

Introduction

1.1 Residential property is both a source of wealth and, insofar as property owners live in or on their property, an important determining factor in their cost of living. The price of a house is something different from the cost of dwelling services it provides, though the two concepts are obviously interlinked.

1.2 Monitoring the development of house prices is considered important, especially in times of economic turbulence. Yet the way house price development is measured varies per country, and even within a country there are sometimes two or more competing methods in use. This situation is of course not favourable for the design of consistent policy measures based on solid international comparisons.

1.3 Against this background it is understandable that it was proposed that a handbook be prepared on housing, or broader residential property, price indices.⁽¹⁾ The primary goals of the handbook are

- to provide guidance for those wishing to set up residential property price indices or modify existing indices in view of international harmonisation;
- to provide a discussion and comparison of the various targets and their corresponding conceptual frameworks;
- to provide an inventory of existing practices.

The contents of the handbook are briefly outlined below.

1.4 *Chapter 2* reviews a number of areas where residential property price indices (RPPIs) play a role. The following applications are considered:

- as a macro-economic indicator of economic activity;
- for use in monetary policy and inflation targeting;
- as a tool for estimating the value of a component of real wealth;
- as a financial stability or soundness indicator to measure risk exposure;
- as a deflator in the National Accounts;
- as an input into citizens' decision making on whether to buy or sell residential property;
- as an input into the Consumer Price Index; and
- for use in making inter-area and international comparisons.

1.5 In *Chapter 3* on the uses of an RPPI, the focus will be to fill in gaps in the System of National Accounts and in the compilation of a Consumer Price Index. It is likely that if appropriate RPPIs can be constructed to fill in these gaps, then the resulting family of RPPIs will meet the needs of most users.

1.6 Broadly speaking, two separate types of RPPI can be distinguished: a constant quality price index for the *stock* of residential housing at a particular moment in time and a constant quality price index for residential property *sales* that took place during a particular period of time. The construction of these two types of index will be different; most particularly, the weighting associated with the two types will differ.

1.7 *Chapter 3* continues by summarizing the four main approaches to constructing an RPPI. In the final sections a number of miscellaneous topics are addressed, such as the frequency of an RPPI, the consistency of monthly with quarterly estimates and the consistency of quarterly with annual estimates, revision policies, and seasonal adjustment.

1.8 *Chapters 4-7* review in depth the main methods for compiling RPPIs. The simplest methods are based on some measure of central tendency of the distribution of transaction prices in a period, in particular the mean or the median. Since house price distributions are generally positively skewed (predominantly reflecting the heterogeneous nature of housing, the positive skew in income distributions, and the zero lower bound on transaction prices), the median rather than the mean is often used. As no data on housing characteristics are required to calculate the median, a price index that tracks changes in the price of the median house sold from one period to the next can be easily constructed. Another attraction of median indices is that they are easy to understand.

1.9 One major drawback of simple median based indices is that they provide very noisy estimates of price change. The set of houses actually traded in a period, or a sample thereof, is typically small and not necessarily representative of the total stock of houses. Changes in the mix of properties sold will therefore affect the sample median price more than the median price of the housing stock. A perhaps bigger problem than short-term noise is systematic error, or bias. A median index will be subject to bias when the quality of the housing stock changes over time. Bias can also arise if certain types of houses are sold more frequently than other types of houses and at the same time exhibit different price changes.

1.10 A general technique for reducing sample selection bias is (post-) stratification. This technique, which is also known as mix adjustment, is discussed in *Chapter 4*.

1.11 *Chapter 5* reviews the hedonic regression approach. This approach recognizes that heterogeneous goods can be described by their attributes or characteristics. That is, each good is essentially a bundle of performance characteristics. In the housing context, this bundle may contain attributes of both the structure and the location of the properties. Although there is no market for

⁽¹⁾ Actually, this was one of the conclusions of the OECD-IMF Workshop on Real Estate Price Indices (Paris, 6-7 November 2006).

characteristics, since they cannot be sold separately, the demand and supply for the properties implicitly determine the characteristics' marginal contributions to the prices of the properties. Regression techniques can be used to estimate those marginal contributions or implicit prices.

1.12 This chapter discusses, in a non-technical way, the main models used as well as the methods to form RPPIs from estimation of such models. The overall evaluation of the hedonic regression method is that it is probably the best method that could be used in order to construct constant quality RPPIs for various types of residential property. However, it is also the most data-intensive method.

1.13 The repeat sales method, reviewed in *Chapter 6*, utilizes information on the same properties which have been sold more than once. Because only "matched models" are used, there is no change in the quality mix to control for. In its basic form, the only information required is price, sales date and address of the property. So the repeat sales method is much less data-intensive than hedonic methods. Also, the repeat sales method will automatically control for micro location (address), something which hedonic methods are unable to do.

1.14 The matched model methodology, where prices of exactly the same item are compared over time, is the natural starting point for the construction of any price index. Because of the low incidence of transactions, and because the quality of houses continually changes, the standard matched model methodology cannot be applied straightforwardly. The repeat sales method attempts to deal with this issue by looking only at properties that have been sold more than once over a sample period. This, however, can lead to a relatively low number of observations and to sample selection bias. To overcome such problems, assessed values of the properties could be used.

1.15 In many countries, official government assessments are available for all properties, because such data are needed for taxation. If the assessments pertain to some reference date, an RPPI can be constructed by relating actual sale prices to assessed values. This constitutes a variant of the matched model methodology, the distinct feature being that compositional change is accounted for. In this case, there is no need to use econometric techniques. The various assessment-based methods, and in particular the sale-price appraisal ratio (SPAR) method, are reviewed in *Chapter 7*.

1.16 Chapters 4-7 all end with empirical examples tested on actual data in order to illustrate the methods discussed and to provide additional background material. The data set covers 14 quarters of residential property sales for a relatively small town in the Netherlands. As will

become clear in Chapters 4-7, most methods are unable to decompose an RPPI into a land and a structures component. *Chapter 8* discusses how hedonic regression methods can be used to obtain such a decomposition and considers how to construct an RPPI for the *stock* of housing when hedonic regression methods are used. Using the actual data, this chapter also suggests ways to overcome several practical problems that are often encountered in empirical work of this nature, such as a high correlation between the size of the structure and the size of the land.

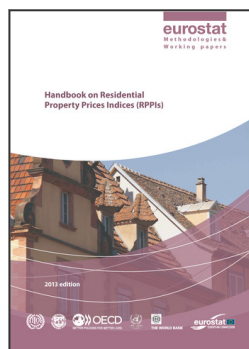
1.17 In practice, because of the high cost of undertaking purpose-designed surveys of house prices, the approaches adopted by statistical agencies and others to construct RPPIs have been mainly a function of the house price data sets generated by the legal and other processes associated with buying a house. The indices so constructed can vary according to the point in the house purchasing process at which the price is measured, for instance whether the final transaction price or the earlier valuation used for securing a loan is taken. Also, the amount of detailed information available on the characteristics of the properties sold will affect index compilation methods, often acting as a constraint on the techniques available to quality adjust for houses of different sizes and locations. Thus, data availability has historically been a constraint on the approach used for index construction.

1.18 *Chapter 9* qualitatively examines the different data sources that can be used for constructing RPPIs, such as printed news media, real estate agents, mortgage companies, property registers and tax offices. In the final section, attention is paid to the situation in many developing countries where data are scarce and the issue of property ownership is ambiguous.

1.19 *Chapter 10* catalogues the availability of RPPIs in different countries and also presents some case studies. It relies on meta-data gathered by various organisations, including the European Central Bank and the Bank for International Settlements, and more recently a fact-finding exercise conducted by Eurostat in connection with the inclusion of owner-occupied housing costs in the European Union's Harmonised Index of Consumer Prices, which was extended to cover some non-EU countries.

1.20 *Chapter 11* provides additional practical guidance by demonstrating the working of the RPPI construction methods (excluding the SPAR method) that were outlined in Chapters 4, 5 and 6 on simple examples using small data sets.

1.21 *Chapter 12* concludes by providing recommendations.



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