

# Why do buildings skip the thirteenth floor?

with Madison Hardesty

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## Fact: Most NYC buildings skip the 13th floor

- ▶ For example, there are approximately 620 residential condominium buildings (condos) in New York City with more than 13 stories.
  - ▷ Only 13% have a unit with a 13th floor address according to data from the New York City Department of Finance.
  - ▷ In contrast, 90% have a unit with a 14th floor address or higher.
- ▶ Of course, the 13th floor is not really skipped, it is only relabeled.
  - ▷ But why?
- ▶ We use two methods from causal inference to investigate whether relabeling the 13th floor increases the value of units on that floor.

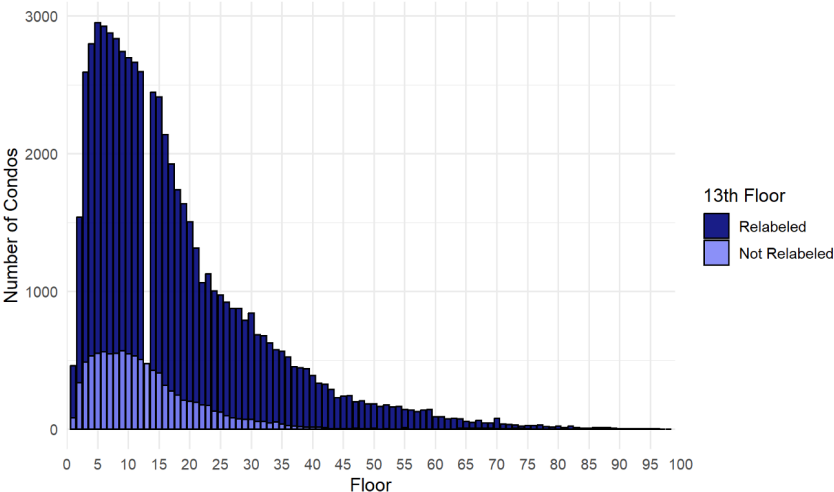
# Several reasons relabeling might increase value

- ▶ For example,
  1. Relabeled units may appeal to superstitious tenants, reluctant to live or work at an address containing the number 13.
  2. Higher floors fetch higher prices on average, and tenants may be paying more for an address that appears higher than it actually is.
- ▶ But are New Yorkers really willing to pay more for an address that is simply relabeled?
  - ▷ Maybe: After all, entire industries, like casinos and the lottery, cater to believers of lucky numbers and other irrational betting strategies.
  - ▷ Maybe not: New York City is the world's financial center, and one may expect a ruthlessly efficient market with little room for superstition.

# We examine the value of New York City condos with more than 13 floors

- ▶ We consider two measures of value:
  1. The market value of condos as assessed by the New York City Department of Finance in 2023 ([bit.ly/492AQYi](https://bit.ly/492AQYi))
  2. The most-recent sales price of the condos that were sold in the last 20 years ([bit.ly/48oppd1](https://bit.ly/48oppd1))
  
- ▶ For each condo, we determined the floor number from the address.
  - ▷ We then separated the condos into two groups:
    1. “Relabeled” condos: Condos in buildings without a 13th floor.
    2. “Not relabeled” condos: Condos in buildings with a 13th floor.

# Number of condos by floor and whether relabeled (dark) or not relabeled (light)



Source: Analysis of property valuation and assessment data from New York City Department of Finance

## We find that New Yorkers pay approximately 20% more for a relabeled address

- ▶ We identified 2,446 relabeled condos with a 14th floor address and 474 not-relabeled condos with a 13th floor address.
- ▶ The not relabeled condos had an average market value of \$253,835, while the relabeled condos had an average market value of \$302,729
  - ▷ An increase of 19.3%.
- ▶ The not relabeled condos sold for an average of \$1.2 million, while the relabeled condos sold for an average of \$1.5 million.
  - ▷ An increase of 25%.

# Does that mean relabeling an address increases the value of a condo by 20% on average?

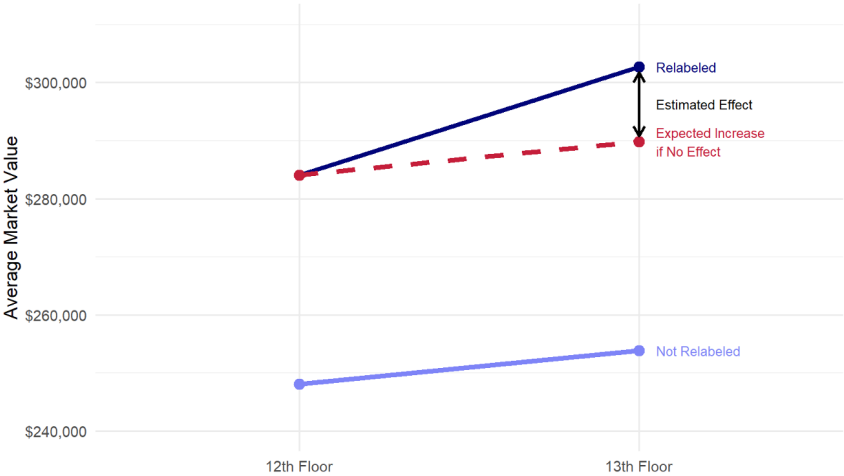
- ▶ Probably not. We found similar differences between the value of relabeled and not relabeled condos when we compared other floors.
- ▶ It seems unlikely that the value of a condo on the 10th floor, for example, would be influenced by whether the 13th floor is relabeled.
  - ▷ More likely, the gap on lower floors reflects baseline differences between relabeled and not relabeled condos.
  - ▷ e.g., relabeled condos are on average larger and newer.
- ▶ On higher floors, some portion of the gap is due to these baseline differences, while the remaining portion is due to the relabeling.
  - ▷ But what portion?

## Adjusting for baseline differences by difference-in-differences

- ▶ We compare the difference in the average value between the relabeled and not-relabeled condos to the difference in the average value between the condos one floor below the relabeled and not-relabeled condos.
- ▶ We find that the average market value of condos below the not relabeled condos—i.e., on the 12th floor of buildings that did not skip the 13th floor—was \$248,082.
  - ▷ Meanwhile the average market value of the condos below the relabeled condos—i.e., on the 12th floor of buildings that skipped the 13th floor—was \$284,069, an increase of 14.5%.
- ▶ The excess of 19.3% over 14.5% is approximately 4.5%, a smaller but still meaningful increase. The excess sales price was approximately 7%.



# Difference-in-differences suggests relabeling increases market value by 4.5%

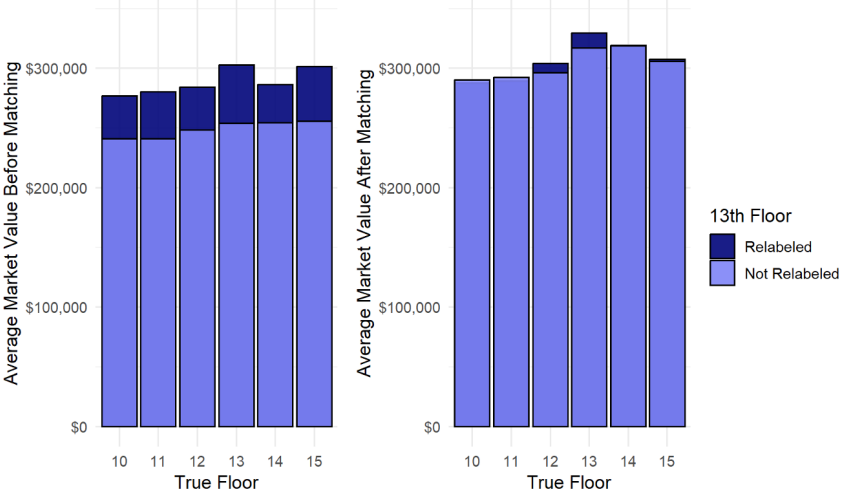


Source: Analysis of property valuation and assessment data from New York City Department of Finance

## Adjusting for baseline differences by matching

- ▶ We match each building that did not relabel the 13th floor to one that did.
  - ▷ Specifically, for each building that did not relabel the 13th floor, we find a building that did relabel the 13th floor and whose 12th floor condos are as close in average value and unit size as possible.
- ▶ We then treat the matched pairs as twins and proceed as though any differences between the two buildings are solely due to the fact that the second was relabeled.
- ▶ We find that not relabeled condos had an approximately 4% higher market value than their relabeled twins and a 0.2% higher sales price.

# Average Condo Price by True Floor (i.e., floor if not relabeled) before (left) and after (right) matching

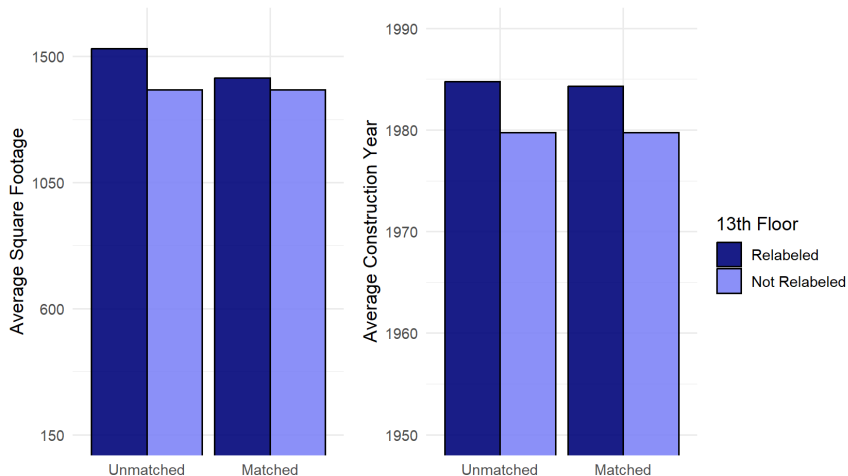


Source: Analysis of property valuation and assessment data from New York City Department of Finance

## Checking whether the matched are in fact similar

- ▶ To ensure that the matched pairs are similar in all respects other than the relabeling, we examine the average size of the 13th floor units and the average year the building was constructed.
- ▶ If the matched pairs are in fact similar, we expect to see the same size and construction year on average, notwithstanding a small deviation due to sampling variation.
- ▶ The averages between the two groups are much closer after matching than before, and we conclude that the condos within each pair are sufficiently similar on average.
  - ▷ The average location was also much closer among the matched pairs (figure not shown).

# Relabeled and not relabeled condos more similar after matching



Source: Analysis of property valuation and assessment data from New York City Department of Finance

# So does simply relabeling a condo increase its value?

- ▶ We found that 86.5% of residential condominium buildings with more than 13 stories do not have a unit with a 13th floor address.
  - ▷ These units have essentially been “reabeled.”
- ▶ The market value and sales price of relabeled condos were around 20% higher than condos that were not relabeled.
  - ▷ This shows that New Yorkers are in fact paying more for a relabeled address.
- ▶ But that disparity greatly diminished after using two methods from causal inference to adjust for baseline differences between relabeled and not relabeled condos.
  - ▷ In particular, matching suggested relabeling had no effect on the average sales price of a condo.

## Conclusion: Relabeling tradition, not profit driven

- ▶ We conclude that the missing 13th floors are better explained by tradition.
- ▶ While the practice may have profited developers in past generations, the additional value generated from skipping the thirteenth floor today appears small.
  - ▷ This is especially true in comparison to other factors that influence value, such as location, size, and other amenities.
- ▶ Moreover, it is the developers who offer better locations, sizes, or amenities that are more likely to skip the 13th floor.
  - ▷ This suggests that it is perhaps the developers, nervous to sell their properties for a profit, who are the superstitious ones—not the tenants.

## References

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## Appendix: Triskaidekaphobia

- ▶ Triskaidekaphobia is an irrational fear of the number 13.
  - ▷ In Christian tradition, the number 13 is often linked to the Last Supper, where Judas, the apostle who betrayed Jesus, is said to have been the 13th person to sit at the table.
  - ▷ In Norse mythology, the god Loki, known for his mischievous and treacherous nature, was the 13th guest at a dinner in Valhalla, leading to chaos and disaster.
  - ▷ Fear of the number 13 is also found in tarot card games from the 15th century, where the number 13 card often represented death and misfortune.
- ▶ The superstition can still be observed today.
  - ▷ e.g., many consider Friday the 13th to be unlucky.
  - ▷ A 2007 Gallup poll found that roughly 13% of Americans are uncomfortable with the idea of staying on a hotel's 13th floor.
  - ▷ This may explain why many buildings skip the 13th floor.

## Appendix: Difference-in-differences and matching

- ▶ Difference-in-differences is often used when comparing treated and control units in observational studies. The difference between the average treated and control units are compared before and after treatment:

$$(\bar{y}_{1a} - \bar{y}_{0a}) - (\bar{y}_{1b} - \bar{y}_{0b})$$

- ▶ where  $\bar{y}_{st}$  denotes the average outcome for the units of status  $s$ —either treatment (1) or control (0)—at time  $t$ —either before ( $b$ ) or after ( $a$ ) treatment.
- ▶ The second part,  $(\bar{y}_{1b} - \bar{y}_{0b})$ , adjusts for the fact that the treated and control units are likely not comparable at baseline—much like how a scale is tared before weighing.
  - ▶ That is, difference-in-differences measures the difference in outcomes,  $(\bar{y}_{1a} - \bar{y}_{0a})$ , relative to the baseline difference before treatment,  $(\bar{y}_{1b} - \bar{y}_{0b})$ .

## Appendix: Difference-in-differences and matching

- ▶ The difference-in-differences “baseline” is intuitive but somewhat arbitrary.
  - ▷ e.g., ratios or percent changes could also be compared.
- ▶ An arguably less arbitrary baseline can be achieved by matching.
  - ▷ Each treated unit is paired with a control unit such that the matched pairs are comparable before treatment.
- ▶ Matching, however, has the disadvantage that a comparable pair cannot always be found.
  - ▷ Unmatched units are often discarded—yielding an estimate that is typically more accurate than difference-in-differences but less precise.