Risk Mapping Analysis
Persistence, Diffusion & Clustering

Output Summary

PART 1: RISK PERSISTENCE ANALYSIS

Panel: 164 entities (154 Municipality, 11 Prefecture, 1 MCF), 520 documents

OVERALL PERSISTENCE RATE: 75.5%
  Once a risk term enters an RSA, it has a 75.5% chance of appearing in the next one.

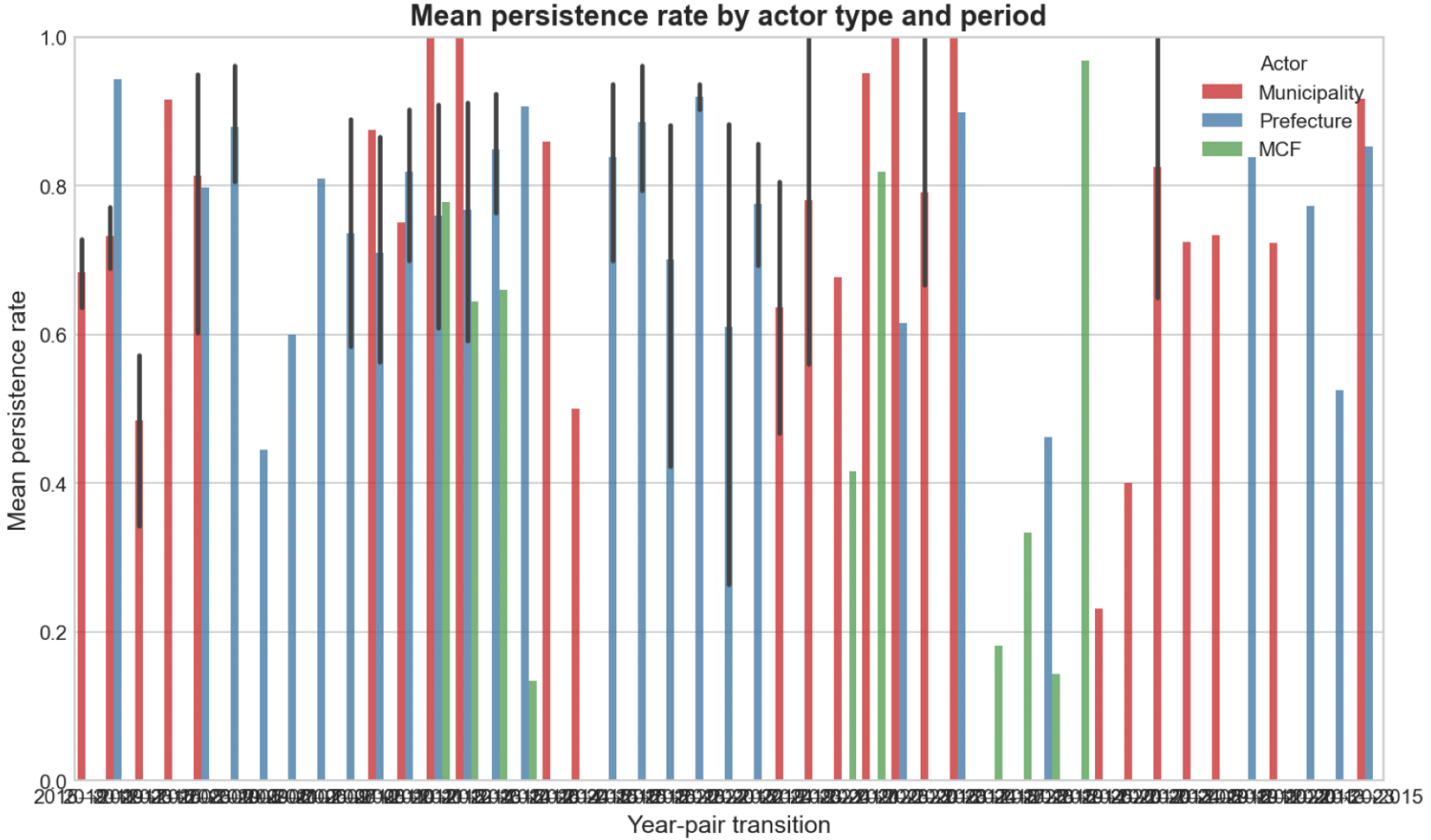
By actor type:
  Prefecture: 80.2% (most stable risk catalogues)
  Municipality: 74.1%
  MCF: 59.9% (most volatile — actively revising)

Jaccard similarity (mean term overlap between consecutive docs):
  Prefecture: 0.629
  Municipality: 0.499
  MCF: 0.275

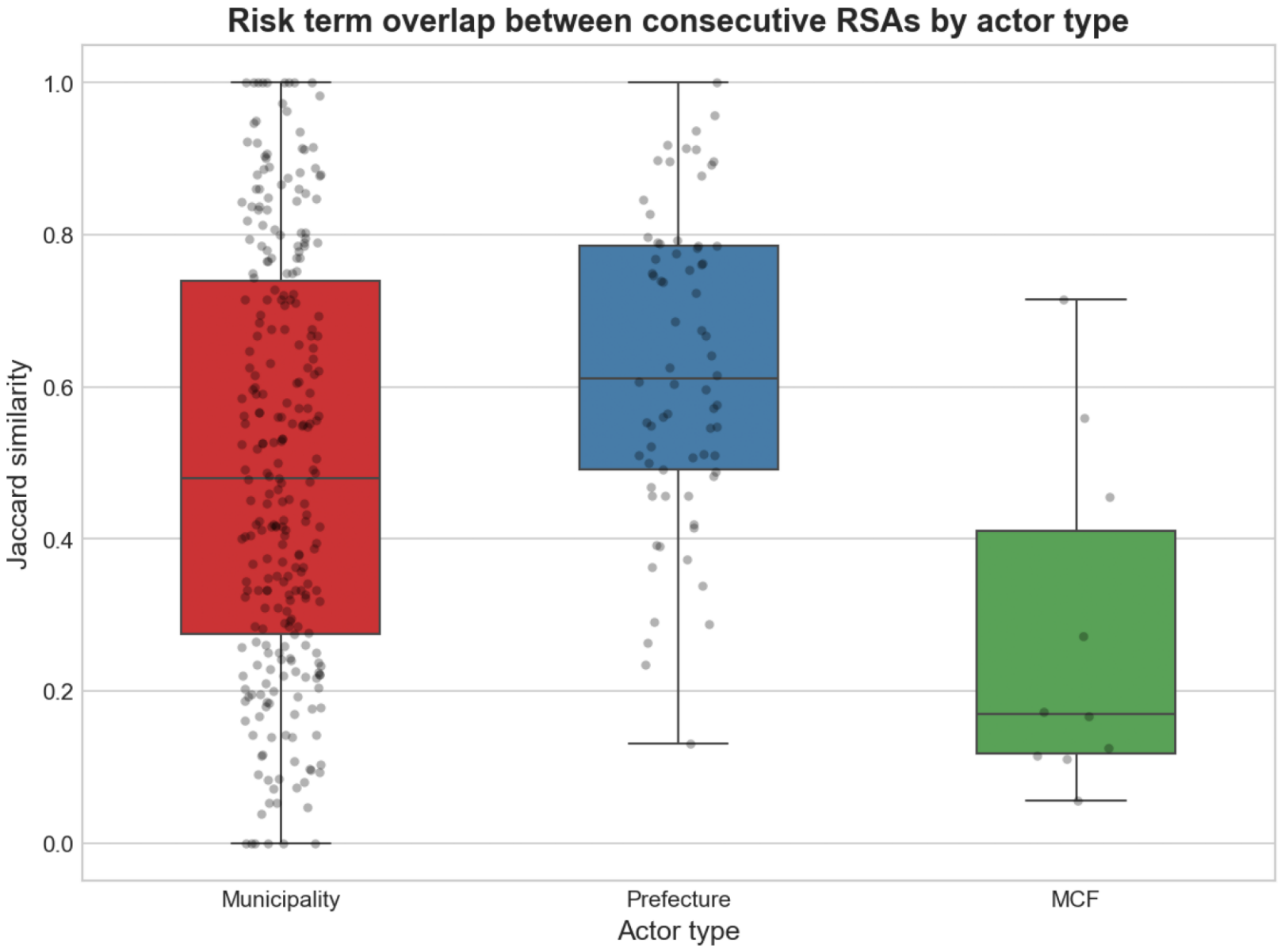
Top 5 most persistent terms:
  hälsa (96.8%), dricksvatten (91.8%), brand (89.7%), farligt gods (89.1%), översvämning (88.9%)

Top 5 most frequently dropped terms:
  vattenläcka (72.0%), terrorhot (71.4%), halka (65.2%), våldsbrott (62.5%), stormfällning (60.7%)

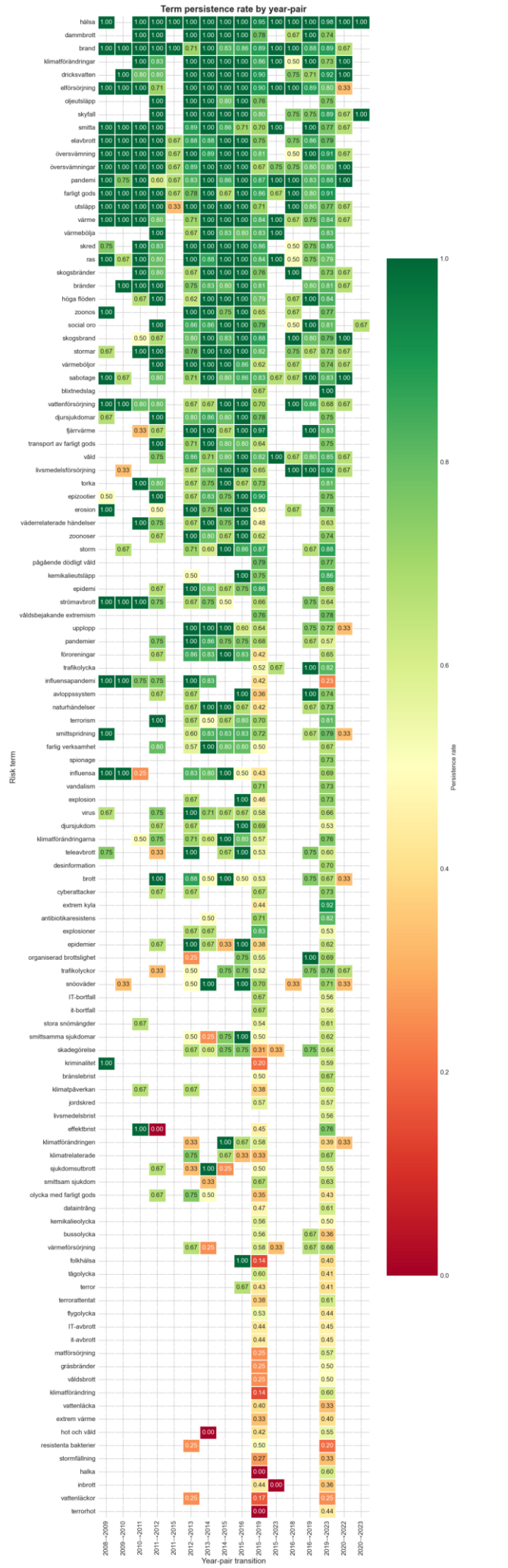
Mean persistence rate by actor type and period



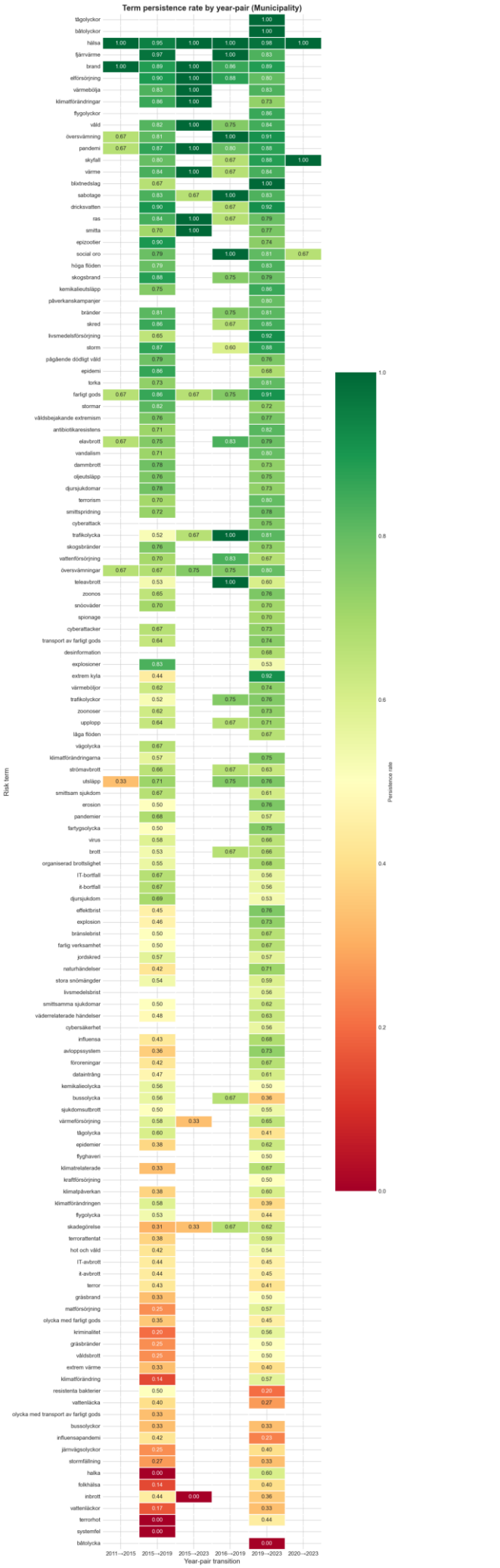
Jaccard similarity distribution by actor type



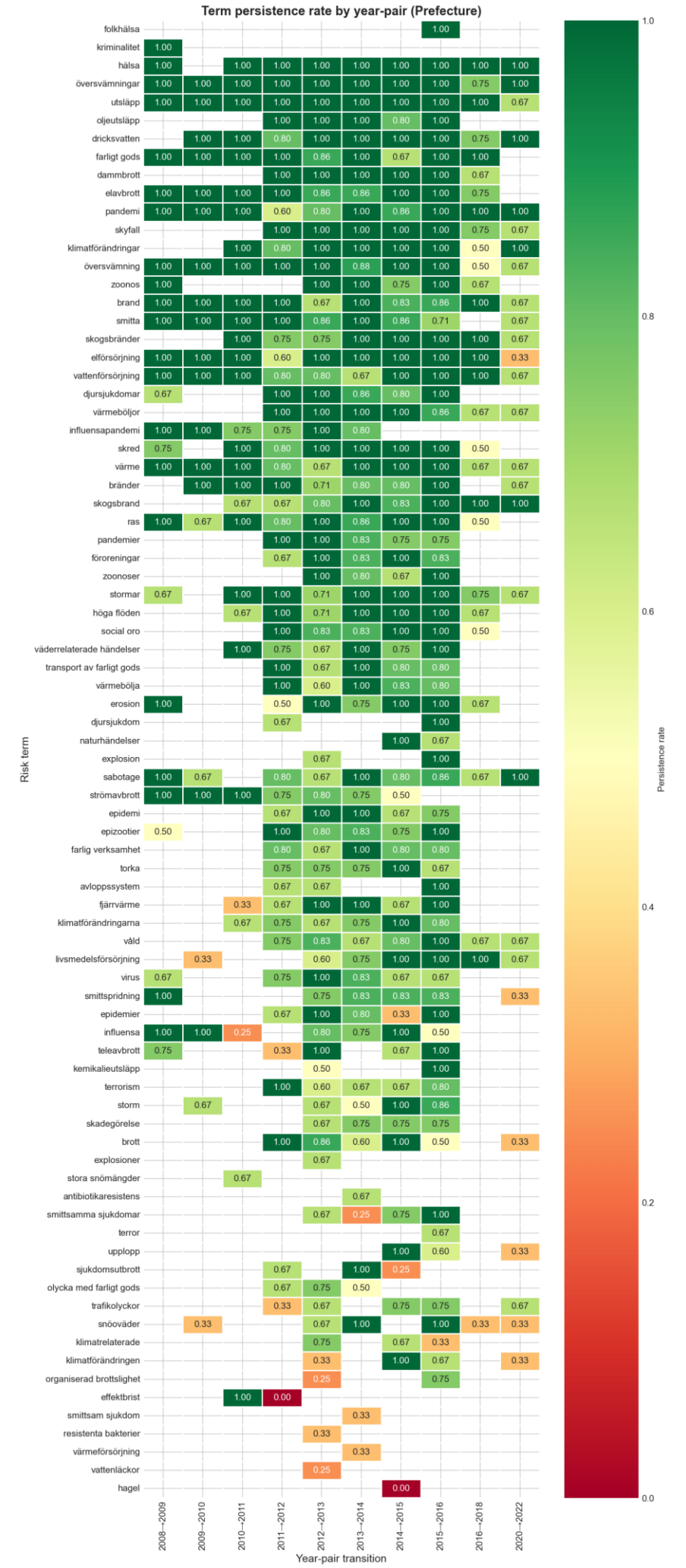
Term persistence heatmap (all actors)



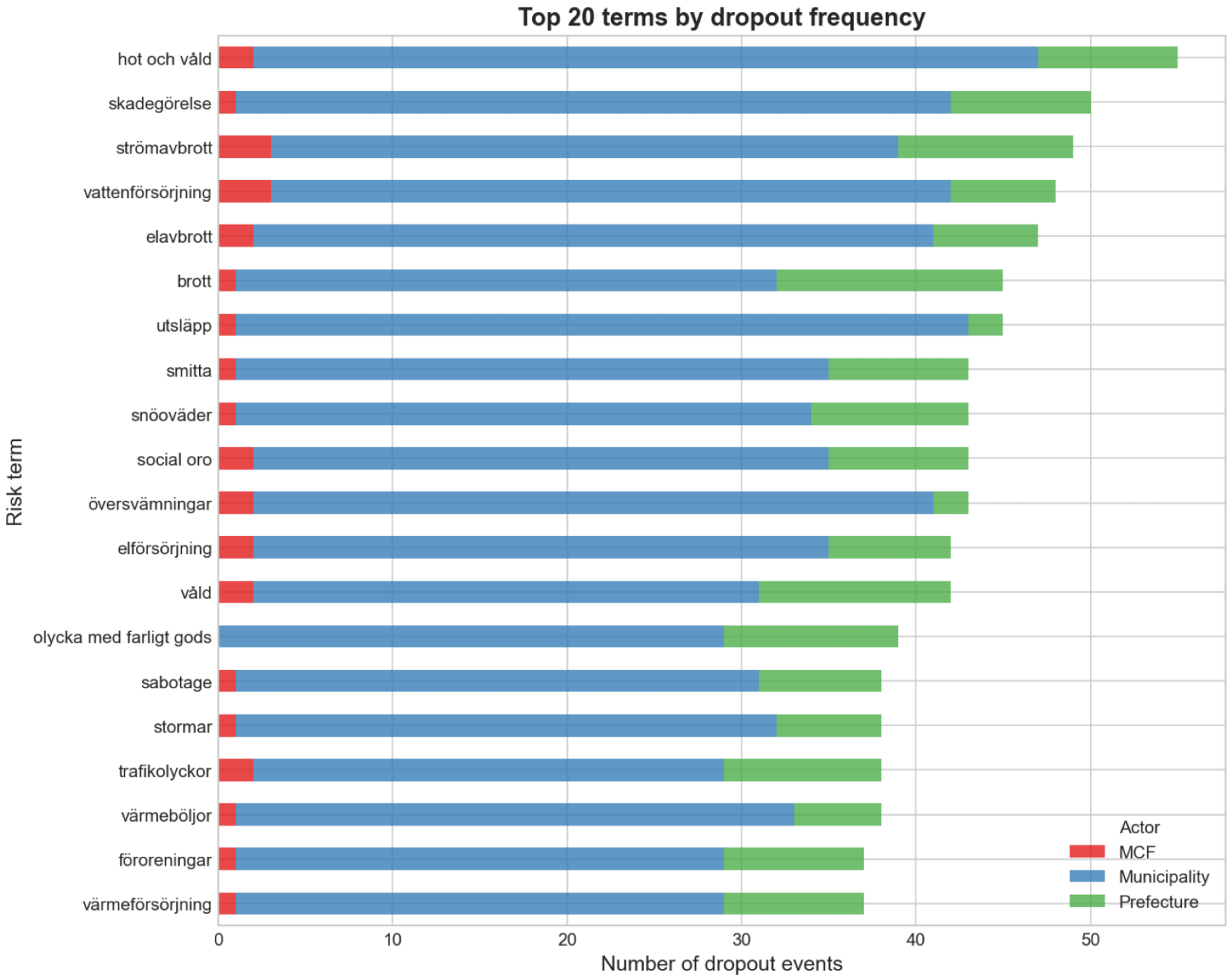
Term persistence heatmap (municipalities)



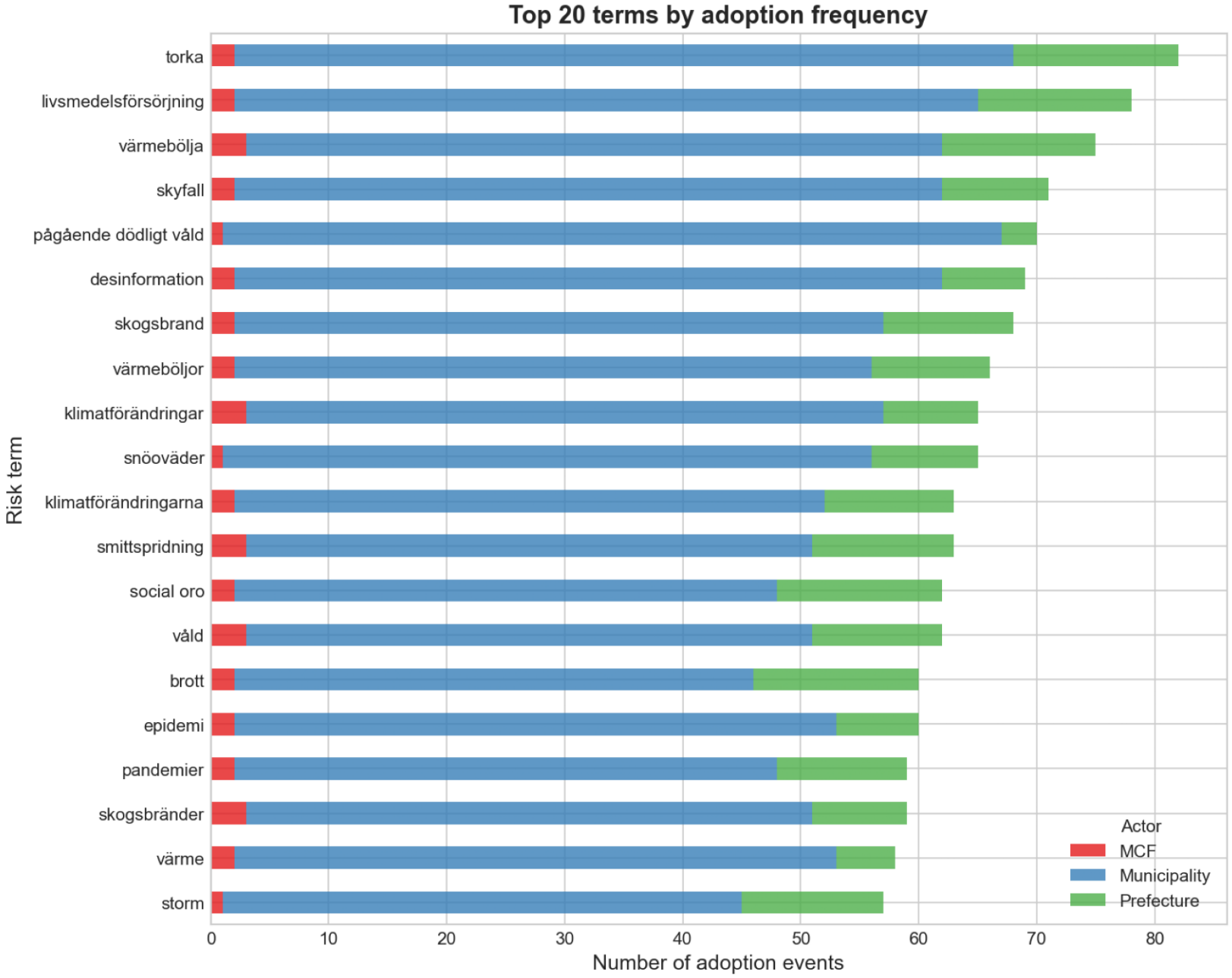
Term persistence heatmap (prefectures)



Top 20 terms by dropout frequency



Top 20 terms by adoption frequency



PART 2: RISK DIFFUSION ANALYSIS

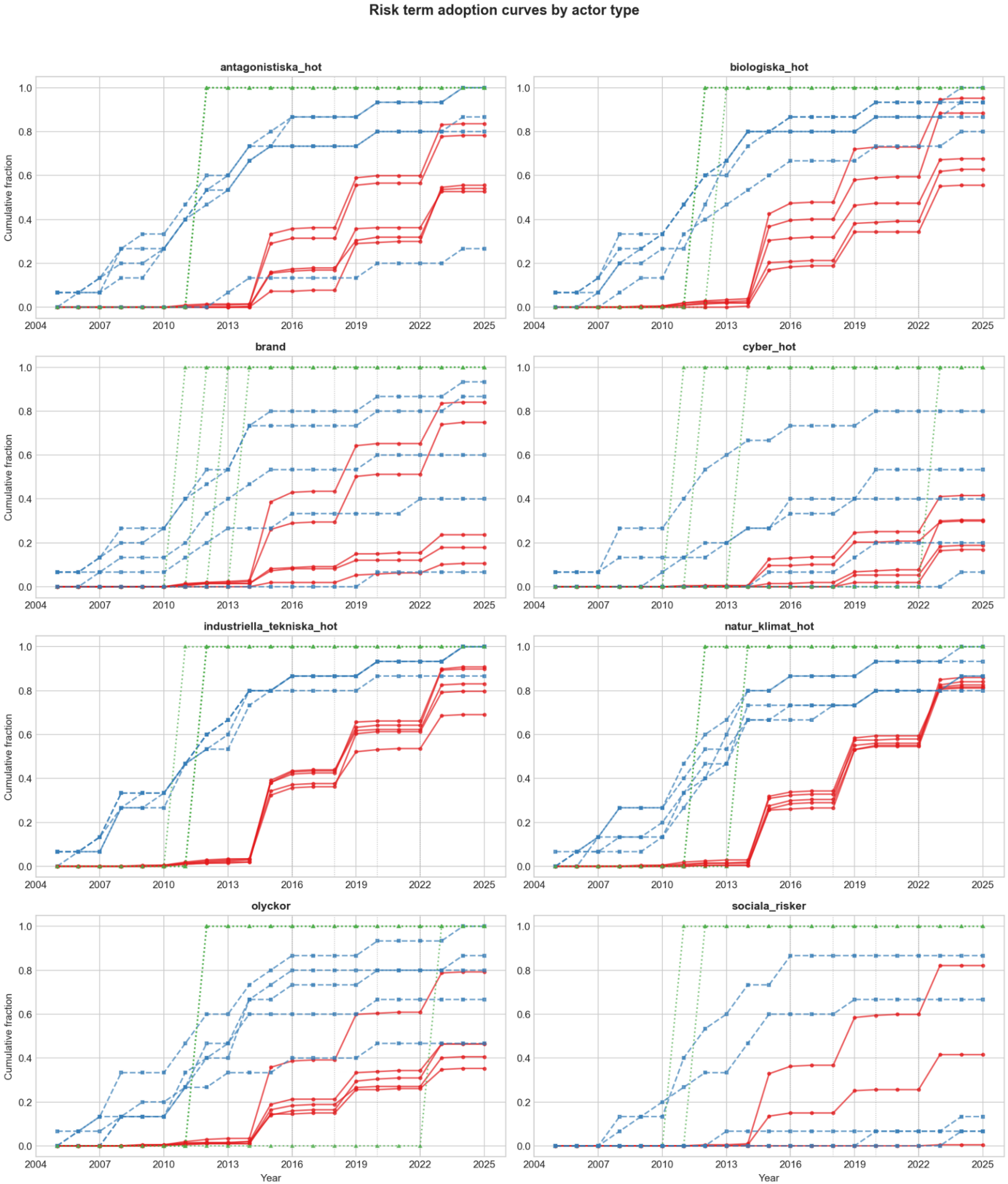
Entities: 220 | Terms with adoptions: 182
Left-censored first appearances: 65.4%

LEAD-LAG: MUNICIPALITY VS PREFECTURE
  Mean lag: +6.0 years (municipalities adopt terms 6 years after prefectures on average)
  Top-down (prefecture first): 139 terms
  Bottom-up (municipality first): 6 terms
  Simultaneous: 3 terms
  → Strong evidence for top-down diffusion

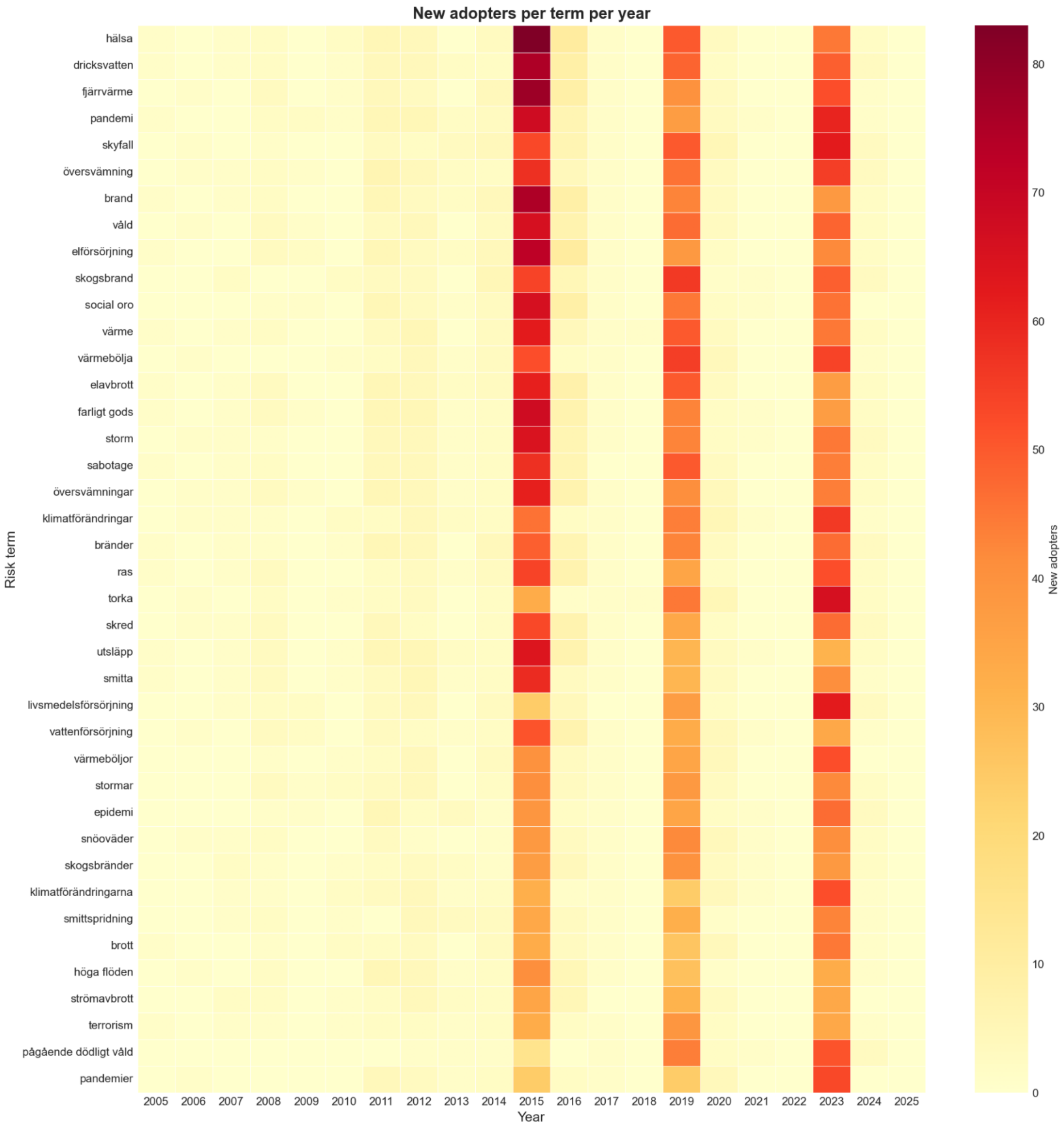
MOST SYNCHRONOUS TERMS (Gini ≈ 0, adopted by many entities in the same year):
  cyberattack (mean 2023), ransomware (2022), desinformation (2021),
  cybersäkerhet (2021), påverkanskampanjer (2021), hybridhot (2021)
  → All post-Ukraine war / new security environment terms

LARGEST ADOPTION SPIKES:
  2015: hälsa (83), fjärrvärme (78), brand (75), dricksvatten (75)
  2023: torka (66), skyfall (62), livsmedelsförsörjning (62), pandemi (60)

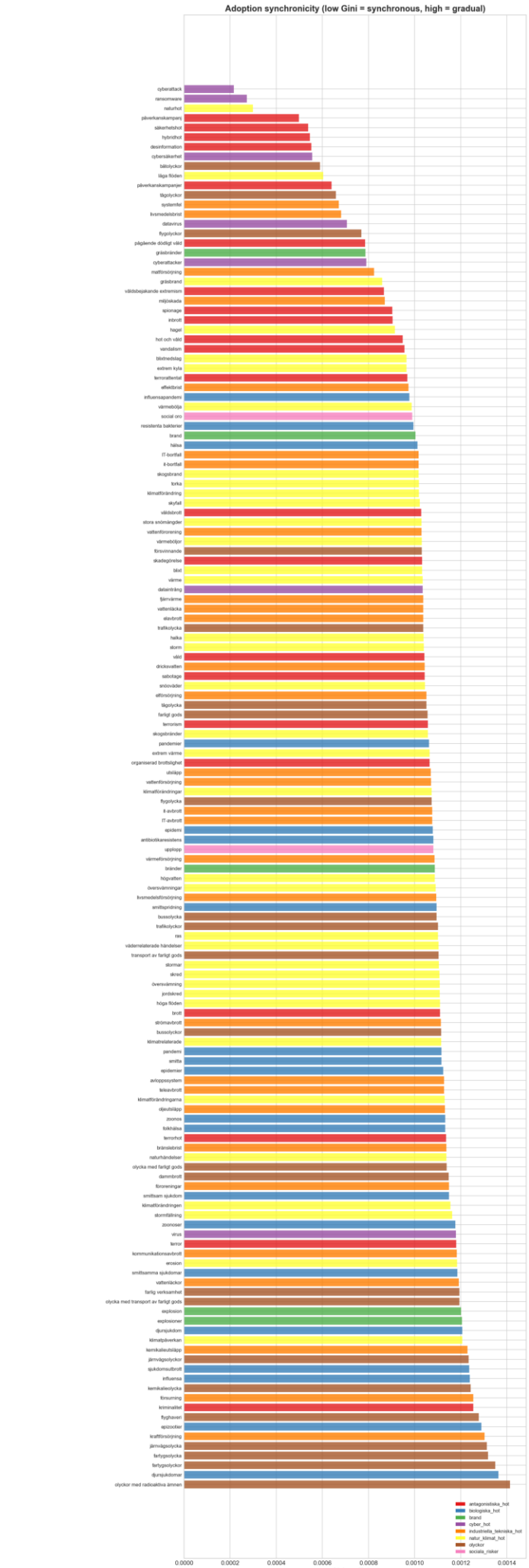
Adoption curves by actor type



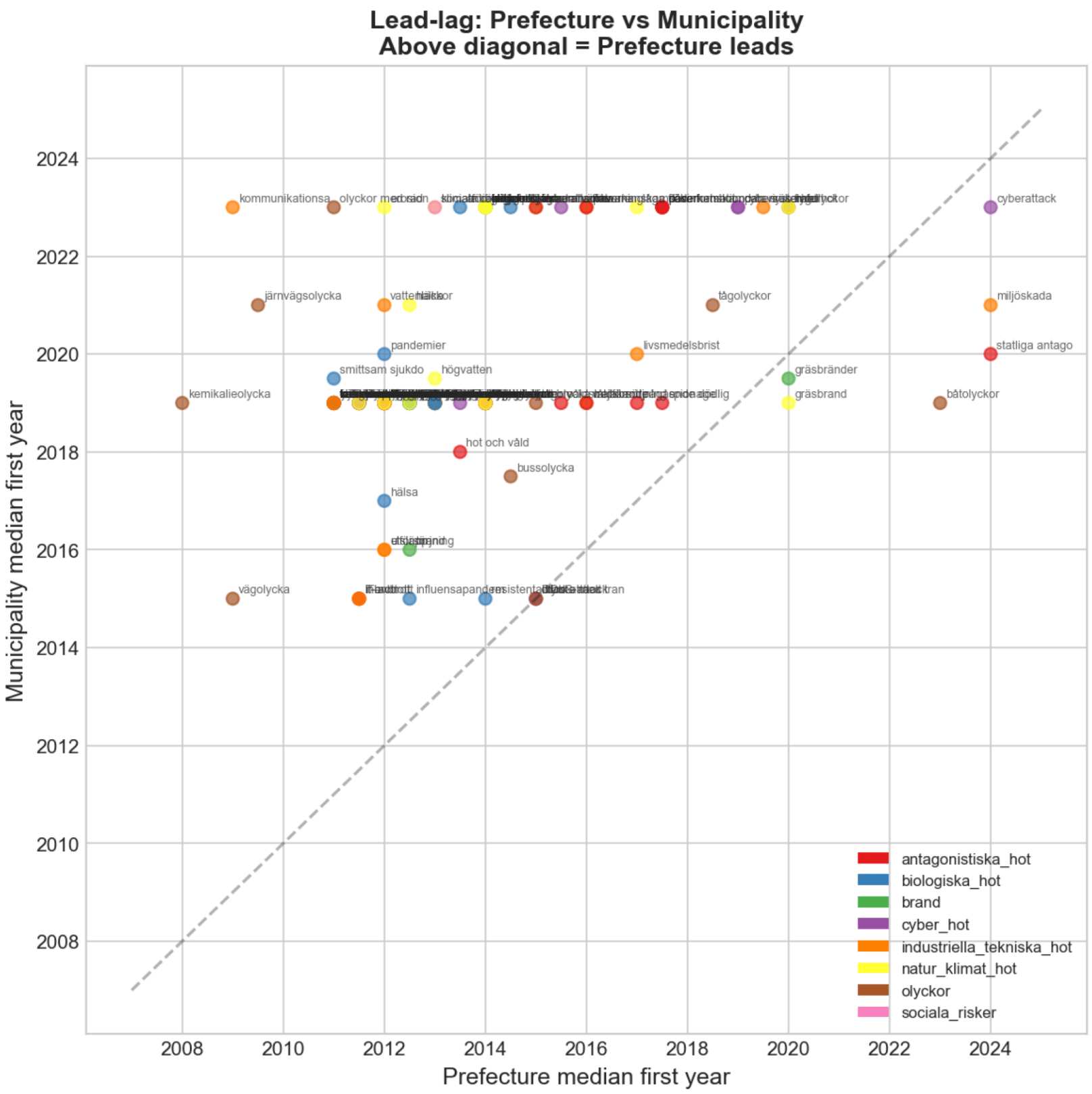
New adopters per term per year



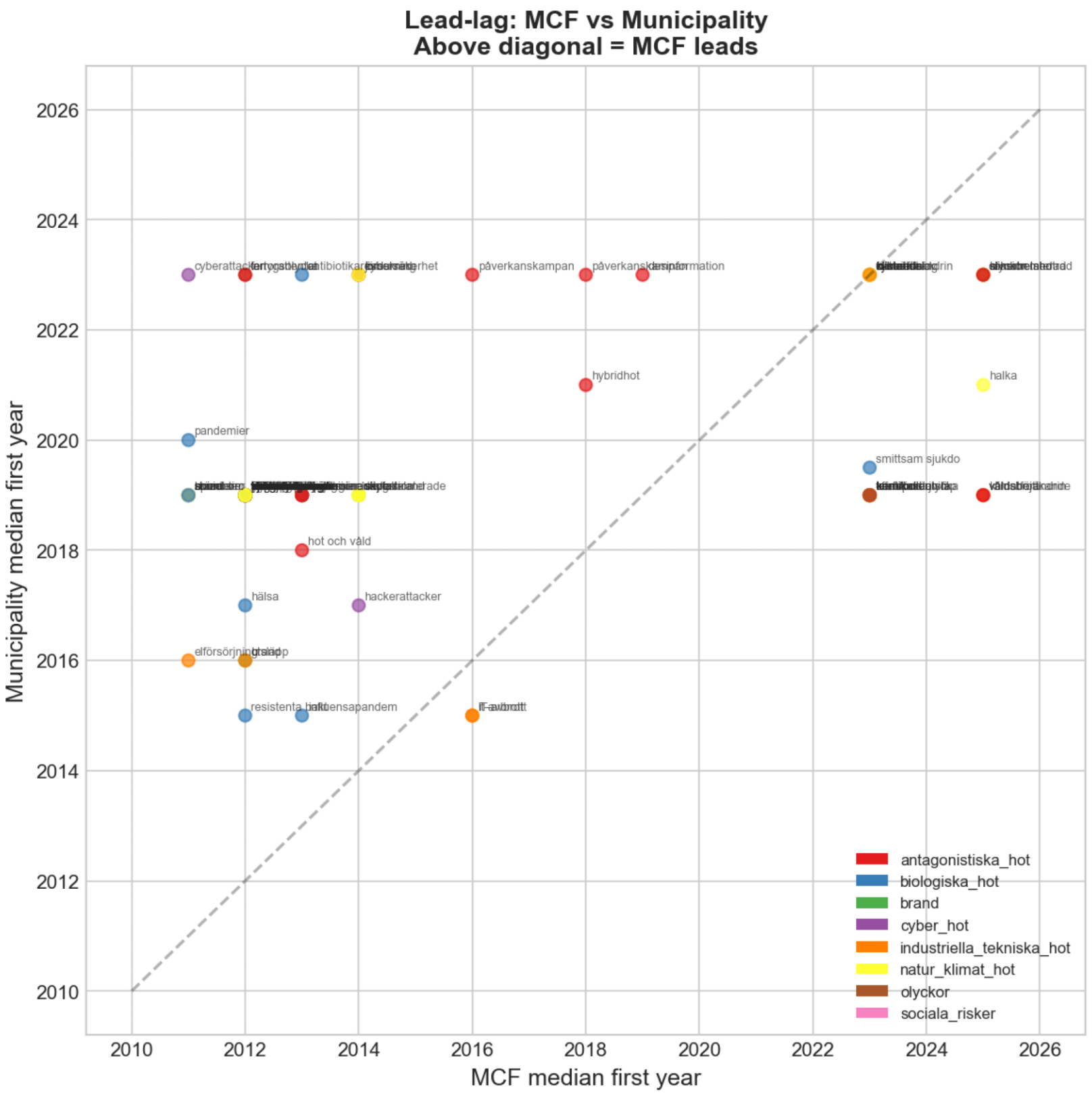
Gini coefficients (synchronous vs. gradual adoption)



Lead-lag: Prefecture vs Municipality



Lead-lag: MCF vs Municipality



PART 3: ACTOR CLUSTERING (Per Time Period)

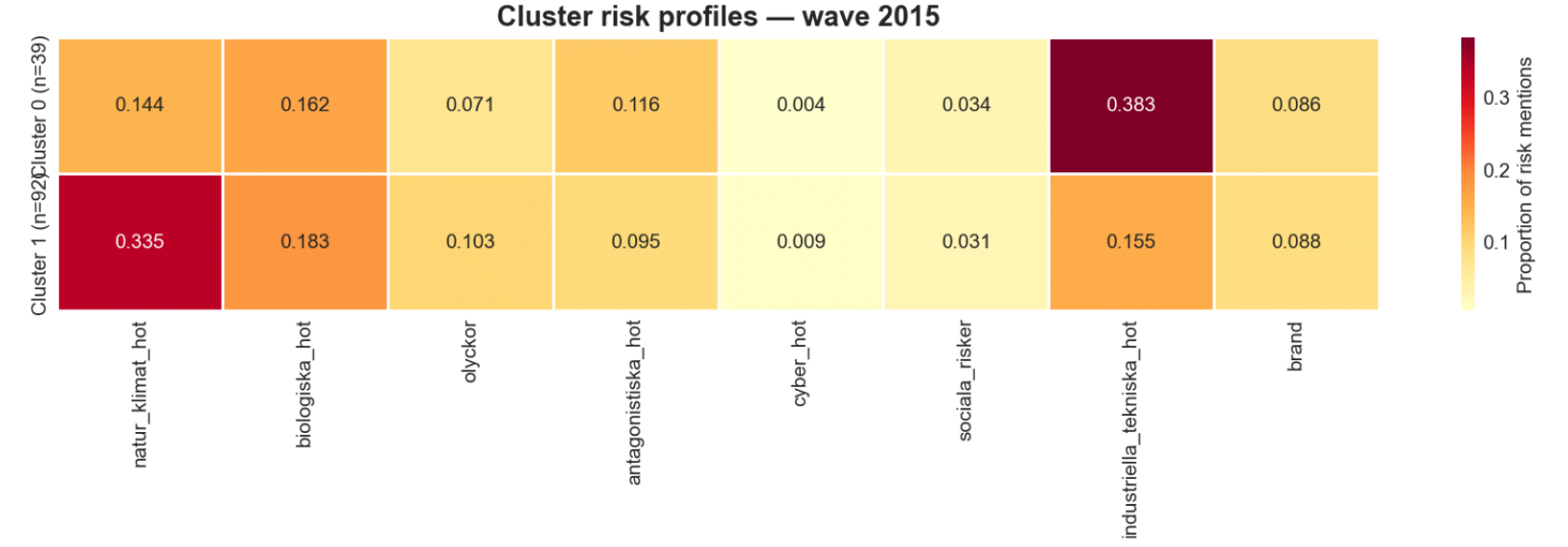
Three waves analysed: 2015 (131 entities), 2019 (156 entities), 2023 (201 entities)

CONSISTENT FINDING: Two main cluster types emerge across all waves:
  Cluster A: natur/klimat-dominant profile (~34-42% nature/climate)
  Cluster B: industriella/tekniska-dominant profile (~26-38% industrial/technical)
  All prefectures and MCF cluster with the nature/climate group.

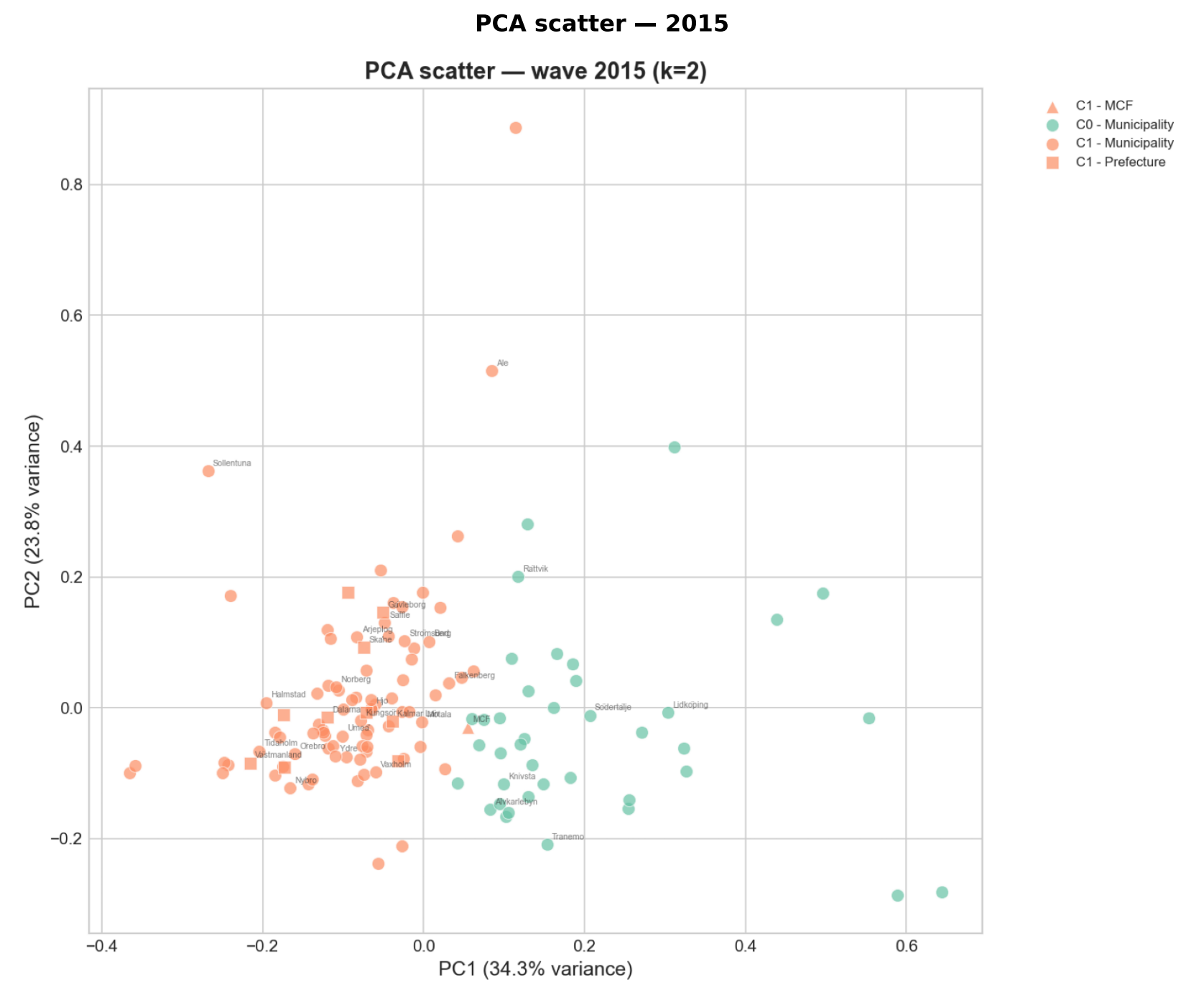
2019 ANOMALY: A small 3rd cluster (n=4) appeared with 77.5% biologiska_hot
  → Likely pandemic-adjacent municipalities

CROSS-PERIOD STABILITY:
  2015→2019: 74.8% of entities changed cluster (high volatility)
  2019→2023: 37.8% changed cluster (stabilising)

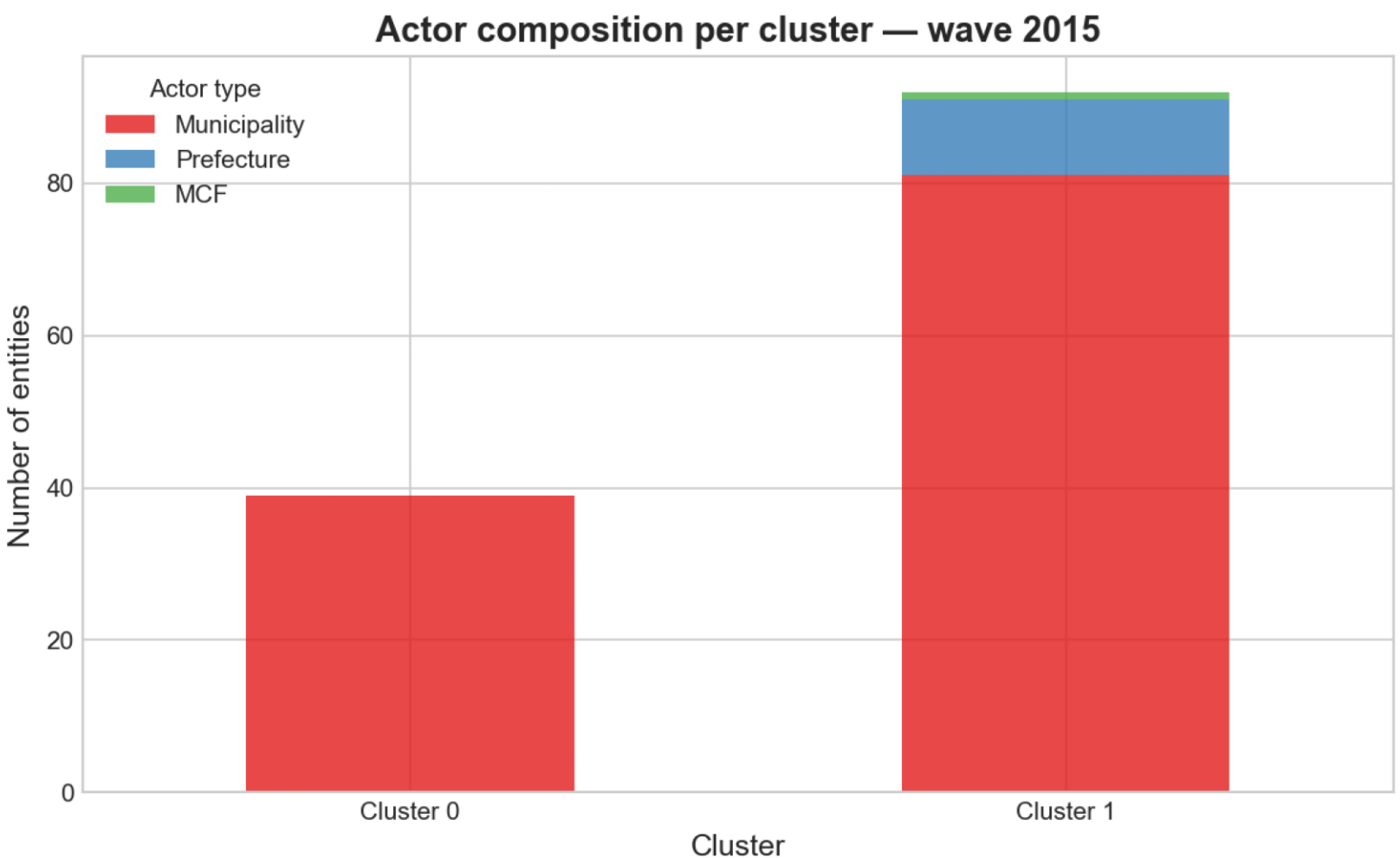
Cluster risk profiles — 2015



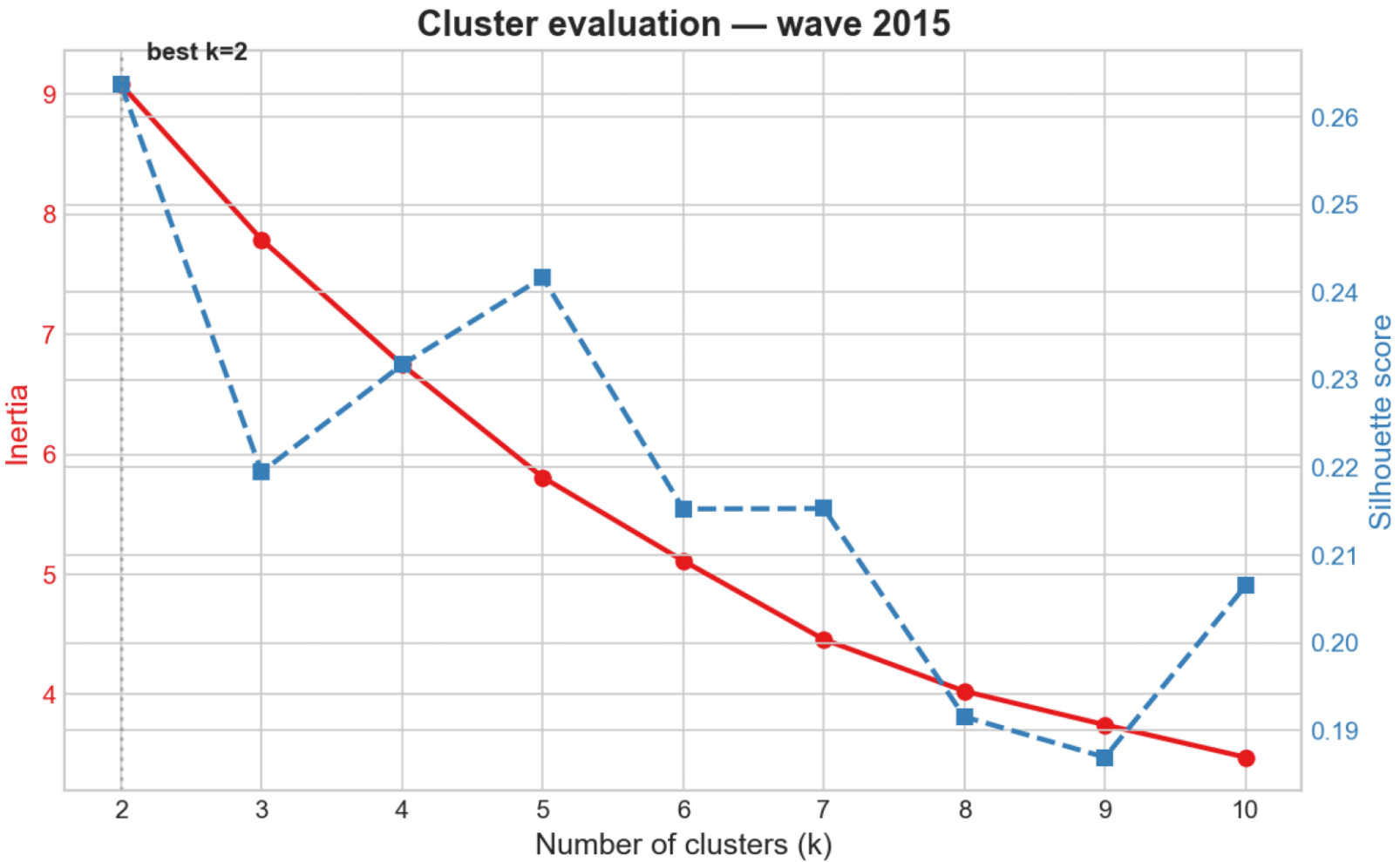
PCA scatter — 2015



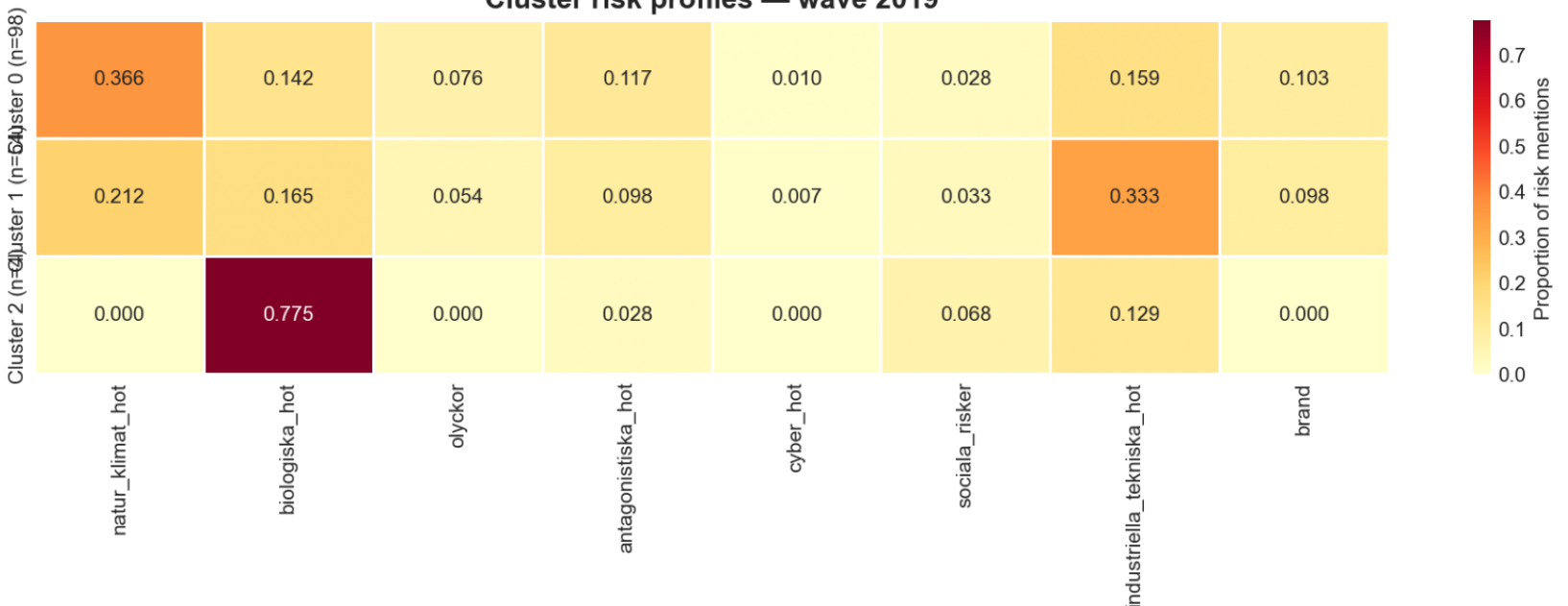
Actor composition — 2015



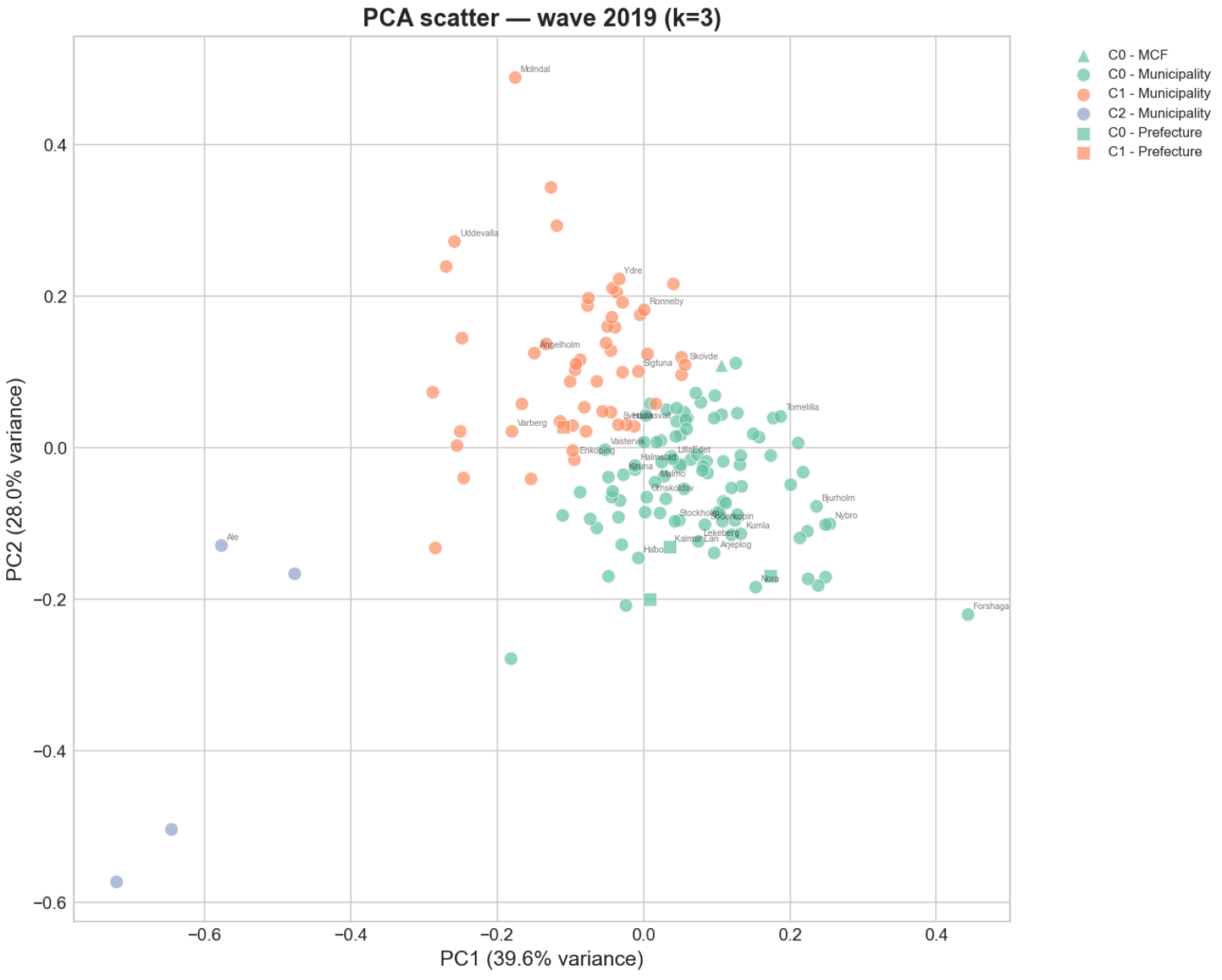
Elbow plot — 2015



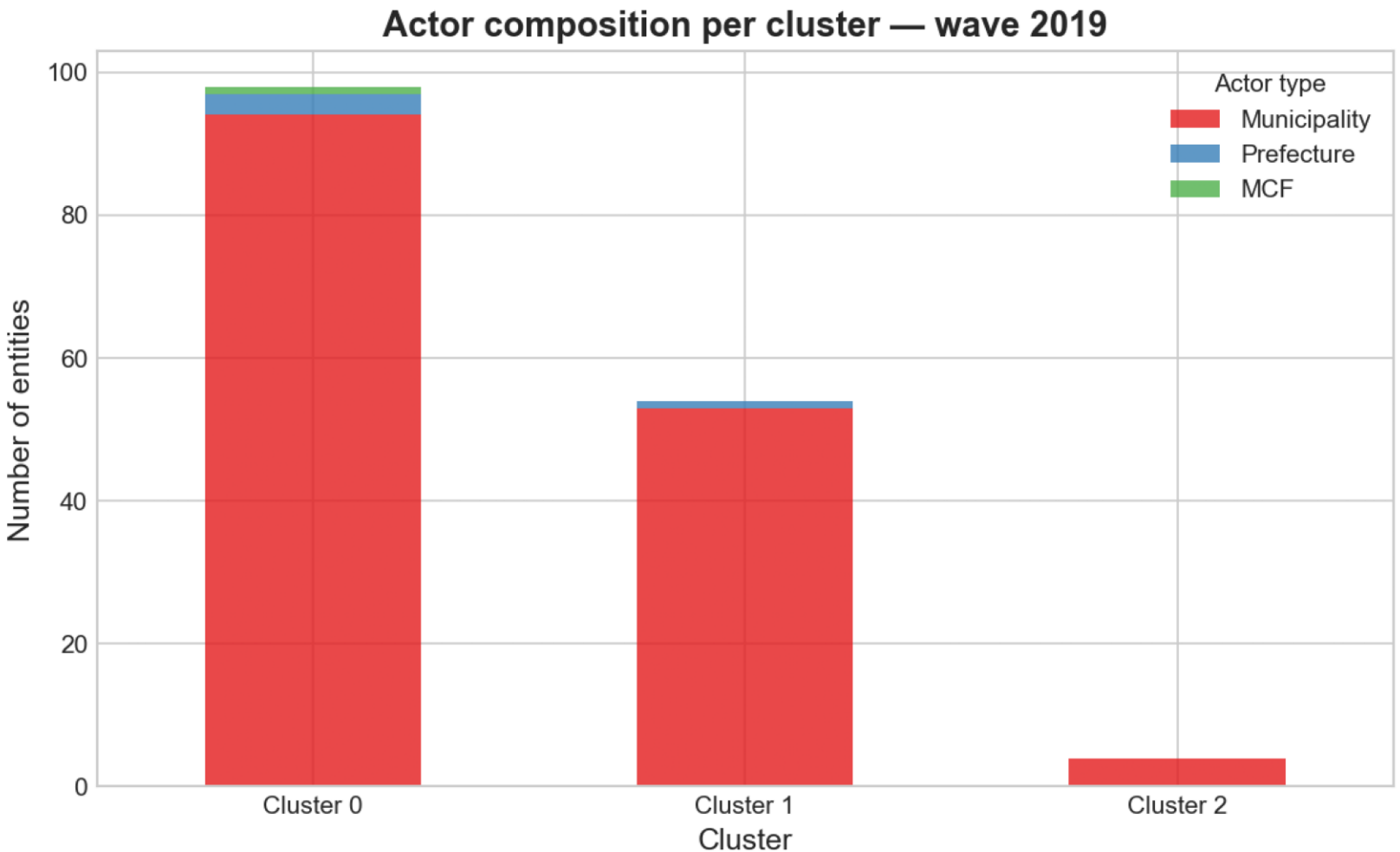
Cluster risk profiles — 2019



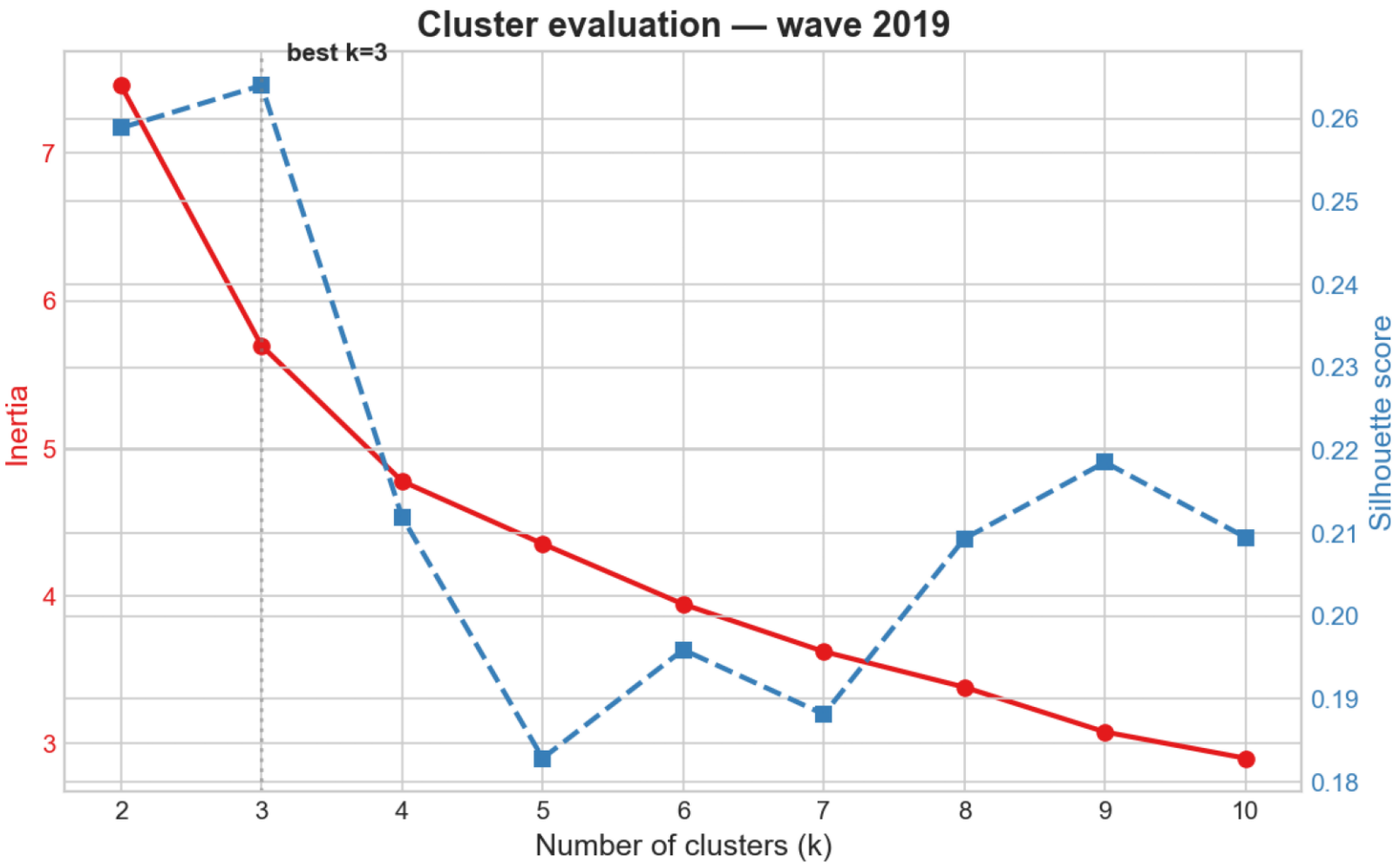
PCA scatter — 2019



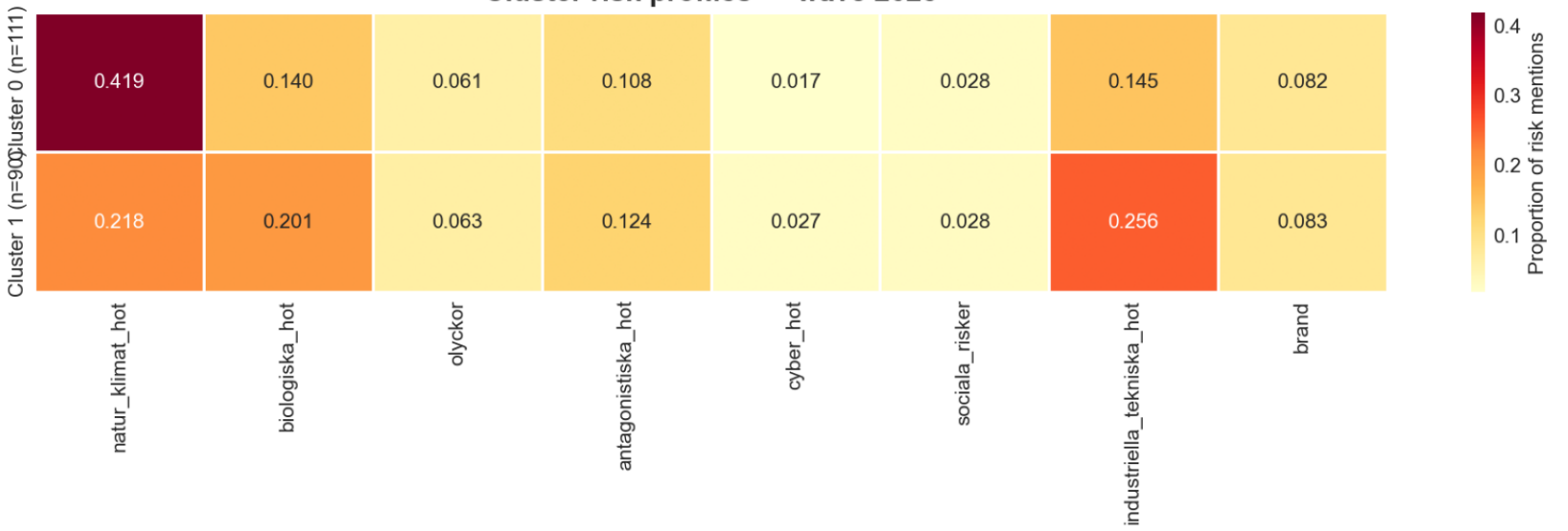
Actor composition — 2019



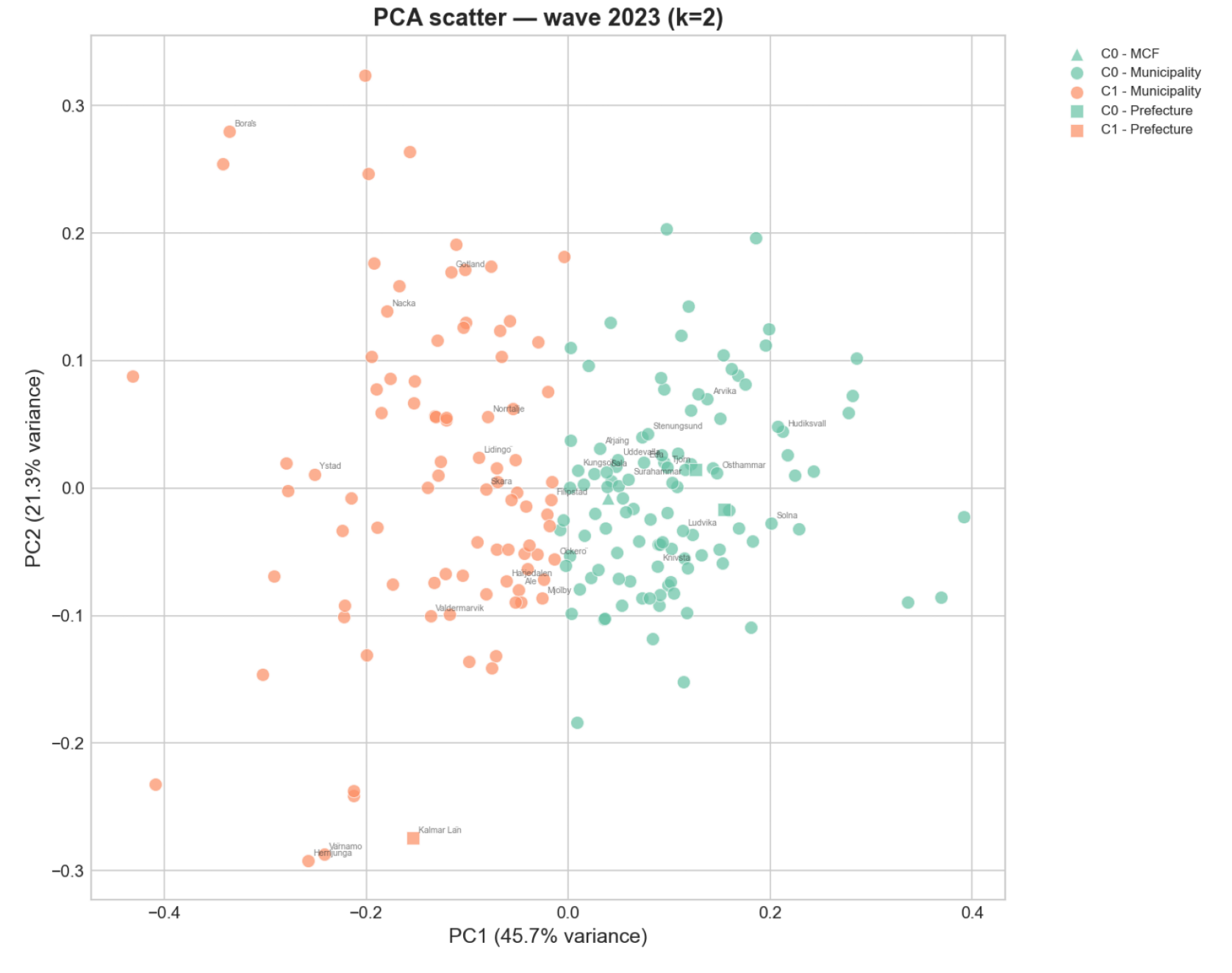
Elbow plot — 2019



Cluster risk profiles — 2023

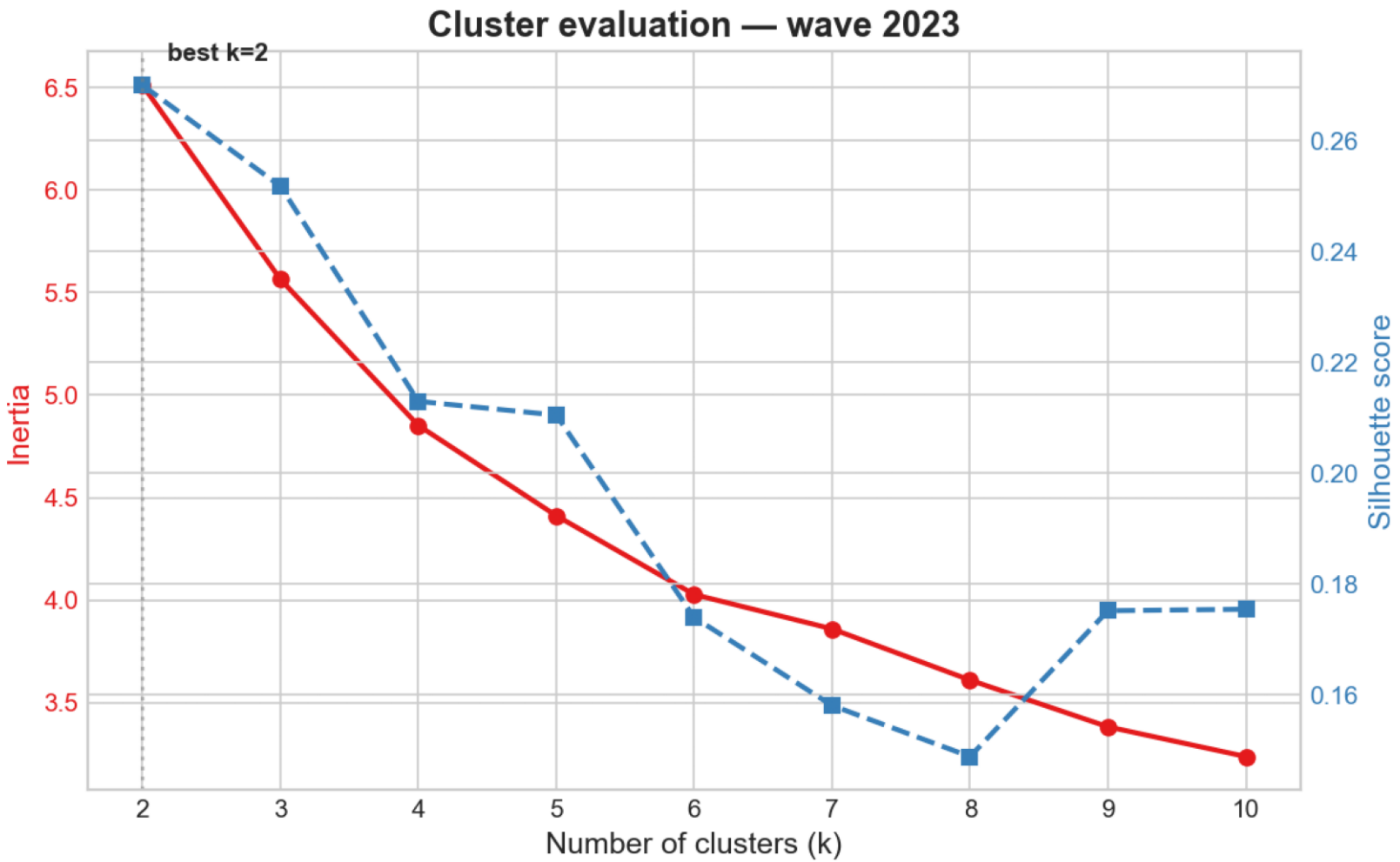


PCA scatter — 2023

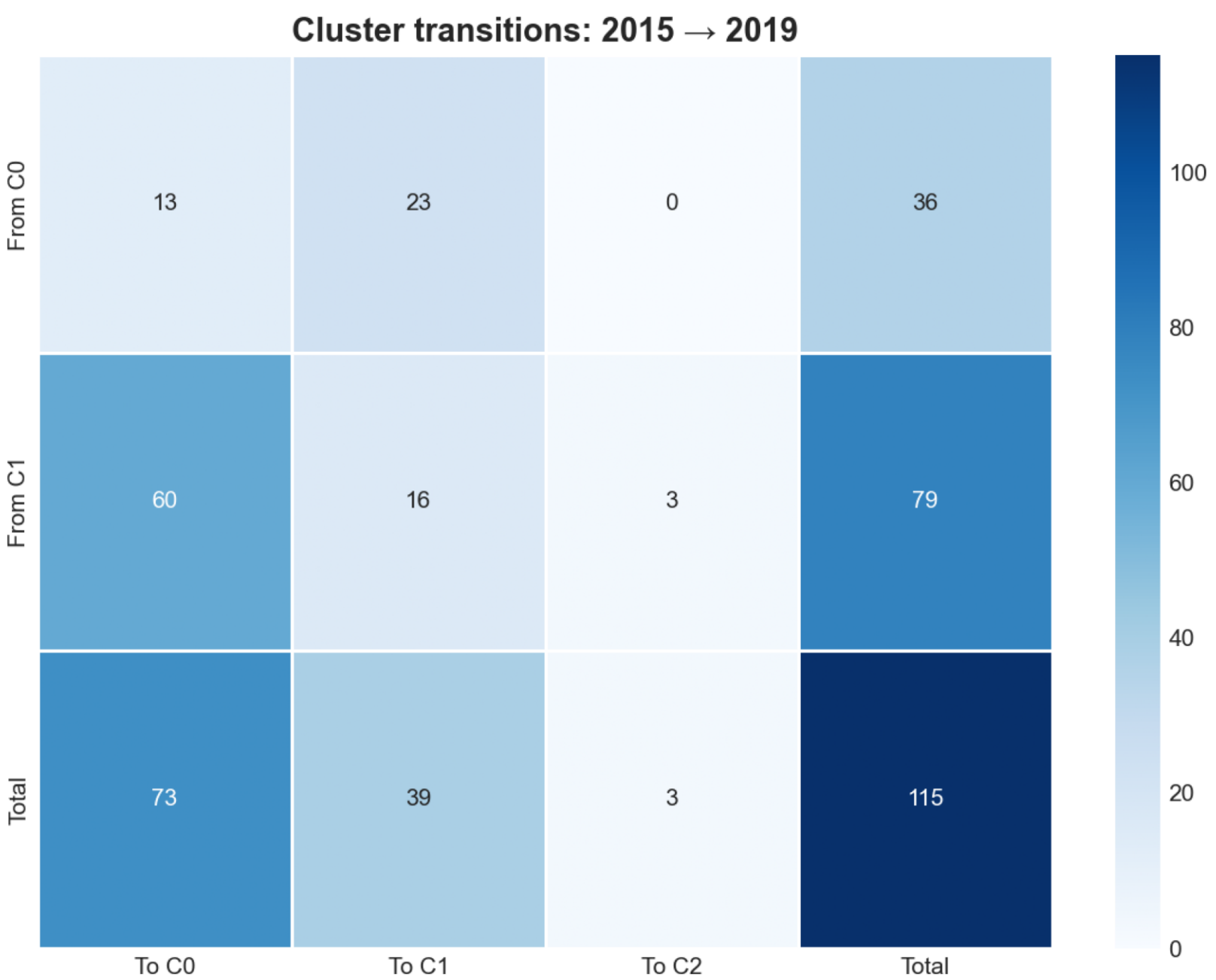


Actor composition — 2023

Elbow plot — 2023



Cluster transitions 2015 → 2019



Cluster transitions 2019 → 2023