

The impact of billboards on deposits using the DID

$$\text{Deposits}_{it} = \beta_0 + \beta_1 \cdot \text{billboard}_i + \beta_2 \cdot \text{post}_t + \beta_3 (\text{billboard}_i \cdot \text{post}_t) + \mathbf{X}'_{it} \boldsymbol{\gamma} + \epsilon_{it}$$

DID Estimation Results

1. Baseline DID Model (Without Controls)

Interaction Term Coefficient = 6.52

The interaction term was not statistically significant, suggesting that the billboard's additional impact after implementation cannot be confirmed.

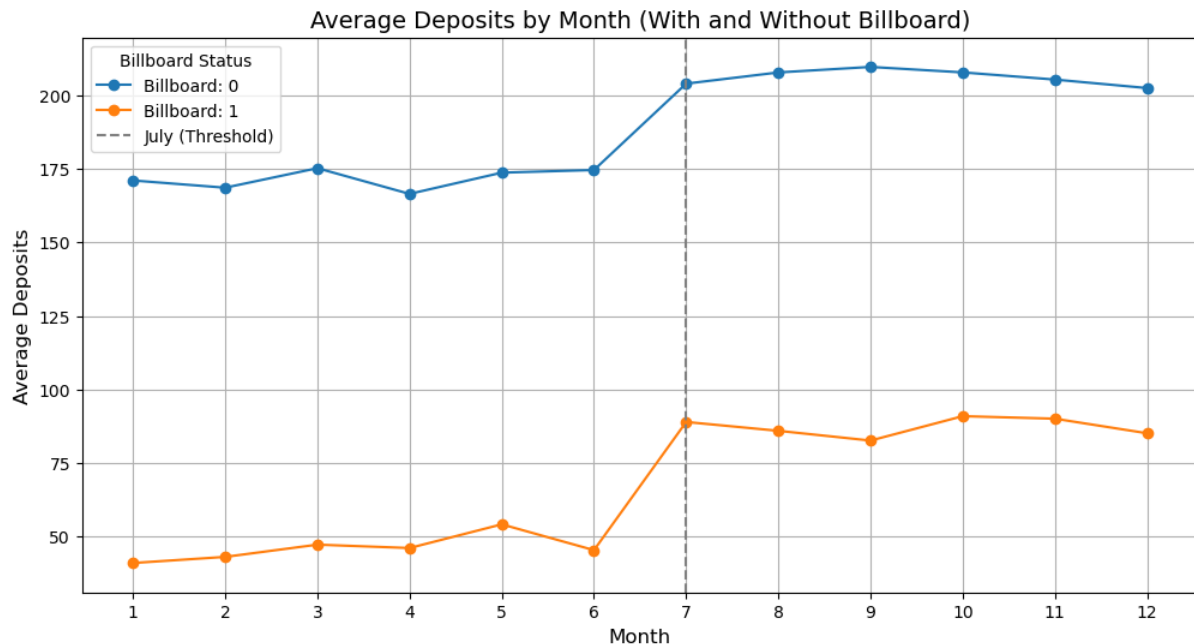
2. DID Model (With Controls)

Interaction Term Coefficient = 6.79

Coefficient slightly increased, but even after including control variables such as average income, population, and the number of banks, the interaction term remained insignificant.

Parallel Trends Assumption

To validate the Parallel Trends Assumption, we examined the deposit trends of the treatment and control groups prior to the intervention (July).

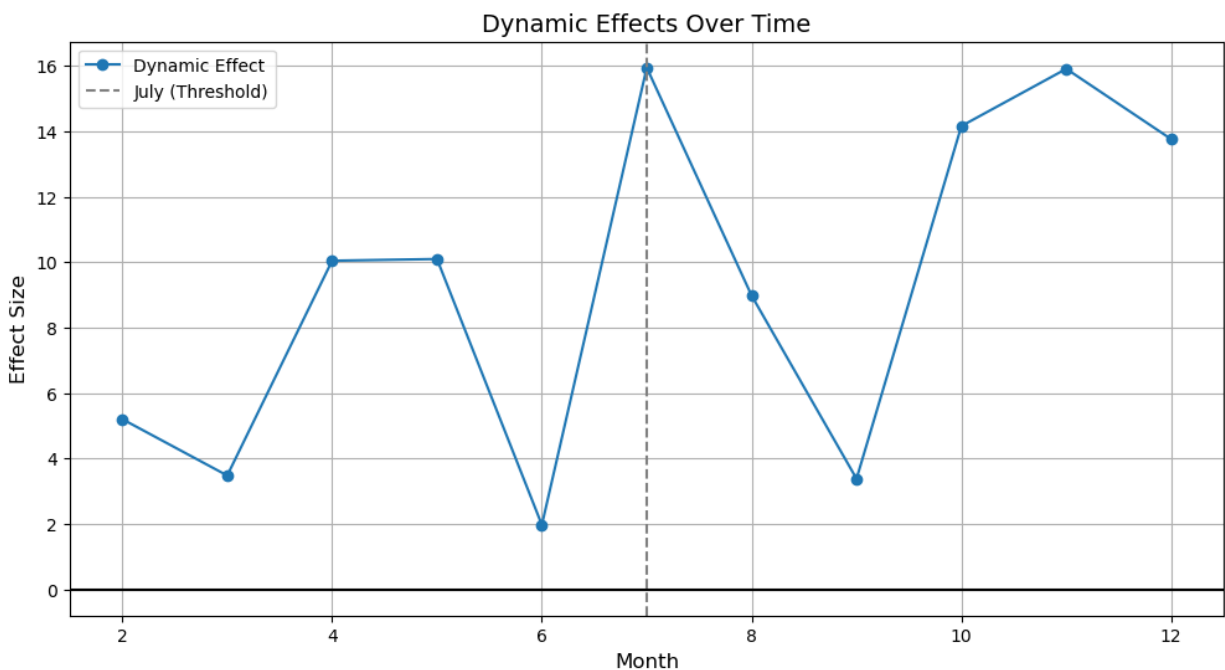


Both groups demonstrate relatively similar trends before the intervention (July), and no sharp divergences or significant deviations are observed.

Also, it turned out that parallel trends assumption was supported by the statistical result.

'Treated Pre-Treatment Mean': 46.016,
'Untreated Pre-Treatment Mean': 171.6423076923077,
'Untreated Post-Treatment Mean': 206.1655,
'Untreated Change': 34.52319230769231,
'Counterfactual Trend': 80.5391923076923,
'Actual Treated Post-Treatment Mean': 87.06375,
'Difference (Actual - Counterfactual)': 6.524557692307695,
'P-value': 3.4572840709727914e-161

Dynamic Effect



The dynamic effect analysis, visualized through a graph, revealed no noticeable differences before and after the treatment. Furthermore, it suggested the possibility that the treatment effect might have been dispersed across multiple time periods.

Conclusion

The DID results suggest a small positive effect of billboards on deposits, but the effect is not statistically significant.

Both graphical and statistical analyses support the parallel trends assumption, validating the DID framework.

The study faces several limitations that may affect the interpretation of the results.

First, the statistical significance of the interaction term (billboard:post), which represents the core treatment effect in the DID model, is lacking ($p=0.237$).

Second, the dynamic effects analysis revealed that the treatment effects are dispersed over multiple time periods without a clear pattern.

This raises the possibility that the treatment effect may have been diluted or spread out over time, potentially indicating the presence of anticipation effects prior to the intervention.