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Statistics on real estate prices: the need for a strategic approach

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Real estate prices: the need for a strategic approach to the development of statistics to meet user needs.

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Introduction

This paper considers the strategic issues that arise in connection with the future evolution of statistics on real estate price changes². and argues for the development of a conceptual framework based on a systematic analysis of user requirements. Such a framework can then be applied in the context of individual national circumstances, including domestic demand for statistics and the availability of the latter as a by-product of the legal process for the sale and purchase of real estate, to identify suitable data sources and corresponding data gaps. The systematic analysis associated with such a framework can also be used for the formulation of standardised meta-data and in the longer-term to inform progress towards a coherent family of price indicators in a national context and greater international comparability in statistics on real estate prices.

The note is written from the perspective of both a producer and a user of house price statistics. It focuses on house prices but can in principle be extended to real estate prices more generally.

The measurement of house prices raises significant conceptual and measurement problems, the quality of available data tends to be variable and lack harmonisation in methodologies between countries makes for difficulties when international comparisons are made.

An overview of available indicators

It can be argued that at a basic level there is plenty of information on real estate prices and that the issue is the failure to capture it and to convert into in to a usable form for analytical purposes. This is so both at the national and international level:

- Users in individual countries can be confronted either with a lack of relevant statistics or with different statistics for different time periods and with varying time-lags and based on different data sources or compilation methods.
- For users seeking international comparisons the situation is further confounded by significant differences between countries in the availability of data and the challenge this represents for compiling like-for-like comparisons and interpreting relative trends between countries. The complication of

¹ The views expressed in this paper are those of the author and are not necessarily those of the UK Office for National Statistics.

² The issue of measuring differences in real estate price levels between regions is closely associated to that of measuring price changes but the technical difficulties are even more acute.

aggregate price indices covering groups of countries- a requirement for co-ordinated economic policy and monitoring across an economic area such as the Euro zone (those countries in Monetary Union)- is a further challenge.

The UK example can be taken by way of illustration of the situation that can arise in individual countries. At the most recent count, there are seven house prices indices compiled and published in the UK on a regular basis. These use different data sources and methods of index construction and with a significant variation in the time-lag between the reference period and publication. Similar challenges are faced by users in other countries which has led to a number of country-specific initiatives. For instance, INSEE, the French statistical agency, has developed a hedonic price index covering the whole of France and based on information collected and computed by notaries. INSEE provide the methodological support. The existing index is quarterly but what a more important role could be played if it was produced on a monthly basis. The Czech Statistical Office in conjunction with the Ministry of Justice have introduced a monitoring system based on real estate tax declarations which by law have to be registered within 30 days of a change of ownership- a comprehensive database which is nonetheless subject to potential bias from the fact that the declared price may not always be the actual price paid³.

The challenges facing users requiring international comparisons are well illustrated by the experiences of the European Central Bank (ECB) and the Bank of International Settlements (BIS). In the absence of harmonised statistics the ECB regularly compiles an indicator for euro-area residential property prices from non-harmonised data using a systematic method for selecting national indices for inclusion in the aggregate based on geographical and market coverage, mix-adjustment techniques and reliability of underlying data source which while useful as a broad indicator of the trend in prices may be considered only as an approximation given the substantial differences between the national sources making up the aggregate and the fact that some national sources fall short of the ideal measure⁴. The experience of the Bank of International Settlements (BIS) in constructing composite asset prices further re-enforces this message. Their aggregate asset price index (AAPI), covering several major industrialised countries, was developed in the early 1990s with the aim of enabling temporal comparisons of prices across countries. This index is a weighted average of national price indices for equities and residential and commercial real estate- which make up the majority of private sector wealth- where the weights are estimates of the normalised share of those assets in total private sector wealth and are updated every five years to capture changes in the property portfolio. BIS conclude that whilst the resulting index is a welcome addition to the set of statistics available for policy relating to monetary and financial stability, further refinements and better data relating to individual components in connection with residential and commercial property would increase the relevance of the index⁵.

From this three common themes emerge:

³ Real Estate Prices and CNB Monetary policy. Matalik et al, Czech National Bank, 2003.

⁴ Euro Area Residential Property Prices: the aggregation of non-harmonised national data. Ahnert and Page, European Central Bank, October 2003.

⁵ Experience with constructing composite asset price indices. Stephan Arthur, Bank of International Settlements, 2003.

- There is an increasing user demand for relevant statistics on real estate prices.
- Work has been undertaken to meet user demand but not universally.
- The work undertaken to meet this demand has been country-based which has led to national solutions reflecting local circumstances.

In the latter context it can be observed that there has been a lack of co-ordination internationally and that where initiatives have been taken to produce composite indices covering a number of countries this has involved making the best available use of country data rather than a co-ordinated approach in partnership with individual countries to improve the available statistics.

There is one exception to this and that is the work currently being undertaken under the direction of Eurostat, the Statistical Office of the European Union, to compile harmonised house price indices for the incorporation of owner-occupier housing costs in the Harmonised Index of Consumer Prices (HICP) based on a net acquisition cost basis- that is new houses excluding land. The latter is undoubtedly a significant and useful development but nonetheless one with a relatively narrow focus and with limited engagement from producers and users of house price statistics outside the European Union⁶.

Data Sources

There are two categories of data that might be used to construct house price indices; household surveys such as the Survey of English Housing or ONS's forthcoming household assets survey that ask respondents to estimate the current value of their home; and administrative data on actual transactions. Although the former offers the potential advantage of considering the prices of an identical or at least comparable group of houses the disadvantage of relying on estimated as opposed to actual prices has been felt to be so important that almost all house price indices rely on transactions data⁷. Actual transactions have their own problems. Like all administrative data they have to be adjusted to fit statistical purposes. If transactions data from mortgage lenders is used for example we need to allow for transactions that take place without a mortgage. More seriously the same property is not repeatedly sold each month. Any price index derived from transactions data will therefore be heavily dependent on the techniques used to adjust each period's set of transactions to eliminate the differences to the total transactions value due to the different mix of house types and locations. Thus the availability of relevant data and statistical techniques act as a constraint and strongly influence the approach to measurement which is adopted in practice.

Why are real estate prices so important?

Trends in real estate prices have a significant impact on the well being of individuals and uncertainty about these price changes may have an important economic impact⁸. The importance of these effects is not reflected in the resources that have been used

⁶ A pilot study is currently being undertaken by Member States.

⁷ Similar considerations have often prevented statisticians from publishing survey derived estimates of housing stocks. However ONS hopes to be able to produce such estimates from the Household Assets Survey

⁸ Any change in real estate, or any other, prices benefits one party at the expense of another. However uncertainty about price changes may impose net costs on society as a whole.

in developing the corresponding statistics. The range of users and their needs for data is particularly diverse which makes the task of satisfying user needs more challenging than would otherwise be the case:

- Buying or selling a house is typically the biggest and most significant transaction a household or individual will enter into:
 - Taking out a loan to purchase a house and the purchase of the house itself, regardless of whether a loan is taken out will impact on other consumer expenditure.
 - House price trends will influence decisions on house purchase.
 - Interest rate policy will have an impact on inflation and net disposable income after the payment of interest.
- More generally, individuals also have an indirect stake in real estate asset prices through pension funds and other investments.

Property prices can therefore be both a source of strength and a source of weakness in the economy both nationally and internationally. For example, over recent years rising house prices, together with low interest rates have encouraged people in many countries to take out larger mortgages and to re-mortgage their homes with the latter in particular contributing to increased consumer spending and economic growth. But long-term observers will point to the long history of asset price bubbles from the Dutch Tulip boom of the 1620s and 1630s to the dot com bubble of the late 1990s as an illustration of the potentially catastrophic problems which can arise if the availability of easy credit gets out-of-hand. Thus there is a clear and strong interdependence between real estate cycles, economic performance and the stability of financial systems. This is reflected in a growing consensus for the need for better statistics. It is therefore relevant to ask two questions:

- Why has such limited progress been made in satisfying user needs?
- What needs to be done to rectify the situation?

Why has such limited progress been made in satisfying user needs and what can be done to address the situation?

Long-time observers would probably point to three reasons why user needs are not being properly met:

- The practical problems with index construction as a result of issues relating to data sources and the problems that arise in trying to overcome these. Most house price indices rely on data which is generated from the administrative systems which are associated with the purchase of property. The alternative of collecting data specifically for statistical purposes is both expensive and challenging. But the use of administrative data poses a number of issues relating to its relevance and reliability. For instance: coverage (e.g. type of house, whether old or new, transaction-type {mortgage or cash purchase} and geographical); the price captured (e.g. initial offer price, the lenders valuation or the final transaction price); data quality and reliability and whether it is subject to revision. Different systems generate different data. Also

administrative systems may not have the detailed information required for effective mix-adjustment⁹ (see final bullet point below).

- One price index cannot meet the diverse user need. This is further illustrated in the discussion later in the paper on conceptual frameworks. For instance, indices used for deflation should be current weighted while if the focus is purely on price changes indices should be base weighted. Moreover each use will require a specific pattern of base weighting or stock weighting. For directly estimating net capital formation, for instance, only new houses should be included while estimating the effect of price changes on capital stocks requires us to look at all transactions.
- Methodological issues. The construction of real estate price indices and house price indices in particular from transactions, present a number of methodological challenges over and above the data observation issues already raised. The basic issue is that the transactions observed in each period are different. Creating an index requires that the transactions for each period are classified into groups sufficiently homogenous that the unit values can be treated as prices but without too many empty cells. In the housing market the problems are exaggerated by the low volumes of sales for certain house types in particular geographical areas which then presents an issue relating to empty cells and the prospect of price imputation. Hedonic regression techniques seem to present the most practical solution but there can be reliability issues if, for example, there is not enough detailed information on house characteristics. For instance, most house price indices do not allow for internal quality improvements such as better bathrooms and kitchens. Insofar as this is true most published indices will over exaggerate the increase in quality-adjusted prices. Once the cells are decided they become, in effect, elementary indices, and determine the limits of any reweighting and therefore in effect any possibilities for mix adjustment.

The common link between these is the need for resources to make further progress on what has up until now been a relatively neglected sector of statistics. But resources are an issue for any area of statistics- there is a need for a more systematic approach to prioritisation.

It can also be argued that progress has been furthered hampered by:

- The lack of a clear institutional framework for taking things forward at an international level, also reflected in part by lack of clarity of where responsibilities lie due again to the diverse community of potential users. This has meant that at the international level there has been limited opportunity for users to articulate their needs. But the situation has improved over recent years firstly with the Joint IMF and BIS Real Estate Indicators & Financial Stability Conference in Washington in October 2003, which very much focused on how to meet the data needs of financial institutions and, secondly, the further follow-up discussions which have taken place between the relevant

⁹ An improved House Price Index-update on developments. Fenwick and Duff, UK Office for National Statistics, Economic Trends, October 2002.

UN Agencies which have led to the current a more broad-based conference organised by the OECD. In addition, over recent years Eurostat has been increasingly pro-active and has acted as a focal point within Europe.

- The lack of a conceptual framework which underpins many other important price indices such as the consumer price index. This has made the translation of users needs into a statistical design even more challenging than would otherwise have been the case. It has also hindered the prioritisation of work because of a lack of a systematic process for identifying data gaps.

It is the latter bullet point which is addressed in the remainder of this paper and which essentially addresses what first needs to be done to rectify the situation. It is an essential first step in the way forward to better meet user needs.

User requirements and conceptual frameworks

A systematic analysis of user requirements for statistics on house prices may take the form of a series of questions reflecting the different reasons why users may want information on house prices. For instance, whether an index of house prices is to be used as one of a suite of general macroeconomic indicators, as an input into the measurement of consumer price inflation, as an element in the calculation of household wealth or as a direct input into an analysis of lenders' exposure. Such an analysis can then be transformed into a statistical user requirement and an associated conceptual framework by expressing the needs in statistical terms and identifying the common linkages and corresponding relationships at a micro and macro level. A first attempt at the preliminary stages of such an exercise for house price statistics is given in diagram A. It is produced for illustrative purposes and may usefully be expanded to cover a number of additional dimensions. It is not a definitive view based on current consensus nor does provide a resolution of all the issues- its primary aim is to identify the various concerns in a systematic way. As such it can raise more questions than it answers but does illustrate the basic challenges and the need for a more structured approach to the development of the statistics.

It can be seen that user needs can have a significant impact on decisions relating to the conceptual basis of an index and the associated statistical requirement. This can be considered in the context of the analytical questions that need to be addressed. This can be illustrated by way of example:

- The primary focus of governments and city analysts looking at inflationary pressures and those with a direct investment in real estate may be the cyclical nature of prices and the ability of real estate prices to lead to destabilising booms and slumps in the economy as a whole. This is particularly so in developed economies where real estate asset prices can account for a significant proportion of GDP. For this purpose specialists will be looking to a variety of indicators:
 - Indices of the volume and price of current real estate transactions. as a general macro-economic indicator for modelling the economic cycle and predicting subsequent peaks and troughs. For deriving the volume

index we require a current weighted deflator that includes the effects of changes in the mix of transactions while for the pure price index we need a base weighted index that excludes these effects. Analysts looking at the inflationary pressures of real estate price rises in comparison to other price rises may be interested in including in a consumer prices index the inflationary costs of owner-occupier housing costs by means of a house price index based on the net acquisition cost basis but excluding land .

- An index of the current value of the real estate portfolio against which outstanding mortgages are secured. This requires an index of changes in the price of the properties for which mortgages were issued, weighted by the amounts loaned for each type of property at the time at which they were issued.

For both these measures the value of the land underlying the buildings is as important as the value of the buildings themselves.

- A primary focus of employers and trade unions when negotiating wage settlements will be the effects of price changes on the standard of living of workers. For this purpose users will be looking to a consumer price index that includes the cost of keeping a roof over their heads whether this requires mortgage interest payments and repairs costs or rental payments:
 - In the UK mortgage interest payments are calculated using historical time series of house prices to estimate the mortgage outlay at time of purchase and the subsequent repayment history. For this purpose a transaction weighted mix-adjusted house price index is used. In an ideal world re-financing should be excluded.
 - For the repairs element depreciation is used in the UK as a proxy. A smoothed house price index is used for this but a stock-weighted index may be considered more appropriate. In addition there is the issue of land where it is often argued that in most circumstances land is an investment which appreciates and that its inclusion in a depreciation calculation is inappropriate¹⁰.
- The primary focus of a national accountant seeking an appropriate deflator for national accounts will be different. Real estate appears in the National Accounts in several ways;
 - the imputed rental value received by owner occupiers for buildings, as opposed to land, is part of household final consumption,
 - the capital formation in buildings, again as opposed to land, is part of gross fixed capital formation, depreciation, and the measurement of the stock of fixed capital,

¹⁰ There are other more general issues, which are not addressed here, to do with the measurement of depreciation and its inclusion in a consumer price index.

- and land values are an important part element of the National stock of wealth.

In each case the derivation of volumes from values or vice versa requires current weighted price indices of respectively , rent with the land element removed weighted by the stock of different types of owner occupied housing;; new house purchases weighted by the transactions in new houses, and of the whole housing stock including land weighted by the housing stock

It can be seen that user needs will vary and that in some instances more than one measure of house price or real estate inflation may be required. It can also be seen that coherence between different measure and with other economic statistics is important and that achieving this will be especially difficult as statisticians are unlikely to have an ideal set of price indicators available to them. In the UK for instance National Accountants must choose between an index of new house prices that includes land values and an index of the output of the new house output of the construction industry that excludes changes in operating surplus.

The analysis in diagram A can also be simplified to provide a basic conceptual framework of fundamental principles. This is attempted in diagram B.

Diagram B: Use Matrix

	Transactions		Stock	
	Volume	Value (£s)	Volume	Value(£s)
Mix Adjusted	Market monitoring, price of a typical house sold?	Macro-economic Indicator. Deflators for National Accounts.	Market monitoring, price of a house typical of the stock?	Housing stock deflator. Macro-economic indicator.
<u>Not</u> mix Adjusted				. Lender exposure.

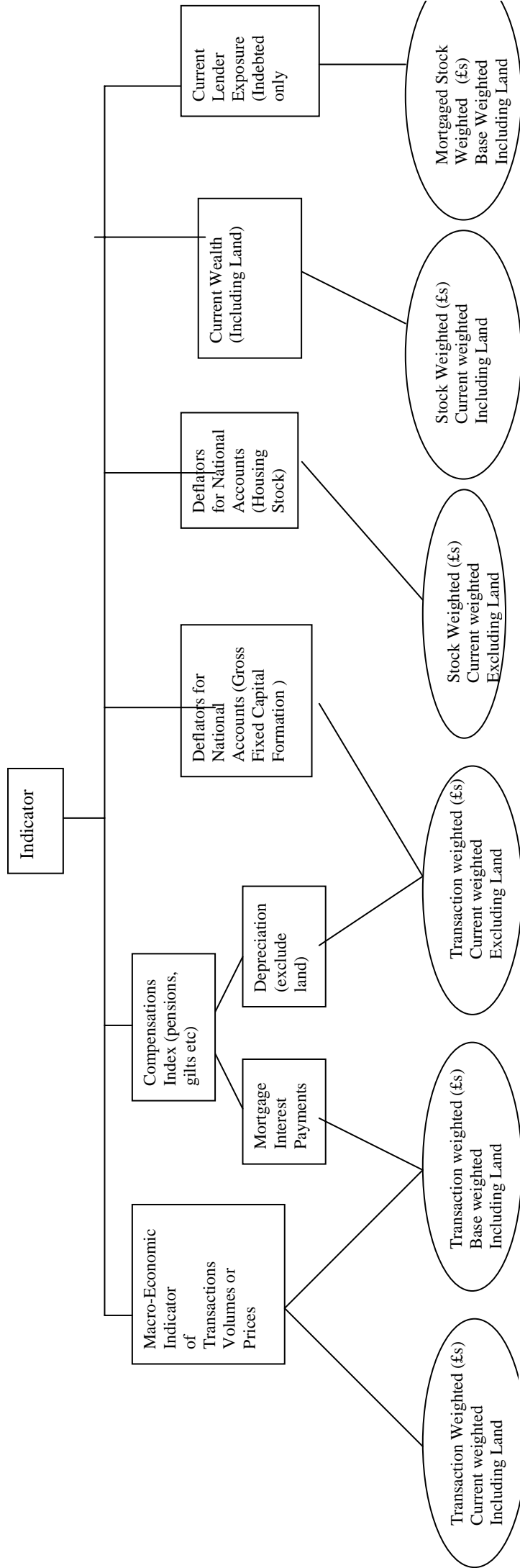
It can be noted that the articulation in conceptual and statistical terms of user needs is not a trivial exercise. A key element for the successful delivery of statistics that are fit for purpose is to define precisely user requirements. This requires absolute clarity about what the statistic, in this case a house price index, is aiming to measure- a clarity that may not necessarily be forthcoming from users. Judgements will also need

to be made¹¹. The exercise is a challenging one in much the same way as with similar exercises for consumer price indices¹².

¹¹ For example, whilst the correct conceptual basis and statistical definition of a house price index for the purposes of deflating national accounts might be clear and uncontentious (because the framework for national accounts is universally accepted and relatively well-defined) it might be considered less clear for a macro-economic indicator. In the latter context, a transactions-weighted acquisition index might be appropriate for tracking inflationary trends in the economy but there are differing views about whether such an index should be restricted to new houses only and whether the index should include the price of land- issues which, in part, reflect the alternative formulations used in constructing consumer price indices. Also there is a strong argument, in the context of financial stability indicators, for the separate identification of re-finances of mortgages as past experience indicates that the latter can surge to significant levels when interest rates drop.

¹² As with consumer price indices and the debate about cost-of-living indices (COLIs) and non-COLIs, the choices are not necessarily either/or. Different formulations should not necessarily be viewed as competing with one another. For instance, an alternative specification of a house price index for macroeconomic purposes might be one measuring the change in the value of the total housing stock. Such an indicator might be considered useful because owners get a “feel happy” factor from increasing house values and an opportunity to free up equity. Both could fuel inflation. Such an index would be stock-weighted, cover all houses and include the price of land. National statistical offices may decide to construct it as an additional rather than sole measure. Similar debates arise in connection with other uses of a house price index such as in the treatment of owner occupier housing costs in a compensation index.

Diagram A: Derivation of the Primary House Price Indices (illustrative only)



Notes

1. For depreciation, National Accounts deflators (to deflate the GFCF housing stock value), and household consumption, land should be excluded from the acquisition value.
2. A calculation of mortgage interest payments would require the use of a number of historical indices to estimate mortgage outlay at time of purchase and should include separate information on re-financing.
3. Only basic house price indices are covered in this table, not derivatives used in subsequent calculations. For example, the UK Retail Prices Index's treatment of owner-occupier housing costs, which is based on its historical roots in a compensation index, is essentially based on a mixture of the payments and user cost approaches although the RPI itself can be considered an acquisitions index. Under the *acquisition* approach the total value of all goods and services delivered during a given period, whether or not they were wholly paid for during the period, is taken into account. With *payments*, the total payments made for goods and services during a given period, whether or not they were delivered, is taken into account. Finally, *user cost (or consumption)* considers the total value of all goods and services consumed during a given period. The distinction between the three approaches is particularly important for purchases financed by some form of credit, notably houses, which are acquired at a certain point of time, used over a considerable number of years, and paid for, at least partly, some time after they were acquired, possibly in a series of instalments. The RPI mortgage interest payments calculation uses a mix/quality adjusted transaction-weighted index to provide an historical profile of past houses purchases.
4. Depreciation can be thought of as the costs of major repairs and renovations, with minor maintenance and decorating costs covered elsewhere in the index. In the UK it is priced using a smoothed house price index.
5. The treatment of mortgage payments in a compensation index depends on what the owner-occupier is being compensated for. For example, whether the historical calculation to estimate current levels of mortgage debt should include the change in profile of houses acquired over the years.
6. Clearly, in reality in some instances the primary calculation is unlikely to involve a single house price index. For instance, the calculation of wealth where separate price indices may be used to up-rate the prices of separate sectors of the housing stock (e.g. apartments in Central London, detached houses in rural areas of Scotland) for subsequent summation to produce a total value for the UK.

A number of observations can be made even on the basis of such a limited exercise. For example¹³:

- weighting schemes are an important conceptual issue that impact on the use to which an index is put. The construction of an index using expenditure weights based on housing stock provides a measure of the increase in the average value of the housing stock and is therefore a relevant measure for estimating wealth and but not lender exposure. In contrast, a quality-adjusted index restricted to “new” houses and expenditure weighted according to transactions may be more appropriate for inclusion in a consumer price index that is being constructed as a general economic indicator for a house price index being used as a stand alone indicator.
- true quality adjustment¹⁴ to allow for improvements in kitchens, bathrooms, etc. is also an important conceptual issue. It is relevant for inclusion in a transaction-based “Laspyres-type” CPI constructed as a macro-economic indicator(as stated above) but has no place in the calculation of wealth, which like a house stock deflator should be weighted by stock but unlike the latter should not be quality adjusted.

Data sources and gap analysis

The next stage is to compare this framework with the currently available statistics and data sources to identify:

- major gaps in data provision;
- options for filling these gaps cost effectively from readily available sources;
- data coherence issues;
- the scope for further data integration and the need for new data sources.

This approach is analogous in part to the stage of production and stage of processing approaches that have been used as analytical frameworks for determining the development of consumer and producer price indices¹⁵.

At their most simple the frameworks described above can be mapped against a house price timeline¹⁶.

Such an analysis provides basic metadata. It also indicates the compromises made in using one all-purpose house price index and the corresponding data gaps. For example, that the main official house price index published in the United Kingdom by

¹³ The issues become less trivial and more complex the greater the depth of analysis undertaken for the user requirement and associated conceptual framework.

¹⁴ Specifically to allow for improvements such as central heating and double glazing. It does not cover changes in the mix of different house-types such as the relative numbers of four-bedroom detached-properties to one-bedroom apartments- any form of weighting implies mix adjustment to get a unit value.

¹⁵ Wider Inflation Measures: the current state of the art and outstanding issues. Fenwick & Wall, Conference of the International Association for Official Statistics, 1998.

¹⁶ A Comparison of UK Residential House Price Indices. Robert Wood, IMF/IBS Conference on Real Estate Indicators and Financial Stability, 2003.

the former Office of the Deputy Prime Minister (ODPM)¹⁷ uses transaction expenditure weights and is appropriate for inclusion in, for example, a CPI used for indexation of benefits but does not fully suit the needs of users who want to calculate “wealth” where stock rather than transaction (expenditure) weights are most appropriate. The latter may be addressed either by a re-weighting of the official index or by reference to one of the many indices published by lenders. However, the latter suffer from limited coverage. Thus re-weighting of the official index provides a cost effective solution to filling this particular data gap.

A more detailed gap analysis may point to solutions involving synthetic estimates, based on the integration of data from different sources. For example, it can be noted that the ODPM House Price Index referred to above has the advantages of being timely and not subject to revision but has the drawback that it excludes cash purchases. The systematic approach being championed in this paper might conclude that it may be possible to supplement the official index with information on cash purchases from the UK Land Registry. The latter is less up-to-date due to the time-lag in registering transactions in the official registry but time series modelling may be able to address this misalignment. Some preliminary work was done on this in the UK but no firm conclusions reached, although it was clear that potential developments in this direction were for the longer-term. The Land Registry data also provides the opportunity for constructing a repeat sales index by tracking the average growth in house prices using multiple transactions associated with the same home in an attempt to hold "quality" constant.

Coherence and international comparability

The above strategic approach to the construction of house price indices not only provides a structured method for identifying data gaps but also a formal mechanism for obtaining greater coherence in national statistical systems and greater international harmonisation. Greater coherence of national statistical systems will be achieved within the context of a coherent family of house price indices, within real estate prices more generally and also within the broader family of price indices constructed as macroeconomic indicators and as part of the process of constructing other official statistics such as national accounts. Greater international harmonisation will be assisted from the availability of better metadata and from an emerging consensus of the statistical requirements of users and how these can best be addressed. Both aims will benefit from the identification and resolution of data gaps and differences, and an increased conceptual and technical understanding together with a better analytical capability.

Conclusions

The development of a conceptual framework for statistics on real estate prices based on a systematic analysis of user requirements and a corresponding gap analysis will generate standardised metadata and will greatly assist progress in the construction of a more complete and coherent family of statistics on real estate prices of increased relevance to users and based on agreed international standards. It is also observed that it is important that this is done in an international context and that it builds on the

¹⁷ Now the Office for Communities and Local Government.

ground work already done by international agencies in conjunction with users and producers. Progress requires a long-term commitment from all the main players based on an agreed set of objectives.

Ultimately, the main performance measure is whether appropriate information structures are out in place and credible and standardised measures of real estate prices are routinely published. This will be facilitated by:

- Active participation by users and producers in the development of these indicators under the auspices of the relevant international agencies.
- The compilation of guidelines on conceptual issues and practical construction issues.

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