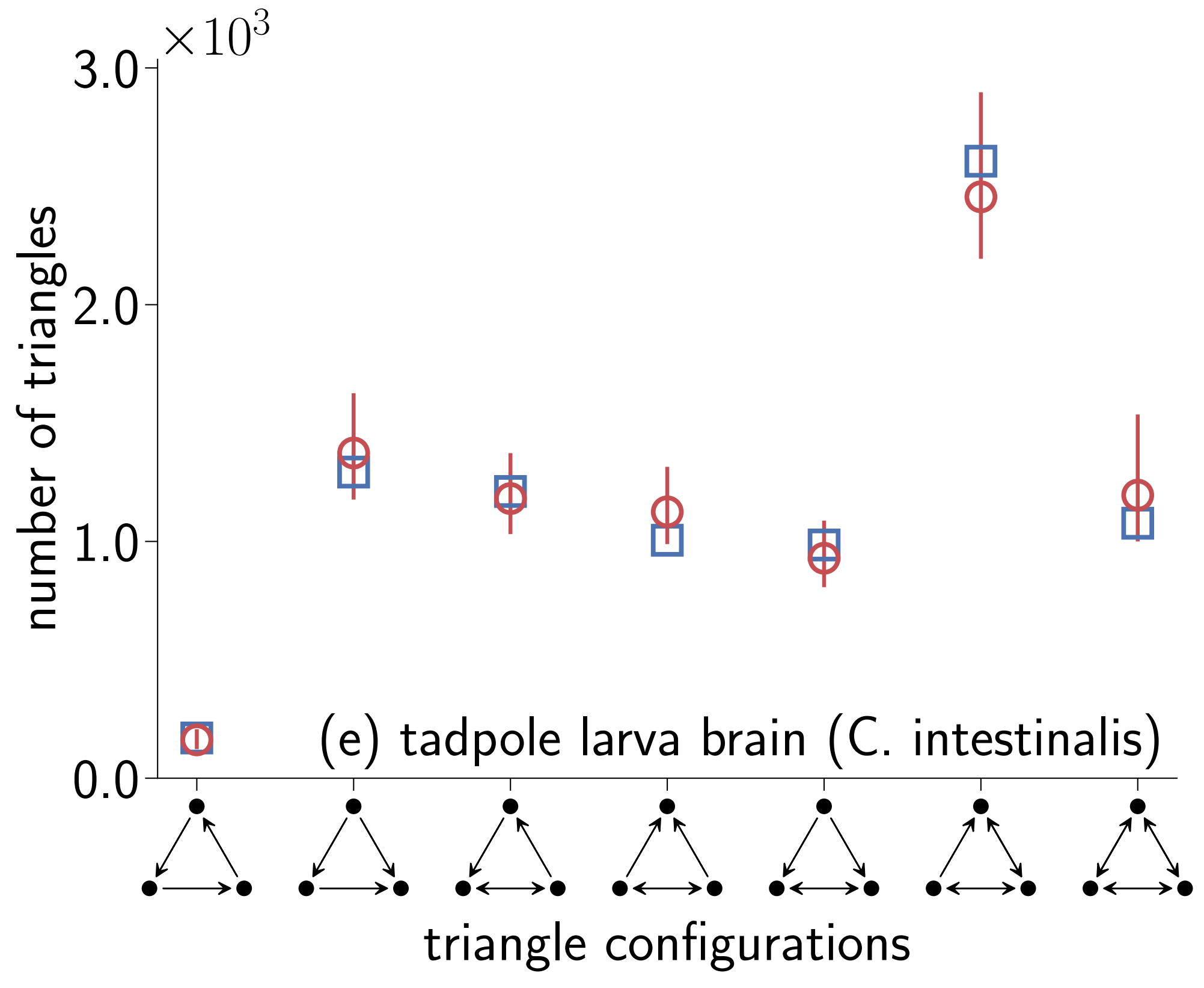
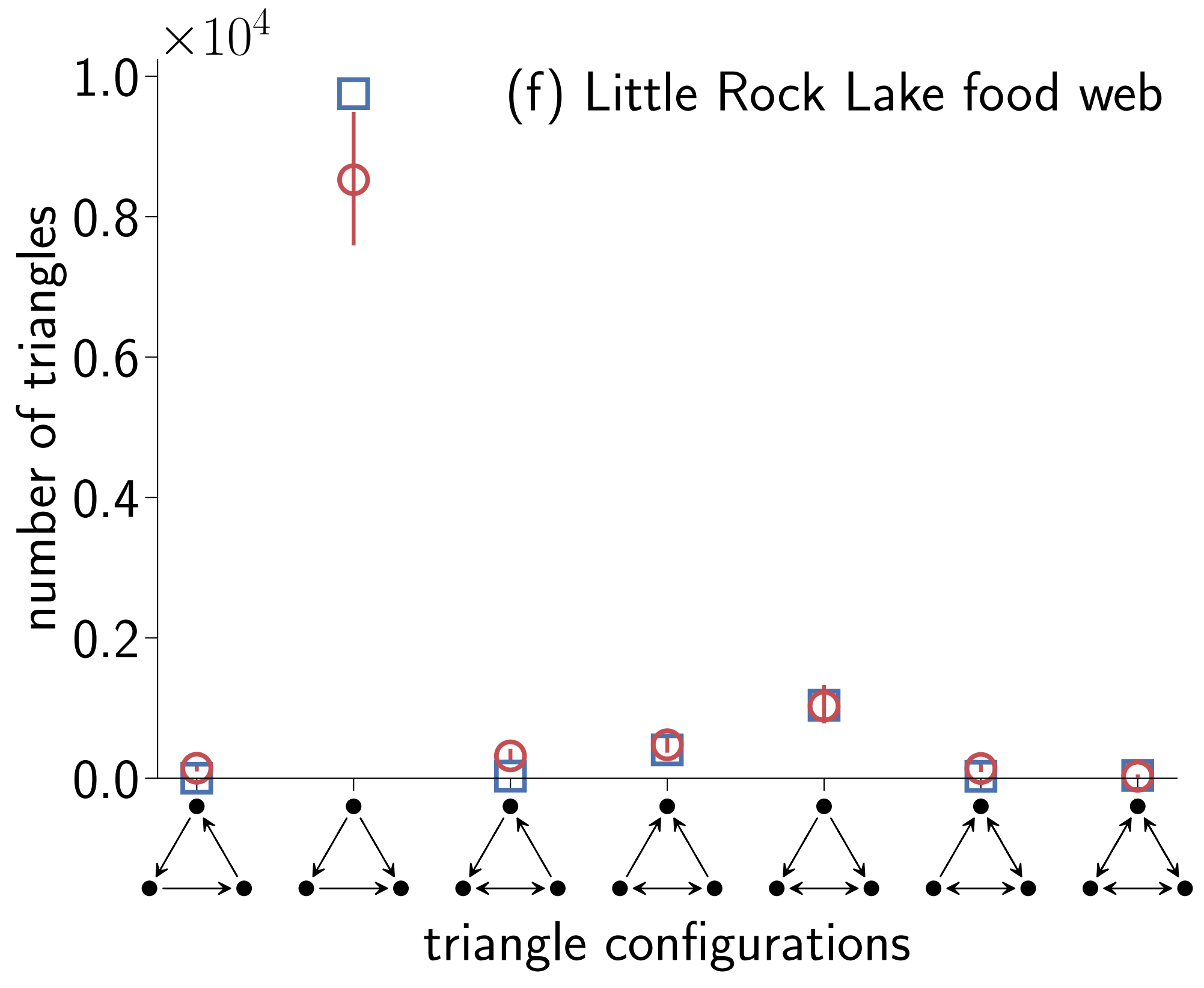
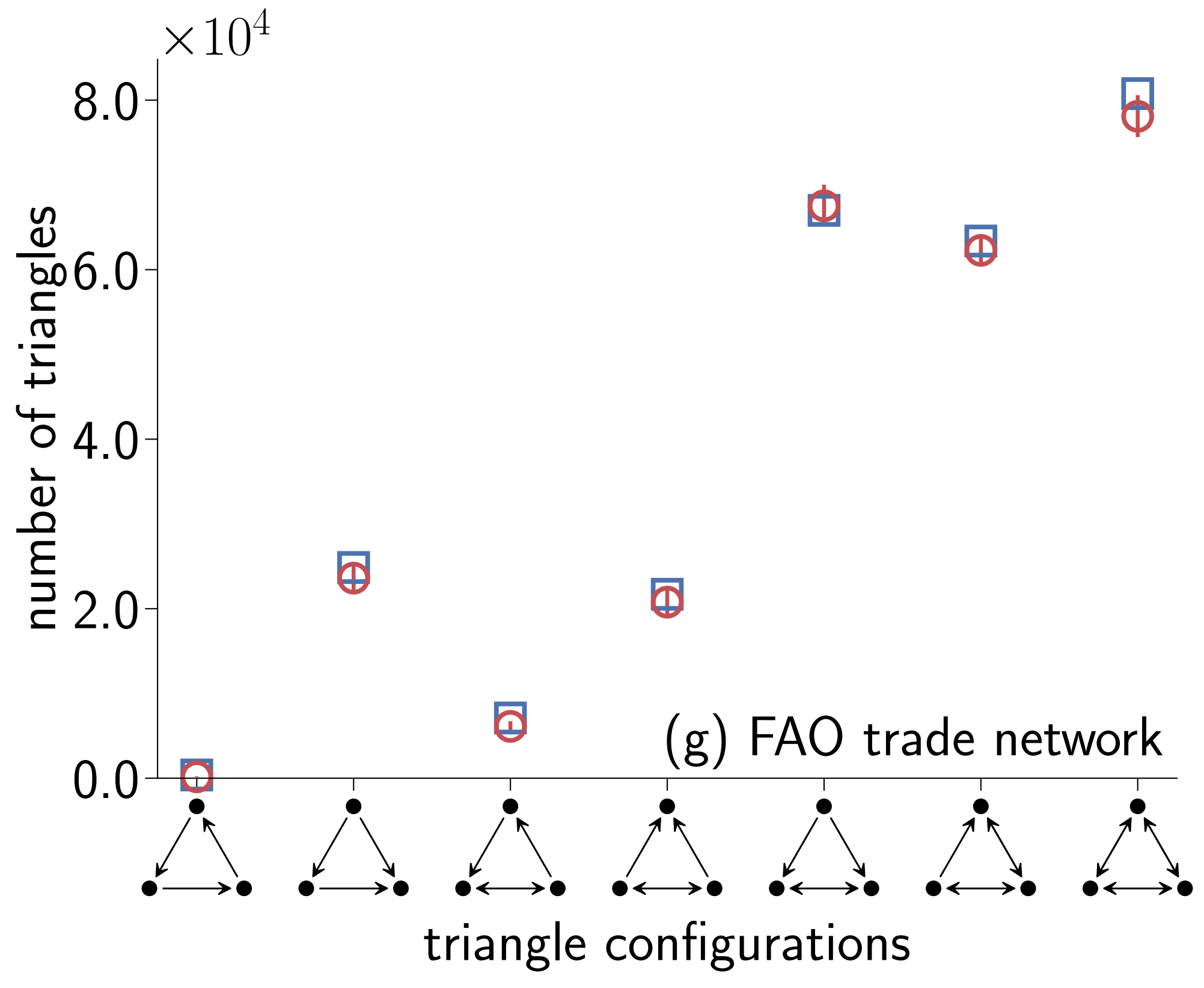
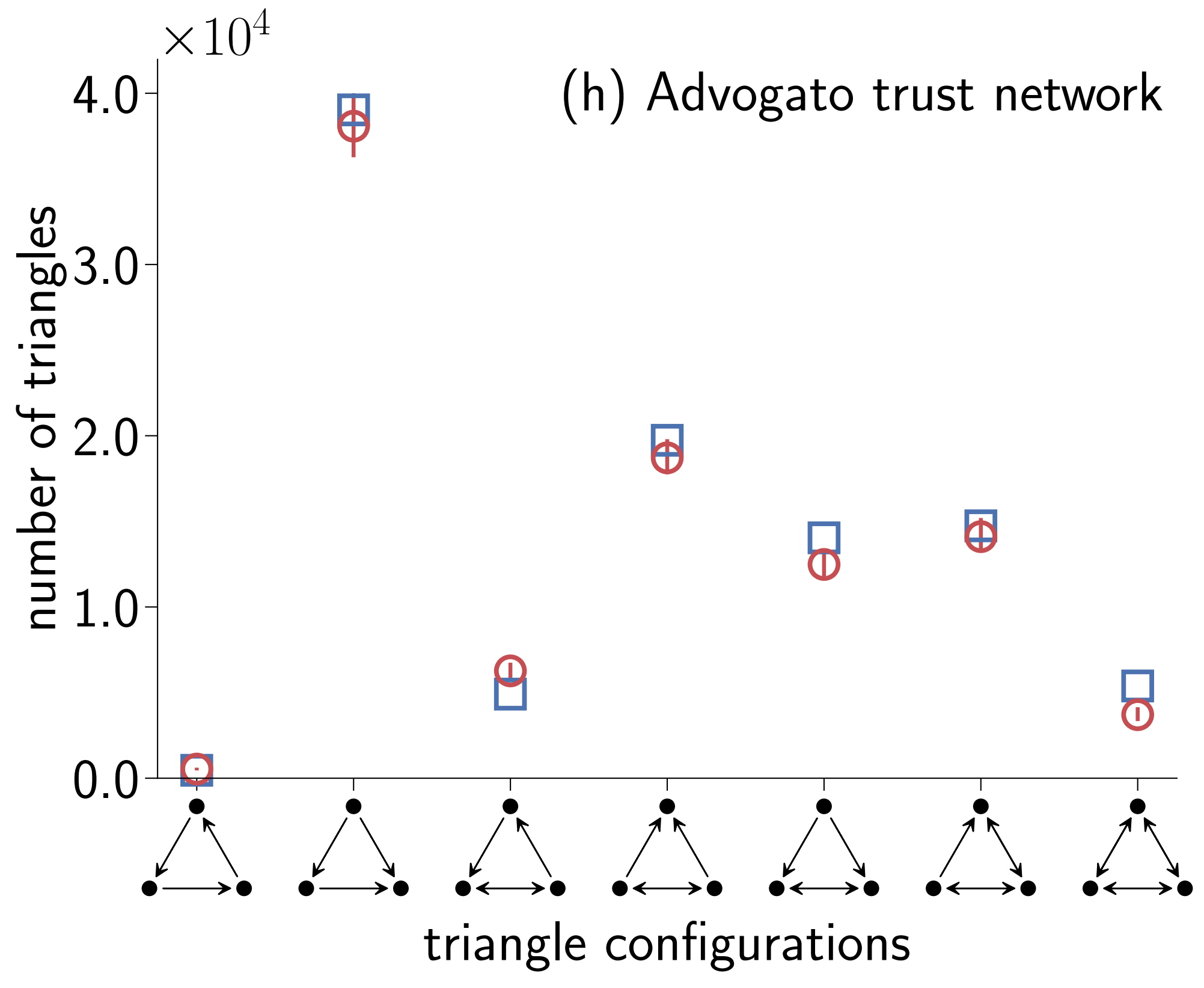
13

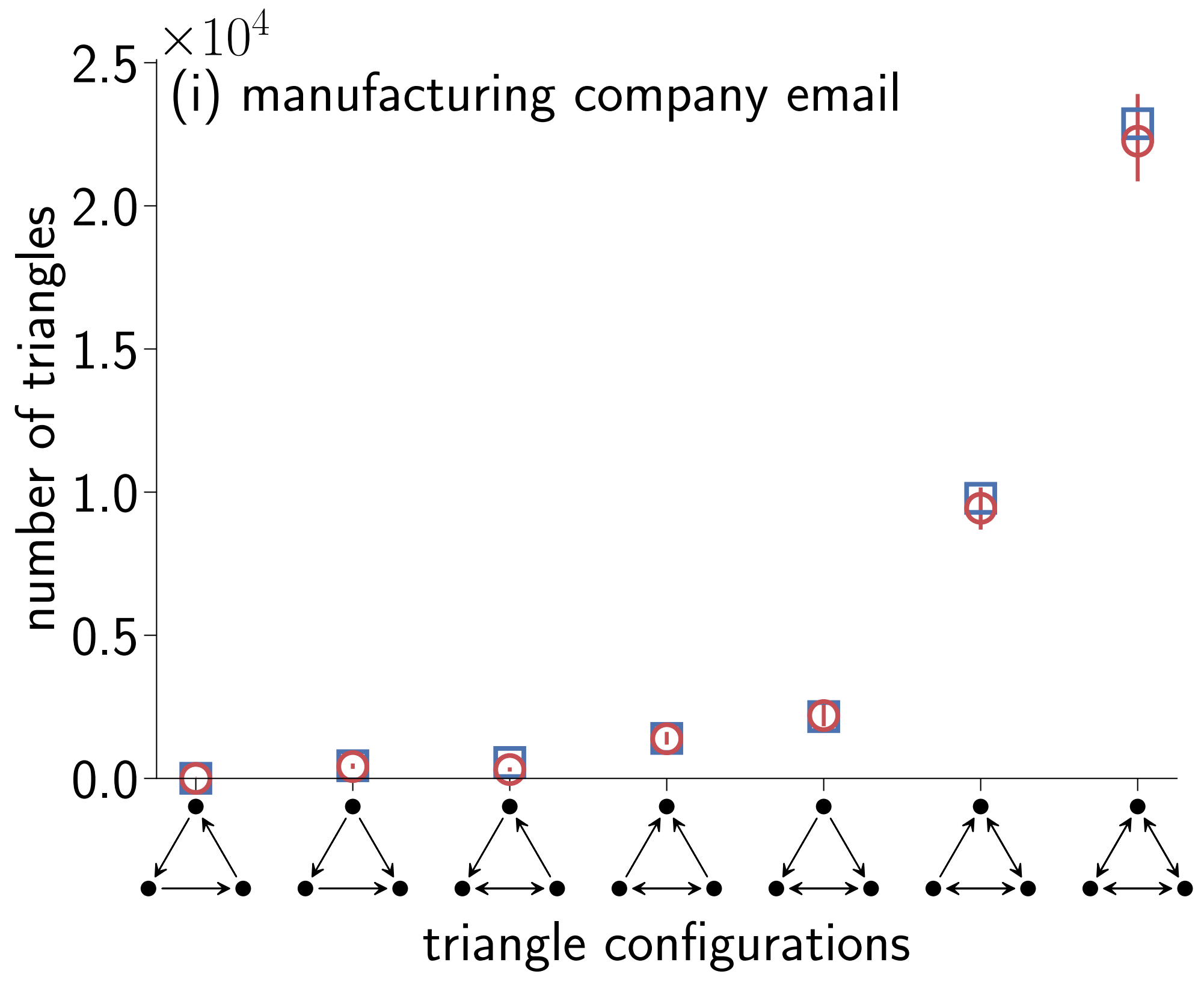
Realistic clustering patterns in directed geometric networks

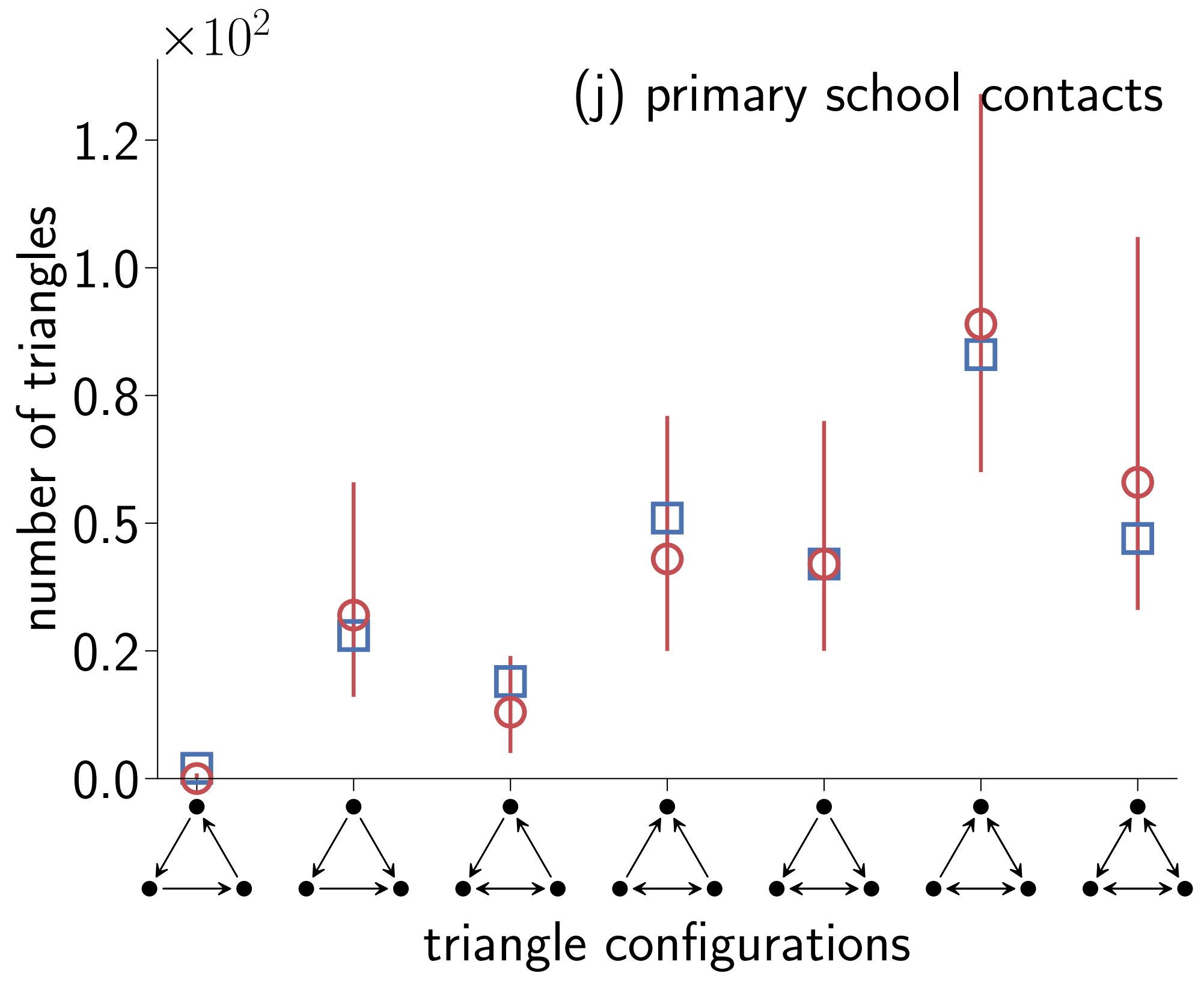

$\times 10^3$
3.0
2.0
1.0
0.0
number of triangles
(e) tadpole larva brain (C. intestinalis)
triangle configurations

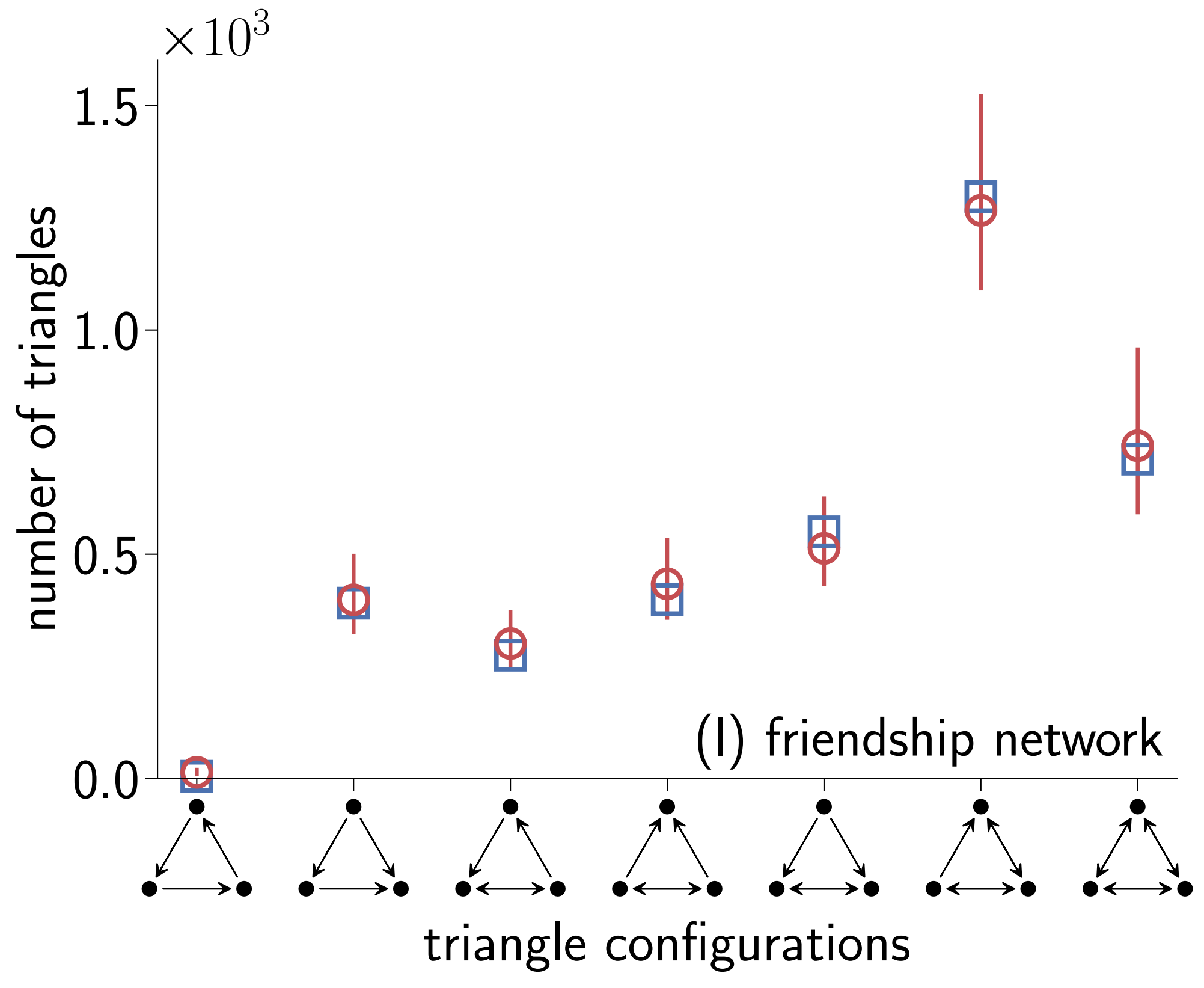

(f) Little Rock Lake food web
$\times 10^4$
1.0
0.8
0.6
0.4
0.2
0.0
number of triangles
triangle configurations

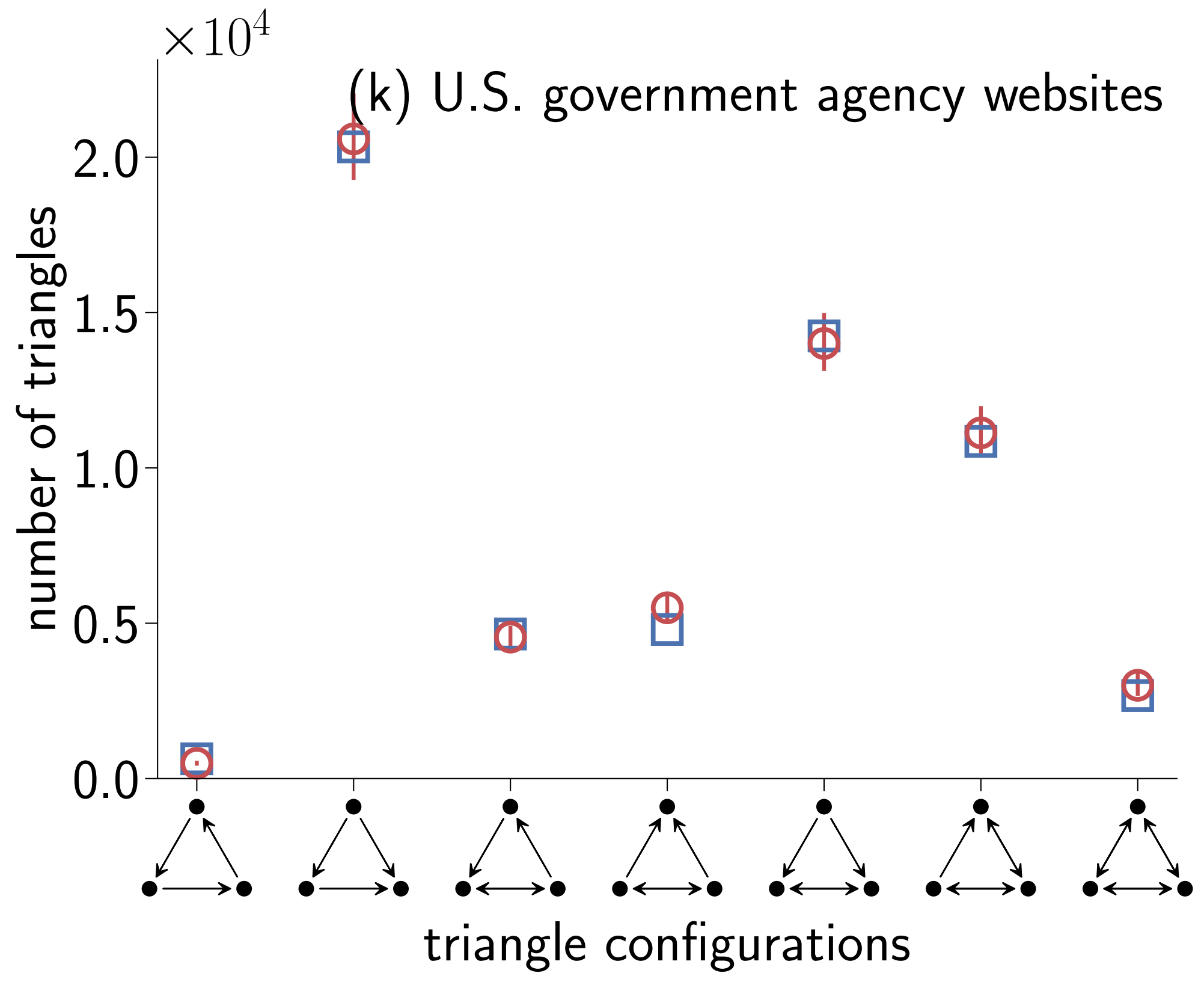

×10^4
8.0
6.0
4.0
2.0
0.0
number of triangles
(g) FAO trade network
triangle configurations


(h) Advogato trust network
$\times 10^4$
4.0
3.0
2.0
1.0
0.0
number of triangles
triangle configurations

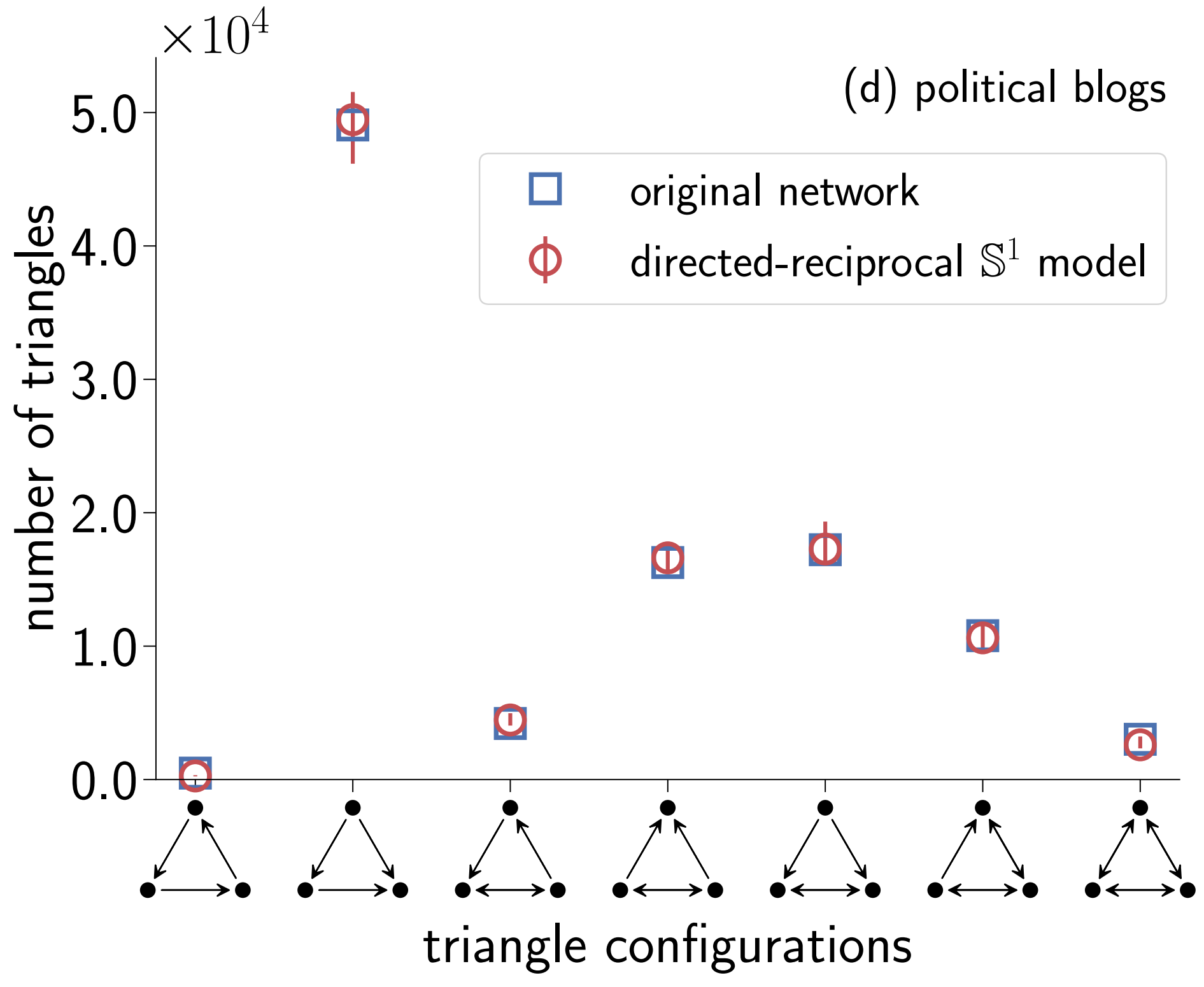

(i) manufacturing company email
$\times 10^4$
2.5
2.0
1.5
1.0
0.5
0.0
number of triangles
triangle configurations


(j) primary school contacts
$\times 10^2$
1.2
1.0
0.8
0.5
0.2
0.0
number of triangles
triangle configurations


$\times 10^3$
1.5
1.0
0.5
0.0
number of triangles
(I) friendship network
triangle configurations

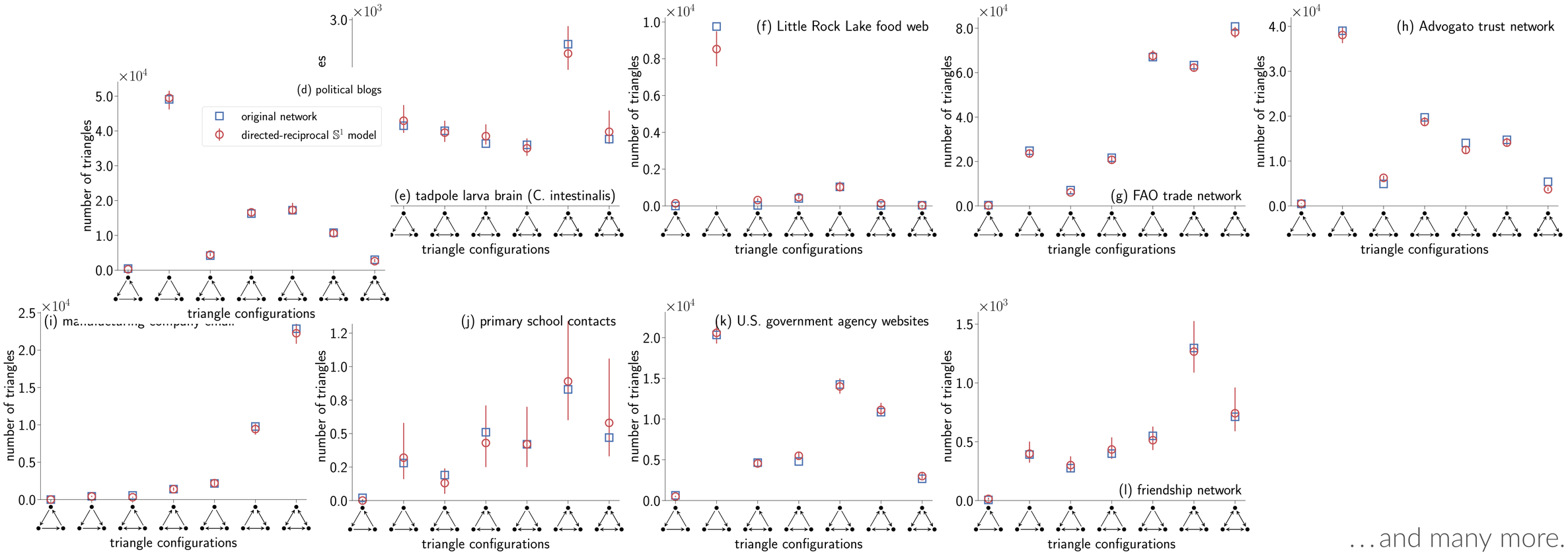

(k) U.S. government agency websites
$\times 10^4$
2.0
1.5
1.0
0.5
0.0
number of triangles
triangle configurations

. . . and many more.


(d) political blogs
original network
directed-reciprocal $\mathbb{S}^1$ model
number of triangles
$\times 10^4$
5.0
4.0
3.0
2.0
1.0
0.0
triangle configurations

Coupled with an underlying geometry, the joint degree distribution, the reciprocity, and the density of triangles fix the clustering patterns in the network.

Realistic clustering patterns in directed geometric networks



. . . and many more.

Coupled with an underlying geometry, the joint degree distribution, the reciprocity, and the density of triangles fix the clustering patterns in the network.

Summary

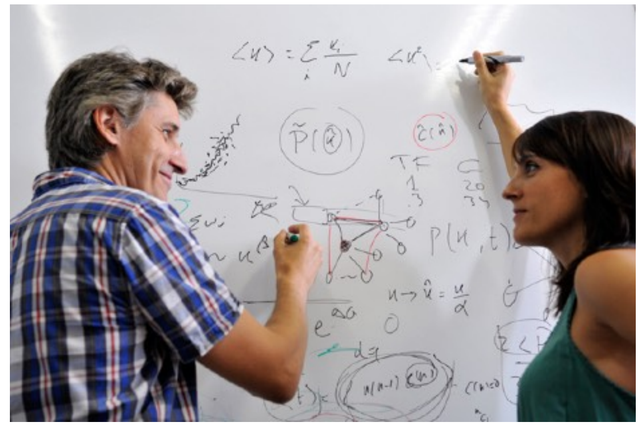
1. Presented a generalization of the $\mathbb{S}^1$ model to directed networks.
2. Proposed a general approach to control reciprocity in any random network model.
3. Showed that the interplay between in/out-degree, reciprocity and clustering in directed networks can be accurately captured by a geometric approach.

Further details

arXiv:2302.09055

github.com/networkgeometry/directed-geometric-networks

Work done in collaboration with



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