Supply Elasticity of Houses in Regional NSW

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Perception that Housing Supply in Australia is Inelastic

"…there have been a number of factors on the supply side that have combined to keep the supply of new housing below where it would have been in a more responsive environment. As a result, we have had the combination of higher prices and lower supply than might otherwise have occurred." (Tony Richards, 2009, RBA)

What is the supply elasticity of residential housing in Australia?

		All Housing
Ball, Meen and Nygaard (2010)	Australia	0.55
Gitelman and Otto (2012)	Sydney	0.33
Liu and Otto (2014)	Sydney	0.51

	Houses	***Apartments***
Gitelman and Otto (2012)	0.18	0.53
Liu and Otto (2014)	0.22	0.80

Why Regional NSW?

- Relatively good disaggregated data on house prices
- Is housing supply more elastic in regional NSW than in Sydney?

Data

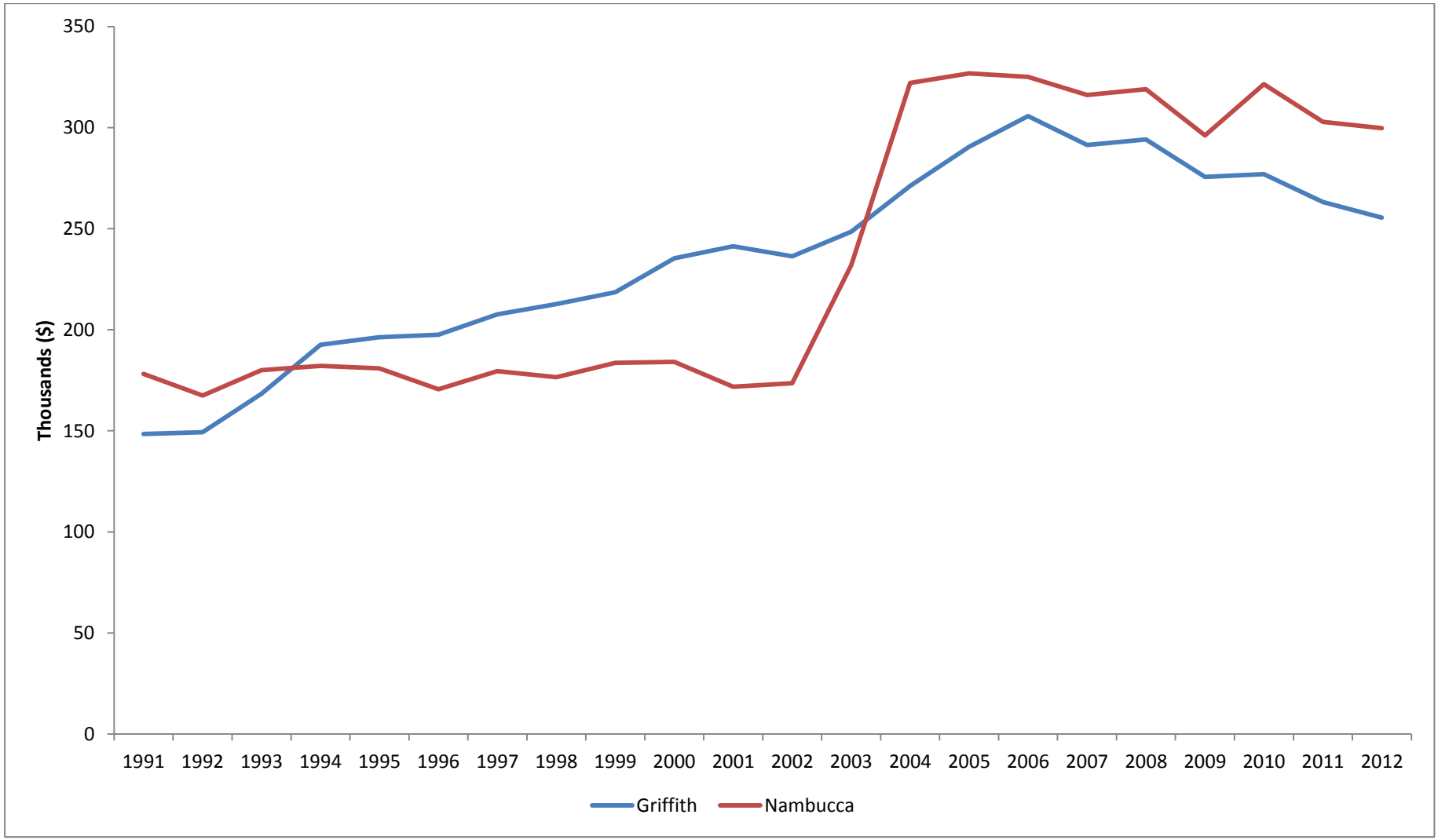
Cross-section unit: Local Government Area (LGA) 101 LGAs

Prices

Median sales price for non-strata dwellings

- Raw data are quarterly observations beginning in 1991:1
- Missing observations for some LGAs are “guesstimated”
- Converted to annual frequency by averaging quarterly calendar year obs
- Sample 1991 – 2012
- All series converted to real house prices using Sydney CPI

Real House Prices in LGAs of Griffith and Nambucca

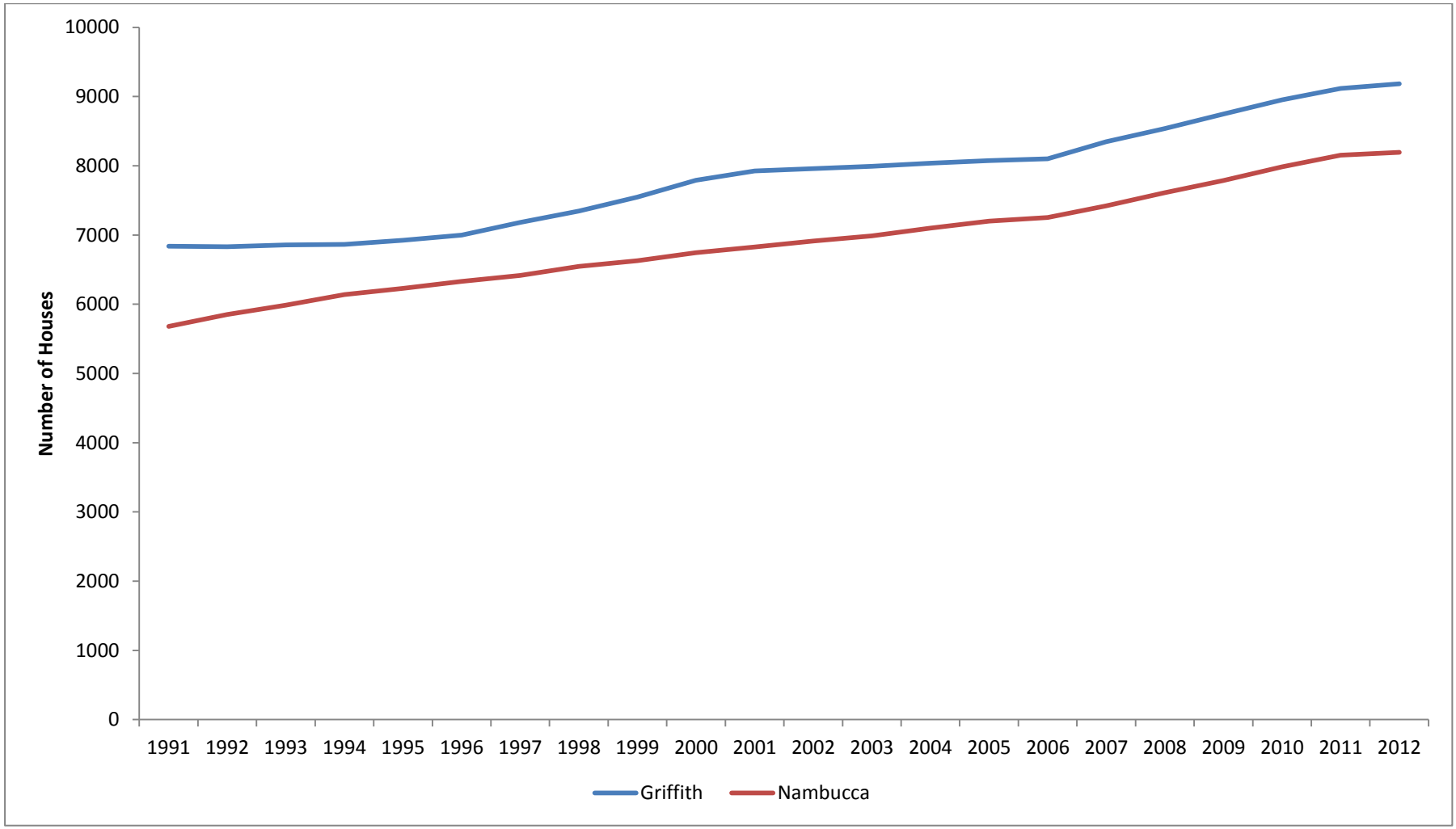


House Stocks

Number of private non-strata dwellings

- Census data provide estimates for 1991, 1996, 2001, 2006 and 2011
- Inter-censual years are interpolated using data on building approvals for LGAs
- No accounting for quality of housing
- In most regional LGAs, non-strata dwelling = detached house

Number of Non-Strata Dwellings in LGAs of Griffith and Nambucca



Regional Groupings for LGAs

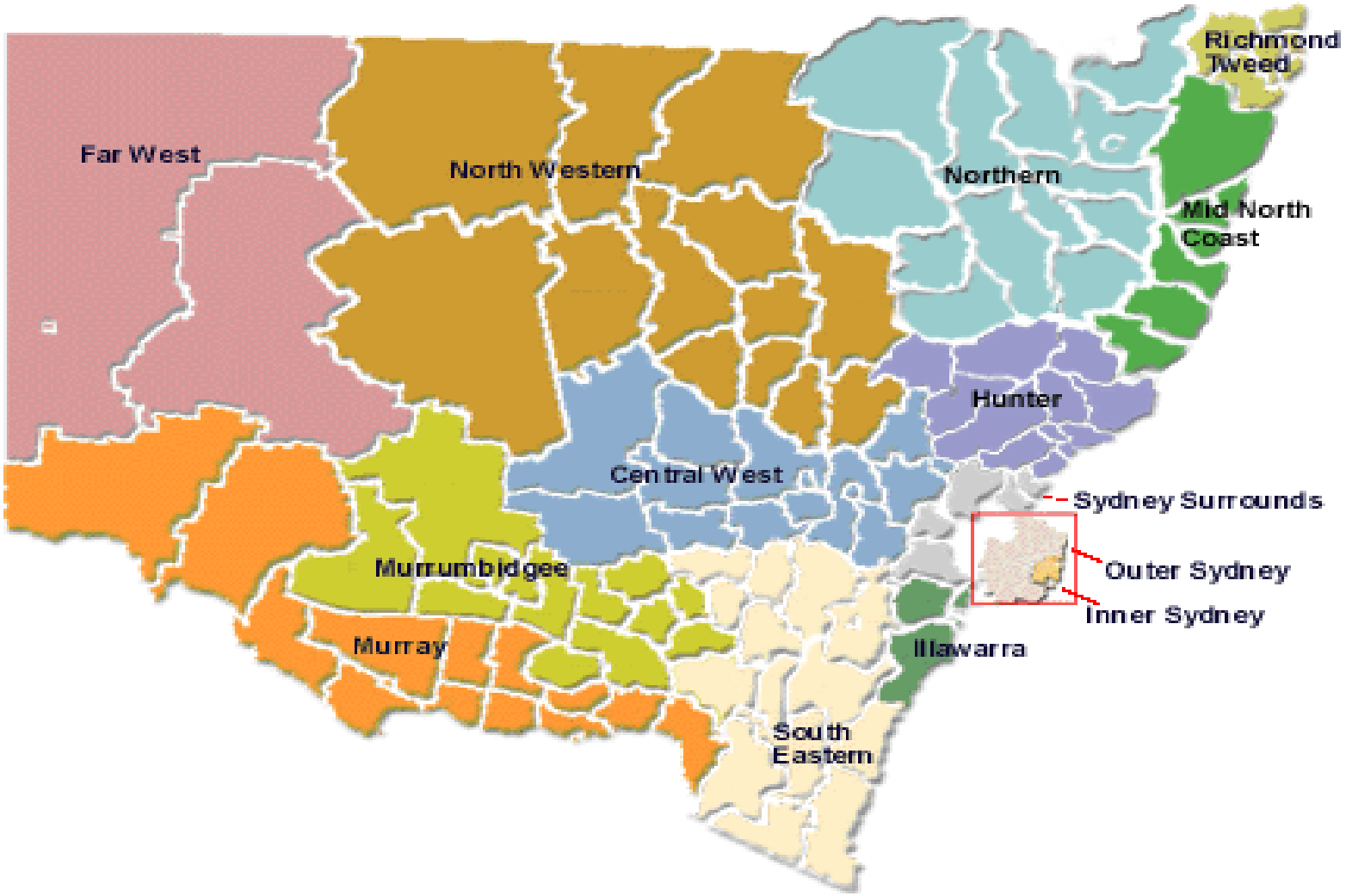
11 regions (Number of LGAs)

Coastal
Hunter (11)
Illawarra (5)
Mid-North Coast (7)
Richmond-Tweed (6)
South-Eastern (14)

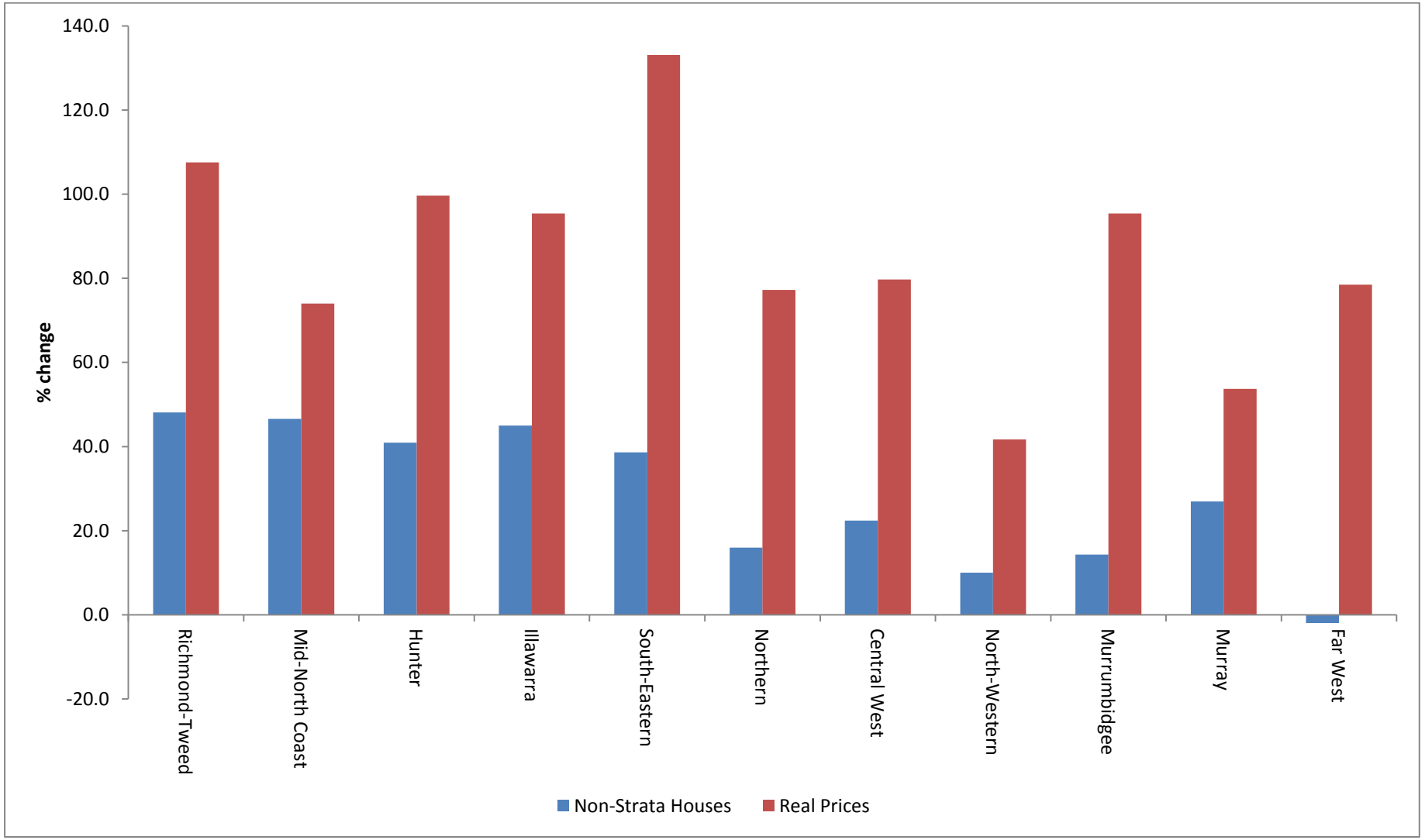
Inland
Central West (13)
Far West (1)
Murrumbidgee (12)
Murray (9)
North-Western (11)
Northern (12)

- Coastal means that at least some LGAs have a coastline.

Regional Map

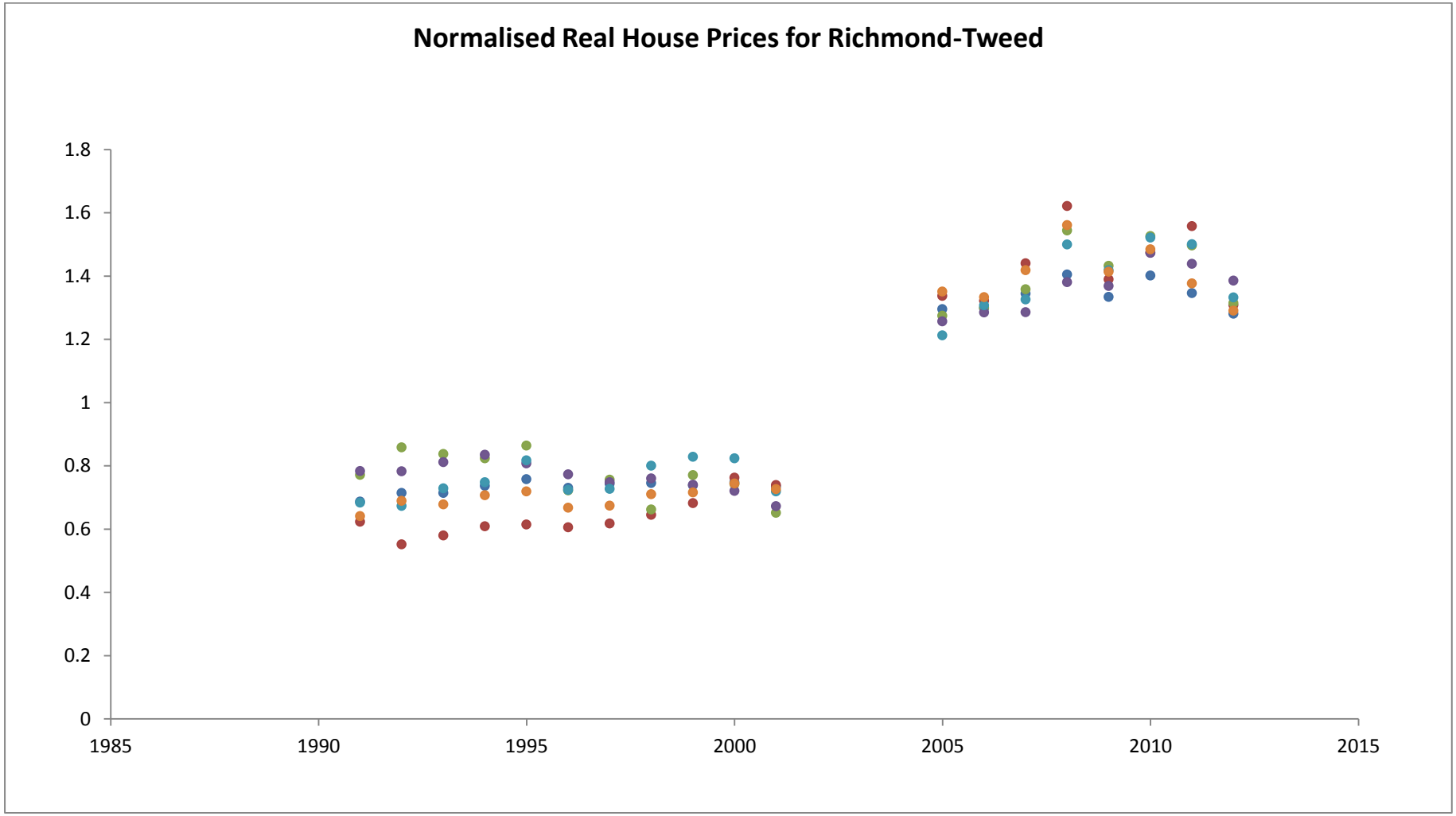


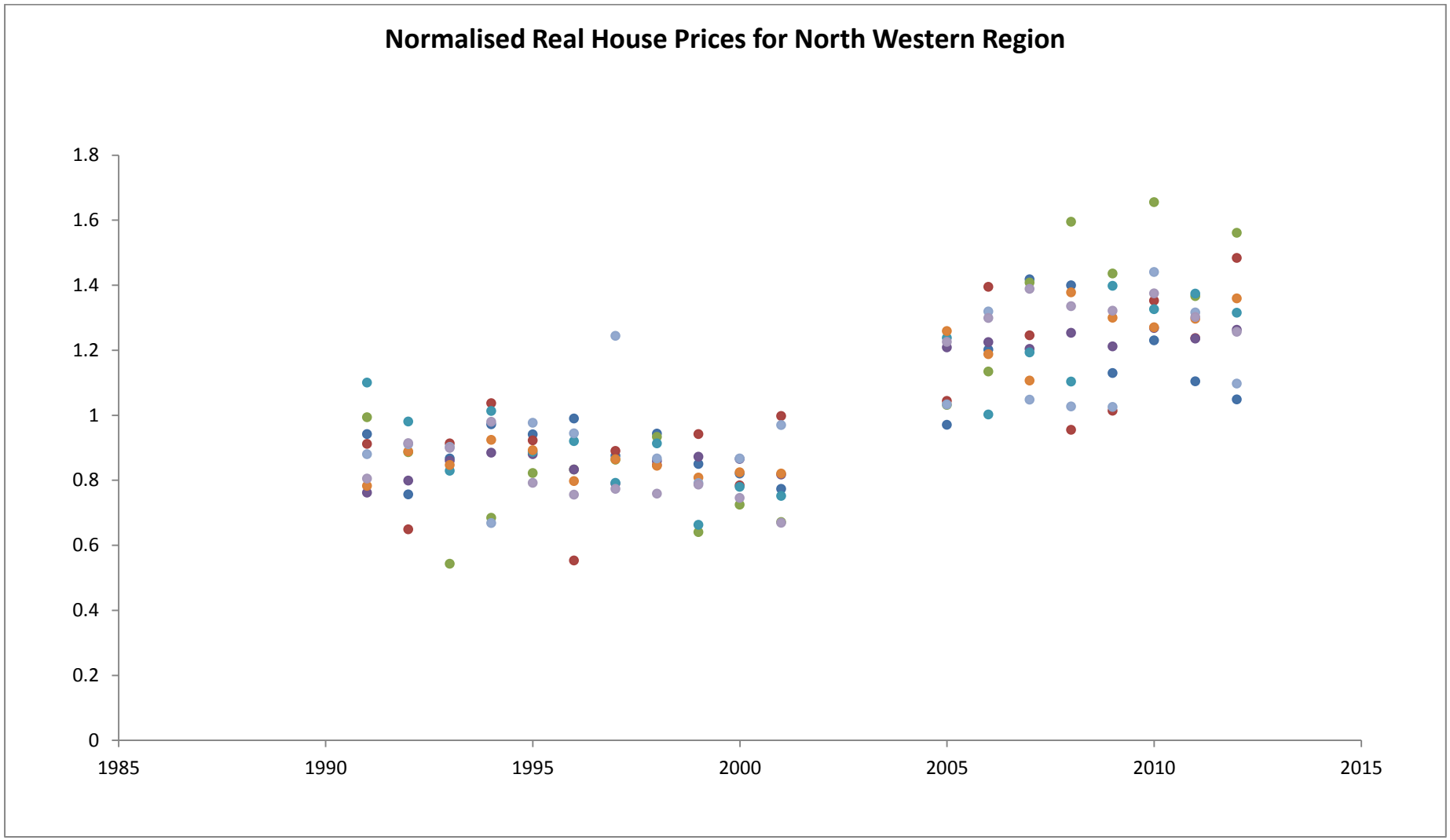
Growth of Housing Stock and Real Prices by Region, 1991-2011



Increase in House Prices: 2002-2004

- Feature of the data is a large increase in real house prices in most LGAs from 2002-2004


Normalised Real House Prices for Richmond-Tweed
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1985
1990
1995
2000
2005
2010
2015


Normalised Real House Prices for North Western Region
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1985
1990
1995
2000
2005
2010
2015

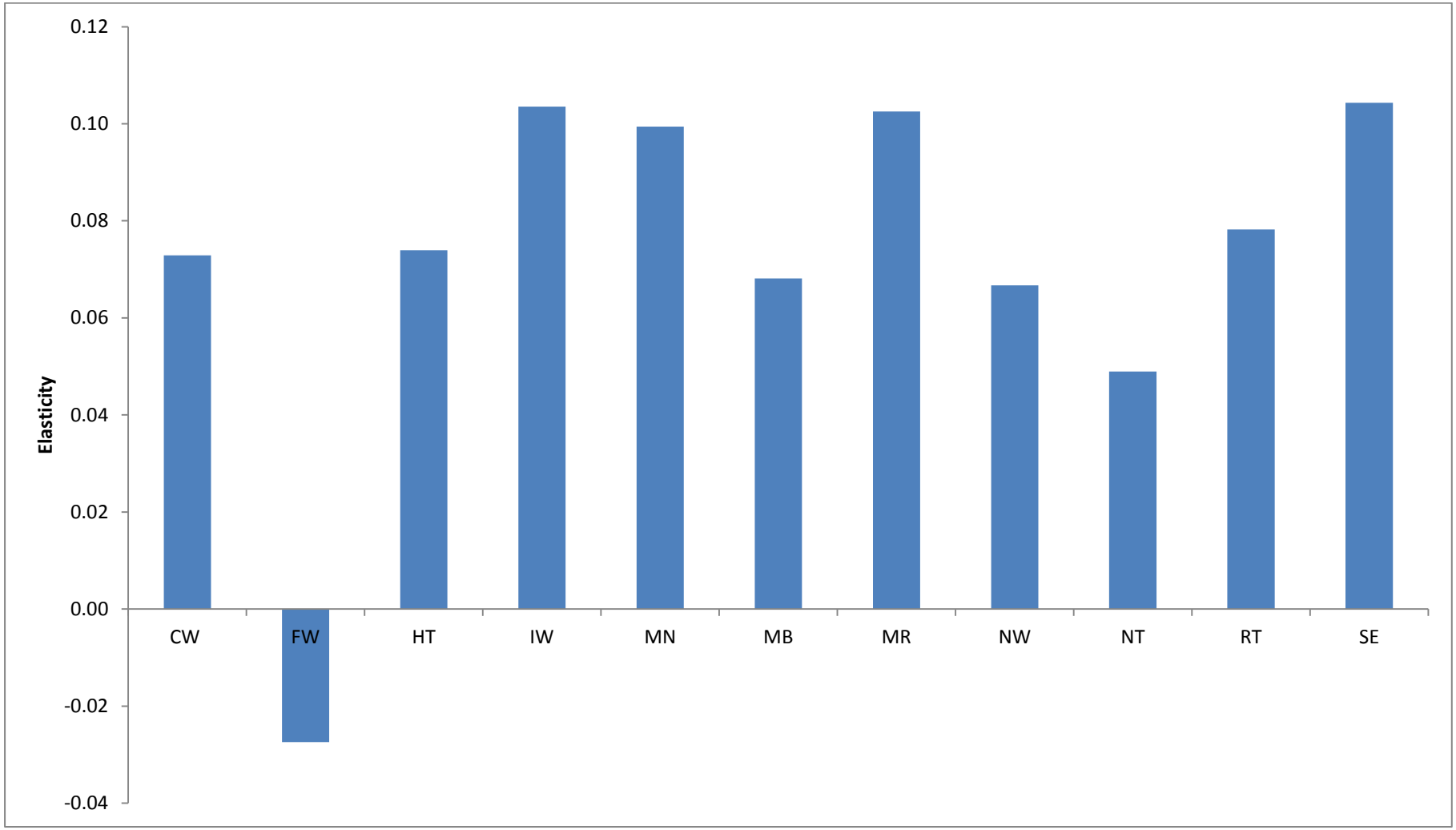
NSW-Wide Common Shock

- Increase in demand curve for houses
- Reduction in supply curve for houses

If we assume the former, then can use the increase in house prices over 2002-2004 to estimate supply elasticity:

$$\frac{\%\ \Delta \text{ in stock of houses 2001 to 2005}}{\%\ \Delta \text{ in real house prices 2001 to 2005}}$$

Naïve Estimate of Supply Elasticity by Region



Formal Supply Elasticity Estimates

- Use annual time-series data from 1991-2012 to estimate supply elasticity for each of 101 regional LGAs

(Very) Simple Model

Supply Curve

$$lnH_t^i = \alpha_i + \beta_i lnP_t^i + u_t^i$$

Reduced Form

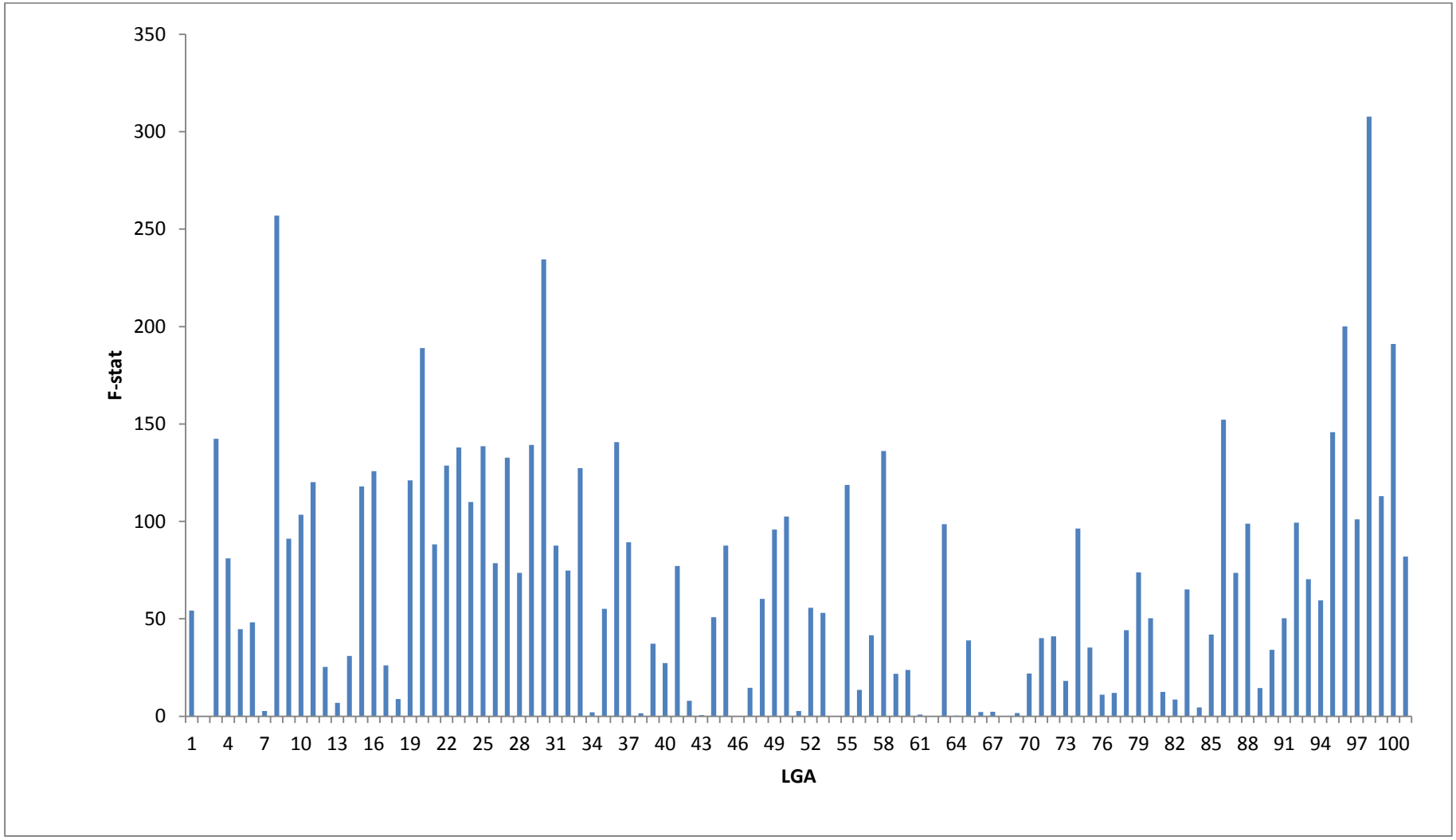
$$lnP_t^i = \pi_{0i} + \pi_{1i} lnY_t^i + \pi_{2i} lnN_t^i + \pi_{3i} R_t + v_t^i$$

H = stock of non-strata properties
P = real median price of non-strata properties

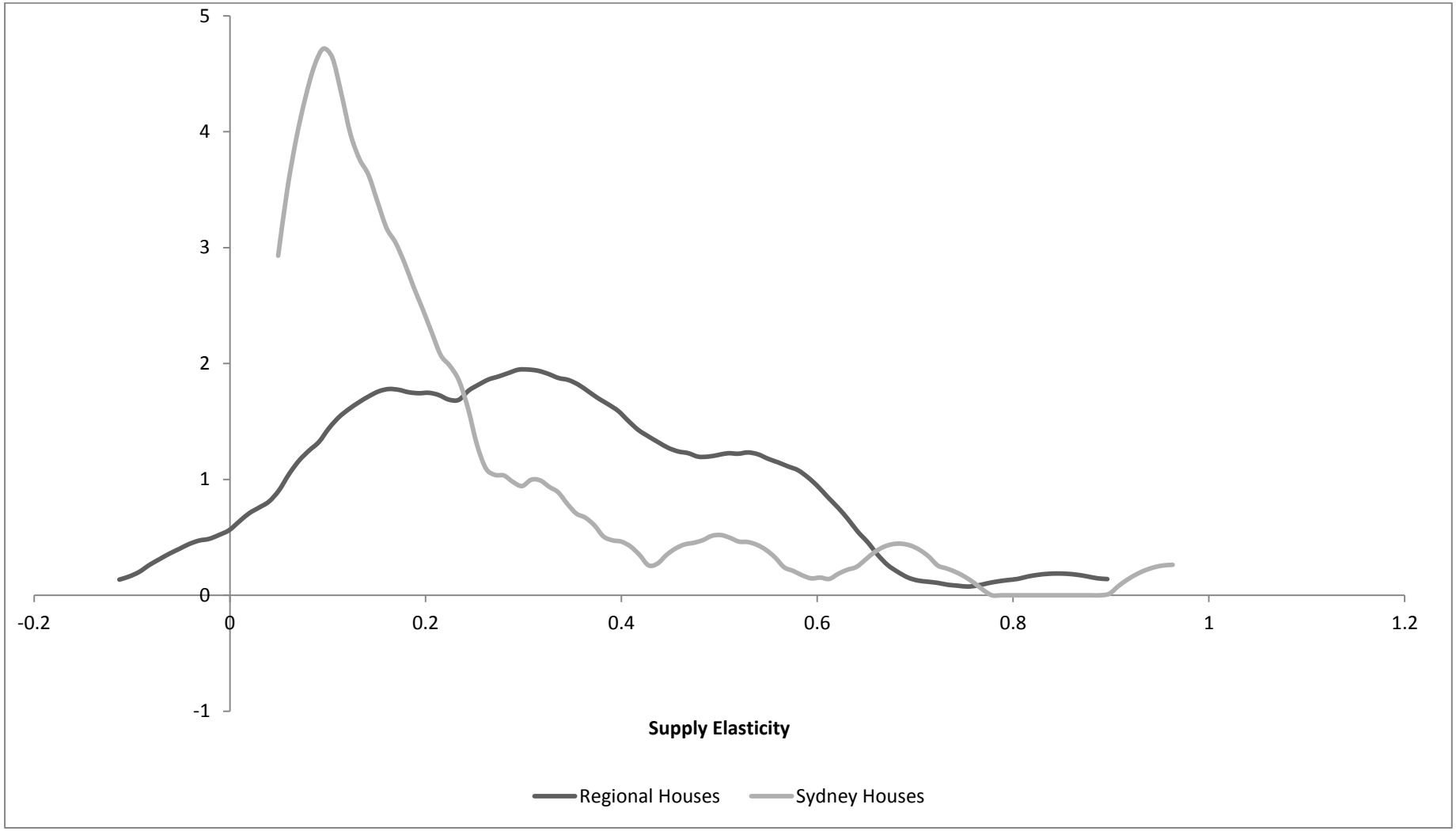
Instruments

Y = real income per taxpayer
N = resident population
R = real 10 year bond rate

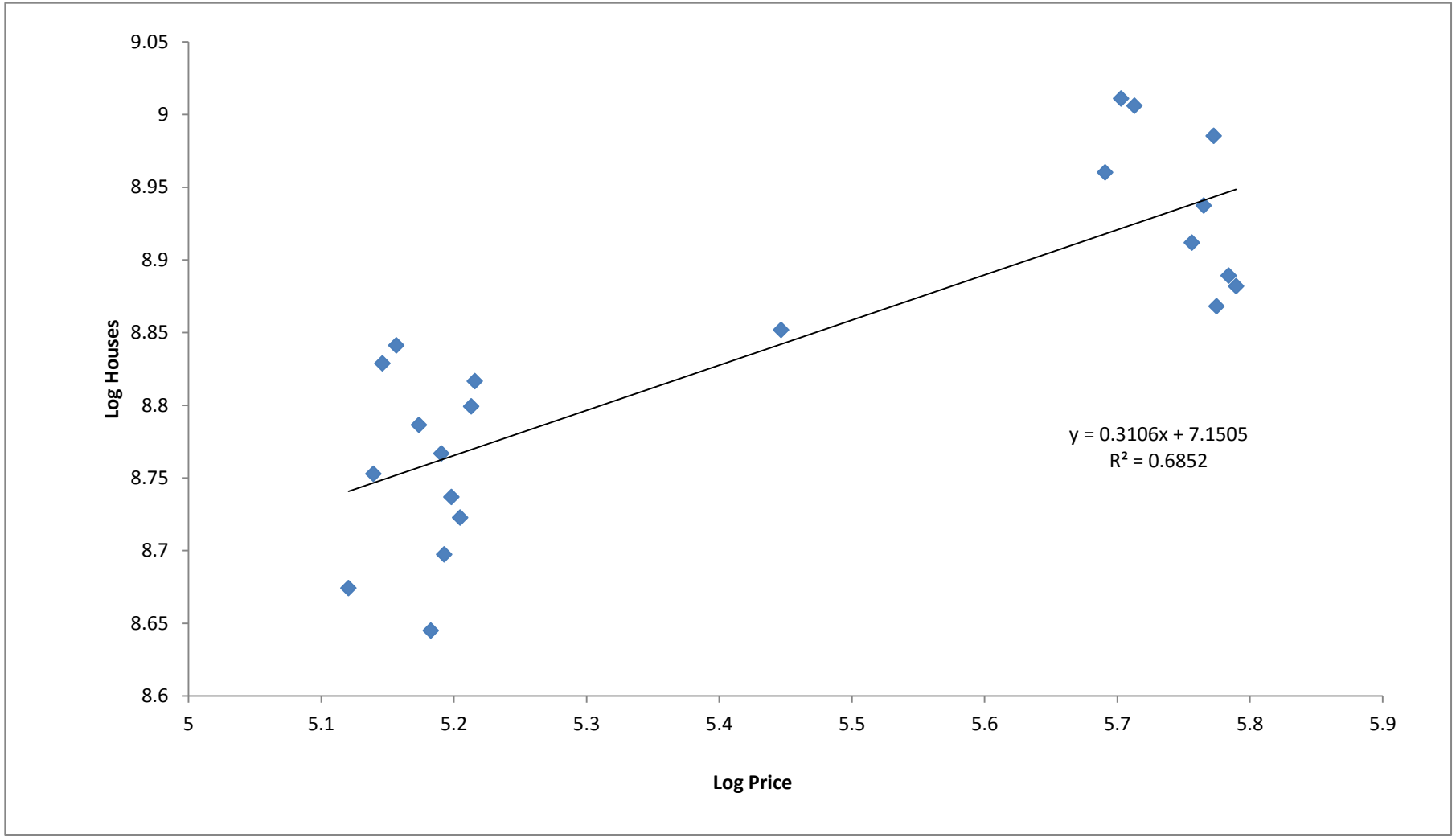
Instrument Quality (income and real rate)



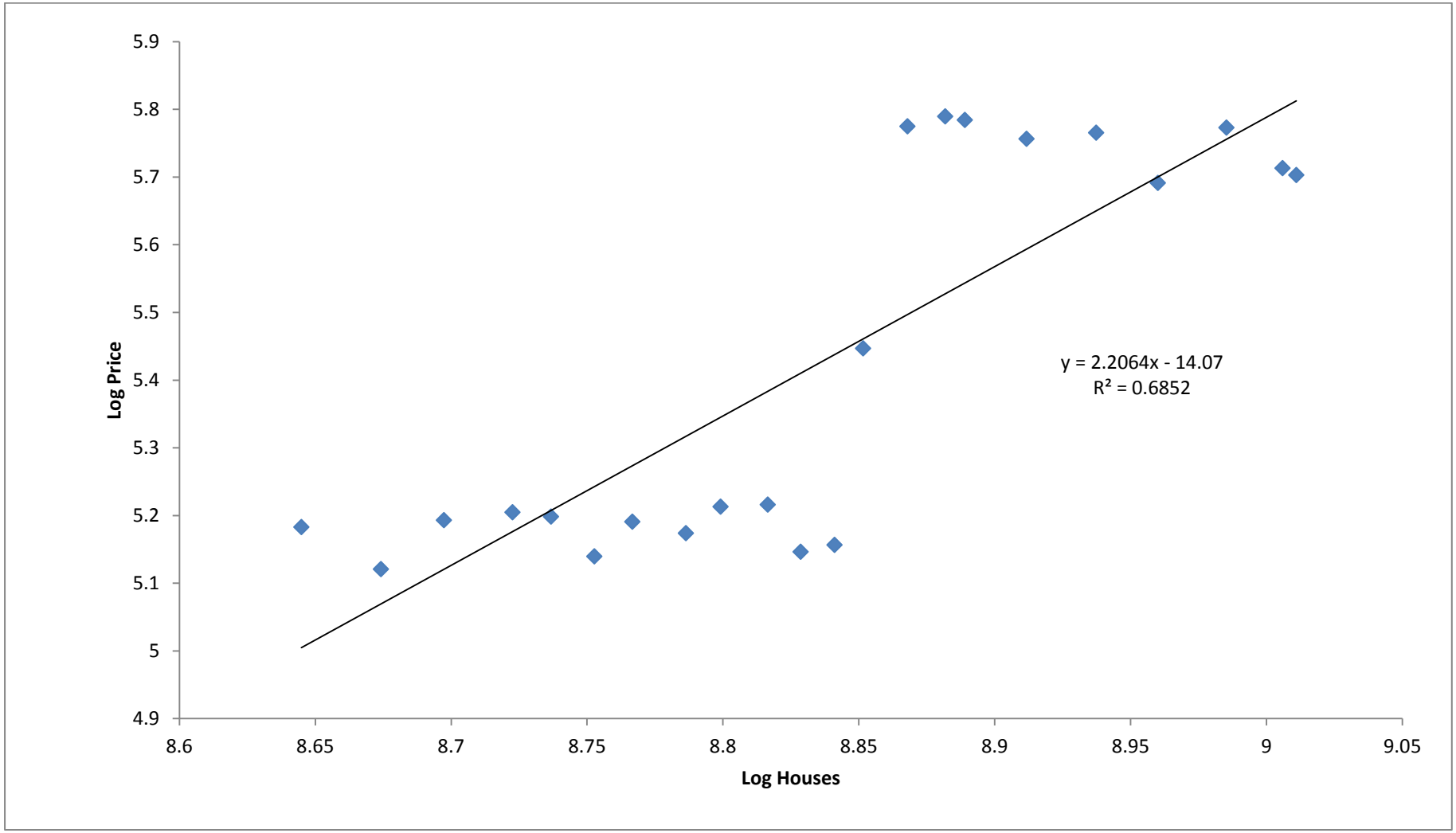
Density Functions for Regional and Metropolitan Supply Elasticity



Estimating Supply Elasticity: Nambucca (IV Estimate = 0.41)



Estimating Supply Elasticity: Nambucca (1/2.21 = 0.45)



Another Estimator

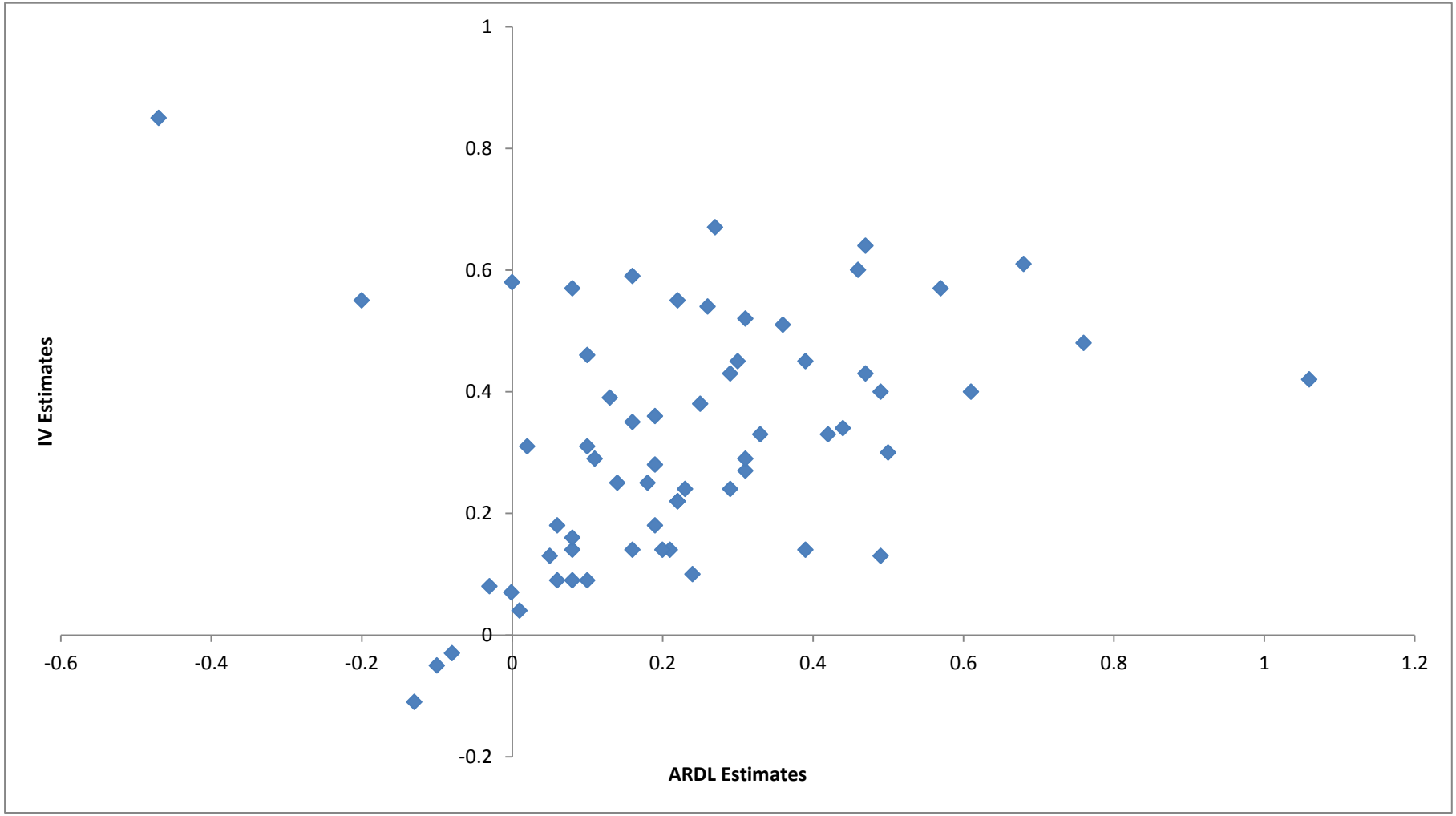
ARDL Bounds Procedure (Pesaran, Shin and Smith, 2001)

$$\Delta lnH_t^i = \delta_{H0}^i + \delta_{HP}^i lnP_{t-1}^i + \delta_{HH}^i lnH_{t-1}^i + \omega_{HP}^i ln\Delta P_t^i + v_t^i$$

$$H_0: \delta_{HP}^i = \delta_{HH}^i = 0$$

- Test for levels relationship between *lnH* and *lnP*
- If F-stat is "sufficiently small" then don't reject null
- If F-stat is "sufficiently large" then reject null
- Range for F-stat where you need to pre-test for variables being I(1) or I(0)
- If null is rejected, then estimate long-run supply elasticity by $\delta_{HP}^i \Big/ \delta_{HH}^i$

Correlation between IV and ARDL Estimates

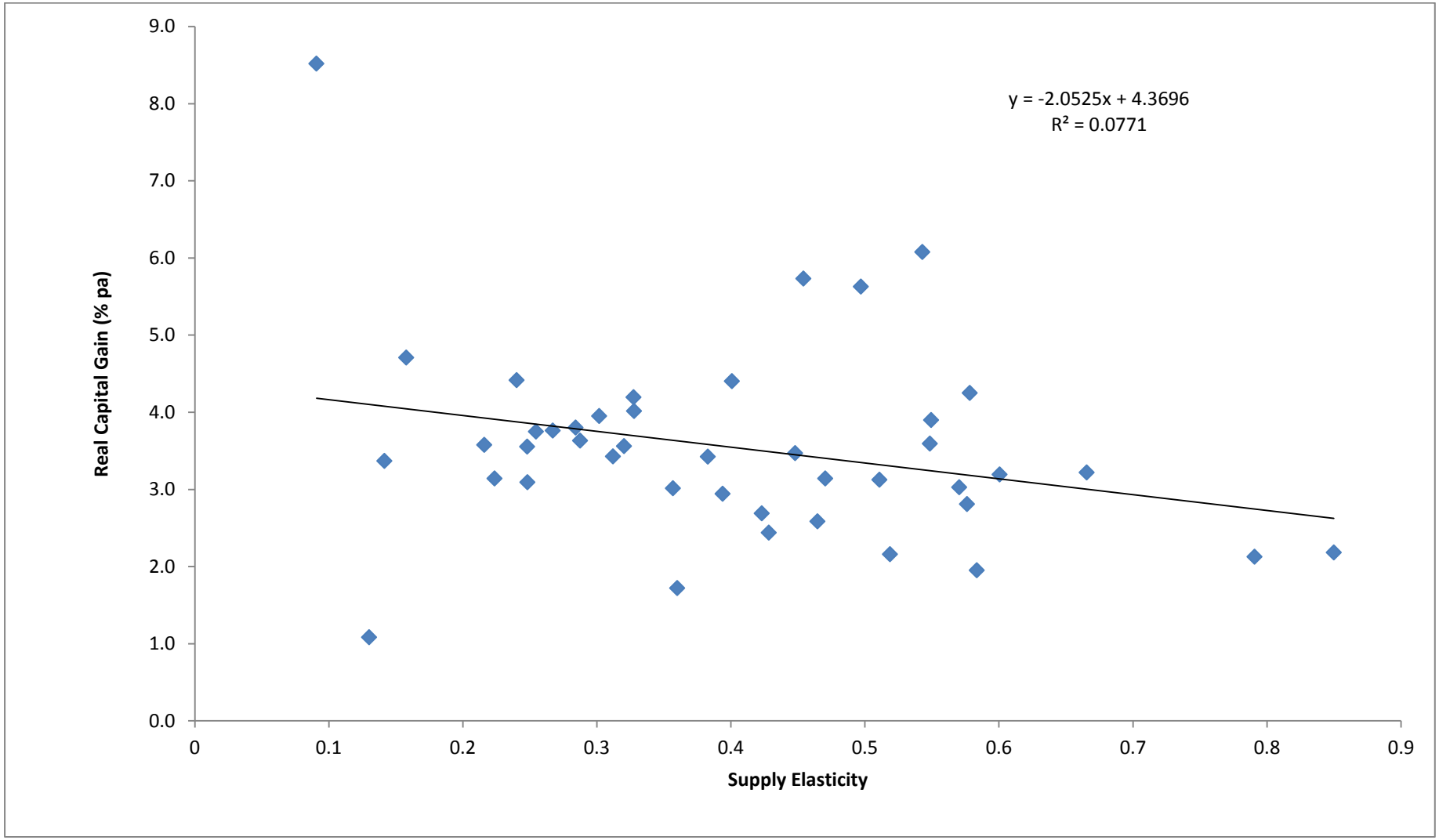


Growth in Real House Prices and Supply Elasticity

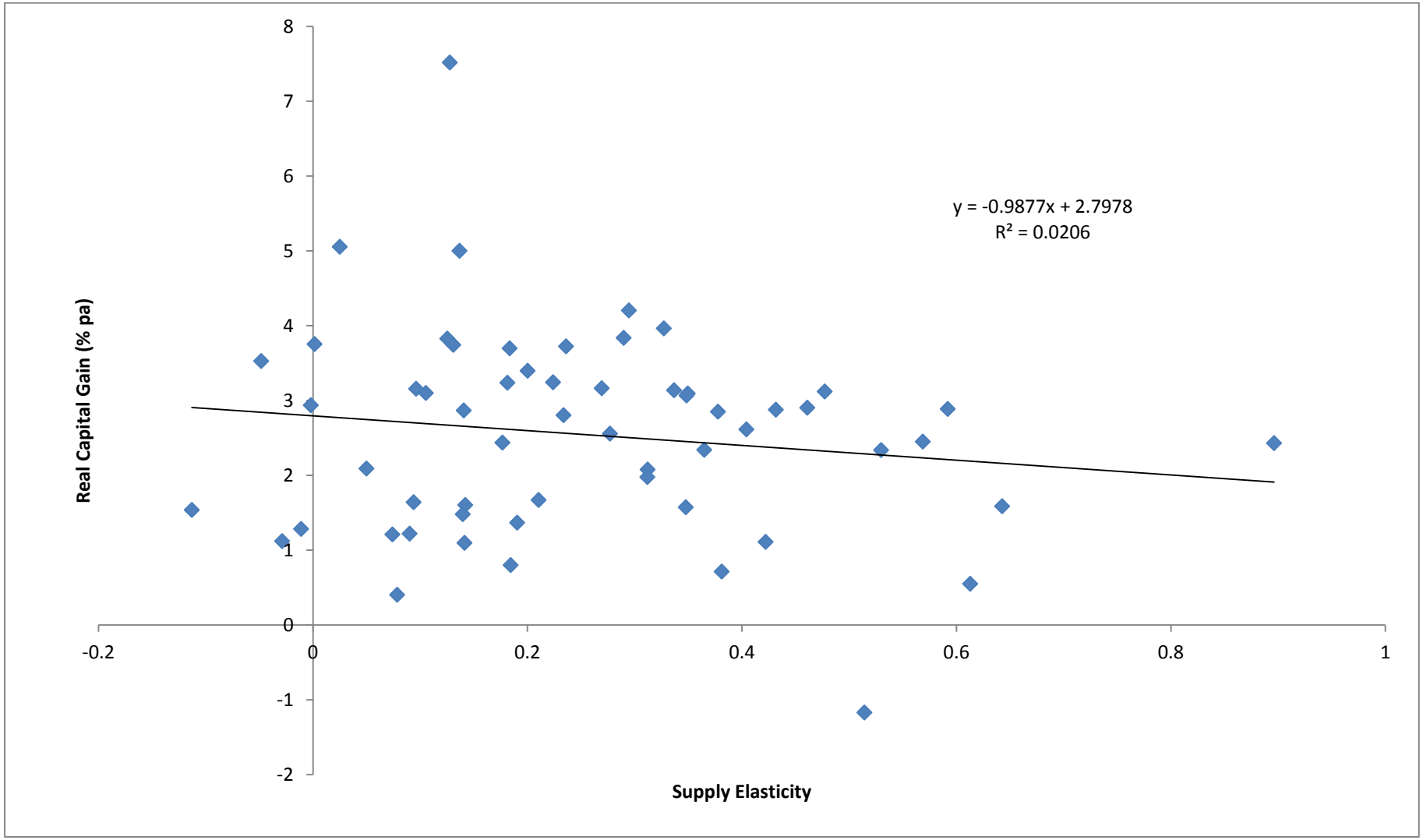
"As a result, we have had the combination of higher prices and lower supply than might otherwise have occurred." (Tony Richards)

Do LGAs with lower supply elasticity have higher average capital gains?

Supply Elasticity and Real Capital Gains: Coastal Regions



Supply Elasticity and Real Capital Gains: Inland Regions



Why is Housing Supply in Regional NSW so Inelastic?

2 observations

- Average supply elasticity for houses in regional NSW (0.32) is not much greater than in Sydney (0.2)

- There are no regional LGAs with elastic housing supply

  5 largest:
  Murray (0.9), Hastings (0.85), Great Lakes (0.79), Port Stephens (0.67) and Bathurst (0.64)

- Why no regions like Dallas, Tampa-St Petersburg or Phoenix?

- All of NSW looks like San Francisco

NSW Planning System

- Legislation
  Planning and Environmental Assessment Act 1979
  Environmental Planning and Assessment Regulation 2000

- State Environmental Planning Policies (SEPPs) NSW-wide planning policies and procedures

- Local Environmental Plan (LEP) zones all land within an LGA; including what developments and land uses can occur and under what criteria

- LEPs need State Government approval

Some Unresolved Questions

- What criteria do Local Councils use to decide on the quantity of land to zone as residential in their LEPs?

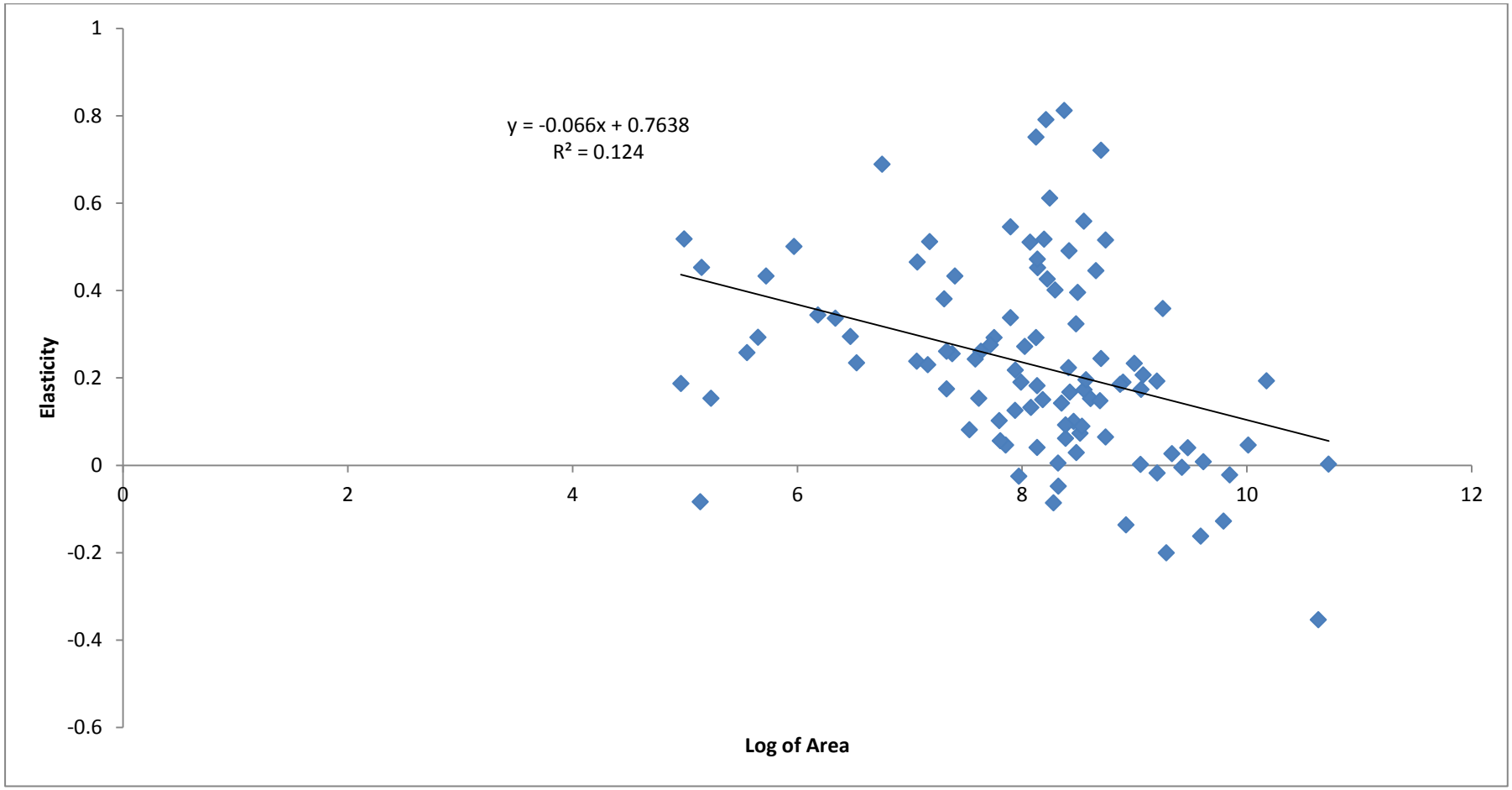
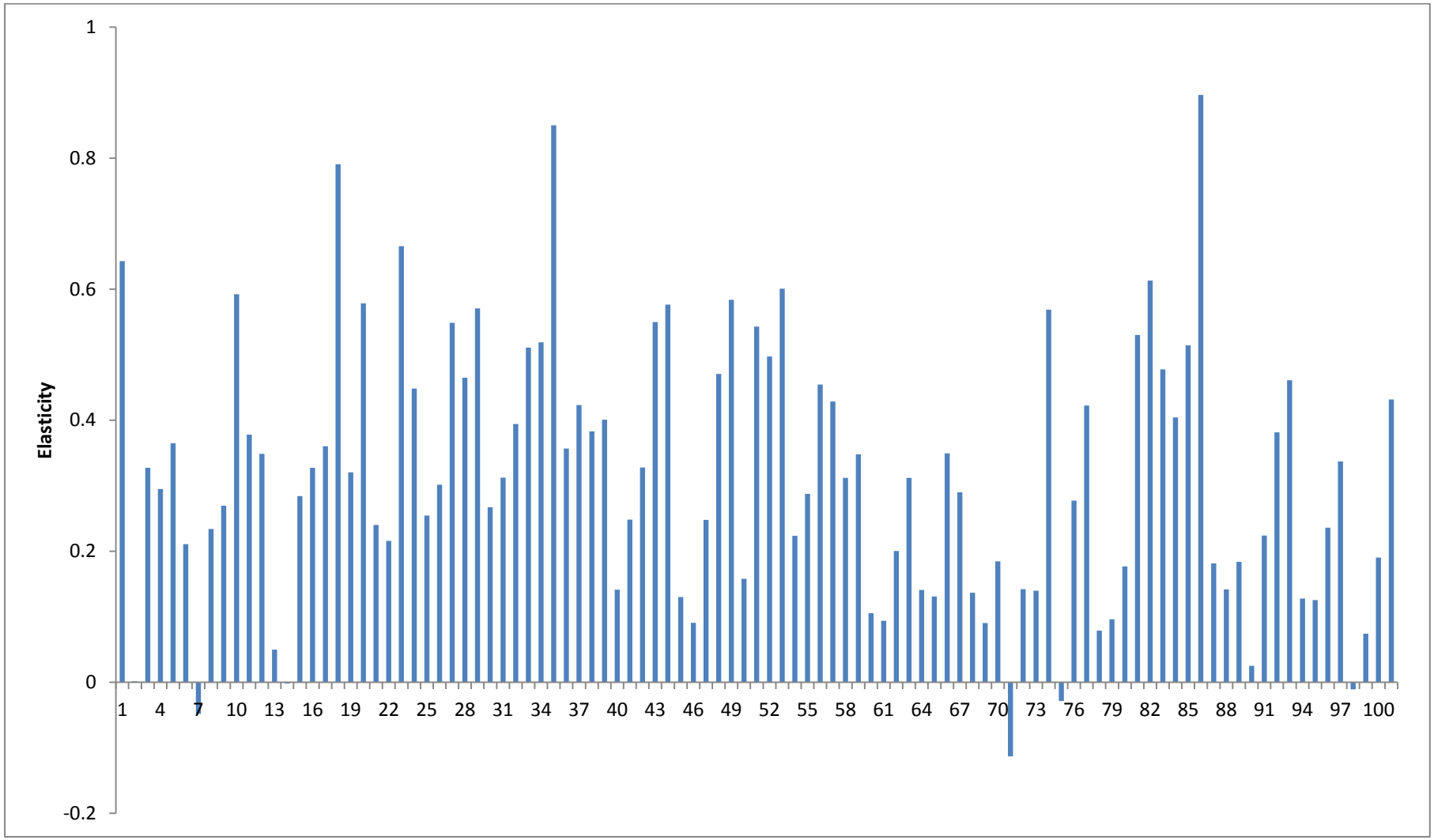
  Answer seems to be that they use population growth projections

- What is the current stock of unused land that is currently zoned as residential in regional LGAs?

  Difficult to calculate this figure

Additional Slides

Supply Elasticity and Area of LGA



Estimates of Supply Elasticity by LGA