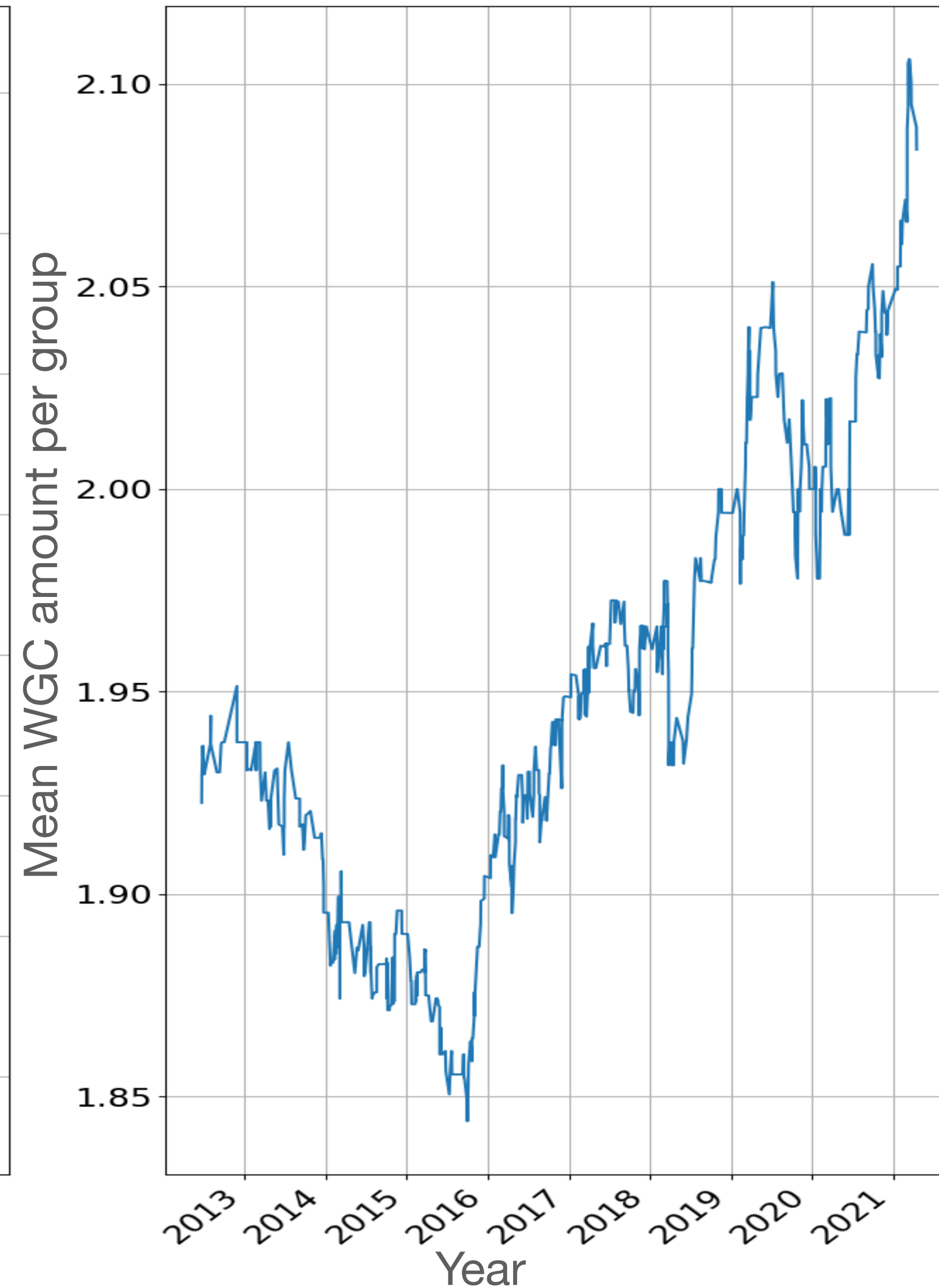
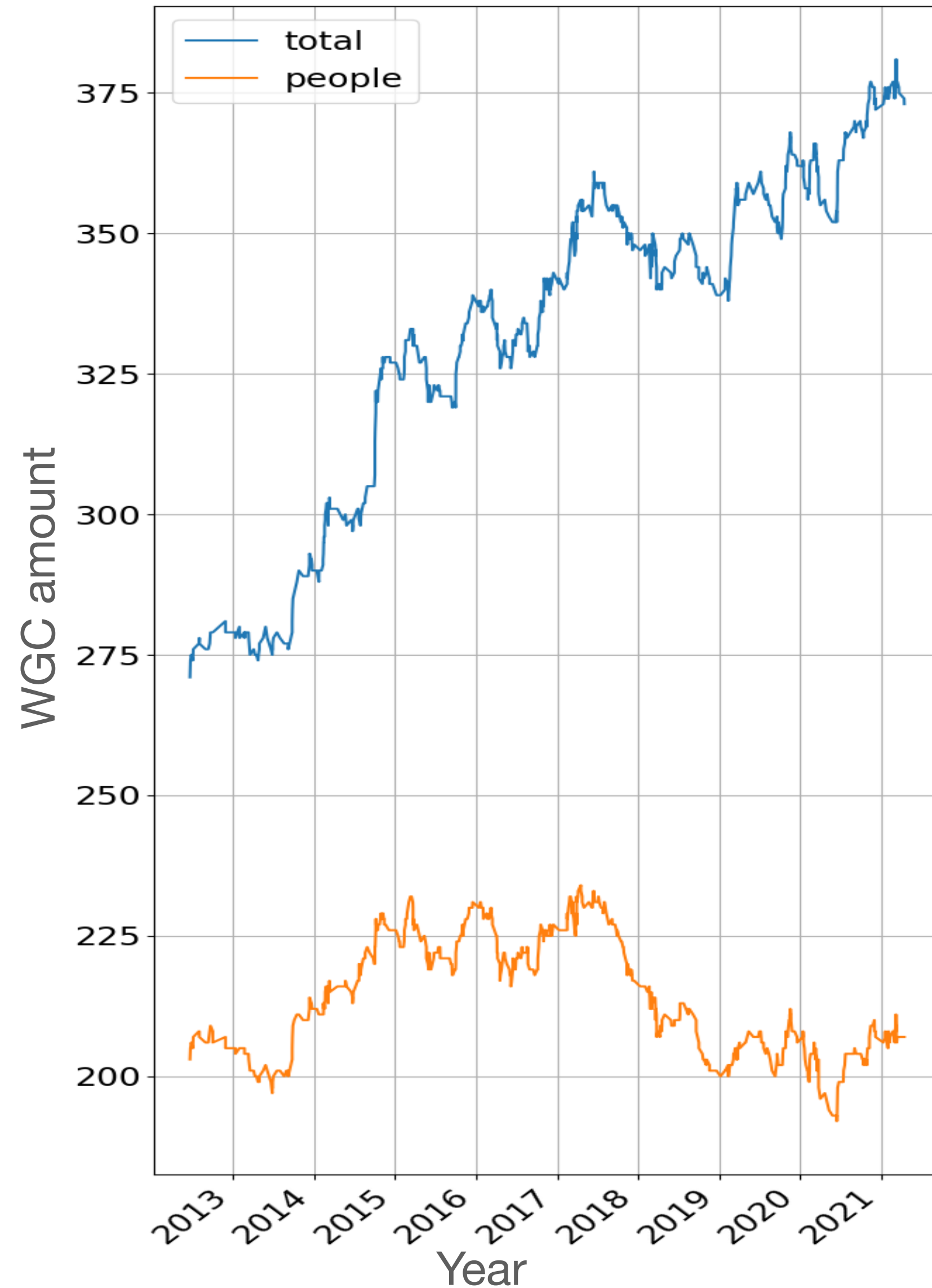
Thank you



Queen Mary
University of London

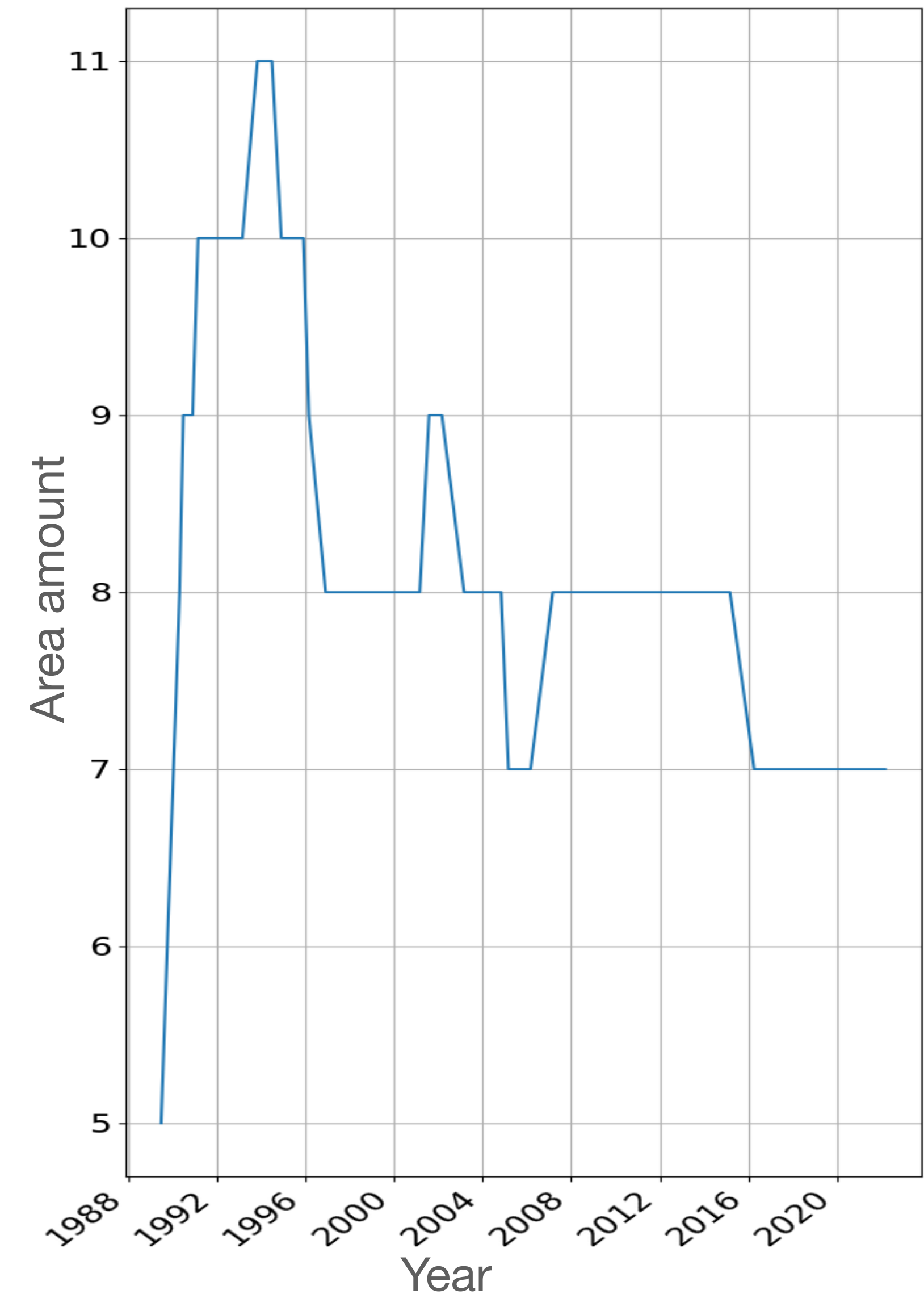
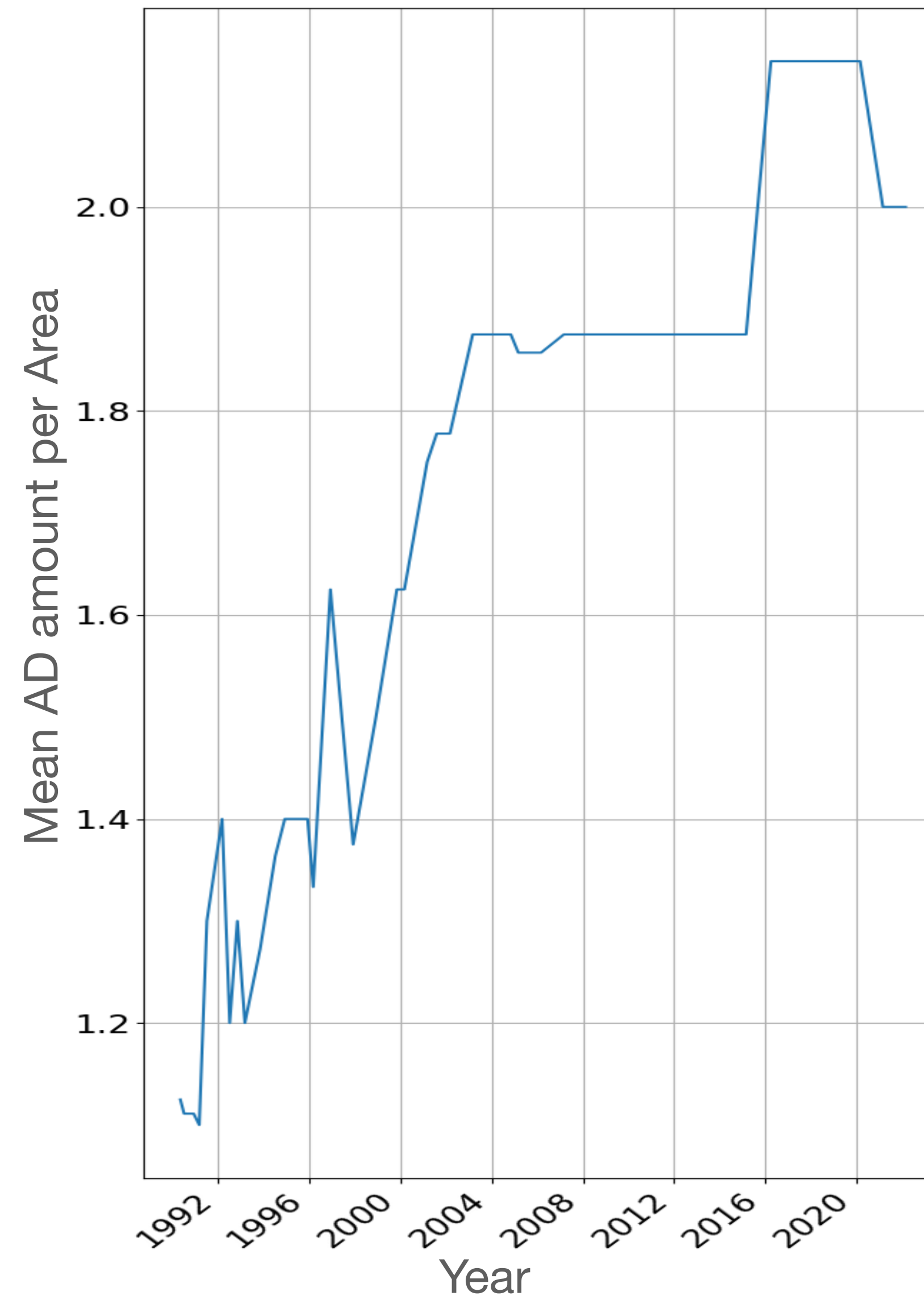
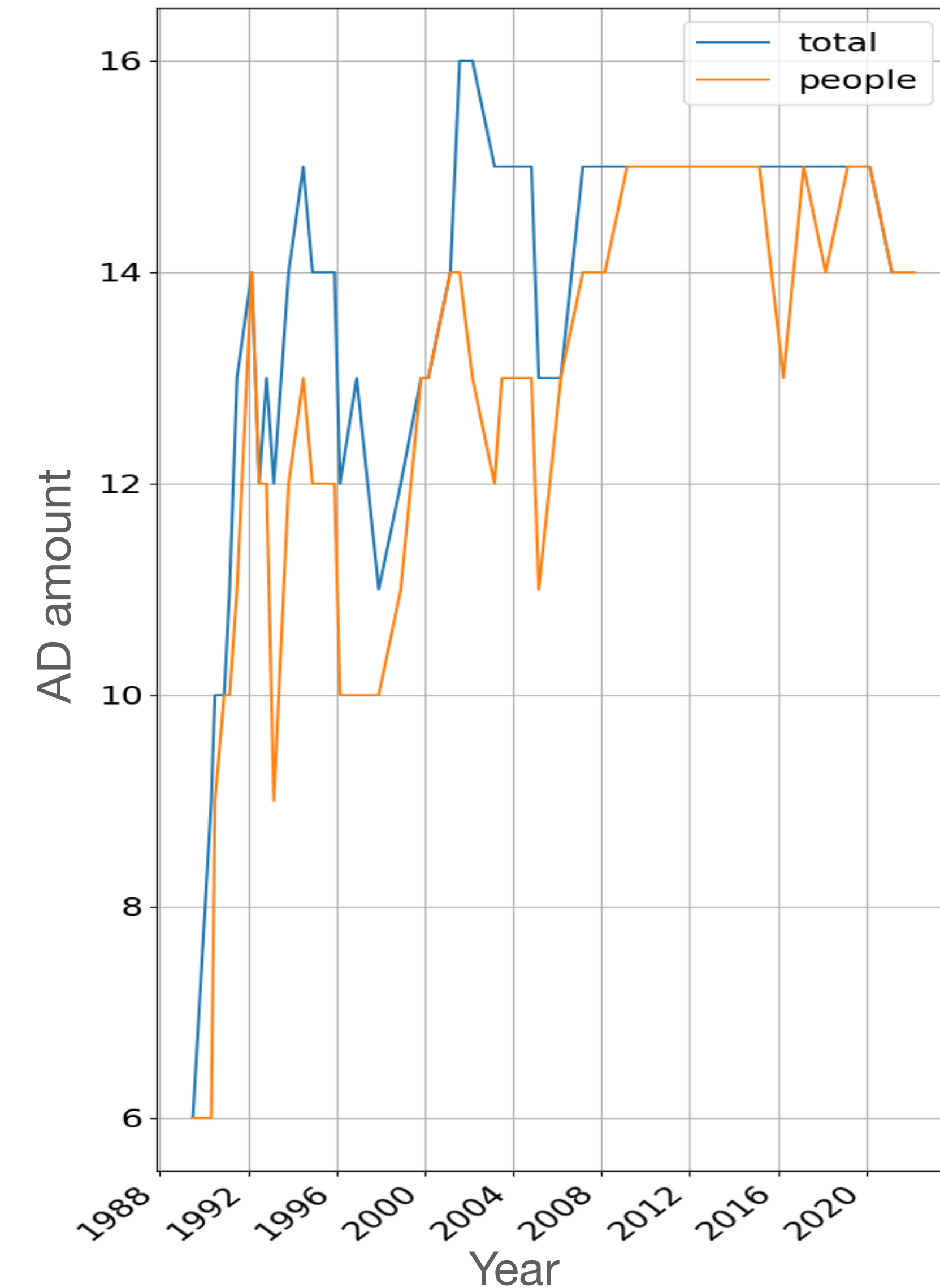
RQ1: How does the hierarchy evolve over time?

- **More** working group chairs - about **+35%**



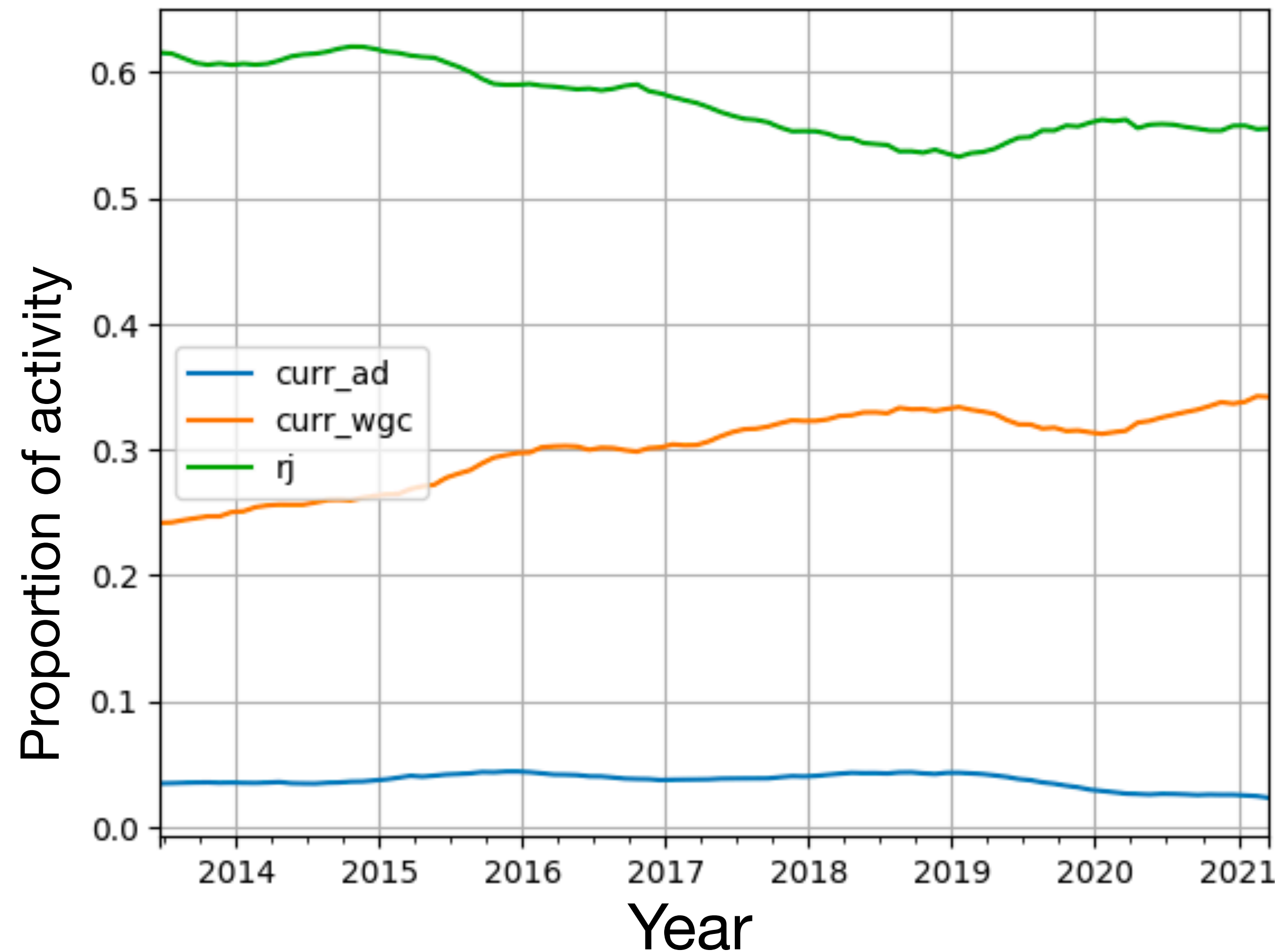
RQ1: How does the hierarchy evolve over time?

- Little change in ADs since 2012



RQ1: How does the hierarchy evolve over time?

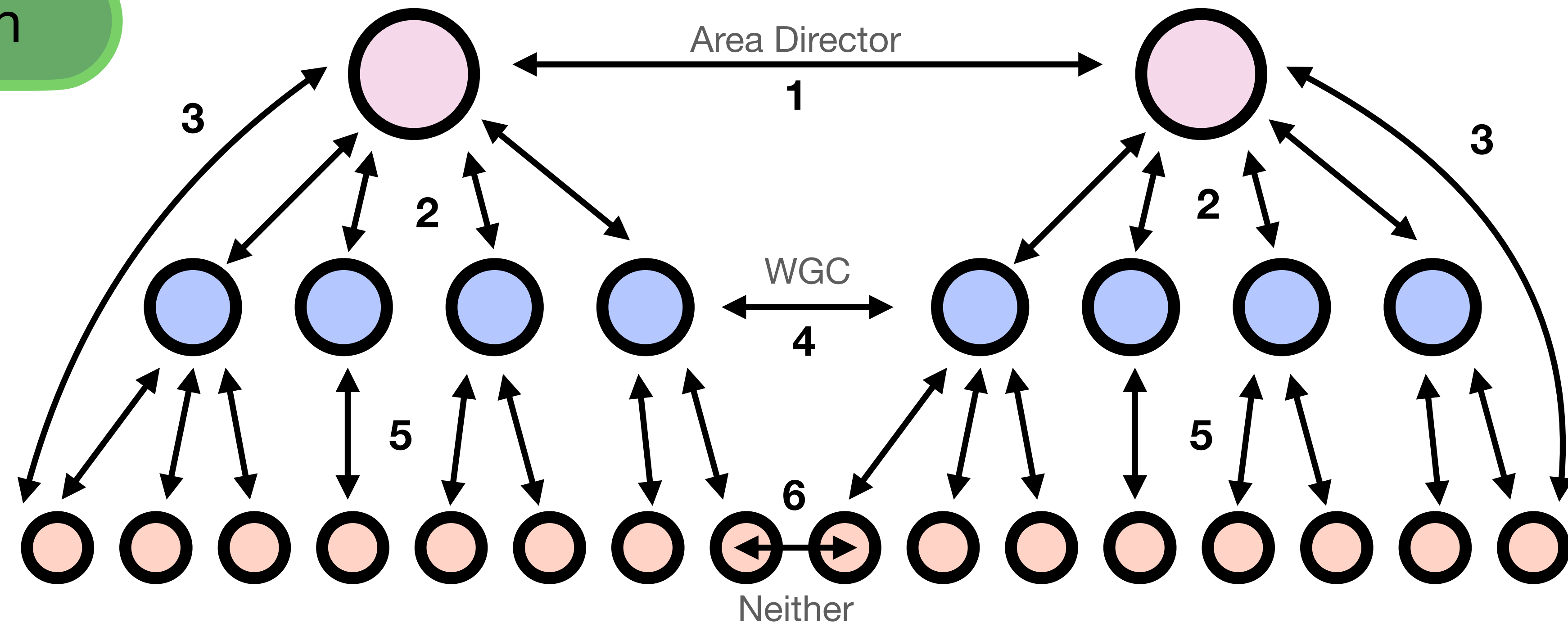
- WGCs are about **25-35%** of the total IETF activity
- ADs are **5%** of activity



RQ4: How do people at different levels communicate, does information flow "up" or "down" the hierarchy?

- Grid of communication

	AD	WGC	NA
A D	1	2	3
W G C		4	5
N A			6



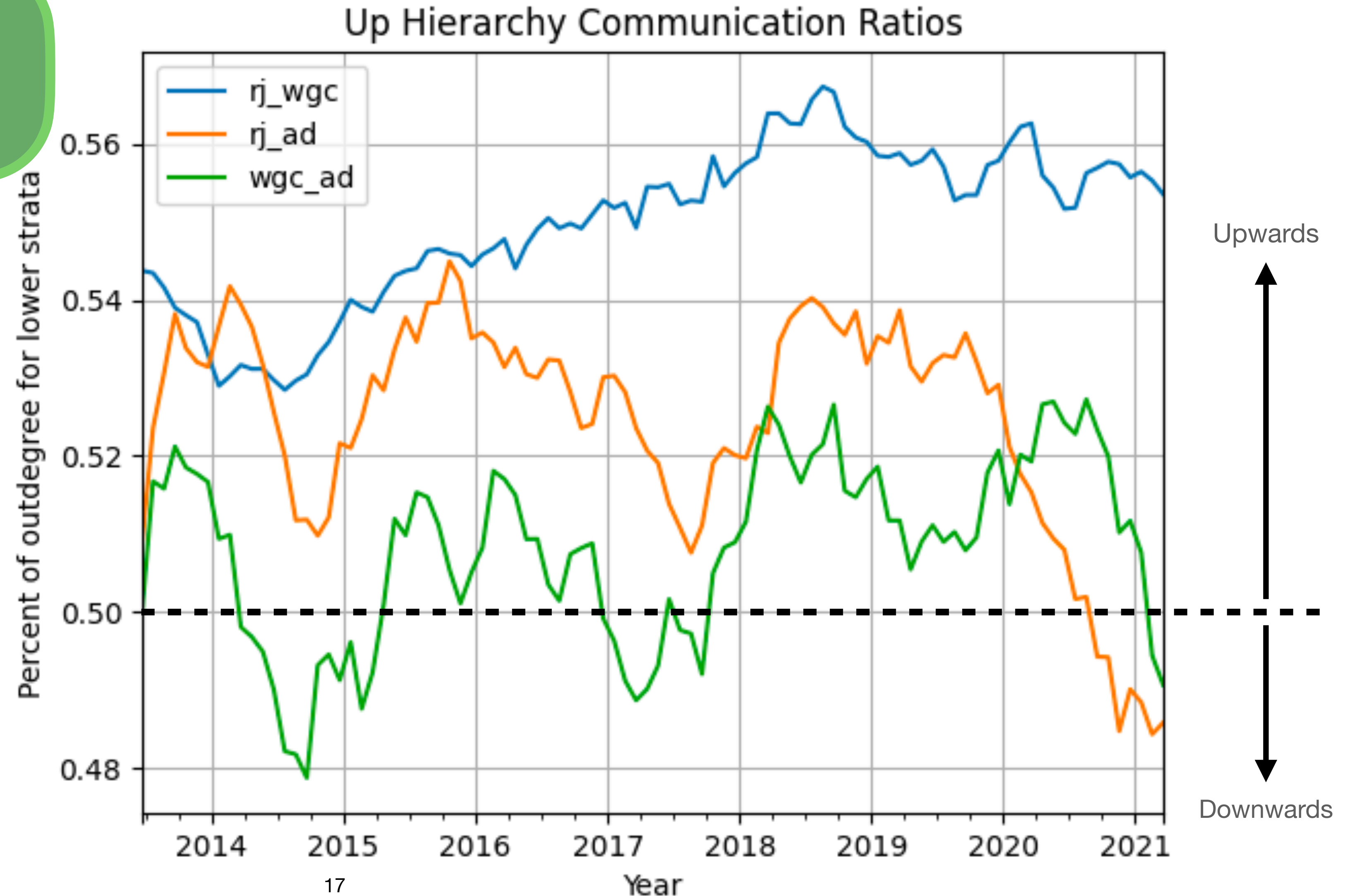
Example:

- Sum of all weighted edges from AD->WGC divided by the sum of all weighted edges from WGC->AD

RQ4: How do people at different levels communicate, does information flow "up" or "down" the hierarchy?

- Ratio of communications inbound/outbound between strata

	AD	WGC	RP
AD			
WGC			
RP			



RQ2: How does organisation hierarchy impact communication patterns?

TODO

- Indegree vs outdegree
 - Number of emails per month
-
- For WGC vs Not
 - Before and after becoming WGC

