

# How effective are the Airbnb regulations?

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## **Motivation**

- Airbnb and other short-term online rental providers lead to significant pressure on the hotel market (Zervas et al., 2017)
- Many cities introduced laws and regulations restricting this type of activity (Nieuwland and van Melik, 2018)
- Geneva introduced regulations for short-term online rentals of entire properties since 1Apr2018 (not on rentals of private rooms)

**Limit on the number of short-term rents of 60 days, the establishment of a monitoring, fines for non-compliance.**

**NB :** Following a court decision in April 2019, the rental period has been increased from 60 to 90 days per year. Beyond this period, it constitutes a change of assignment (commercial activity), which is prohibited.

**Expected effect:** Reduction in Airbnb's supply of accommodation and consequently in the revenues.

## **General overview**

**Aim:** to investigate if the introduction of regulations on short-term rentals in Geneva leads to reduction of supply, demand and revenues of Airbnb facilities.

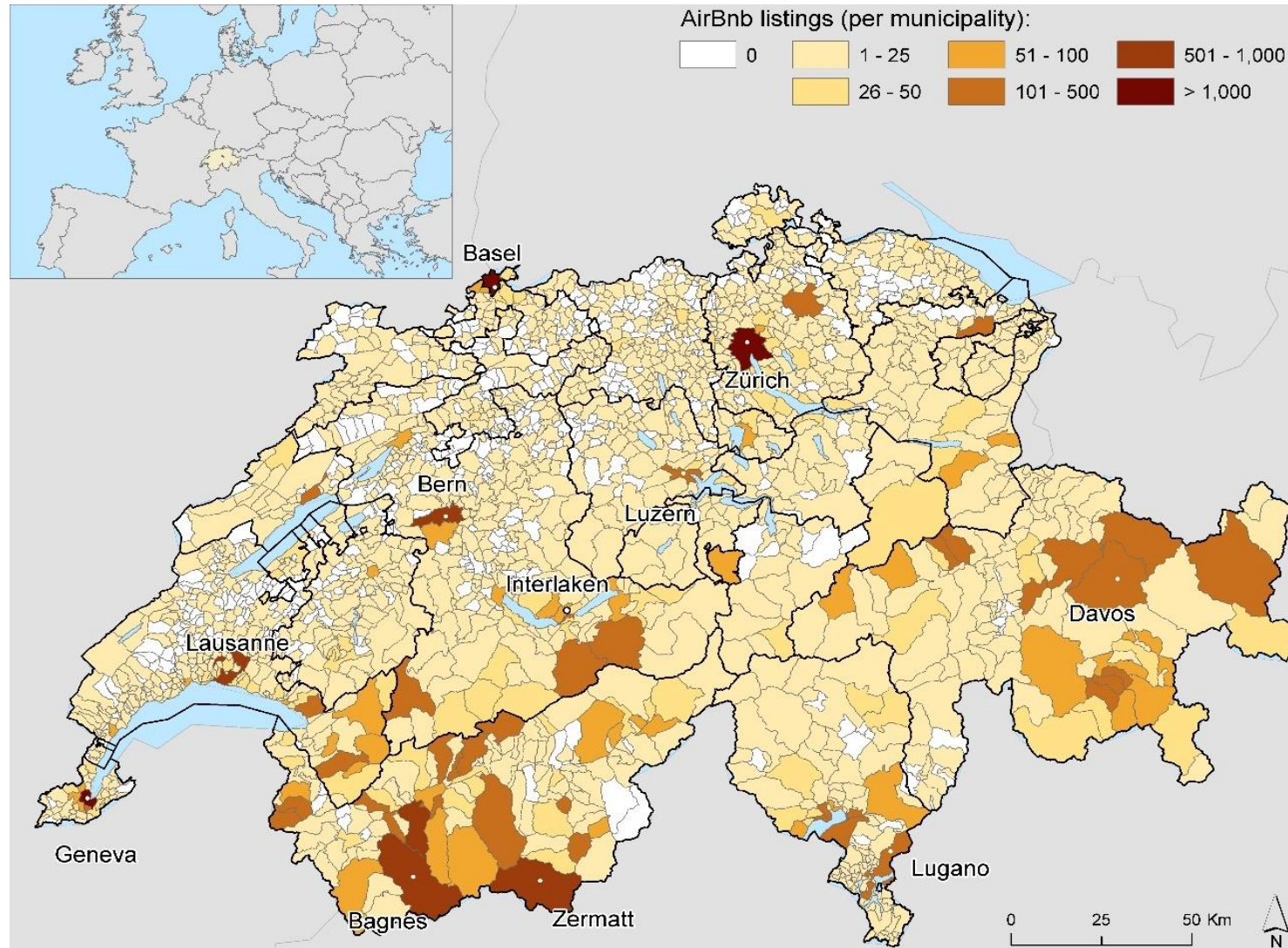
**Method:** panel difference-in-differences approach.

**Data:** Universe of Airbnb listings of the ten largest Swiss cities at the monthly level for the period 2016-2018 with about 500,000 observations.

**Control group:** cities where there are no regulations on short-term rentals or only agreements on the payment of the city tax (Zürich and Basel).

**Contribution:** analysis not only examines the impact of regulations on the affected group of Airbnb accommodations but also takes into account the substitution effect towards an increase in Airbnb demand for private rooms.

# Spatial distribution of Airbnb accommodations at Swiss town level

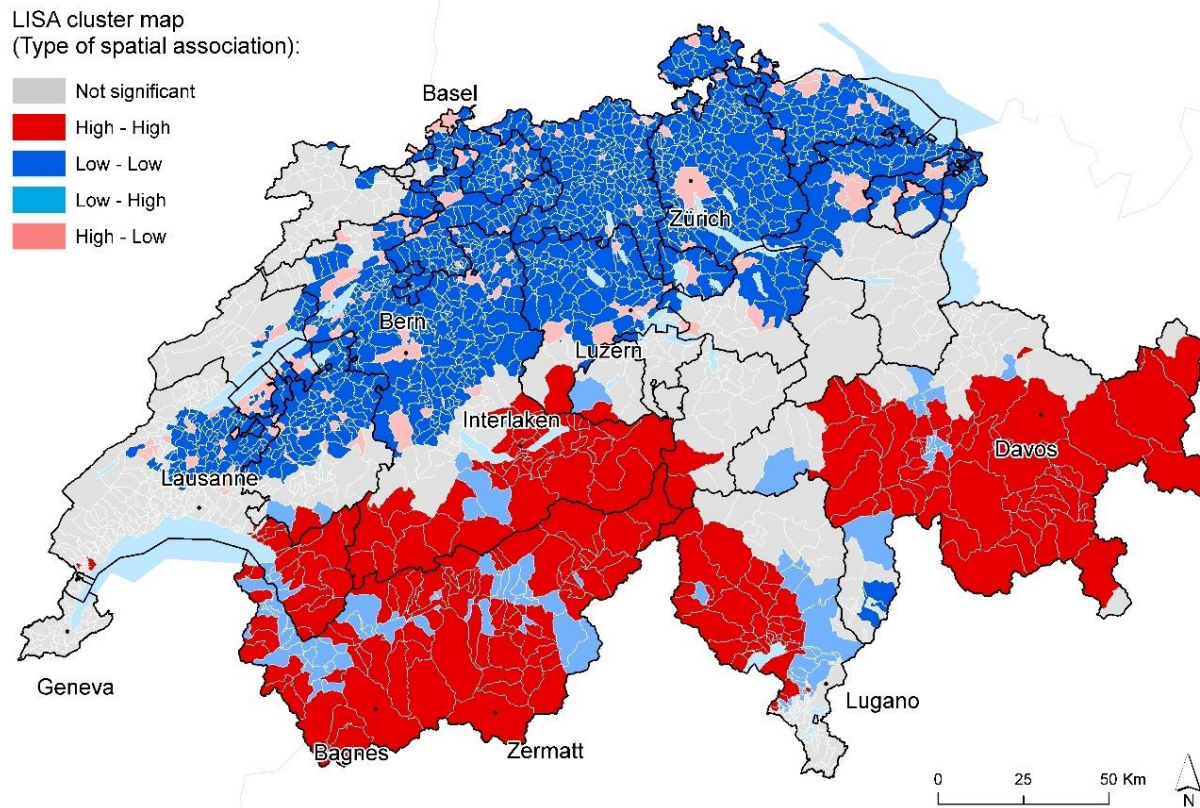


## Valais Tourism Observatory:

- Airbnb API
- 32,761 Airbnb listings
- January 2018
- Data aggregated at a municipal level

# Spatial distribution of Airbnb accommodations at Swiss town level

Clusters based on local Moran spatial autocorrelation indicator



## **Empirical model and previous studies**

**Strategy :** to compare the impact of regulations on short-term rentals on the supply and performance of individual Airbnb listings in cities with and without regulations.

**Previous study:** Yang, Y., & Mao, Z. (2018). Welcome to My Home! An Empirical Analysis of Airbnb Supply in US Cities. *Journal of Travel Research*, early view.

**Methodology :** Difference-in-differences (DID) setting the treatment is a one-time change in government policy applied equally to all members of the treatment group. (Angrist and Pischke, 2009, 2015).

**Treatment group :** Airbnb listings in Geneva

**Control group :** Listings in nine Swiss cities including Zürich & Basel

## Empirical model (1)

Empirical specification:

$$ACTIVEAIRBNB_{it}^* = \beta_0 POST_{it} + \beta_1 POST_{it} \cdot GENEVA_{it} + X_{it} \beta + e_{it}$$
$$e_{it} = \delta_i + d_t + \varepsilon_{it}$$

$ACTIVEAIRBNB_{it}^*$  : likelihood of an active Airbnb listing  $i$  for month  $t$

$POST_{it}$  : dummy variable equal to one for the period Apr 2018 to Dec 2018 and zero for the period Jan 2016 to Mar 2018

$GENEVA_{it}$  : dummy variable equal to one if the Airbnb listing is located in Geneva and zero when located in the other nine largest cities in Switzerland

$X_{it}$  : monthly dummy variables, characteristics of the Airbnb property such number of bedrooms, characteristics of the property (entire house, flat, chalet etc), number of reviews, super host

Estimation method: Conditional (Fixed effects) logit model (Chamberlain 1980)

## Empirical model (2)

Empirical specification of performance indicators of the Airbnb accommodations:

$$AIRBNBPERFORM_{it} = \beta_0 POST_{it} + \beta_1 POST_{it} \cdot GENEVA_{it} + X_{it} \beta + e_{it} \quad e_{it} = \delta_i + d_t + \varepsilon_{it}$$

*AIRBNBPERFORM*: ((i) occupancy, (ii) monthly revenues in CHF, (iii) number of reservations, (iv) number of reservation days, (v) number of blocked days

Left hand variables contain a significant proportion of zeros

**Estimation method:** Conditional fixed-effects Poisson regression (Silva and Tenreiro, 2006); can be applied to any non-negative continuous variable

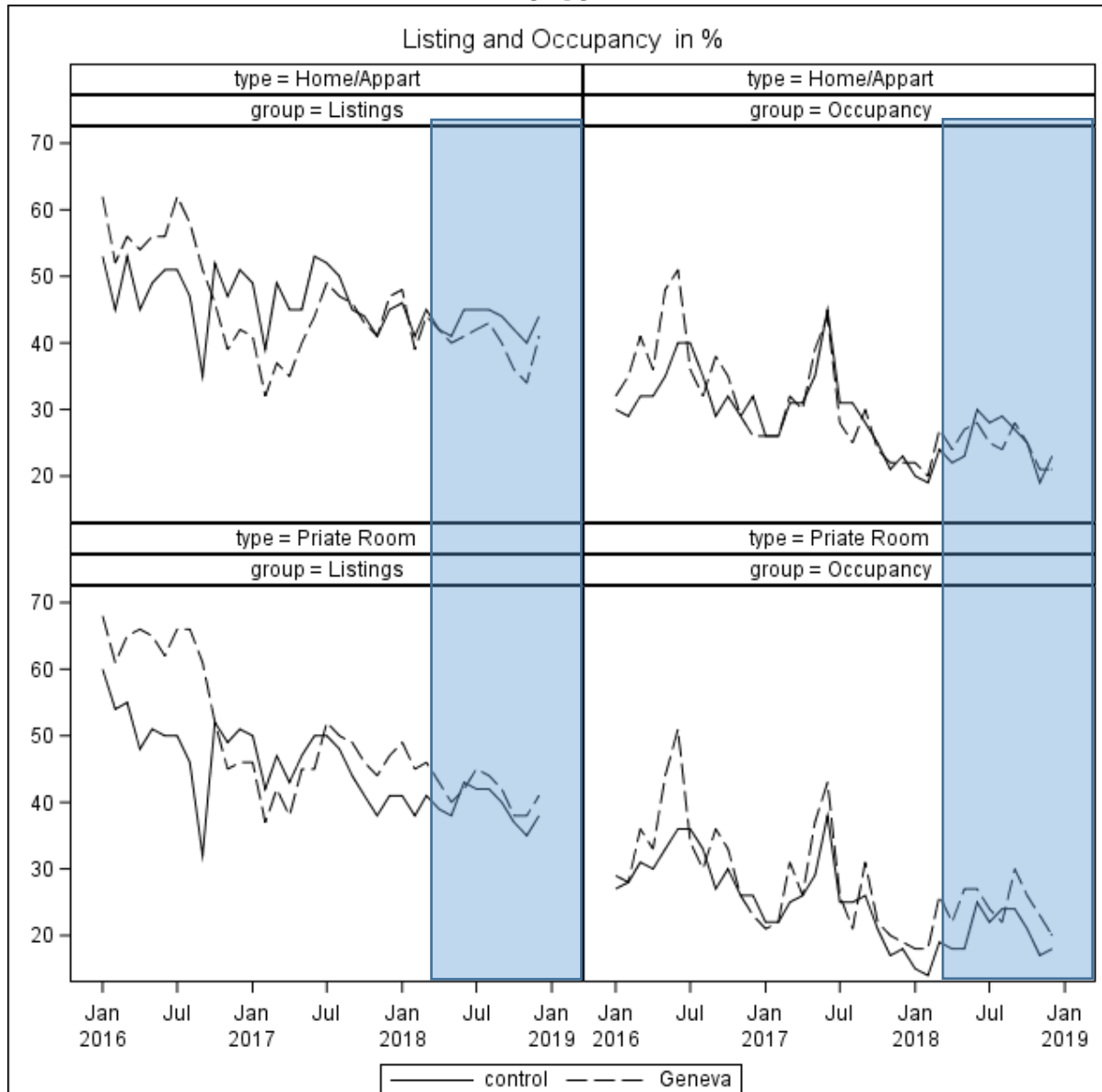
### Hypotheses:

- i. New threshold on the number of rental days in Geneva leads to a decline in active Airbnb accommodations of entire homes and apartments
- ii. New threshold leads to reduction in revenues, occupancy, reservations
- iii. New threshold leads to increase in the number of blocked days
- iv. Airbnb regulations on entire properties might lead to an increase in demand for private rooms.

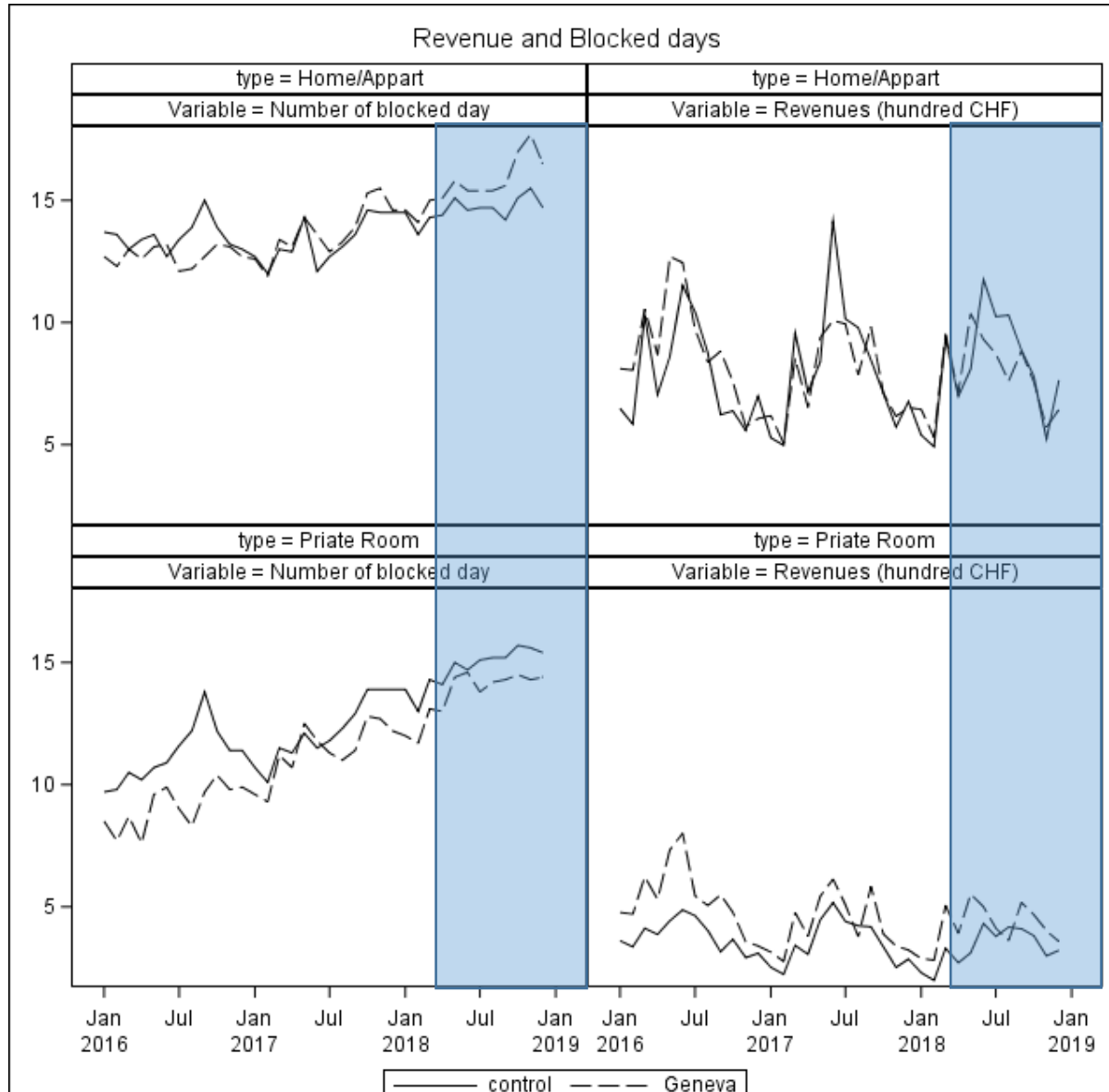
## **Data**

- Information on Airbnb listings provided by Airdna
- Universe of Airbnb listings in Switzerland at the monthly level for the period 2016-2018 with 1.5 million obs.
- Sample is restricted to the ten largest cities
- Use of Fixed effect Panel data models => exclusion of listings where there is no change over time in the status
- Sample size about 430,000 observations of which 270,000 are entire homes and 165,000 are private rooms

## Data



## Data



## **Empirical results**

### **MODEL 1 - Panel logit model estimations**

Likelihood of an active Airbnb listing (entire property or private room) in Geneva decreases significantly after the introduction of the Airbnb regulation on 1Apr2018 .

Marginal effect of the Airbnb regulation in Geneva on listing of entire properties is - **0.04** (=>low effect).

### **MODEL 2 - Panel fixed-effects Poisson regression**

Entire homes or apartments: short term rental regulations in Geneva lead to a significant decrease in the occupancy rate, revenues, number of reservations and reservation days.

Increase in the number of days on which the Airbnb listing is not available.

Airbnb regulations do not lead to an increase in demand of private rooms which indicates that the substitution effect is not existent

## Empirical results

### Fixed effects logit and Random effects probit estimates of the determinants of active Airbnb listings

	coeff.		z-stat	coeff.		z-stat
Post period	-1.28	***	-80.53	-1.50	***	-75.73
Geneva	-0.37	***	-9.30	0.11	**	2.09
Geneva X post period	-0.20	***	-7.26	-0.19	***	-4.64
Control variables	yes			yes		
Rho (random effect)	0.57			0.54		
Marginal effect Geneva X post period	-0.05	***		-0.04	***	
Number of observations	310,798			193,830		
Number of Airbnb listings	17,957			11,239		
	Entire property/home			Private rooms		
	Conditional logit model					
	Coeff		z-stat	Coeff.		z-stat
Post period	-1.57	***	-95.5	-1.83	***	-88.5
Geneva X post period	-0.16	***	-5.36	-0.16	***	-3.65
Control variables	yes			yes		
Marginal effect Geneva X post period	-0.04	***	-5.36	-0.03	***	-3.65
Number of observations	265,783			167,386		
Number of Airbnb listings	14,113			9,089		

## Fixed-effects Poisson regression of the performance of Airbnb offers

	Entire homes/apartments			Private room		
	Dependent variable: Occupancy rate					
	Coeff.		z-stat	Coeff.		z-stat
Post period	-0.42	***	-31.66	-0.55	***	-26.47
Geneva X post period	-0.12	***	-4.58	0.04		1.08
	Dependent variable: Airbnb revenues					
	Coeff.		z-stat	Coeff.		z-stat
Post period	-0.20	***	-11.52	-0.41	***	-17.25
Geneva X post period	-0.20	***	-6.77	-0.01		-0.24
	Dependent variable: Number of reservations					
	Coeff.		z-stat	Coeff.		z-stat
Post period	-0.33	***	-19.67	-0.51	***	-20.41
Geneva X post period	-0.17	***	-4.87	0.03		0.58
	Dependent variable: Number of days reserved					
	Coeff.		z-stat	Coeff.		z-stat
Post period	-0.29	***	-21.81	-0.43	***	-20.18
Geneva X post period	-0.14	***	-5.08	0.01		0.31
	Dependent Variable: Number of days blocked					
	Coeff.		z-stat	Coeff.		z-stat
Post period	0.14	***	19.97	0.21	***	22.14
Geneva X post period	0.04	***	2.87	0.05	**	2.25

## **Conclusions**

Difference-in-differences technique combined with panel count data models is used to estimate the impact of the STR regulation on entire properties in Geneva.

Supply and performance of entire Airbnb properties decrease after the introduction of the STR regulation.

Magnitude of the regulation effects is rather small.

Airbnb demand for private rooms has not benefited from the Airbnb regulations => no substitution effect in the form of increased demand for private rooms.

More drastic regulations needed to decrease Airbnb supply

Future work: Panel quantile regressions.



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**QUESTIONS ?**  
**MERCI !!!**