APPRAISAL-BASED PRICE INDICES

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CPPI HANDBOOK 2ND DRAFT CHAPTER **5 & 9**

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CONTENT

- Introduction
- Appraisal values as regressor variable
- SPAR
- Conclusions

INTRODUCTION

- Transaction price model with lagged appraisal values as regressor
- Appraisal value as catch-all “hedonic” variable
- Potential solution to problems in hedonic regressions
  - Omitted-variables
  - Misspecification
- Appraisal values
  - Properties need to be regularly and consistently appraised
  - Systematic valuation bias
    Expensive (cheaper) properties are under(over)valued
  - Valuations are smoothed and lagged

APPRAISAL VALUES AS REGRESSOR (1)

- Log transaction price at time *t* regressed on
  - log appraisal value at time *t-s*
    - Coefficient = 1: transaction price proportional to appraisal value
    - Coefficient < 1: expensive properties are undervalued
    - Coefficient > 1: expensive properties are overvalued
  - Constant
    - Price change between *t-s* and *t*
      (assuming no over- or undervaluation at *t-s*)
  - Control variables

APPRAISAL VALUES AS REGRESSOR (2)

- Chained (imputed)
  - Separate regression models applied on transactions in period *t-1* and *t*
  - Predict sales prices for *all* properties (correction for log transformation)
  - Value (equal) weighted index based on predicted sales prices in period *t-1* and *t*
- Pooled (time dummy)
  - Joint regression model applied on transactions in different time periods (*p* = log price and *av* = log assessed value)

$$\begin{pmatrix} \vec{p}_{t-1} \\ \vec{p}_t \end{pmatrix} = \begin{pmatrix} \mathbf{1} & \mathbf{0} \\ \mathbf{1} & \mathbf{1} \end{pmatrix} \begin{pmatrix} \alpha_{t-1} \\ \alpha_t \end{pmatrix} + \begin{pmatrix} \overrightarrow{av}_{t-lag} \\ \overrightarrow{av}_{t-lag} \end{pmatrix} \beta + \begin{pmatrix} \vec{\varepsilon}_{t-1} \\ \vec{\varepsilon}_t \end{pmatrix}$$

  - Coefficient for time dummy variable α_t gives directly the log price change between period *t-1* and *t*

APPRAISAL VALUES AS REGRESSOR (3)

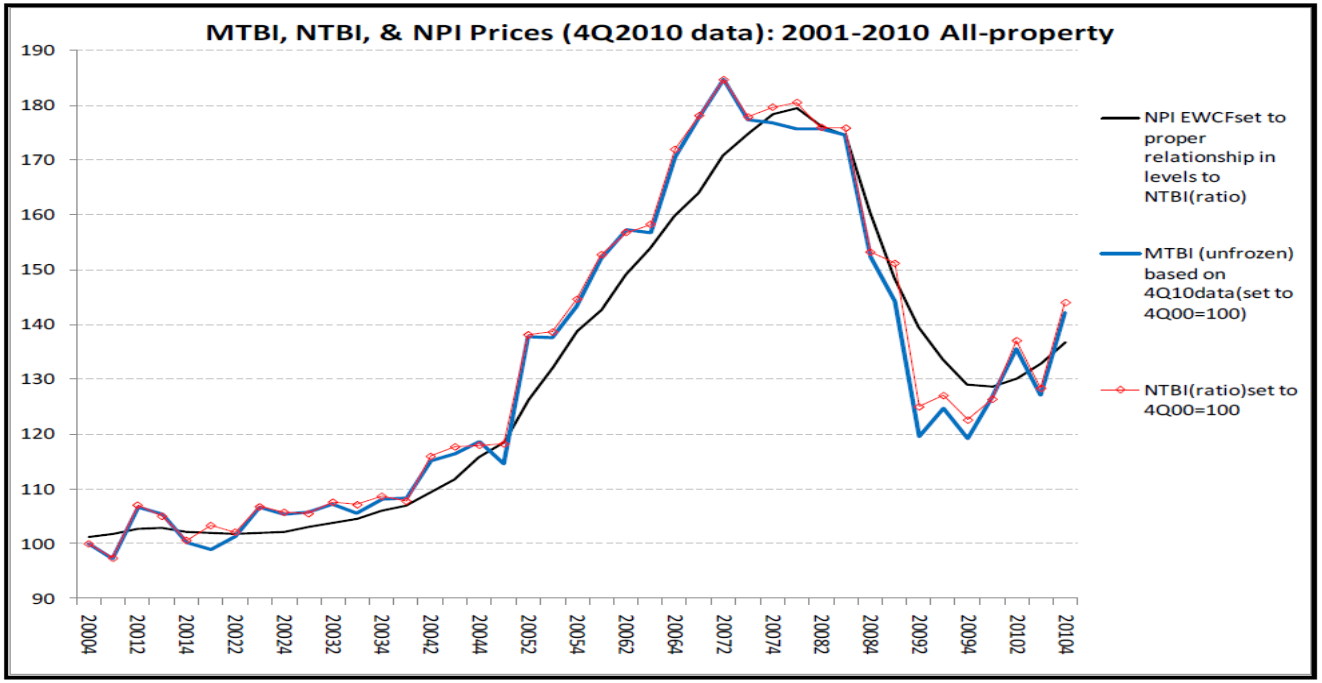
- Appraisal value not available for each period
  - Interpolate appraisal values
- Difference in price change resulting from chained and pooled regression should be small
  - If coefficient for log appraisal value is time-invariant, then log price changes are identical
  - Coefficient for log appraisal value should be stable over time and close to unity

SPAR

- SPAR
  - Value weighted: sum of all transaction prices in period *t* divided by sum of corresponding appraisal values in period *t – lag*
  - Equal weighted: average of (transaction price in period *t* divided by appraisal value in period *t – lag*) over all transactions
- Relation between SPAR and appraisal regressor price index
  - Appraisal regressor:
    - More sophisticated
  - SPAR:
    - Easy to calculate and explain
    - Special case of appraisal regressor price index
    - Assumes proportionality between price and appraisal value

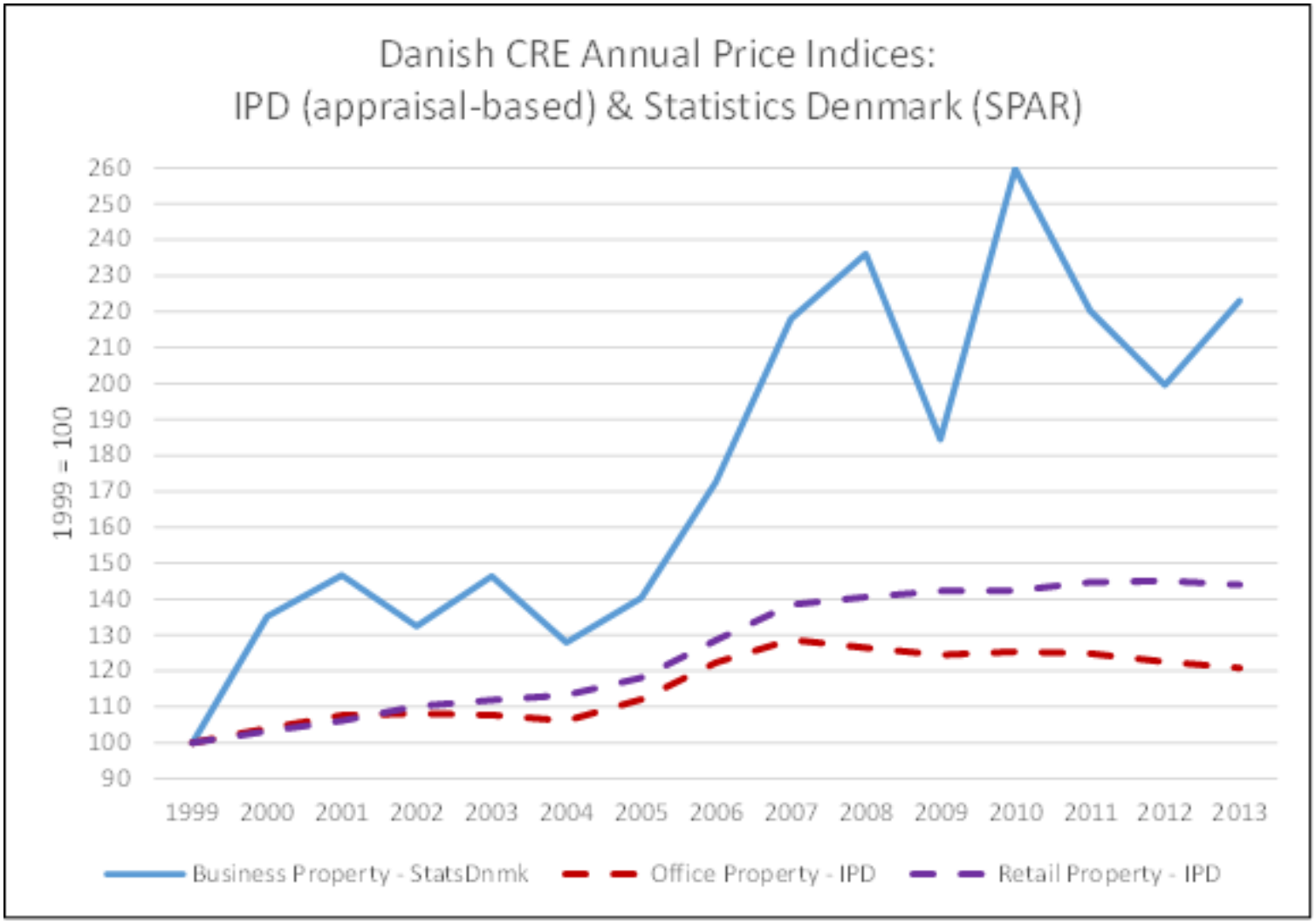
APPRAISAL REGRESSOR (MTBI) AND SPAR (NTBI)

Exhibit 5



APPRAISAL-BASED PRICE INDICES

EXAMPLE



CONCLUSIONS

- Pro
  - Index (in specific SPAR) is easy to calculate
  - Can correct for systematic bias between appraisal valuations and contemporaneous transaction prices
- Cons
  - It requires frequently reappraised properties and depends on the quality of the appraisals
    - New built usually do not have an appraisal value
  - The method cannot directly deal with deprecation
  - The method cannot directly deal with major repairs/renovations

Thank you!

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