LONGITUDINAL AND NETWORK METHODS FOR SPATIO-TEMPORAL DATA

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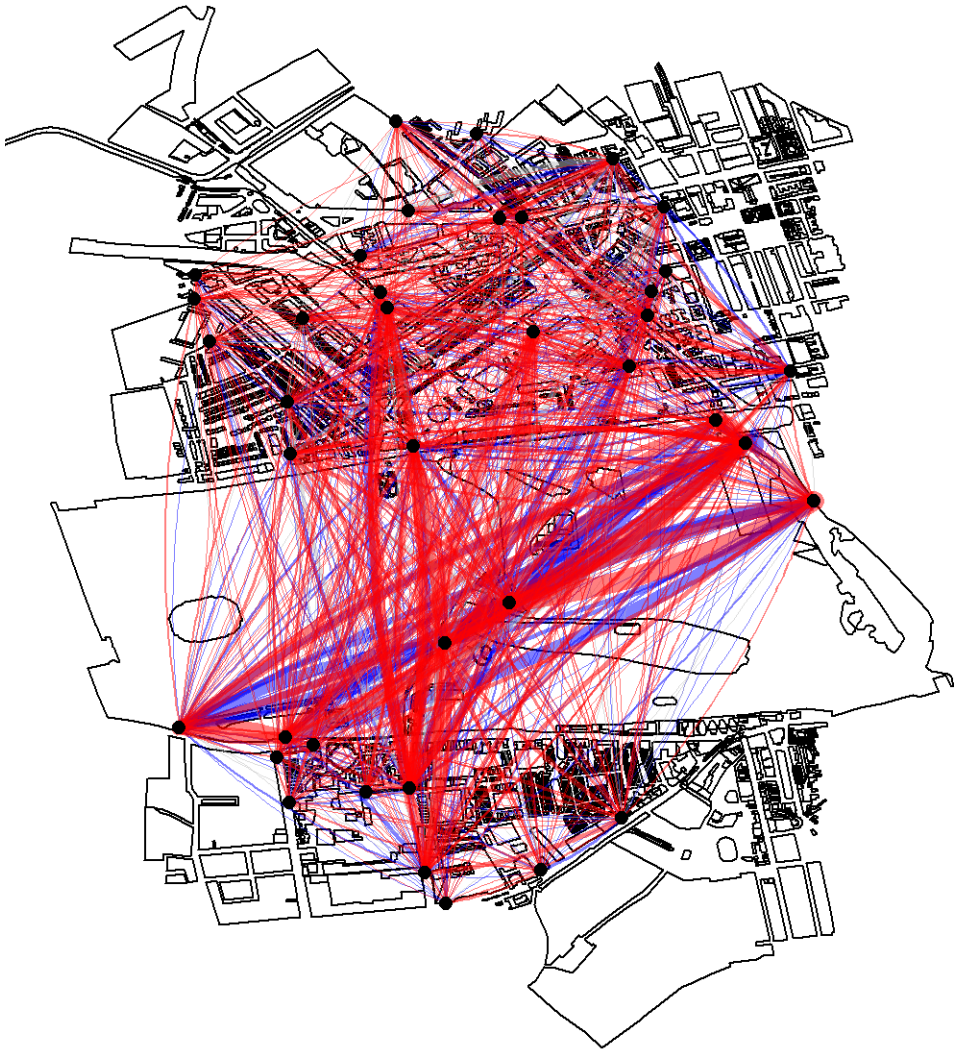
Outline

- Networks for bicycle sharing
- Longitudinal data analysis
- Combination with geographical methods
- Example application



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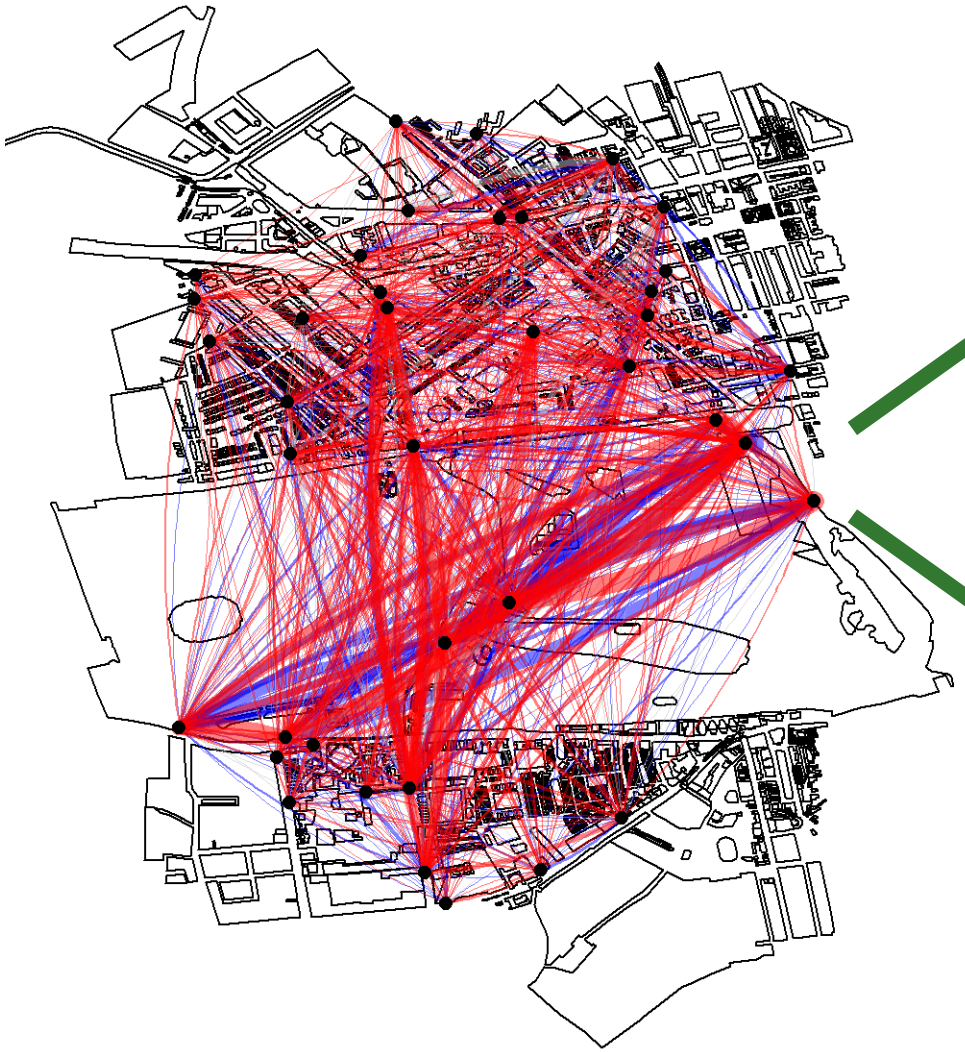
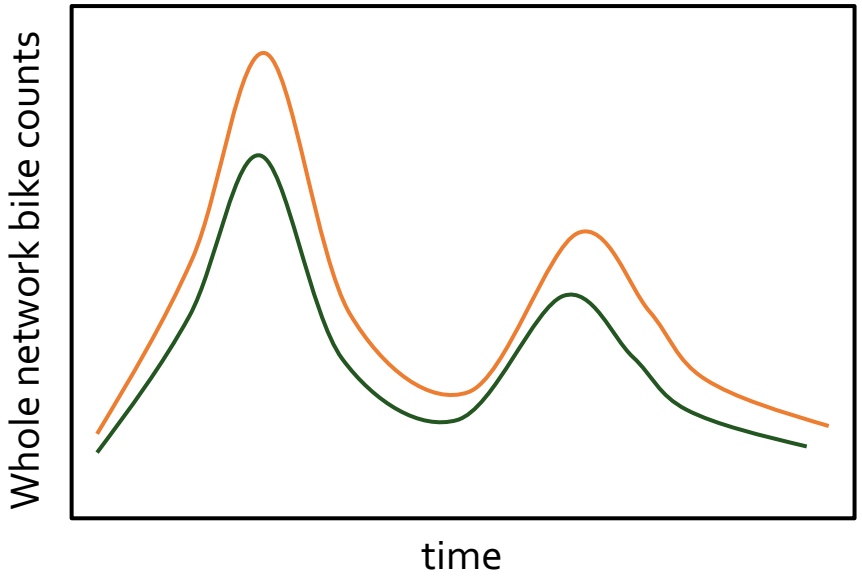
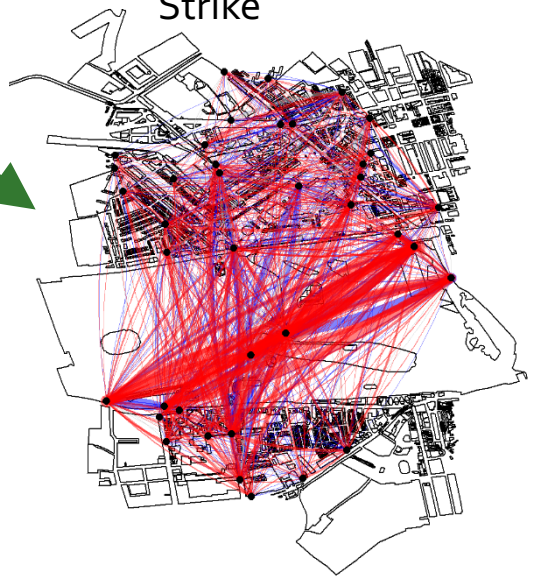
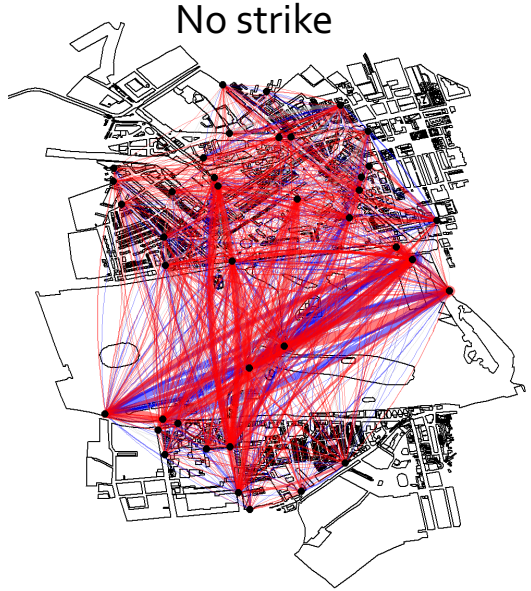


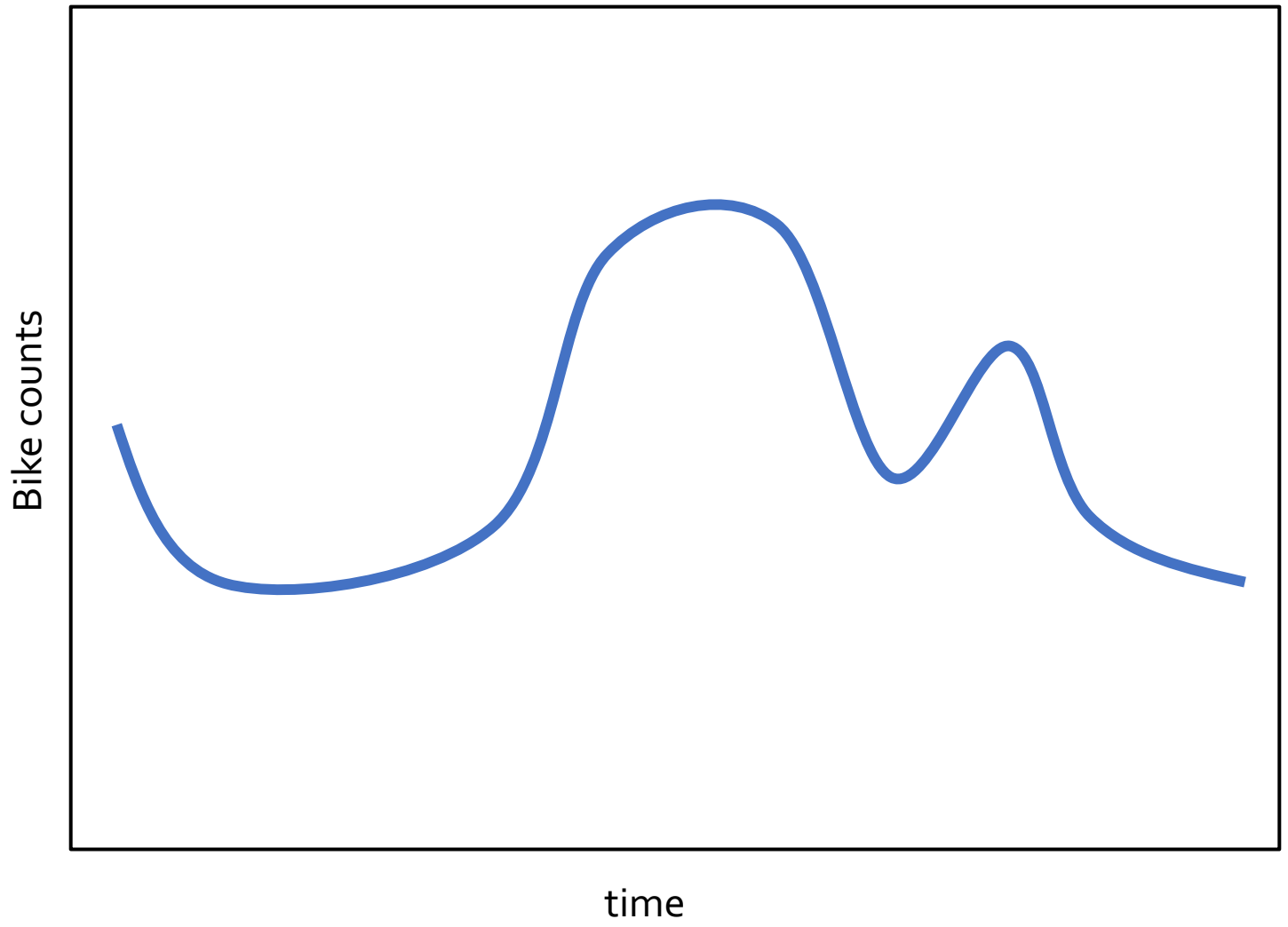


Strike



No strike

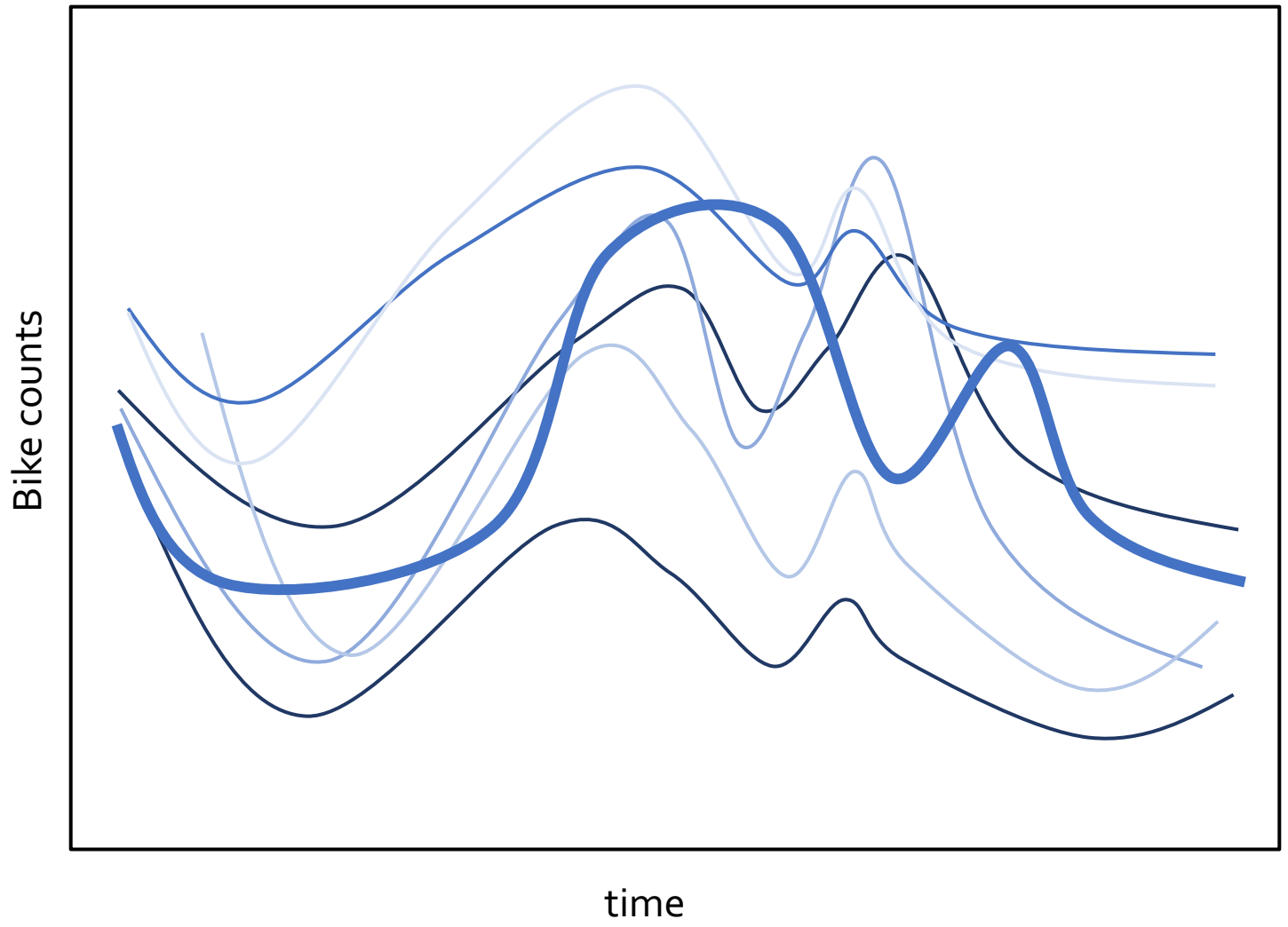




FDA

MLM

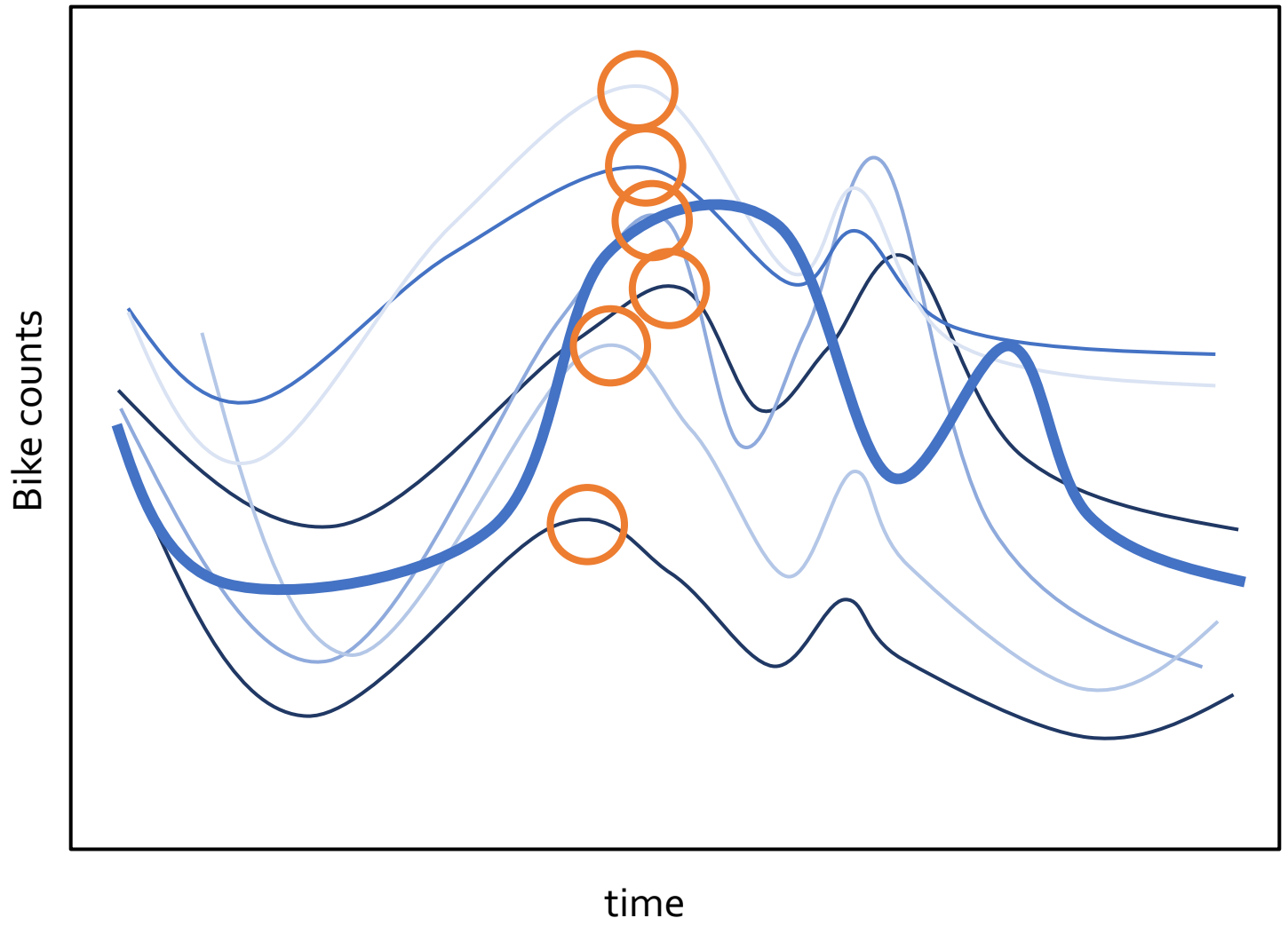
LGCM



FDA

MLM

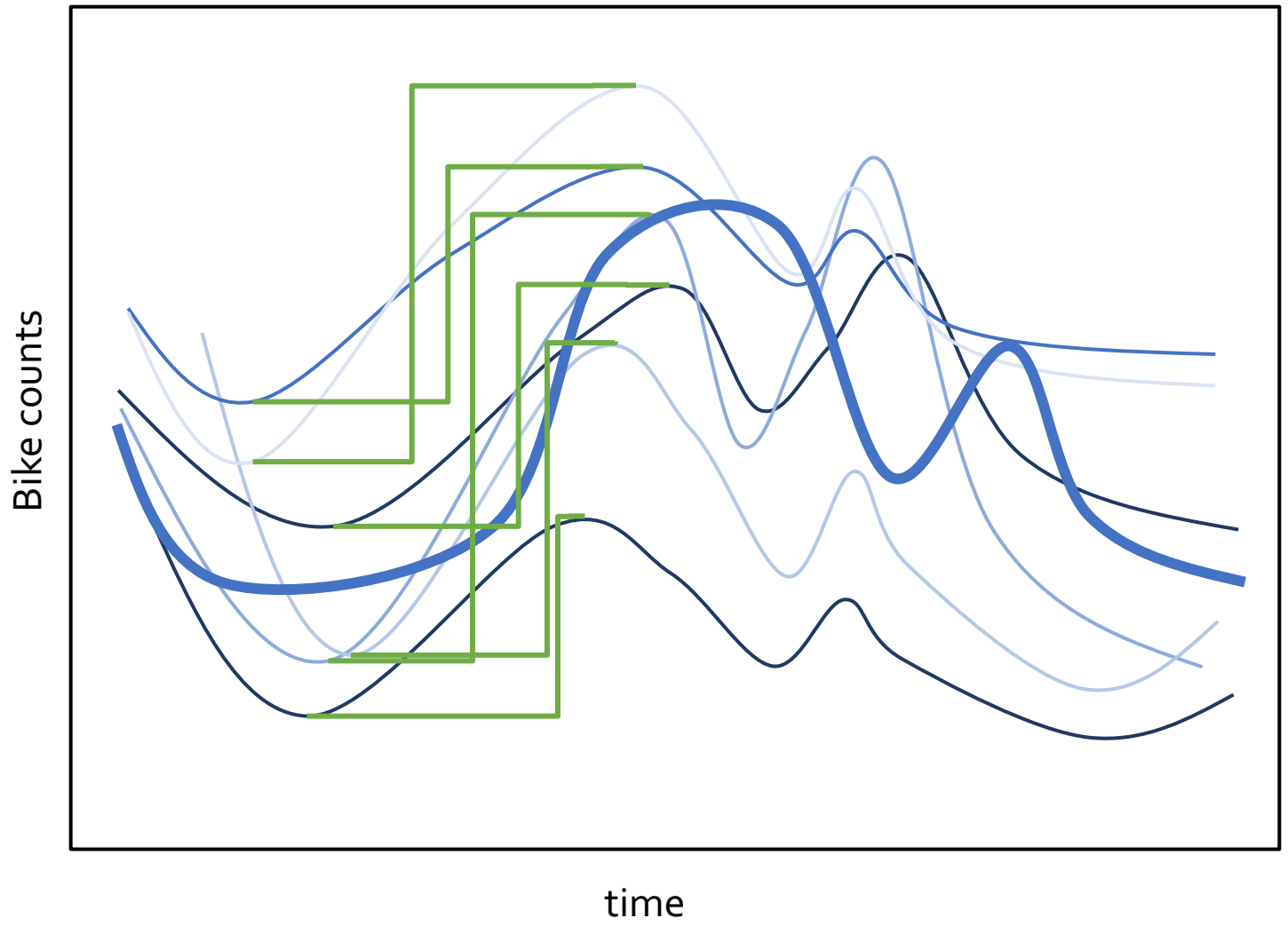
LGCM



FDA

MLM

LGCM

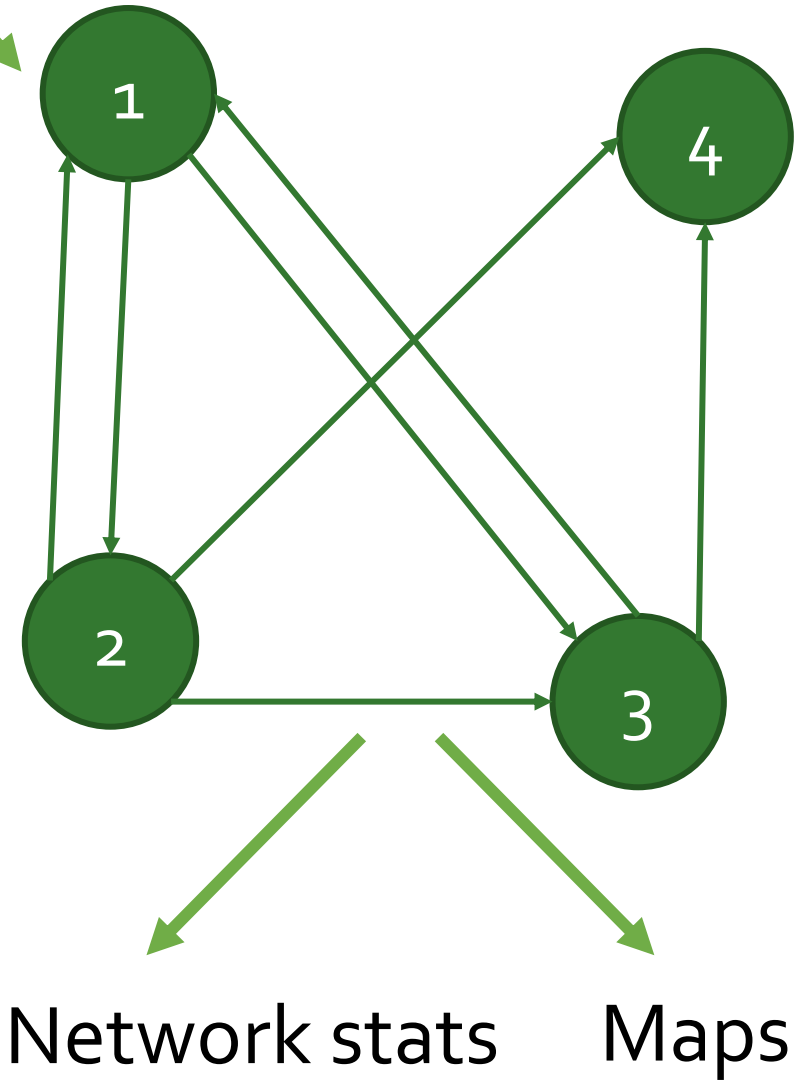


FDA

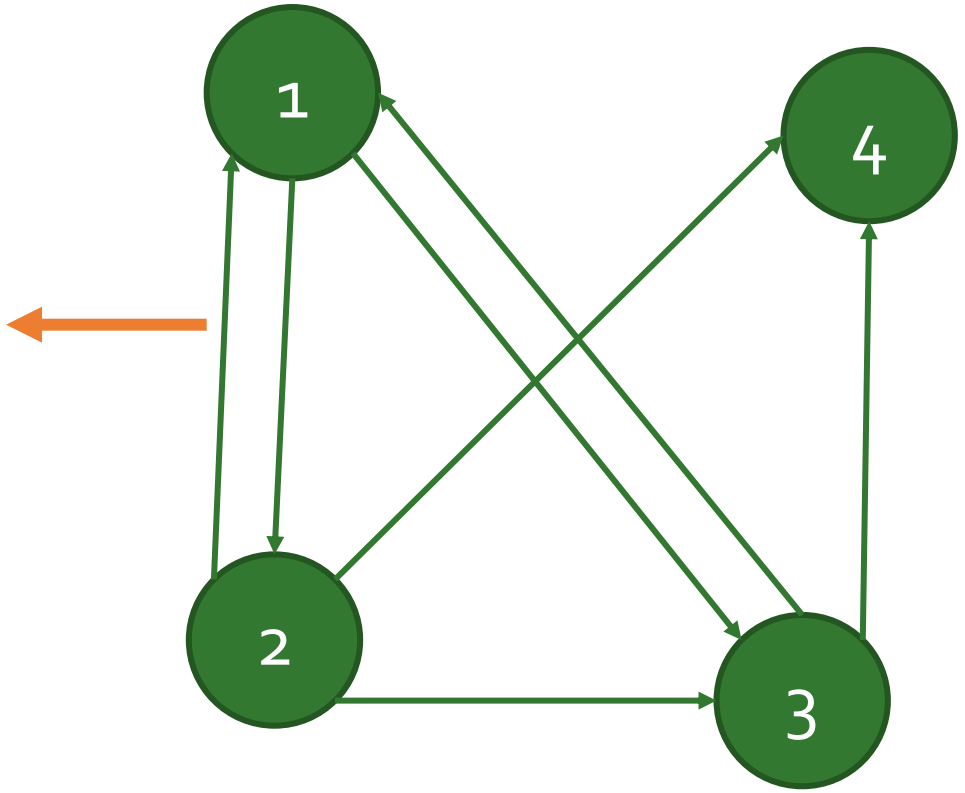
MLM

LGCM

From	To	Peak time
1	2	7:15
1	3	7:25
2	1	8:30
2	3	8:04
2	4	7:43
3	1	7:59
3	4	7:36



From	To	Peak time	Node property
1	2	7:15	2
1	3	7:25	2
2	1	8:30	1
2	3	8:04	1
2	4	7:43	1
3	1	7:59	2
3	4	7:36	2

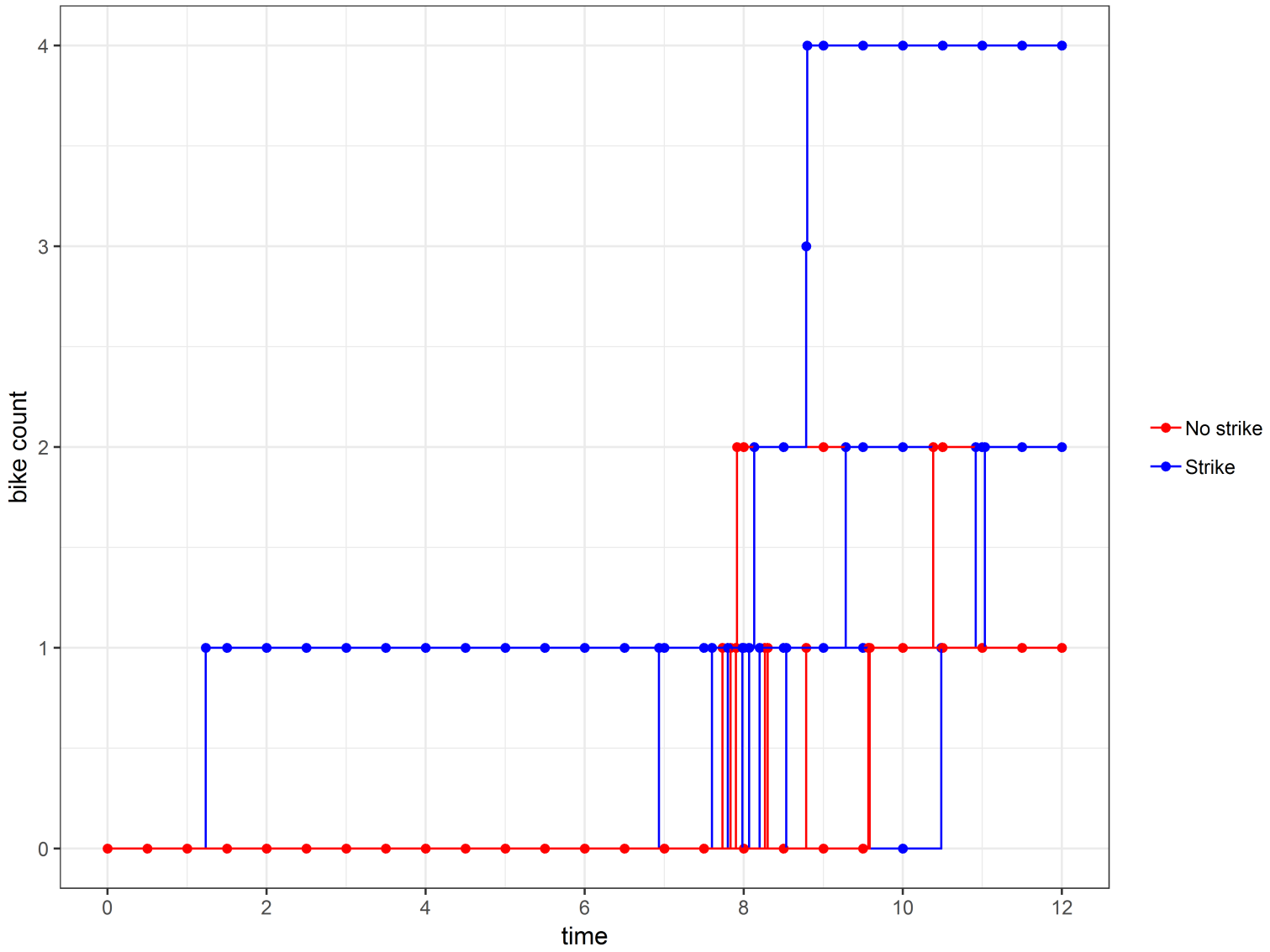


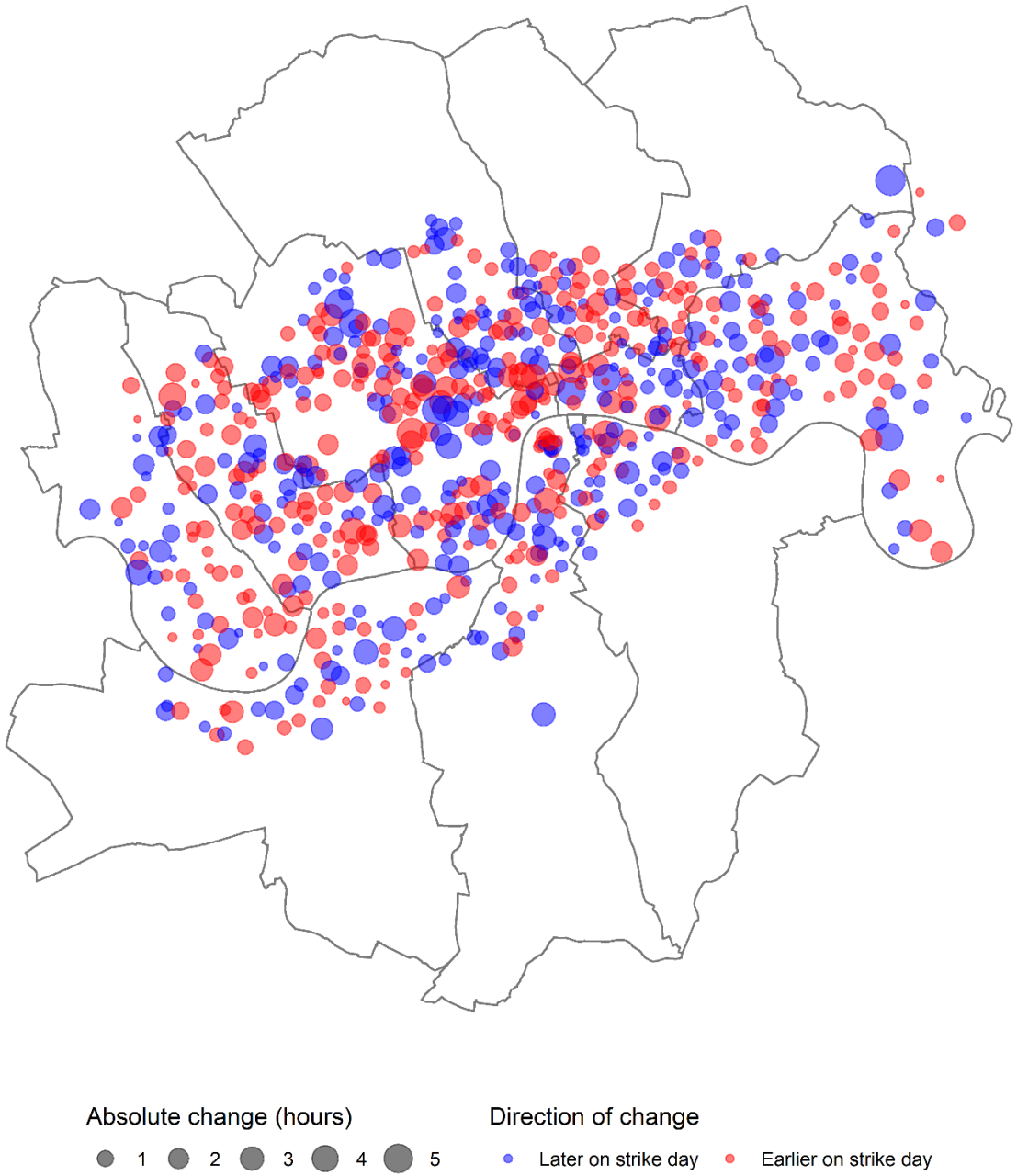
Modelling

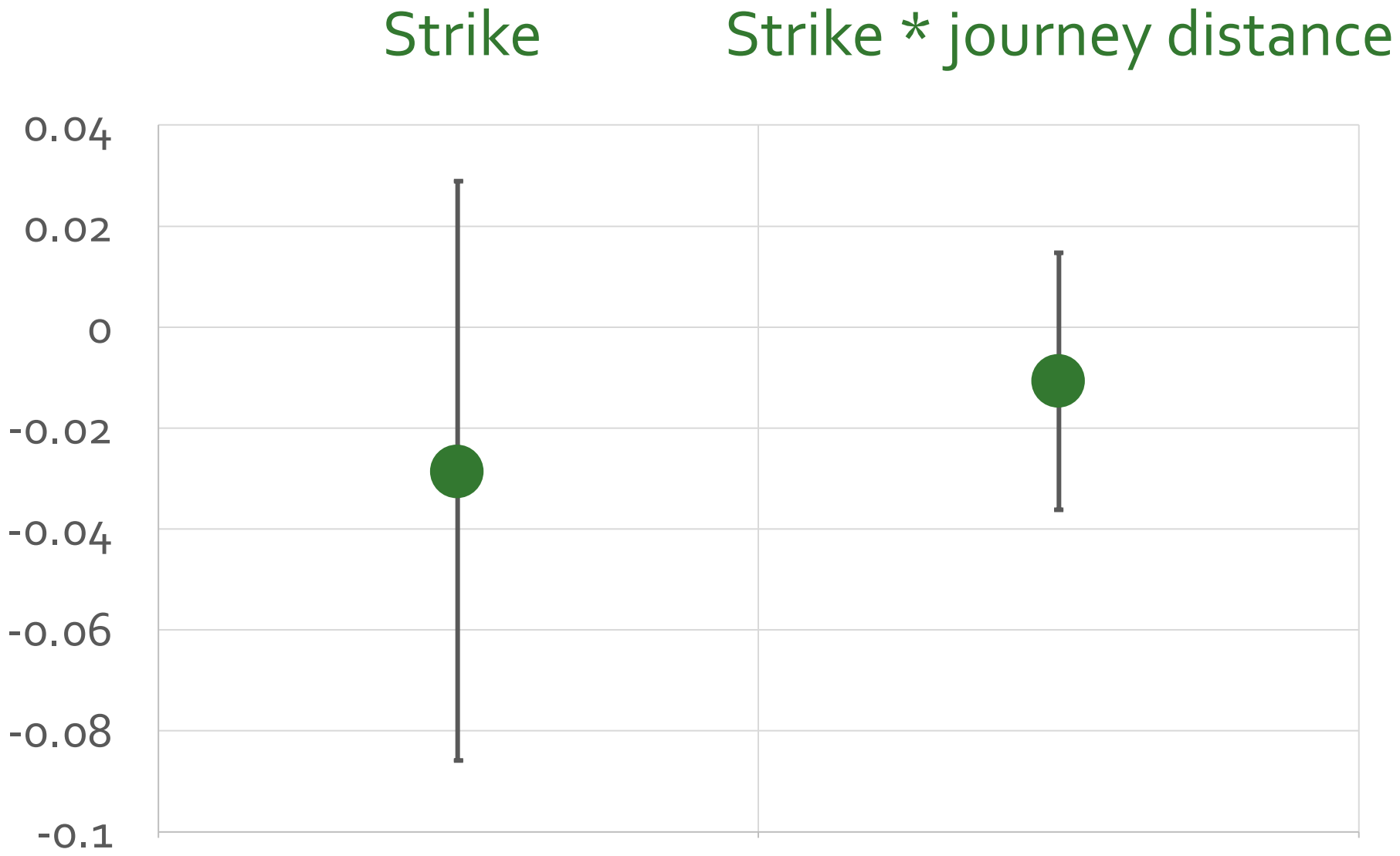
EXAMPLE APPLICATION

Research questions

- How do morning peak travel times change on strike days?
- How does this vary across space?


bike count
time
0
1
2
3
4
0
2
4
6
8
10
12
No strike
Strike


Absolute change (hours)
1
2
3
4
5
Direction of change
Later on strike day
Earlier on strike day


Strike
Strike * journey distance
0.04
0.02
0
-0.02
-0.04
-0.06
-0.08
-0.1

Conclusions

- Examining spatial variation in temporal pattern features potentially useful
- Future work to identify which models perform best when