Floodplain Designation and Property Sale Prices

Noelwah R. Netusil
Stanley H. Cohn Professor of Economics
Department of Economics, Reed College

Klaus Moeltner
Virginia Tech

Maya Jarrad
Reed College

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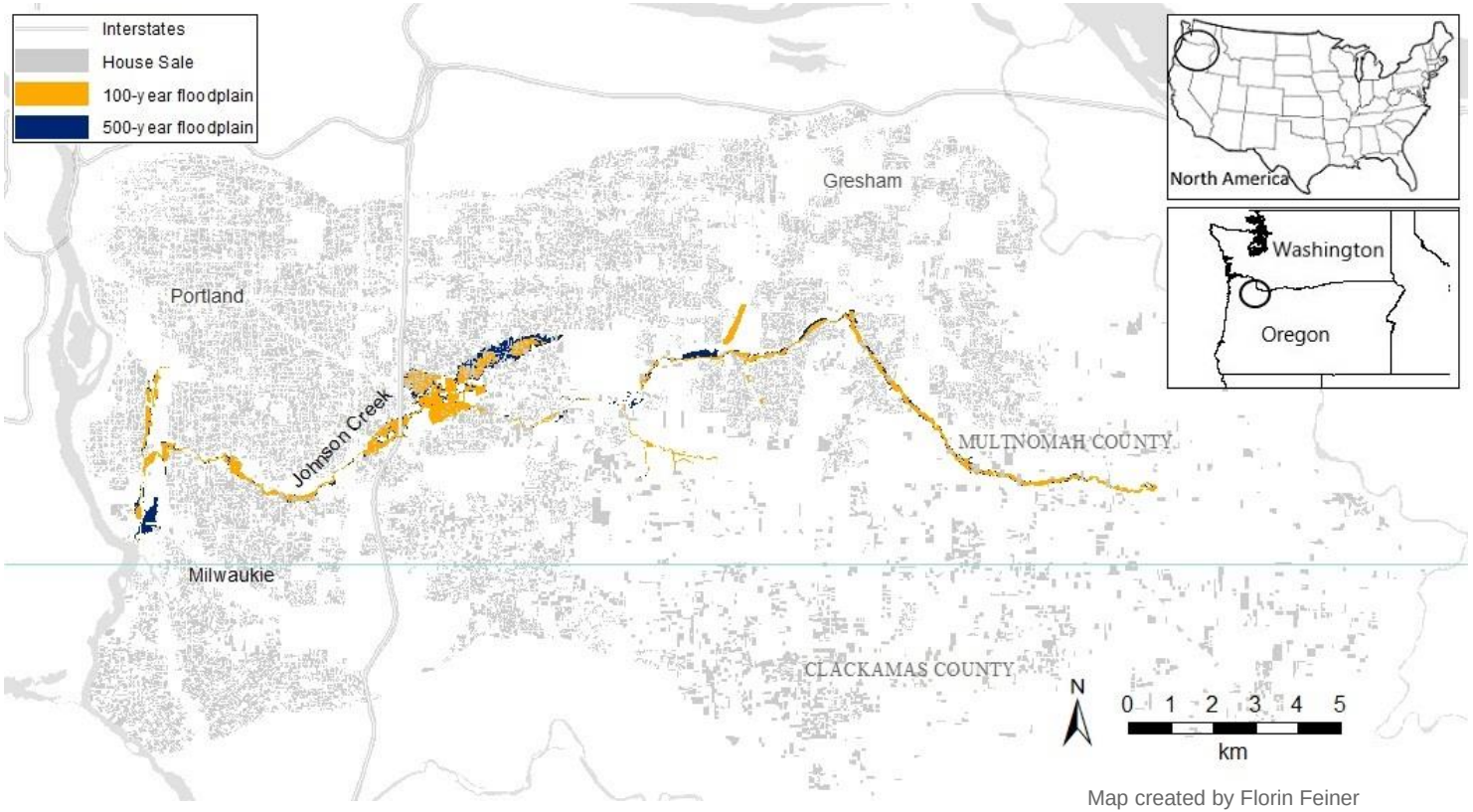
Motivating Questions

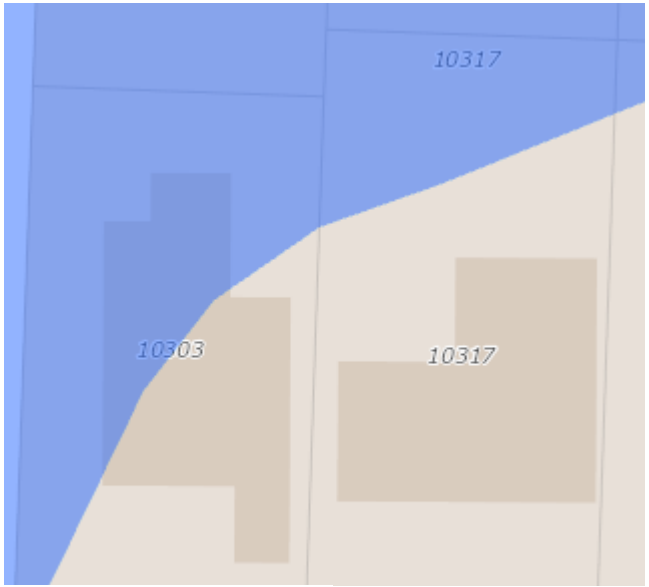
- Does a property's location in a floodplain affect its sale price?
- Has the effect changed over time?
- Does the effect differ between properties in the 100- and 500-year floodplains?
- What is driving price changes? Flood risk or flood insurance capitalization?

Floodplains and Johnson Creek



Map created by Florin Feiner

Floodplain Variables

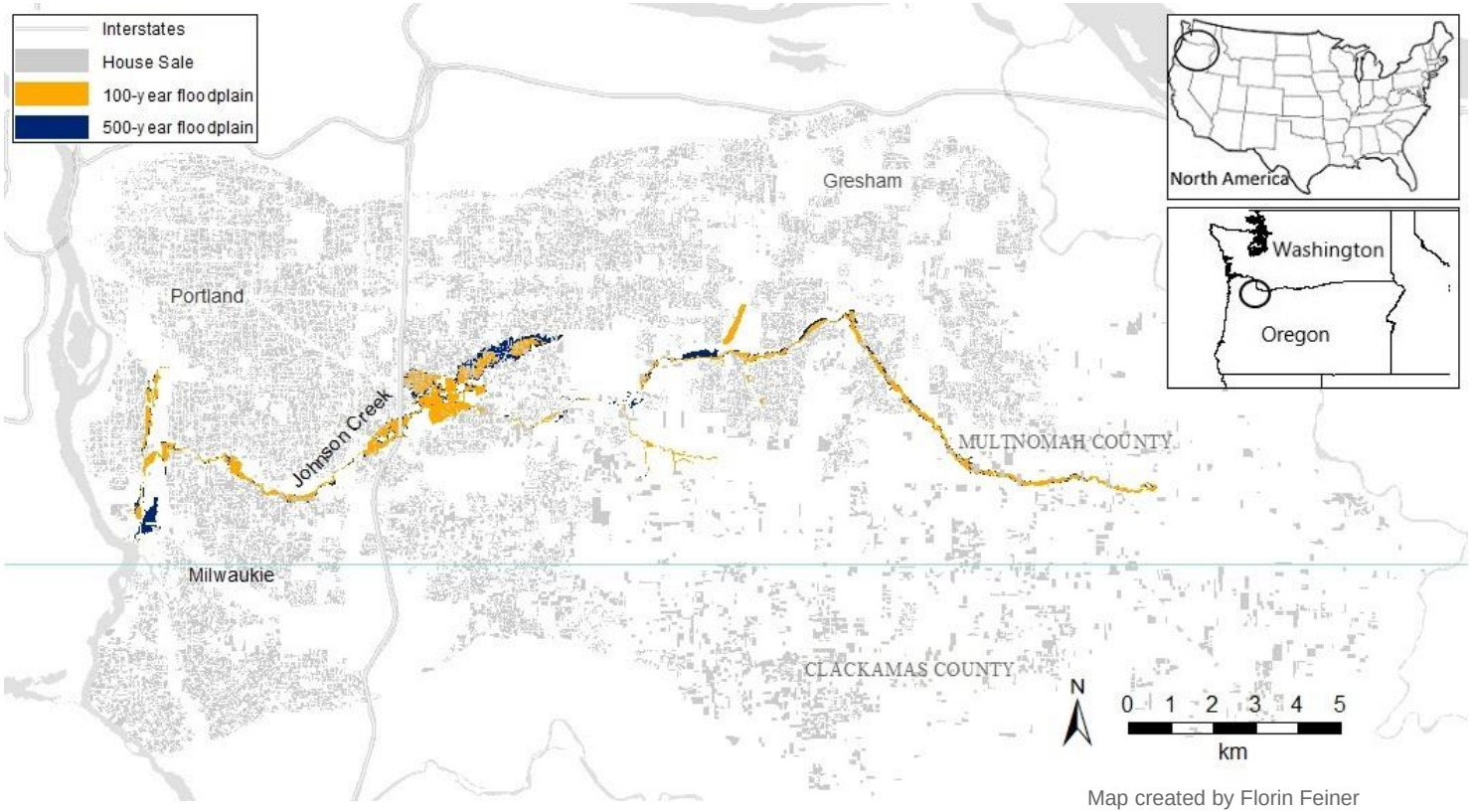


Included in Building Footprint and Tax Lot Variables

Included only in Tax Lot Variable

- Existing literature counts a property as being in a 100-year floodplain if the tax lot is inside or intersected by the floodplain
- Both properties are counted using the *tax lot approach*
- Flood insurance is only required if the owner has a federally-backed mortgage and if the structure is inside or intersected by the 100-year floodplain
- Only the property on the left is counted using the *building footprint approach*

Home Sales and Floodplains



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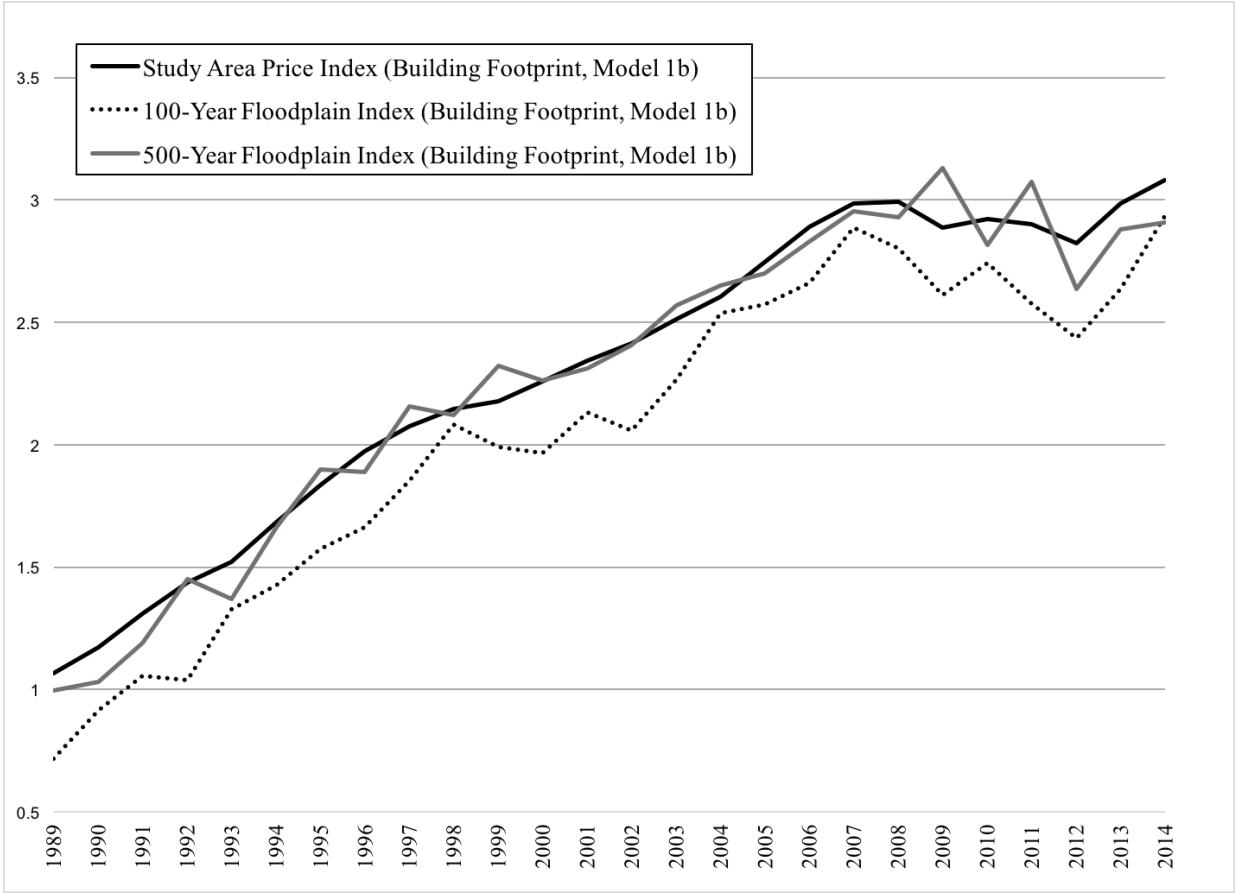
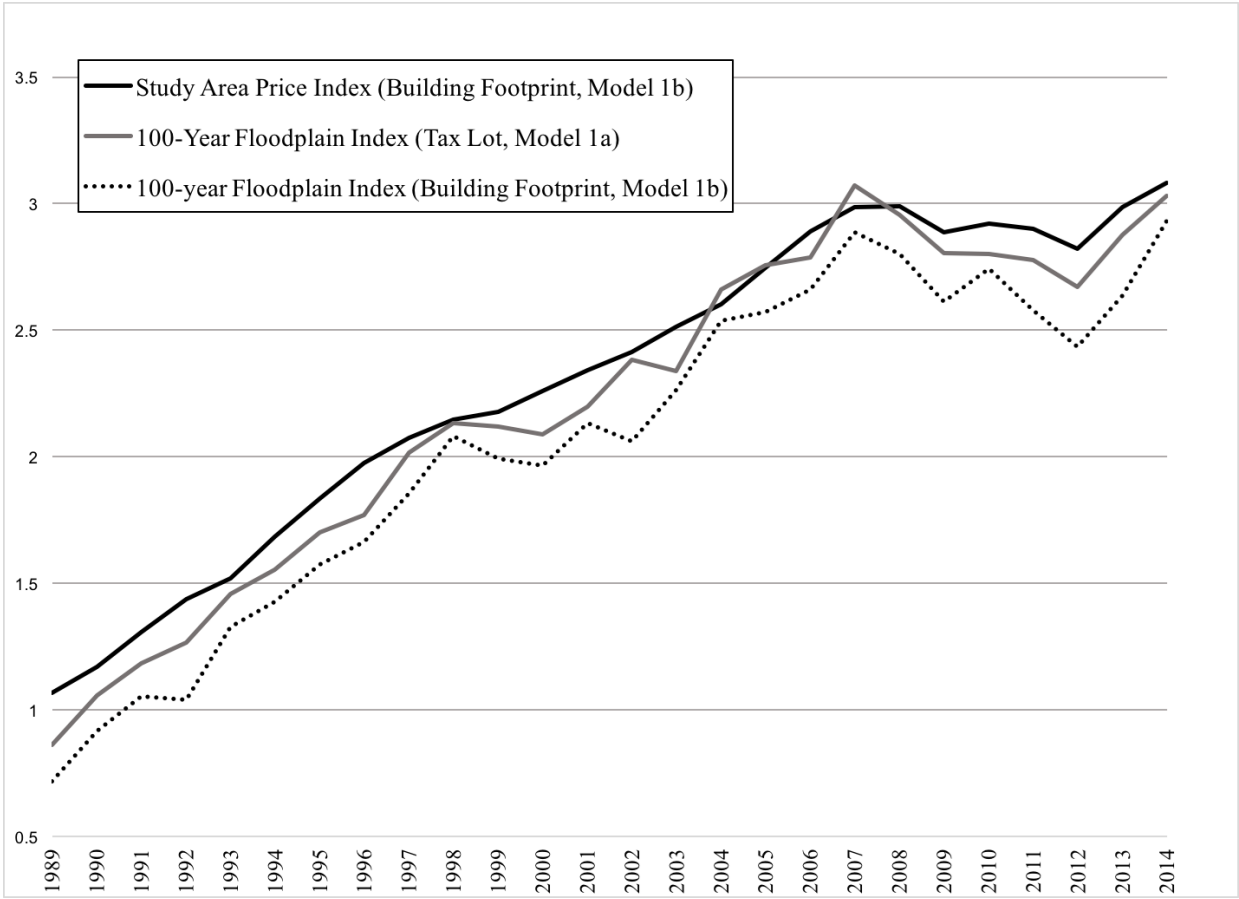
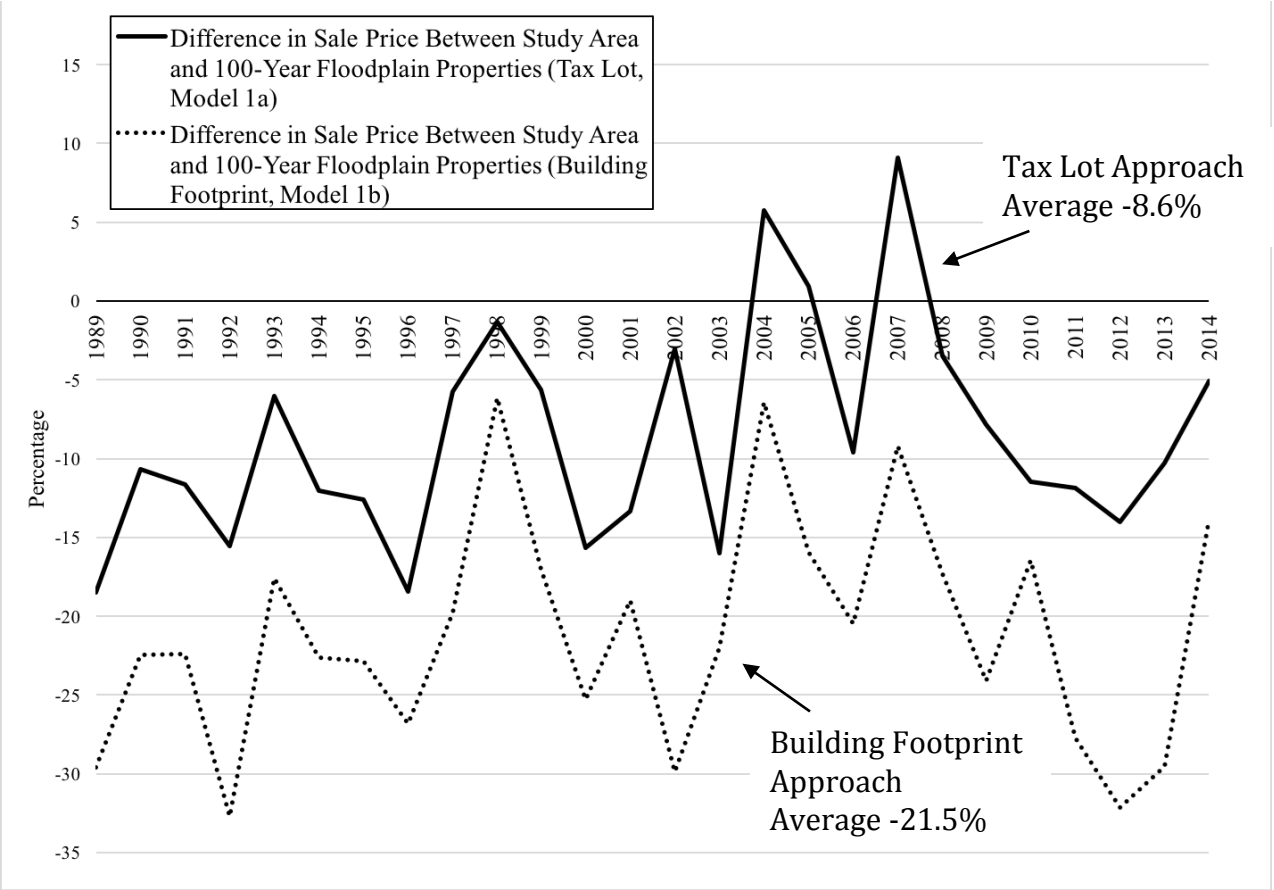
100-Year and 500-Year Floodplains



Building and Tax Lot Models



Difference in Sale Prices



Summary of Results

- Existing literature uses the *tax lot approach* and predicts a 4-12% decline in property sale prices
- These estimates are used to determine investments in floodplain restoration and flood prevention projects
- Estimated effect of -8.6% using the *tax lot approach*, consistent with literature
- Estimated effect of -21.5% using the *building footprint approach*
- Estimated effects in our study area appear to be driven by the capitalization of flood insurance premiums

Portland's Flood Insurance Savings Program

- Program is the first of its kind
- Collaboration between Portland Housing Bureau and Enhabit
- Participants received an elevation certificate for free or at a reduced rate
- Included a consult with an insurance agent specializing in flood insurance
- 86 participants
- Average cost savings of $650; Present discounted value of over $13,000

Portland Flood Insurance Study

- Collaboration between Reed, Portland Housing Bureau, and Wharton
- Goals
  - Flood insurance literacy
  - Willingness-to-pay for flood insurance
  - Flood risk perceptions
  - Assess Flood Insurance Savings Program
- Lents and Powellhurst-Gilbert
  - Around 4,000 mailings
  - Online and paper options
  - 4 languages
- Preliminary results shared at neighborhood meetings in 2019

Thanks!

More information about the Portland Flood Insurance Study : https://www.reed.edu/flood-survey.html

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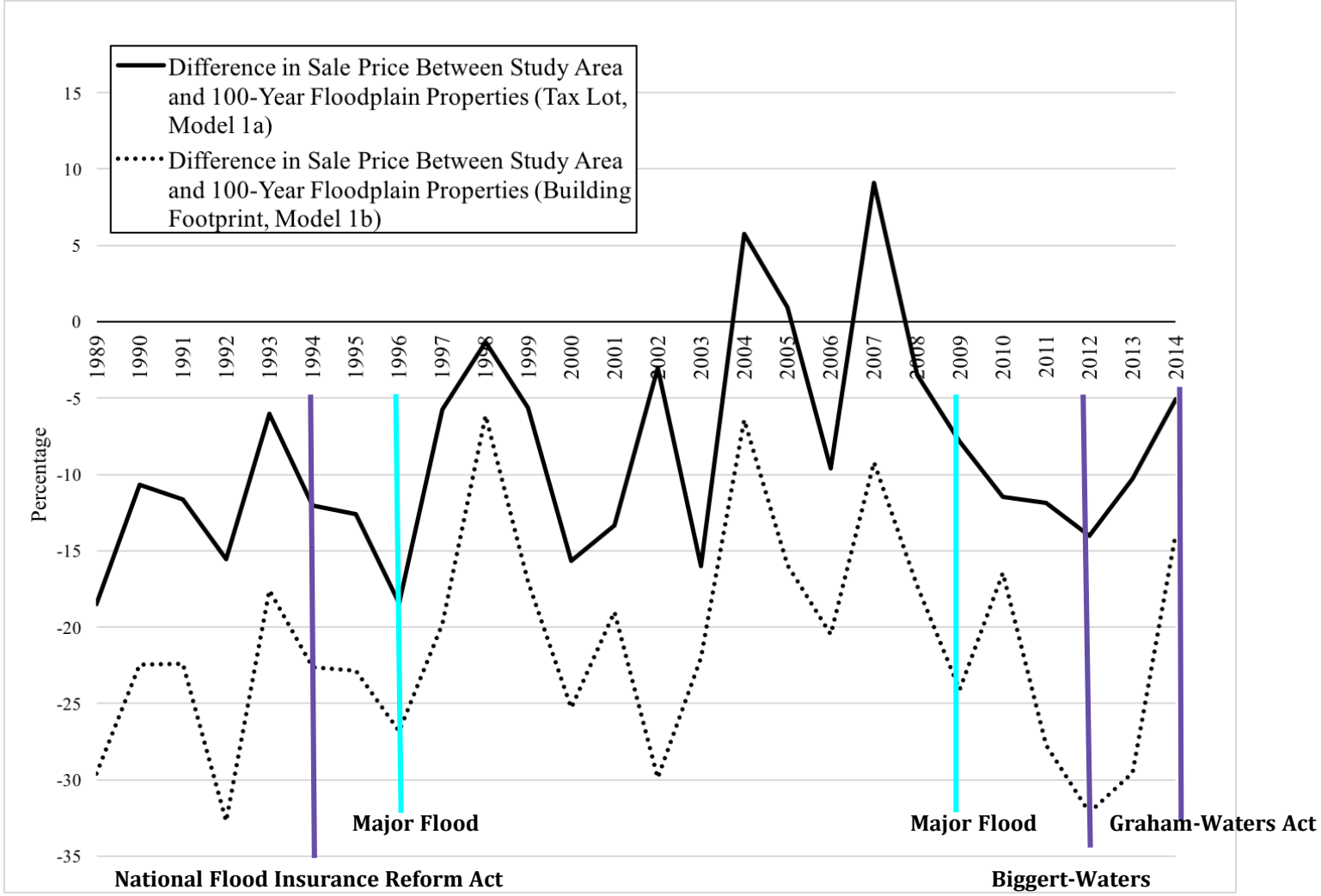
Difference in Sale Price Between Study Area and 100-Year Floodplain Properties (Tax Lot, Model 1a)
Difference in Sale Price Between Study Area and 100-Year Floodplain Properties (Building Footprint, Model 1b)
Percentage
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Major Flood
Major Flood
Graham-Waters Act
National Flood Insurance Reform Act
Biggert-Waters Act

Repeat-Sales Equation

$$ln\left(\frac{P_{i,t'}}{P_{i,t^0}}\right) = \beta_0 + \sum_{t=2}^{T} \phi_t 100FZ_i * d_t + \sum_{t=2}^{T} \psi_t 500FZ_i * d_t + \sum_{t=2}^{T} \gamma_t dist\_CBD_i * d_t + \sum_{STP=1}^{60} \alpha_{STP} R_{STP}$$

$$+ \beta_1 Age_{i,(t',t^0)} + \beta_2 UGB_i + \sum_{t=2}^{T} \tau_t * d_t + \epsilon_{i,(t',t^0)} \qquad (equation\ 1)$$

500-year Floodplain Price Index

Study Area Price Index

Where,

$$d_t = -1\ if\ t = t^0, d_t = -1\ if\ t = t', d_t = 0\ if\ t = neither$$

100-year Floodplain Price Index

P_i: property's sale price

t^o is the first transaction and t' the second transaction in a sale pair

β_0: captures non-temporal changes in housing appreciation

$100FZ$: 100-year floodplain

$500FZ$: 500-year floodplain

$dist\_CBD_i$: distance to Portland's central business district

R_{STP}: spatial-temporal-restoration project variables

$Age_{i,(t',t^0)}$: change in a property's age between transactions

UGB_i: if a property was brought inside the Portland metro UGB between transactions

$\tau_t * d_t$: captures temporal changes in the study area