# Where is the Opportunity in Opportunity Zones

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# Introduction

# What are we Interested in? (1/2)



- The Opportunity Zone (OZ) program was part of the Income and Jobs Act, signed in December of 2017.
- The investors get three main benefits;
  - Defer taxes on (**any**) capital gains until 2026, or when the property gets sold (whichever one comes first).
  - Get a 15% discount on capital gains tax when due. (But investment must have been made before 2019.)
  - Essentially no capital gains on the property itself.
- Investors can enjoy these place-based incentives by;
  - Buying commercial real estate in a designated OZ (census tract).
  - Spending at least as much on CAPEX as on purchasing the property.

# What are we Interested in? (2/2)



- We are interested in the following;
  - It is obvious there is direct tax benefit.
  - However, are there also any expected positive spillover effects (gentrification).
  - Is the law simply a tax pass-trough to existing landowners, or is there actually some value creation?
- We analyze prices and liquidity of commercial real estate.
  - Any expected future growth in rents, should be priced in now.
  - We argue that young properties cannot enjoy the tax breaks, thus any effect measured here, must come from the fact that positive gentrification effects are expected.
  - We also analyze older properties and vacant land sales. We compare any possible price increases here and compare it with the total maximum tax break possible. (A bit back-of-the-envelope.)

# Tax Benefit

- Consider the following two Eqs;

$$\textbf{no OZ: } I_0 = \sum_{t=1}^{T} \frac{CF_t}{(1+c)^t} + \frac{TV}{(1+c)^T} - I_0 x - \frac{(TV - I_0)x}{(1+c)^T}$$

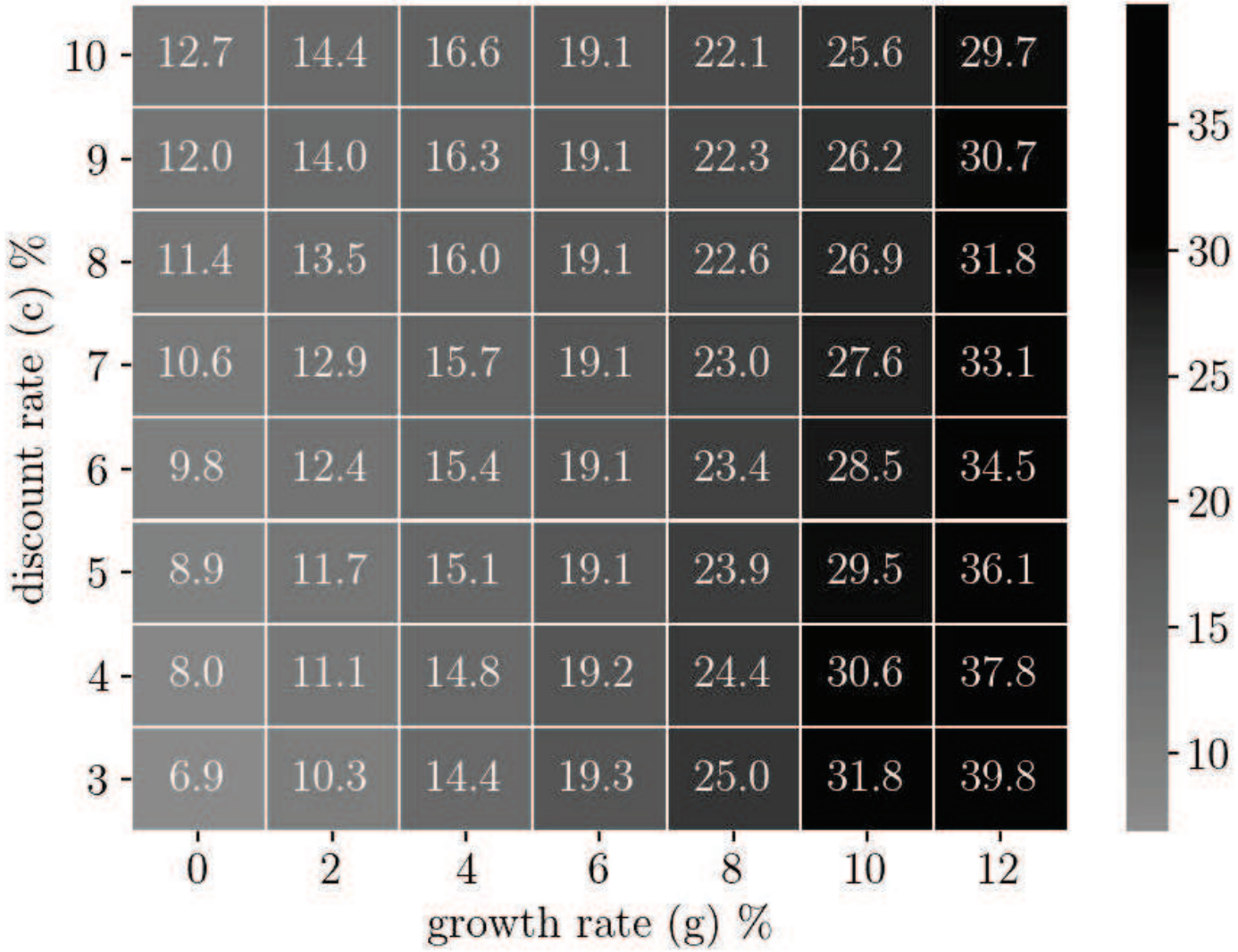
$$\textbf{OZ: } I_0 = \sum_{t=1}^{T} \frac{CF_t}{(1+c)^t} + \frac{TV}{(1+c)^T} - \frac{(1-0.15)I_0 x}{(1+c)^{t_i}}$$

- where we assume;
  - $TV = I_0 \times (1+g)^T$.
  - The initial investment is funded entirely from (past) capital gains.
  - Cash Flow and discount rates are **after-tax**.
- We can compute the difference between the two;

$$\Delta OZ = x\left(1 - \frac{0.85}{(1+c)^{t_i}} + \frac{(1+g)^T - 1}{(1+c)^T}\right).$$

# Size of the Benefit





# Methodology

# Design Philosophy



- Many census tracts were chosen by the federal government to be potential OZ. Out all these eligible census tracts, the individual states designated about 25% of these.
- In essence we perform a Difference-in-Differences (DiD) setup exploiting this designation process.
  - First we perform Propensity Score Matching (PSM) to closely match 1 on 1 designated census tracts with eligible (but not designated) census tracts, based on poverty and income levels.
  - We only look at a relative tight band around the treatment (which happened early 2018), to alleviate any non-parallel trend issues (2017 – 2019).
  - We run a OLS (for pricing) and Logit (for liquidity) which includes a treatment dummy.
  - Given that we believe age might have an effect, we also break the sample in age cohort and do rolling regressions.
  - Finally, we also look at how persistent/consistent the designation effect has been.

# Pricing Model



- Our baseline specification is given by;

$$\ln Y_{jtz} = \beta_{jt} + \gamma X_t + \theta_z + \mu_{t \geq t_d, z} + \varepsilon_{jtz},$$

- where;
  - Y = transaction prices.
  - $\beta_{jt}$ = county times year fixed effects.
  - $X$ = property characteristics, with corresponding parameter vector $\gamma$.
  - $\theta_z$ = (1/0) indicator on whether the property is in an OZ zone.
  - $\mu_{t \geq t_d, z}$ = the treatment dummy.
  - $\varepsilon$ = residual term.
- We also allow for an interaction term with a post-treatment trend and time dummies with the treatment dummy.

# Liquidity Model



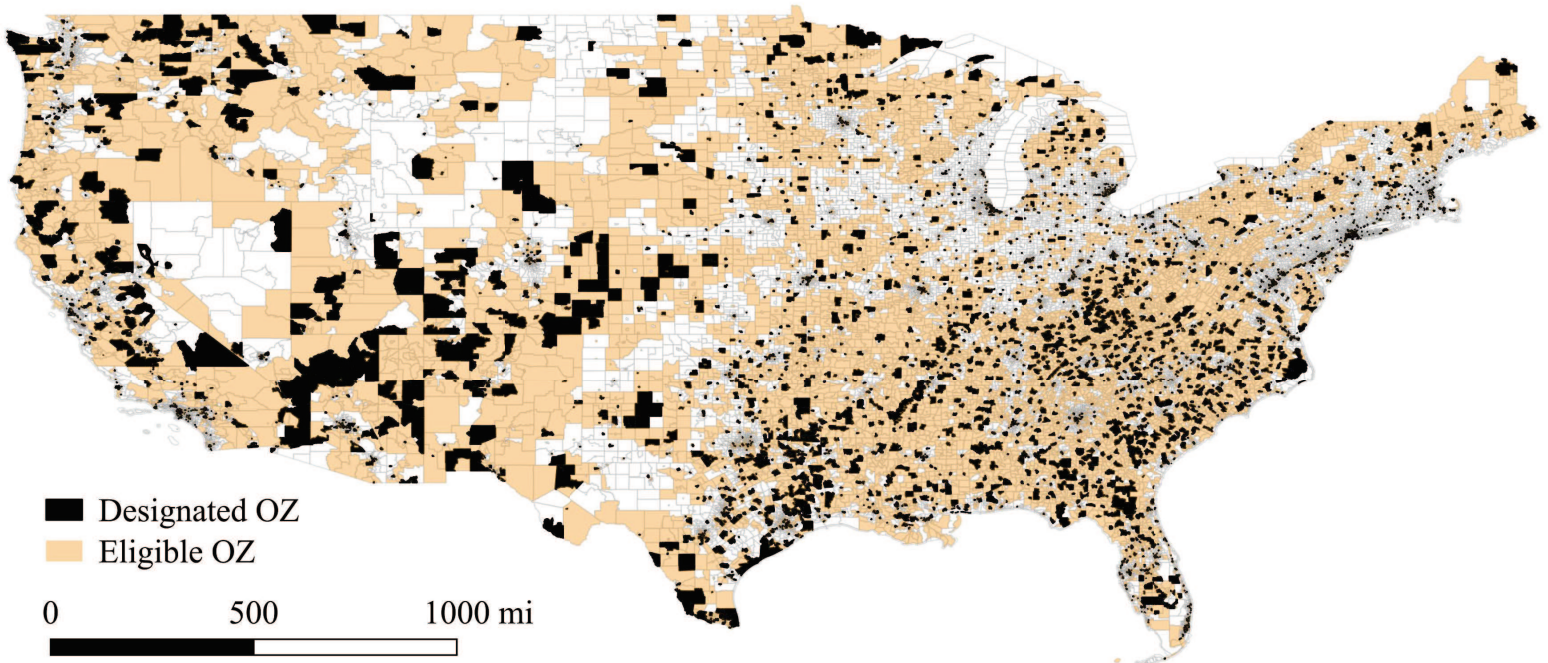
- We use the same basic model as proposed by Van Dijk, Geltner, Van de Minne (JREFE, 2020), where we define liquidity as the **probability to sell** a property.
  - First, we make a full (quarterly) panel of all properties in the RCA dataset (sold since 2000, until mid-2020).
  - The property get a 1 if it was sold in a specific quarter and a 0 otherwise.
  - We subsequently only keep the years 2017 – 2019, but keep the properties that were not sold during this period. (Which will have only zeros as the dependent variable.)
- Other than that, we keep the model identical to the pricing model;

$$l = \ln\left(\frac{p}{1-p}\right) = \beta_{jt} + \gamma X_t + \theta_z + \mu_{t \geq t_d, z}.$$

# Opportunity Zones

# OZ location





# Propensity Score Matching (PSM)



| Panel A: Before Propensity Score Matching | | |
|---|---|---|
| | Eligible | OZ |
| Avg. median income | $ 44,604 | $ 35,252 |
| Std. | $ 14,560 | $ 13,405 |
| Poverty rate | 0.198 | 0.283 |
| Std. | 0.114 | 0.135 |
| N. | 10,994 (79%) | 2,979 (21%) |
| **Panel B: After Propensity Score Matching** | | |
| | Eligible | OZ |
| Avg. median income | $ 35,481 | $ 35,252 |
| Std. | $ 12,755 | $ 13,405 |
| Poverty rate | 0.277 | 0.283 |
| Std. | 0.135 | 0.135 |
| N. | 2,979 (50%) | 2,979 (50%) |

# Transaction Data

# Existing Properties (Prices)



| | (I) | (II) | (III) | (IV) | (V) |
|---|---|---|---|---|---|
| **Variable** | **Full** | **Non OZ** | **OZ ($\forall$t)** | **OZ (t$<$d)** | **OZ (t$\geq$d)** |
| Transaction price | \$ 12,601 | \$ 12,979 | \$ 12,288 | \$ 11,961 | \$ 12,533 |
| ($\times$ 1,000) | [\$ 25,279] | [\$ 27,037] | [\$ 23,718] | [\$ 25,045] | [\$ 22,673] |
| Land size (sqft) | 209,050 | 209,992 | 208,269 | 203,623 | 211,751 |
| | [439,003] | [422,977] | [451,899] | [410,104] | [480,879] |
| $Y = \frac{\text{Transaction price}}{\text{Land size}}$ | \$ 326 | \$ 384 | \$ 279 | \$ 273 | \$ 283 |
| | [\$ 649] | [\$ 753] | [\$ 544] | [\$ 544] | [\$ 543] |
| FAR | 1.127 | 1.133 | 1.122 | 1.175 | 1.083 |
| | [1.697] | [1.571] | [1.795] | [1.966] | [1.653] |
| Effective age | 39 | 40 | 39 | 38 | 40 |
| | [29] | [29] | [28] | [28] | [28] |
| *Dummy:* Apartment | 0.351 | 0.421 | 0.293 | 0.305 | 0.284 |
| *Dummy:* Industrial | 0.290 | 0.226 | 0.343 | 0.340 | 0.345 |
| *Dummy:* Office | 0.178 | 0.161 | 0.192 | 0.182 | 0.199 |
| *Dummy:* Retail | 0.181 | 0.192 | 0.173 | 0.173 | 0.172 |
| Nr. observations | 12,111 | 5,492 | 6,619 | 2,836 | 3,783 |

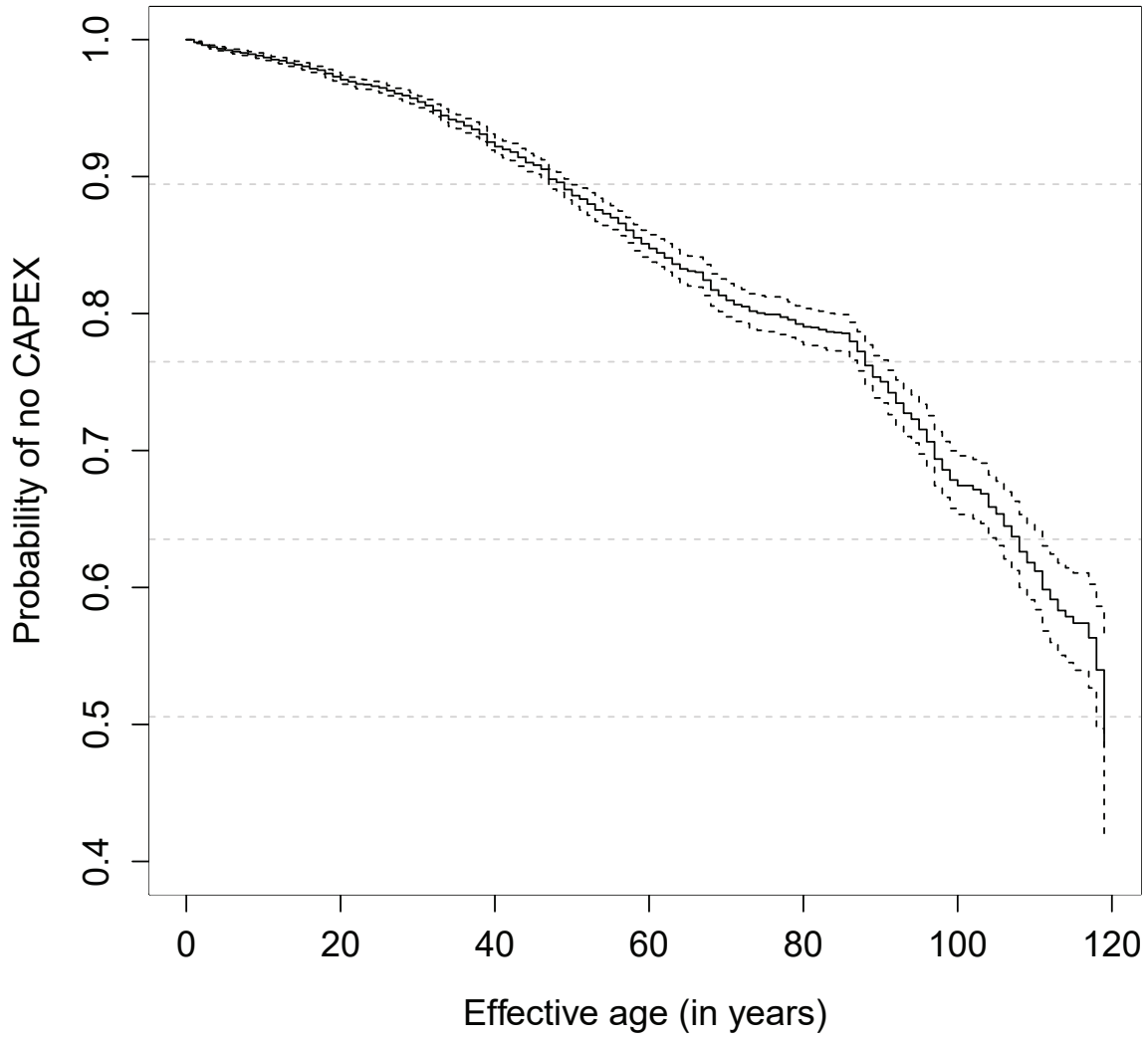
# Existing Properties (Prob of sales)



| | (I) | (II) | (III) | (IV) | (V) |
|---|---|---|---|---|---|
| **Variable** | **Full** | **Non OZ** | **OZ ($\forall$t)** | **OZ (t$<$d)** | **OZ (t$\geq$d)** |
| Y = *D:* Sold | 0.040 | 0.038 | 0.041 | 0.041 | 0.041 |
| Land size (sqft) | 207,195 | 211,762 | 203,049 | 203,705 | 202,560 |
| | [456,755] | [493,223] | [420,883] | [424,987] | [417,796] |
| FAR | 1.560 | 1.650 | 1.479 | 1.467 | 1.488 |
| | [2.588] | [2.443] | [2.711] | [2.708] | [2.713] |
| Effective age | 44 | 45 | 43 | 42 | 44 |
| | [27] | [28] | [27] | [26] | [27] |
| *Dummy:* Apartment | 0.416 | 0.471 | 0.367 | 0.365 | 0.368 |
| *Dummy:* Industrial | 0.241 | 0.182 | 0.294 | 0.295 | 0.293 |
| *Dummy:* Office | 0.184 | 0.177 | 0.191 | 0.191 | 0.192 |
| *Dummy:* Retail | 0.158 | 0.170 | 0.148 | 0.149 | 0.147 |
| Nr. observations | 1,040,544 | 495,104 | 545,440 | 233,047 | 312,393 |

# Kaplan-Meyer To CAPEX





# Vacant Land



*Panel A: Transaction Price Dataset*

| **Variable** | **(I) Full** | **(II) Non OZ** | **(III) OZ ($\forall$t)** | **(IV) OZ (t$<$d)** | **(V) OZ (t $\geq$ d)** |
|---|---|---|---|---|---|
| Transaction price ($) | $ 10,528 | $ 10,292 | $ 10,733 | $ 9,972 | $ 11,264 |
| ($\times$ 1,000) | [$ 18,318] | [$ 20,425] | [$ 16,266] | [$ 17,107] | [$ 15,657] |
| Land size (sqft) | 476,183 | 335,444 | 599,388 | 702,691 | 527,513 |
| | [1,265,128] | [1,054,580] | [1,413,541] | [1,728,601] | [1,141,566] |
| $\frac{\text{Transaction price}}{\text{Land size}}$ | $ 237 | $ 264 | $ 213 | $ 203 | $ 221 |
| | [$ 411] | [$ 431] | [ $ 392] | [$ 411] | [$ 379] |
| Nr. observations | 1,129 | 527 | 602 | 247 | 355 |

*Panel B: Probability to Sell Dataset*

| **Variable** | **Full** | **Non OZ** | **OZ ($\forall$t)** | **OZ (t$<$d)** | **OZ (t $\geq$ d)** |
|---|---|---|---|---|---|
| *Dummy:* Sold | 0.026 | 0.024 | 0.028 | 0.026 | 0.029 |
| Land size (sqft) | 633,185 | 485,453 | 779,042 | 772,446 | 784,084 |
| | [3,587,906] | [3,304,049] | [3,842,181] | [3,795,442] | [3,877,672] |
| Nr. observations | 43,236 | 21,480 | 21,756 | 9,425 | 12,331 |

# Results

# Prices Existing Properties



| **Eff. age group:** | **[1 – 120]** | **[1 – 30]** | **[31 – 80]** | **[81 – 120]** |
|---|---|---|---|---|
| OZ designation ($\mu_{t \geq t_d, z}$) | 0.001 | -0.014 | -0.014 | 0.066* |
| (1=yes) | [0.07] | [-0.61] | [-0.57] | [1.75] |
| OZ designation ($\mu_{t \geq t_d, z}$) | 0.021 | -0.021 | 0.006 | 0.192*** |
| (1=yes) | [0.72] | [-0.46] | [0.14] | [2.73] |
| Post-treatment trend | 0.008 | 0.010 | 0.010 | -0.016 |
| | [1.60] | [1.37] | [1.57] | [-1.33] |
| OZ designation ($\mu_{t=2018.I \& t \geq t_d, z}$) | -0.004 | -0.054 | -0.008 | 0.125 |
| (1=yes) | [-0.11] | [-0.92] | [-0.13] | [1.27] |
| OZ designation ($\mu_{t=2018.II, z}$) | 0.068** | 0.035 | 0.079* | 0.141** |
| (1=yes) | [2.53] | [0.85] | [1.86] | [2.29] |
| OZ designation ($\mu_{t=2019.I, z}$) | 0.048 | 0.017 | 0.022 | 0.182** |
| (1=yes) | [1.58] | [0.35] | [0.47] | [2.43] |
| OZ designation ($\mu_{t=2019.II, z}$) | 0.064** | 0.048 | 0.082* | 0.028 |
| (1=yes) | [2.12] | [1.04] | [1.76] | [0.36] |

# Liquidity Existing Properties



| **Eff. age group:** | **[1 – 120]** | **[1 – 30]** | **[31 – 80]** | **[81 – 120]** |
|---|---|---|---|---|
| OZ designation ($\mu_{t \geq t_d, z}$) | 0.020 | -0.048 | 0.092 | 0.054 |
| (1=yes) | [1.04] | [-1.50] | [3.49] | [1.38] |
| OZ designation ($\mu_{t \geq t_d, z}$) | -0.102** | -0.172** | -0.030 | -0.123 |
| (1=yes) | [-2.31] | [-2.44] | [-0.48] | [-1.12] |
| Post-treatment trend | 0.072*** | 0.100*** | 0.044 | 0.038 |
| | [3.29] | [2.84] | [1.49] | [0.69] |
| OZ designation ($\mu_{t=2018.I \& t \geq t_d, z}$) | -0.090** | -0.063 | -0.049 | -0.199** |
| (1=yes) | [-2.23] | [-1.00] | [-0.85] | [-1.96] |
| OZ designation ($\mu_{t=2018.II, z}$) | -0.059* | -0.075 | -0.024 | -0.069 |
| (1=yes) | [-1.92] | [-1.58] | [-0.55] | [-0.88] |
| OZ designation ($\mu_{t=2019.I, z}$) | -0.058 | -0.136** | -0.039 | 0.171* |
| (1=yes) | [-1.63] | [-2.44] | [-0.77] | [1.80] |
| OZ designation ($\mu_{t=2019.II, z}$) | 0.078** | 0.124** | 0.078 | -0.109 |
| (1=yes) | [2.24] | [2.34] | [1.59] | [-1.08] |

# Vacant Land



| Dep. Variable | Price | | | Prob. to sell | | |
|---|---|---|---|---|---|---|
| OZ designation | 0.320*** | 0.426** | | 0.285** | 0.294** | |
| (1=yes) | [3.19] | [3.06] | | [2.22] | [2.00] | |
| Trend | | -0.011 | | | 0.013 | |
| | | [-1.05] | | | [0.36] | |
| OZ designation 1 | | | 0.330* | | | -0.053 |
| (1=yes) | | | [1.73] | | | [-0.23] |
| OZ designation 2 | | | 0.375*** | | | 0.192 |
| (1=yes) | | | [3.04] | | | [1.21] |
| OZ designation 3 | | | 0.271* | | | 0.683*** |
| (1=yes) | | | [1.91] | | | [3.75] |
| OZ designation 4 | | | 0.223 | | | 0.314 |
| (1=yes) | | | [1.45] | | | [1.63] |

# Concluding Remarks

# How Large is The Effect?



- For the existing properties;
  - Assuming investors put exactly the same amount of capital expenditures in the property, the total maximum benefit is approximately 32%.
  - The largest price effect we find is 21%.
- For the vacant land;
  - Assuming the average Land Value Fraction (LVF) is 20% for commercial real estate in the US, we find the maximum theoretical benefit is 80%.
  - Our largest estimate is 53%.
- For new properties (needed to find the indirect effect) we do not find a price increase, however we do see that liquidity is up strong in (late) 2019.