

# Analysis of Impact of Hosting Olympics on Real Estate Prices with Difference-in-difference Model



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## Dataset and Processing

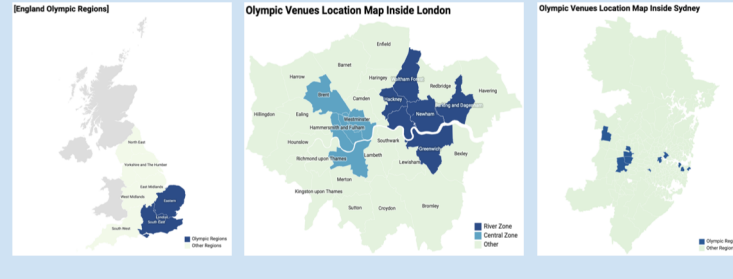
### Datasets:

1. England Average Real Estate Price
2. Sydney Real Estate Price

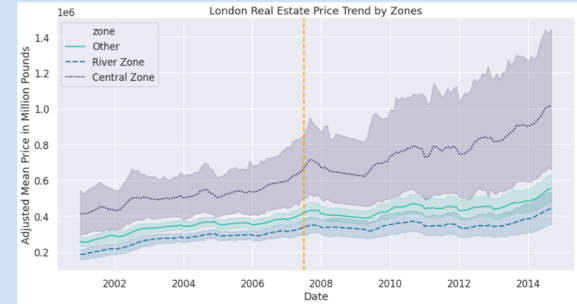
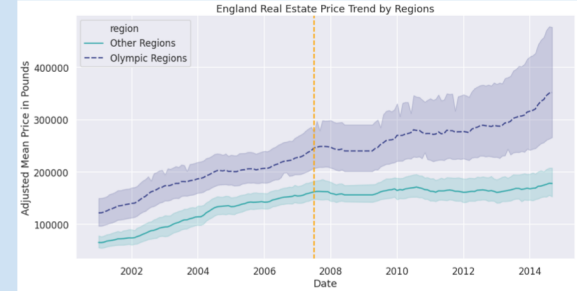
### Data Processing

1. Classify hosting and non-hosting regions by boroughs based on the density of Olympic Venues and athlete residential areas.
2. Classify before/after (*TimeStamp*) hosting period by announcement of the Olympic development plan.
3. Adjust price with inflation multiplier and construct price per square meter label.

## Visualizing Host/Non-Host Areas



## Trends on the Real Estate Market Price by Host/Non-Host Regions



## Methodology and Approaches:

1. We use Box and Cox method to transform our label to normal distribution.

$$price^{(\theta)} = \begin{cases} \frac{p^{(\theta)} - 1}{\theta} & \text{for } \theta \neq 0 \\ \ln p & \text{for } \theta = 0 \end{cases}$$

2. We utilize a Difference-in-difference approach of linear regression and its semi-logarithmic functional form to estimate real estate prices. We regress the adjusted price per square meter label on various attributes and the interaction term between *TimeStamp* and *HostRegion*.

$$\log p_{j,t} = c + \delta_1 TimeStamp + \delta_2 GeographicalFactor + \delta_3 TimeStamp * GeographicalFactor + \sum_{i=1}^n \beta_i x_i + \epsilon_j$$

3. Estimated coefficients were then transformed back for interpretation.

$$\frac{\partial}{\partial c} (\delta + c) \cdot \theta + 1 - \frac{\partial}{\partial c} c \cdot \theta + 1$$

## Results and Discussion:

1. Hosting the Olympics contributed additional 4% to the residential real estate market in the London boroughs that hosted the events, which corresponds to an increase of about 1.88bn USD in residential property value in those areas.
2. Hosting the Olympics added additional 5.92% to residential property values in Sydney, which corresponds to an increase of about 1.27bn USD in the residential property values of host area.
3. On country level, hosting Olympic Games contributed additional 1% to the residential real estate market in Olympic regions, comparing to other non-Olympic regions.

## Conclusions

1. Both host/non-host areas experience increase in real estate price after the country hosted the Olympics. The positive percent change in price per unit change of the interaction term shows that the hosting activity further boosted the real estate price.
2. Hosting the Olympics added 4% value to residential properties in London, and 5.92% to residential property in Sydney.

Based on these results, it is clear that hosting the Olympics positively impacted real estate prices in the areas that served as venues compared to other areas of the same city.