

Impacts of open data on citizens' behavior change:

assessing a countermeasure for face mask panic buying behaviors during the early stage of the Covid-19 pandemic

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Background

- Open data initiatives have expanded worldwide. But, **do data actually change citizens' behaviors?**
- Investigations of exemplary open-data use cases and evaluations of their impacts are insufficient.

Case & Research questions

- Taiwanese open-data initiative during Covid-19 pandemic.
 - The national government opened the store-level face mask stock data to the public.
 - It aimed to reduce panic buying behaviors.

Civic tech initiatives develop maps showing mask availability at the store level to address panic buying behaviors

<https://kiang.github.io/pharmacies/>

- RQ1**: how the open data initiative impacted citizens' panic buying behaviors?
- RQ2**: how, if at all, the impacts of the open data initiative differ among socioeconomic characteristics?

Methods & Data

- A quasi-experiment approach, difference-in-difference (DiD) approach.
 - The model compares the changes in **sold mask numbers** (the degree of panic buying behavior) between the **stores in mask map use areas** (treatment group) and **those in no/lower mask map use areas** (not-treated group) before and after the government loosened the mask purchase policy.

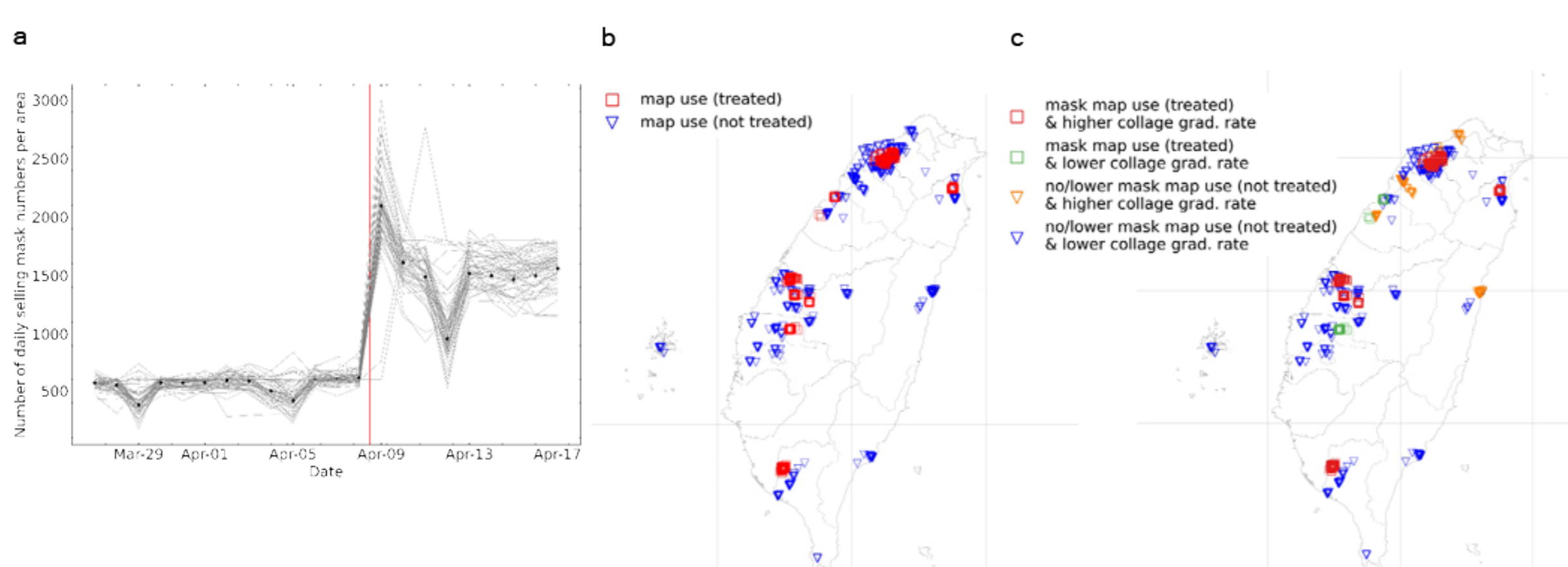


Figure 1. The surge in sold face mask numbers when the government loosened the mask purchase policy (a). The mask selling stores' locations used for the study (b, c).

Results & Discussion

Table. Coefficients estimated with Kernel propensity score matching model.

	all stores		higher educated		lower educated
Treatment threshold	1 %	3 %	1 %	3 %	1 %
Coef. of treatment dummy	-0.522	-0.758**	-1.184***	-0.720*	1.485
Std.err.	(0.572)	(0.272)	(0.329)	(0.271)	(2.099)
Adjusted R ²	0.11	0.31	0.44	0.36	0.07
Number of obs.	29,592	15,760	12,202	10,562	12,718

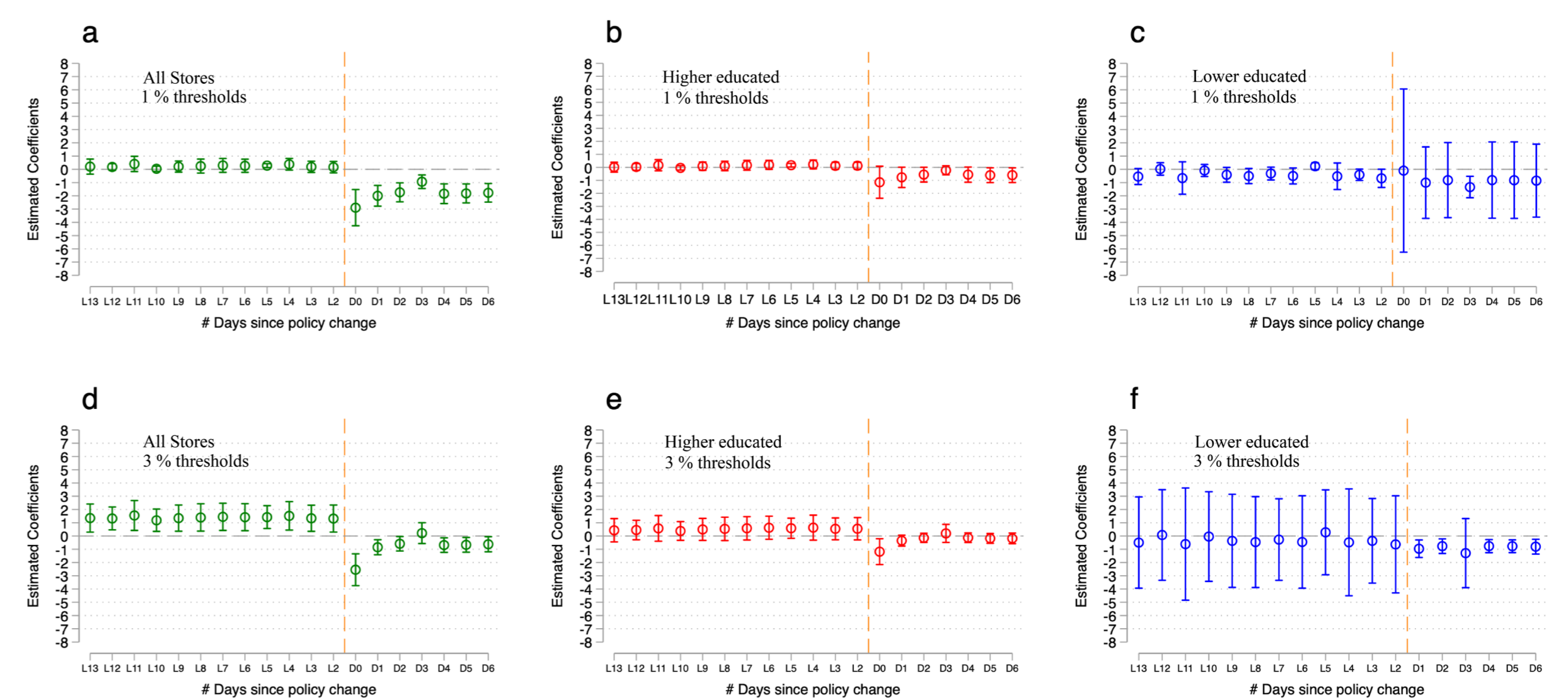


Figure 2. Event-study results on the mask map use effects on mask purchase for assessing parallel trend assumptions

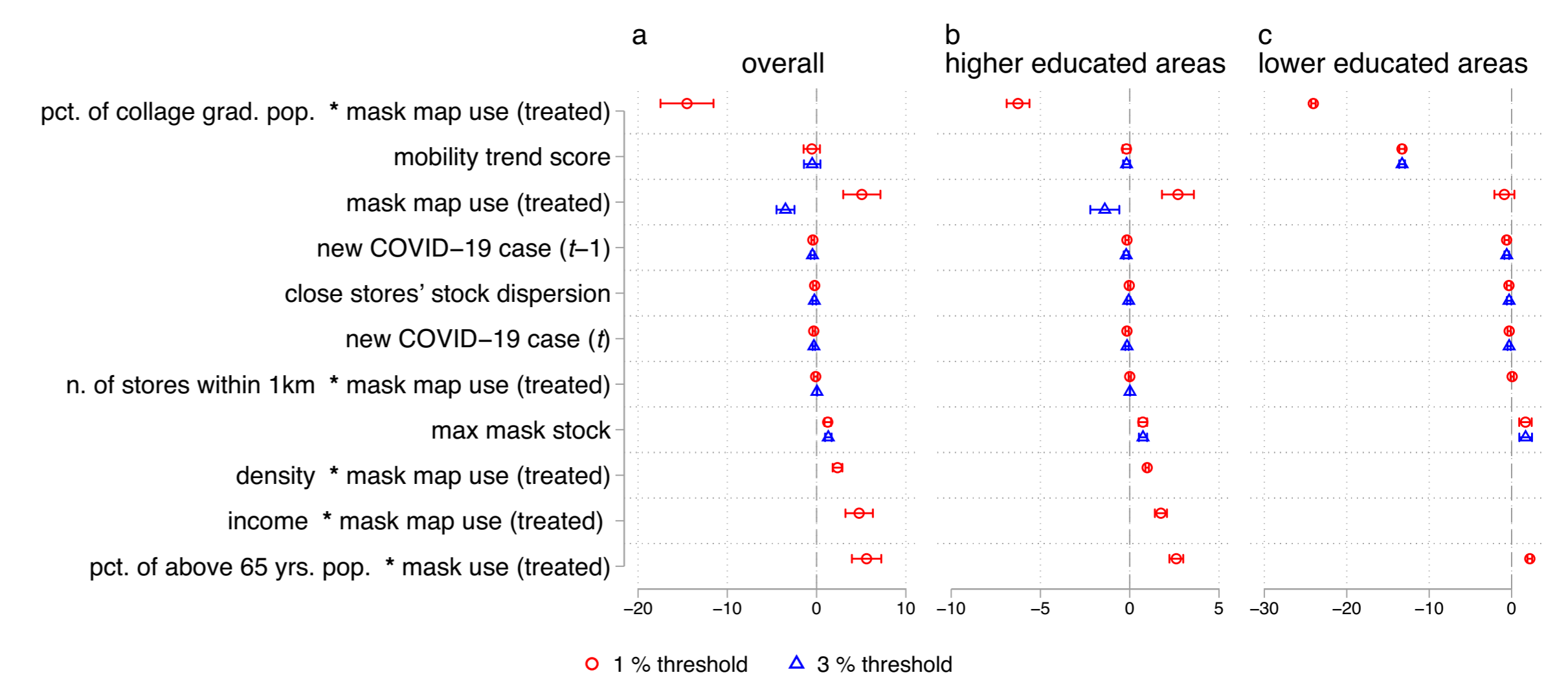


Figure 3. The socioeconomically heterogeneous impacts of mask map use. The impact of the mask map on suppressing sold mask amounts is greater when stores are located in the higher college graduate rate areas.

Key takeaways

- The data openly provided via the mask map may have impacted people's purchasing behavior in terms of whether to rush to a store to buy face masks.
 - Such influence may have **contributed to reducing panic buying behaviors.**
- The impacts of digital solutions may have been limited and **vary across socioeconomic conditions** of areas.
 - More educated populations** might have behaved based on the open data.