

# Handbook on Residential Property Price Indices

(sponsored by Eurostat & endorsed by Inter-  
Secretariat Working Party on Price Indices)

Presentation by David Fenwick

Joint UNECE/ILO meeting on consumer price indices  
Geneva 2012

# Handbook on Residential Property

## Price Indices – purpose & overview

- Guidance on concepts & methods
- But practical recommendations (not rules) on compilation take into account different country situations
  - Most particularly data availability.
- Aim: fit-for-purpose indices & increased international comparability
- Structure
  - **Chapter 1** Introduction
  - **Chapter 2** Reviews uses (macro-economic indicator; wealth component; financial stability indicator; National Accounts deflator; input into CPI)
  - **Chapter 3** Conceptual Framework – different uses, different concepts.
  - **Chapters 4-7** In-depth review of main compilation methods (mix-adjustment; hedonic regression; repeat sales)
  - **Chapter 8** Decomposition into land/building
  - **Chapter 9** Qualitatively examination of different data sources
  - **Chapter 10** Catalogues availability of RPPIs (up-to-date metadata on BIS website)
  - **Chapter 11** Provides practical guidance with illustrative data-sets
  - **Chapter 12** Recommendations

# Chapter 12: Recommendations & Guidelines – weighting

- Type of index to be compiled, will depend on its purpose.
  - *System of National Accounts (1993/2008)*.
- A *stock-weighted* index is appropriate when measuring the *wealth* associated with the ownership of residential property
  - A *stock-weighted* index is also appropriate for a financial stability indicator, in particular to identify property price bubbles.
- A *sales-weighted* index is appropriate for measuring the *real output* of the residential real estate industry
  - This is consistent in treatment to the acquisition or purchase of goods and services in a consumer price index.

# Chapter 12: Recommendations and Guidelines – scope

- A price index covering all residential property is appropriate for measuring the *wealth* associated with the ownership of residential property
  - The index should cover existing properties and properties which have been recently built
  - It should include conversions of existing property, for example where a warehouse has been converted into flats or an existing property has been sub-divided.
- An index covering all properties is also appropriate when used as a financial stability indicator

# Chapter 12: Recommendations and Guidelines - scope

- A price index covering new property only is appropriate for measuring the *real output* of the residential real estate industry
- The value of new housing is part of *gross investment*
  - The cost of the land, apart from the value of any improvements made to this element, should be excluded
- A price index restricted to new property is also appropriate for the inclusion of owner-occupier housing costs on a net-acquisition cost basis
  - I.e. where the consumer price index covers the cost of acquiring properties which are new to the owner-occupier housing market

# Chapter 12: Recommendations and Guidelines – constant quality

- A residential property price index compares the values of the stock or of the sales of residential property between two time periods
  - after allowing for changes in the attributes of the properties involved
  - Price changes need to be decomposed into those associated with changes in attributes and the residual which relates to the underlying “pure price” change
- A constant quality price index is appropriate for all purposes
  - Both for a stock and for a sales-weighted price index
- Challenging but a number of practical methodologies which can be used

## Chapter 12: Recommendations and Guidelines - decomposition between building & land components

- A decomposition between building & the land.
  - should be made where a country's balance sheet estimates of national wealth make this distinction
  - may also be required when a residential property price index is an input into the CPI for the measurement of owner-occupier housing costs using the net-acquisition approach
- Land decomposition & constant quality most challenging practical aspect.

# Chapter 12: Recommendations and Guidelines - Statistical methods for compiling constant quality indices

- Challenging due to following three factors
  - Residential properties are heterogeneous
    - No two properties are identical
  - Prices are often negotiated
    - The (asking) price of a property is not fixed & can change throughout the transaction process until the price is finalised
    - A property's market value can only be known with certainty after it has been sold
  - Property sales are infrequent
  - For example, typically less than ten per cent of housing stock changes hands every year
  - A given house is likely to have a confirmed value not more than every ten years
- Four methodologies presented in depth in handbook
  - Stratification or “mix-adjustment”; hedonic regression; repeat sales; appraisal-based methods (more particularly, the SPAR method)



## Chapter 12: Recommendations and Guidelines - Statistical methods for compiling constant quality indices: hedonics generally preferred

- Recommendation
  - Hedonic regression is generally the best technique for constructing a constant quality residential property price index
  - Hedonic regression using the predicted prices (not time dummy) approach is the recommended method
  - It is also recommended that stratified hedonic indices be computed to minimise the potential for any residual bias
    - Subject to the required data being available

## Chapter 12: Recommendations and Guidelines - Statistical methods for compiling constant quality indices (hedonics)

- Main advantages of hedonics are
  - The method adjusts for both sample mix changes and quality changes over time of the individual houses
    - If the list of property characteristics is sufficiently detailed
  - Price indices can be constructed for different types of dwellings and locations through stratification and the application of hedonics to each individual stratum
  - The method maximises the use of the available data
  - It can be used to decompose the overall price index into the land and structures components, subject to the availability of data
- Main disadvantage – data intensive

## Chapter 12: Recommendations and Guidelines – other statistical methods for compiling constant quality indices: mix-adjustment/stratification

- *Stratification or “mix-adjustment”*
  - Most straightforward method for controlling for changes in the composition or ‘quality mix’ of properties sold
  - Also addresses any user need for sub-indices relating to different housing market segments (house-type/location)
- Main advantages
  - It is not data intensive (but needs house characteristics)
  - It is easy to deploy & reproducible
  - It is not subject to revision
- The main disadvantages
  - It cannot deal adequately with depreciation or major renovations

## Chapter 12: Recommendations and Guidelines – other statistical methods for compiling constant quality indices: stratification/mix-adjustment

- Recommendation
- Stratification or “mix-adjustment” is an appropriate method where
  - An appropriate level of detail is chosen for the number of cells and can be applied in practice.
  - The age of the structure is one of the stratification variables.
  - A decomposition of the index into structure and land components is not required
- *Stratification/mix-adjustment is recommended where the volume of sales is large enough to support a detailed classification of properties*

# Chapter 12: Recommendations and Guidelines – Other statistical methods for compiling constant quality indices: repeat sales

- *Repeat sales*
  - Observes the price development of a specific house over a period of time by reference to the selling price each time it is sold
  - The price development of a “representative” selection of houses during overlapping time periods can then be used to a measure general trend in prices
    - Using repeat sales on the same properties ensures a like for like comparison
- The main disadvantages
  - It uses information only on those properties that have sold more than once during the sample period
    - Small sample & selection bias from restriction to properties that have been sold more than once during the sample period
    - It ignores (net) depreciation of the dwelling unit
    - Cannot structure from land

## Chapter 12: Recommendations and Guidelines – other statistical methods for compiling constant quality indices: repeat sales

- Recommendation
  - Repeat sales method is not preferred above the hedonic method but is satisfactory where
    - There is limited or no information on housing characteristics
    - There are a relatively large number of repeat transactions
      - To provide enough data points to populate the required types of residences and where sample selection bias is not a problem
  - Repeat sales method is not recommended when distinction needed between price of structure & price of land

# Chapter 12: Recommendations and Guidelines – Other statistical methods for compiling constant quality indices: appraisal-based methods SPAR INDEX

- The value-weighted arithmetic Sale Price Appraisal Ratio (or SPAR) index
  - Re-scales appraisal-based indices by dividing by the base-period values
  - Corrects for the potential bias which may result from inaccurate valuations
  - Bias can arise from frequent re-assessments and reduced precision over time can arise from new appraisals
- The main advantages
  - It is consistent with index number theory & straight forward to compute
    - Being based on standard matched model methodology
  - Can benefit from many more observations than the repeat sales method
    - In which case less susceptible to problems arising from small number of price observations
  - It is not susceptible to sample selection bias
- The main disadvantages
  - It cannot deal with major repairs or renovations (or depreciation) of the dwelling units lack of data to decompose land from building

## Chapter 12: Recommendations and Guidelines - Statistical methods for compiling constant quality indices (SPAR method)

- Recommendation
- Preferred to the repeat sales methodology
  - if assessment data of sufficient quality is available
- The SPAR methodology addresses some of the weaknesses of the repeat sales methodology
  - E.g. Selection bias
- The SPAR methodology does have its drawbacks but is a recommended when hedonics is not possible, in particular in combination with stratification



# Handbook on Residential Property Price Indices

Concepts, definitions & target index is prescriptive  
Guidelines on methods of practical compilation – depend on data availability

Handbook available at [http://epp.eurostat.ec.europa.eu/portal/page/portal/hicp/documents/Tab/Tab/RPPI\\_Handbook%20combined\\_V3\\_0.pdf](http://epp.eurostat.ec.europa.eu/portal/page/portal/hicp/documents/Tab/Tab/RPPI_Handbook%20combined_V3_0.pdf)

Meta-data on residential property price indices published by different countries is available from the website of the Bank for International Settlements (see [www.bis.org/statistics](http://www.bis.org/statistics))

## End of Presentation