

ECB PROGRESS TOWARDS A EUROPEAN COMMERCIAL PROPERTY PRICE INDEX¹

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1. Introduction

Commercial property price indicators (CPPIs) are high on the list of EU policy-makers' data needs. Additional impetus for developing statistics on CPPIs has come from the G20. In particular, the need for CPPIs is one of the 20 recommendations listed by the IMF and Financial Stability Board in its Report to the G20 entitled "The Financial Crisis and Information Gaps". Their recommendation 19 calls for the inclusion of "real estate prices (residential and commercial) in the Principal Global Indicators (PGI) website". The PGI website gives, at a glance, an overview of the main statistical indicators which policy-makers may want to use to assess the cyclical situation of the world economy. Recommendation 19 also calls for measurement standards to be developed under the aegis of the Inter-Secretariat Working Group on Price Statistics (IWGPS). Indicators of the price developments of commercial real estate are important in the euro area context to multiple constituencies ranging from economic analysis, monetary policy, financial stability to prudential supervision.

In line with its mandate to fill the gaps in the official statistics needed by the ESCB, the ECBs Working Group on General Economic Statistics (WGGES) in late 2009 started to investigate data sources for CPPIs. The WGGES is now testing experimental quarterly indicator for CPPIs for the EU, the euro area and each of the following countries²: Austria, Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Poland, Portugal, Spain, Sweden and the UK. In parallel, the ECB is also involved in the European Statistical System work for statistics on CPPIs. This paper summarises the work that has been undertaken and presents initial, tentative results of an indicator made up of data supplied by a commercial data provider and enhanced by the ESCB. This is work in progress with initial results expected to be ready for publication as "experimental statistics" at the end of 2013. While that will be an important

¹ This paper has been prepared for the 13th Ottawa Group Meeting to be held from 1 to 3 May 2013 in Copenhagen. The views expressed in this paper are those of the author and do not necessarily reflect the views of the European Central Bank.

² Data are also available for Switzerland and Norway.

milestone the data, as indicated by their description as experimental, are not perfect and further development work is both necessary and planned.

The next section describes the proposed uses of the data. Section 3 then details the development process of the experimental indices. Section 4 describes the work going on in parallel by the official statistical community with the aim that in the longer-term they supply official data on this topic. Section 5 explains the main characteristics of the Investment Property Databank data which are predominantly used in the calculations. Section 6 presents publication plans while further research and potential enhancements to the data set which are planned to be carried out are highlighted in Section 7. Section 8 concludes.

2. Usage of Commercial Property Indicators

Indicators measuring the price development of commercial real estate are important in the euro area context for economic analysis, monetary policy, financial stability and prudential supervision. All the following applications could be envisaged:

- Financial stability³ (incl. needs of the ESRB), i.e. CPPIs as financial soundness indicator,
- Mortgage lenders' exposure to risk and risk management by mortgage providers,
- Macro-economic indicator of inflation pressure,
- Macro-economic assessment (for the property market sector),
- In conjunctural analysis developments on the commercial property market and its connection to the construction sector (indicator of economic activity),
- Economic analysis (relating property prices to fundamentals, detection of bubbles, etc.),
- National accounts deflation and a measure of non-financial corporations' sector wealth.

Similar to the Residential Property Price Indicators it is clearly recognised that one universal index cannot serve equally well all data users. The intention therefore is to develop for ESCB purposes a headline CPPI which would satisfactorily serve most of the above purposes as well as having the building blocks necessary to allow limited variants of the index to be used for more specific analytical purposes.

The ECB's requirement is thus ideally, a quarterly constant quality euro area indicator of commercial property prices preferably based on transactions prices. The CPPI should cover all types of commercial property ideally disaggregated into four categories, i.e. office buildings, retail, industrial and residential property⁴ owned or developed for commercial purposes. As regards the geographical coverage, the CPPI should be representative of commercial property in the entire country. It would be ideal to have access to

³ See e.g. ECB (2007), "Commercial property investment and financial stability", Financial Stability Review.

⁴ Residential property included in commercial property in this context "is owned or developed for commercial purposes, for example by a professional property company or an institutional investor". Governmental development, for instance for social housing, is not commercial in the sense of purely seeking profit and hence not included. This classification is used for practical convenience and does not imply a segmentation of the residential markets according to the institutional sector of the proprietor. For more information see 'Commercial property markets – financial stability risks, recent developments and EU Banks' exposures' (ECB 2012).

microdata in order to define geographical areas tailor-made for any particular analysis. However, given the currently limited availability of appropriate source data it is likely that these breakdowns will have to be long-term aspirations. The CPPI as defined here as ideal is conceptually close to the residential property price indices collected and compiled by the ESCB, BIS and Eurostat.

3. Development stages

This section details the milestones along the development path for the data.

3.1 Results of stocktaking exercise

The WGGES first examined the subject of CPPIs in May 2010⁵ based on a stocktaking exercise aimed at examining what data were available in each of the EU Member States. At that juncture the results were that 25 NCBs identified information describing the national commercial property market development (price and stock). In France⁶ no data for stock and price developments for commercial property could be identified, but the NCB highlighted that some information was available for new buildings (agreements and starts). At that time Greece was in the process of setting up a mechanism for the collection of data on commercial property through the banking system, but no data were yet available⁷. Also no other data sources could be identified. In Hungary data on second hand owner-occupied property in the private sector are available, but it is not clear if this property is for commercial purpose.

Sources

For a large number of countries more than one data source existed. The main sources for the commercial property data identified are the large real estate companies and the Investment Property Databank (IPD). The Spanish NCB compiles its own commercial property data based on appraisal information. Statistics on commercial property are produced by four national official sources (DK, FI, SI and LT⁸). Further sources are commercial banks (CY, DE, GR and MT) and notaries (EE and RO), research institutes and government agencies (IT) or universities (AT).

Periodicity

Monthly statistics were identified for seven countries (CY, EE, LT, LV, MT, RO and UK). Quarterly data for seventeen countries (AT, BE, DE, ES, FI, IE, LU, NL, SI, SK, DK, EE, LT, LV, PL, SE and UK), semi-annual data from two countries (DE and CZ) and annual information from twelve countries (BE, DE, FI, IE, IT, LU, NL, PT, DK, LT, SE and UK).

Length of the time series

⁶ Subsequently IPD data were used as an alternative.

⁷ The first raw data have now been collected and are expected to be published for the first time in Q3 2013.

⁸ In the case of LT, official sources only cover data on non-residential buildings completed. Data covering offer prices is released by commercial sources – real estate agencies.

The length of the time series differs across countries and inside a country for different sources and series.

Timeliness

The timeliness of the available data differs considerably. The monthly data are available from a few days after the reference period in the case of interactive on-line databases up to one month after the end of the reference period.

In the last two years CPPIs were developed by Banca d'Italia and the Polish NCB; the Deutsche Bundesbank additionally found alternative data with a further enhancement due in the near future.

3.2 Analysis of the stocktaking exercise

While this stocktaking exercise appeared to show a relatively good coverage of data, closer investigation revealed that the data sources were extremely heterogeneous with data collected at different times in the purchase process or under extremely different valuation or appraisal regimes or pertaining to other related phenomenon rather than prices per se. Furthermore metadata should be made available when required.

These included:

- Rents/ rental values (used in 15 data sources referring to AT, BE,CY, DE, FI, IE, LU, PT, SK, CZ LT, LV, PL, SE and UK);
- total return, defined as annual compounded rate of monthly capital appreciation plus monthly net income received expressed as a percentage of monthly capital employed (used in 10 data sources, referring to BE, CY, DE, FI, IE, NL, PT, EE, SE and UK);
- capital value (growth) defined as annual compounded increase in monthly values, expressed as a percentage of the capital employed each month (used in eight data sources, referring to BE, FI, IE, NL, PT, LV, SE and UK);
- performance of portfolio, defined as income receivable as a percentage of the capital value at the same date (used in four data sources, referring to BE, FI, IE and PT);
- other concepts which include the appraisal valuation (only price data for ES), sale prices (IT and SI), or derivatives (UK).

After discussion with ECB end-users it became apparent that, ideally, for most analytical purposes, users would prefer an index of commercial real estate prices representing movements in transaction prices, which is consistent with what is required for residential property prices. In reality this may be more difficult to achieve for commercial property which tends to be infrequently traded in particular in small countries or times of stress, with each property highly heterogeneous as the market registers major reductions in liquidity. Nevertheless, the WGGES supports any additional efforts on the side of NCBs and other official sources to aim at constructing transaction based CPPIs by exploring and searching further for possible existing sources of data on sale prices of commercial property. Valuation based indicators remain a second best option.

The countries' replies to the stock-taking conducted in May 2010 indicated that the majority of the price data available for commercial property are largely valuation-based indices and the sources are predominantly private organisations. These indices are strictly speaking designed for performance measurement purposes rather than for measuring price changes over time. The indices thus often have the following issues:

- valuation error: the index could be calculated for a non-representative sample of the commercial property (sample bias);
- smoothing issue: the index value is based on valuations and may be subject to bias, because there is a tendency for appraisers to use historical comparable or past transaction prices when forming an opinion of the value of a property; a particular value might therefore be too 'tied' to its previous valuation in a rapidly moving market;
- the underlying sample can have a non-continuous coverage although this can be controlled for (see section 5.1);
- for many countries only relatively short histories of index data are available.

3.3 Two-step approach

Notwithstanding these conceptual issues, the WGGES agreed in February 2011 to explore a two-step approach for data supply on CPPIs:

While bridging the gap until the official statistics community will provide data with a higher degree of comparability, due to the current non-availability of relevant (and sufficiently harmonised) national data, the WGGES agreed that the ECB should explore the data set made available commercially from the Investment Property Databank as a first step (see next section for a full discussion of this data). The main target was agreed to be a quarterly CPPI for the euro area and EU (without full national breakdown), using appraisals or valuation prices to be provided by the IPD. To improve this "short-term" dataset and to fill national gaps, the WGGES agreed, that whenever better national data than IPD exists, and these are suitable to be included in the ESCB compilation process, the WGGES would send those data to the ECB in order to replace or complement the IPD data. So far Denmark's Nationalbank, the Deutsche Bundesbank and the Banca d'Italia have supplied alternative source data to be used in the compilation process; the Bank of Greece and Narodowy Bank Polski indicated they will submit data in the course of 2013. The so-called "interim approach" is discussed in more detail in Sections 5-7.

The WGGES furthermore agreed that in the longer-term the ultimate goal was a regular compilation of (comparable) national CPPIs (preferably transaction based) by individual euro area countries and their aggregation to European aggregates. This work might be undertaken by either the European Statistical System or the ESCB and be similar to the work already done in respect to residential property price indicators. As the practical development of international comparable CPPIs is a relatively new subject,

international price indices manuals presently available do not give any guidance on this issue⁹ and thus some necessary methodological work needs to be carried out. The long-term approach is discussed in more detail in the following section.

4. The long-term approach

As explained in the last section, for the WGGES the long-term approach is that the European Statistical System compiles Commercial Property Price indicators. In order to facilitate this, the ECB co-organised and hosted an international conference on Commercial Property Prices on 10-11 May 2012. It was the first conference on this topic bringing together representatives of all the stakeholder communities; the official conference summary is on the ECB website¹⁰. The key messages from the conference were:

- Information on commercial property prices is generally available from non-official data providers. The amount of data available differs across regions and cities: the more important an area is for investors in commercial property, the more data are usually available. The reliability and comparability of the data needs to be further investigated, and better metadata provided. It will be necessary to be pragmatic as to what can be achieved in both the short and longer term and to guide the user community accordingly. With this in mind a quarterly price indicator (for trend movements and turning points) released around 90 days after the end of the quarter was identified as a suitable development target.
- In terms of the compilation of indicators, statistical work is likely to have to be innovative since the indicator may not be fully based on transaction-price data. A partnership between official and commercial data providers in this field is seen as mutually beneficial. With this in mind, some of the commercial data providers expressed a willingness to allow the official statisticians access to their detailed datasets. Reconciling the needs of national accounts and commercial property price indices as economic indicators was identified as being potentially challenging.
- There was a call for the definition of harmonised and comparable standards.
- It is likely that a multi-source approach will be required for the development of a headline indicator. Transaction-based data are likely to be the best theoretical approach, but cannot be the sole data source as in times of stress market liquidity tends to be too low. Valuation data, perhaps accompanied by further indicators, are therefore likely to be key inputs. The methodological implications of the multi-source approach will also have to be assessed. Examples of supplementary information include data such as vacancy rates, financing information and rents.
- Supporting metadata should also be produced to enable users to understand the headline data.

⁹ The Residential Property Price Indices Handbook being developed by Eurostat does not refer to commercial property price indices.

¹⁰ See http://www.ecb.europa.eu/events/conferences/html/20120511_cpqi.en.html.

- Given the above conclusions from the conference, Eurostat, under the aegis of the Inter-Secretariat Working Group on Price Statistics, has already initiated a process aimed at putting together a handbook for compilers of commercial property price indices. Although it still needs to fully cover theoretical aspects, it is expected to serve as a pragmatic, operational “cookbook”. The authors of the handbook will need to consult with the commercial data providers to ensure that the latter’s request for a harmonisation process is covered in a mutually beneficial way. The handbook is expected to become available by end-2014.

The tender process is now complete and Eurostat have offered a contract to a consortium which has started work in January 2013. The ECB is likely to be involved in any subsequent work in this domain.

From the ESCB point of view the conference was doubly useful. First, it confirmed that the WGGES investigations were accurate – no harmonised data are available; the subject needs innovative solutions and that it is necessary to be pragmatic about the methodology as, while designing a perfect indicator is possible, the approach would have a high risk of failing due to the difficulty of collecting the data. Second, the official statisticians fully understood the user requirements, could see that they were urgent and committed to do work on the topic as a matter of urgency. Notwithstanding this, assuming the handbook is ready on time, at best a European regulation on this topic is likely to take a few years to be drafted and enacted with a further couple of years before data are likely to be available. As such, the WGGES work on this topic will remain relevant in the medium term.

5. The interim approach: experimental statistics based on the IPD data set

As mentioned in the section 4, the Investment Property Databank (IPD) is a commercial information business providing market data and performance analysis for the owners, investors, managers and occupiers of real estate. Since 2011 IPD worked closely with the ECB to enhance its data set in order to supply quarterly commercial property price indices for all directly held commercial real estate assets (all property) and for the four main market sectors – retail, office, industrial and residential (i.e. those residential properties that are let to tenants by professional landlords) - wherever they are held in professionally managed portfolios. The work, while remaining at an experimental stage, allows the production of two separate IPD data-sets: a) data calculated purely on the basis of professional valuations and b) a combination of the valuation data with additional information on actual transactions.

The IPD dataset collates asset level data from a wide variety of professional investors in real estate. It excludes any data from properties that are indirectly held through investment vehicles, bonds, cash, derivative and Real Estate Investment Trust share holdings. The IPD national databases are based on IPD outputs, holding records of properties owned by investors and managed by portfolio managers.

The IPD datasets currently available to the ECB contain national quarterly frequency price series for Austria, Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and UK albeit some of these are interpolated.

5.1 Compilation methodology

Two different methodologies have been distinguished to estimate commercial property prices at a national level by IPD: a valuation and, where the required data are available, a transaction linked method. The valuation data is based on open market valuations of real buildings produced by property professionals. The second data set uses the valuation data but supplements and enhances these with any available data on transactions in the market in the quarter in question. The data are presented in euro (converted using quarter average exchange rates where relevant). In both cases originally the data reflected properties under management in portfolios at the time of reporting. However, due to divestment or new portfolios joining the sample this could lead to structural breaks. To counteract this issue the data are now produced so as to maintain a constant coverage for five consecutive quarters. This allows year to year percentage change series to be calculated which have the same underlying assets included in the calculation and thus ensuring that movements in the index in the analysis period are due to price movements rather than asset level shifts.

5.1.1 The Valuation Based Index

Ideally, the market valuation of a property corresponds to the price that would be agreed between a willing buyer and a willing seller within a reasonable negotiating period net of purchasers' costs e.g. legal fees, tax payments. This is also the definition that IPD request from their reporting agents. Nonetheless, in practice the valuation price may diverge from the price that would be settled if a transaction were to take place due the cyclical conditions of demand in the market. The calculation of valuations starts from very detailed asset level prices, these are then aggregated up to sector (retail property, industrial, etc.) and national aggregates.

IPD provides the following valuation-based CPP headline indicators:

- **Total return** is calculated as the change in capital value, less any capital expenditure incurred, plus net income, expressed as a percentage of capital employed over the period concerned. *Total value* is then arrived at by estimating the value of future income (i.e. using discounted cash flows¹¹ for the rental income).
- **Income return** is calculated as net income expressed as a percentage of capital employed over the period concerned.

Capital growth is calculated as the change in capital value, less any capital expenditure incurred, expressed as a percentage of capital employed over the period concerned.

¹¹ A valid concern in this methodology is that the future cash flow projections and yields used for discounting are not harmonised across markets and are instead chosen by individual valuers. Nonetheless, within a market segment it is not believed that the approach taken within a particular country would deviate significantly.

Table 1: Computation Formulae

Total return

With respect to a single month total return is defined as:

$$TR_t = \frac{(CV_t - CV_{(t-1)} - CExp_t + CRpt_t + NI_t)}{(CV_{(t-1)} + CExp_t)} * 100$$

Income return

$$INCR_t = \frac{(NI_t)}{(CV_{(t-1)} + CExp_t)} * 100$$

Capital growth

$$CVG_t = \frac{(CV_t - CV_{(t-1)} - CExp_t + CRpt_t)}{(CV_{(t-1)} + CExp_t)} * 100$$

Where:

TR_t is the total return in month t

CV_t is the capital value at the end of month t

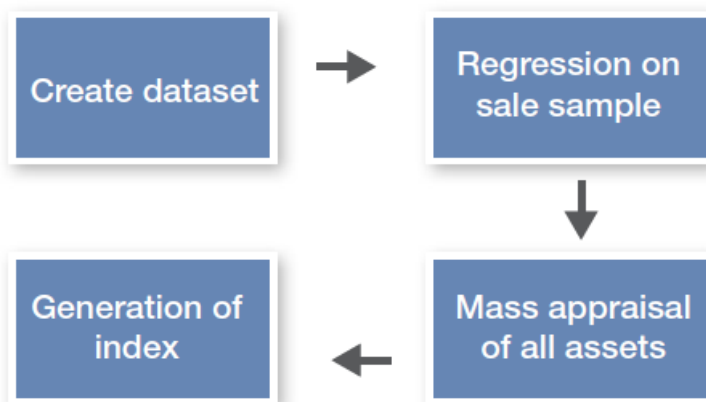
CExp_t is the capital expenditure (includes purchases & developments) in month t

CRpt_t is the capital receipts (includes sales) in month t

NI_t is the day-dated rent receivable during month t, net of property management costs, ground rent and other irrecoverable expenditure

5.1.2 The Transaction Linked Index

IPD, at the behest of the ECB, have also been developing a model-based hybrid index which incorporates transaction information with the standard IPD valuation data described in the previous paragraphs. The aim is to get closer to a transaction based index given the specificities of the commercial property market such as heterogeneous properties and infrequent transactions. There are four fundamental stages in the methodology adopted in constructing Transaction Linked Indices:



- **I) Creation of the dataset**

The underlying database used to create Transaction Linked Indices is the same as that for IPD’s standard Valuation Based Indices. However, the Transaction Linked Indices use price information from sales recorded in the database in addition to valuations from this same database. Some filtering is performed to ensure the model is not distorted by extreme cases and to make available as long as possible history. All available European countries are modelled together using data specified in euro and then for non-euro area countries converted to the local currency. The UK is an exception as it existed prior to development of Pan-European Transaction Linked Indices and so has an independent model.

- **II) Regression on sale sample**

Sale samples are first defined. For each quarter’s model, sales from the preceding six months are identified. This reflects the fact that, owing to the low liquidity of property investments in many markets particularly in times of market turmoil, there are insufficient sales in just one quarter for stable models to be estimated and usable indices to be produced. A reference set of valuations for each sale sample is defined using valuations two quarters prior to the quarter being analysed. In the case of biannually and annually valued countries (which is the case for many European countries), the valuations used are linearly interpolated between actual valuations.

Once the relevant sales and their reference valuations are defined, the natural log of the sale price and the capital value, which is the reference value, in each case are computed. Meanwhile, dummy variables are created to identify the main property type and the country of each asset in the dataset. Dummy variables are defined to strike a balance between disaggregation and representation, such that sales for each category are observed in the majority of periods. France is set as the ‘base case’ of the model because of good data coverage and the large size of the market.

An Ordinary Least Squares (OLS) regression is then run for every quarter in the time period. The regression model has the following form:

$$\ln P = \beta_0 + \beta_1 \ln A + \sum \delta_j C_{i,j} + \sum \lambda_k S_{i,k} + \varepsilon$$

- where
- P equals the sale price in Euros
 - A is the appraised capital value for two quarters prior to sale in euros
 - C_j are 0/1 dummy variables for j countries
 - S_k are 0/1 dummy variables for k sectors of the real estate market
 - ε is a random error term

- **(III) Mass appraisal of all assets**

The coefficients from regressions are used to predict sale prices for assets that were not traded. Two predictions are made for properties held in each quarter. First, a start price is predicted using coefficients from the regression on the sale sample for the preceding period. Second, an end price is predicted from output for the regression on the sale sample for the current period.

So, for Q4, predicted start prices are derived from the regression on Q2-Q3 sales and predicted end prices are derived using the regression on Q3-Q4 sales. These predicted prices are in log form rather than cash terms and it is the latter that is required for generating indices. The predicted log prices are transformed in the following manner to correct for bias:

$$\hat{P} = \exp(\ln \hat{P}) \times \exp\left(\frac{\sigma^2}{2}\right)$$

σ^2 is the mean squared error of the regression generating the predicted price.

- **(IV) Generation of index**

The transformed start and end prices are summed for all assets within a particular country or sector. The change between these two totals (in percentage terms) will represent a value-weighted capital return figure derived from transaction evidence. These rates of change can be chain-linked with those from the surrounding quarters in order to form a time-series for that country or sector.

From a theoretical point of view, the transaction linked indicators are likely to be more fit for ESCB purposes than the valuation based ones. However, in times of financial stress market liquidity tends to be very low¹² and an insufficient number of transactions are likely to significantly affect the statistical quality and the reliability of the Transaction Linked Index estimations. To illustrate, in cases where there are not enough transactions, the associated coefficients with country dummy variables could be null or not significant. In this case, the predicted sale prices for these countries would be based on the base –case country’s (i.e. France) which is an obvious concern.

Taking into account these caveats, a multi-source approach using both valuation and hybrid valuation/transaction based series is likely to be necessary for users to assess and monitor the development of commercial property prices.

5.2 Other methodological aspects

In addition to the compilation issues there are several other issues relating to the methodology that need to be noted.

¹² A current example of this is the Swiss market which saw 4 recorded IPD transactions in Q4 2011 significantly lower than the average historical transaction level.

5.2.1 Data frequency and interpolation

IPD provides quarterly CPPIs that are calculated from the highest possible frequency data available to IPD. Where quarterly data are not available the lower frequency data are interpolated. The data are treated in the following ways:

Standard Annual – This is the default option and annual data are linearly interpolated at a property level between actual valuations which occur at year end. These linearly interpolated values are stored for each month in the Investment Property Databank. For the non-headline variables such as total return the income received for each property over the course of a year is apportioned on a monthly basis too, taking into account actual changes to rent levels at points when they occurred. The same is true for costs data. Capital expenditure data is stored in the months when it occurred. With all data stored monthly, quarterly interpolated series can be created by compounding up the months.

Standard Biannual – In those countries which report biannually the data are linearly interpolated at a property level between actual valuations which occur end June and end December. These linearly interpolated values are stored for each month in the databank. The income received for each property over the course of six months is apportioned on a monthly basis too, taking into account actual changes to rent levels at points when they occurred. The same is true for costs data. Capital expenditure data is stored in the months when it occurred. With all data stored monthly, quarterly interpolated series can be created by compounding up the months.

Standard Quarterly - Where IPD has a pure quarterly index there is no need to alter the results for the purpose of this exercise.

Biannual / Annual Mix - Where there is a short history of biannual data and a longer history of annual data the standard annual interpolation method above is used up to the point where the biannual index starts. At this point the annual interpolation methodology is retained for those properties which are annually valued and the biannual interpolation methodology for those properties which are biannual valued. This gives a situation where all assets attract a valuation at year end, all assets have an interpolated value at end March, some assets have an actual valuation at end June and some an interpolated valuation, all assets have an interpolated valuation at end September and all assets have an actual valuation at end December.

Exceptions

Germany - Properties in Germany are valued annually but not on a synchronised basis, so an asset may attract a valuation at any point in the year. Typically between 55% - 70% of properties are valued at year end with the remainder being reasonably evenly spread across the other 11 months of the year. Once a property has been valued in any given year, the value is kept stable for the remainder of that year. This can cause smoothing over annual time periods but produces the opposite effect when quarterly data is constructed. Due to some assets having a step change in value during intermediate quarters in the year, quarterly data can produce some volatility driven by a small number of revaluations. In order to smooth

out these data spikes smoothing of the quarterly results is undertaken to fit them to the shape of the annual index.

Netherlands - For the Netherlands IPD has a standard annual index based in 1994 and a standard quarterly index based in 2007. There is also a longer quarterly series which ran from 2000 to 2007 based on a smaller sample of between 20 - 70% of the annual sample, which did not meet IPD's quality criteria to be made a full index. In order to make use of this extra quarterly evidence the annual index is de-smoothed to fit the shape of this quarterly indicator series, so that the end years points are fixed to the actual annual valuations but the intervening quarters take the shape of the quarterly indicator. Therefore the data series for the Netherlands is based on annually interpolated data from 1994 to 2000, then annual data shaped to the quarterly indicator from 2000 to 2007 and then pure quarterly data from 2007 to the present.

UK - IPD has three frequencies of series for the UK with different index start dates; monthly (1986), quarterly (2000) and annual (1980). The monthly sample is approximately 35-50% of the quarterly sample and the quarterly sample is 35-85% of the annual sample, increasing over time. Between 1986 and 2000 the monthly data can be cumulated to create quarterly data so no interpolation is needed from the annual series unless data are required prior to 1986. The exception to this is the residential sector which only exists on an annual frequency. Data are interpolated for the residential sector but are not included in the all property index. As IPD estimates that residential investment only makes up about 3% of the total professionally managed stock the exclusion of residential from the all property index this does not affect the UK cycle by a significant magnitude.

Table 2: Reporting frequency and interpolation

Country / Composite	Valuation Frequency	Interpolation Methodology
Austria	Annual	Standard Annual
Belgium	Annual	Standard Annual
Czech Republic	Annual	Standard Annual
Denmark	Annual	Standard Annual
France	Biannual / Annual	Biannual / Annual Mix
Germany	Non-synchronised Annual	Re-smoothed Annual
Hungary	Annual	Standard Annual
Ireland	Quarterly	N/A
Italy	Biannual / Annual	Biannual / Annual Mix
Netherlands	Quarterly / Annual	Annual / De-smoothed Annual / Quarterly Mix
Norway	Annual	Standard Annual
Poland	Annual	Standard Annual
Portugal	Annual	Standard Annual
Spain	Annual	Standard Annual
Sweden	Annual	Standard Annual
Switzerland	Annual	Standard Annual
UK	Monthly / Quarterly / Annual	Standard Annual / Monthly / Quarterly Mix with Standard Annual Residential

5.2.2 Aggregation

The Pan-European aggregate provided by IPD to end-users follows a continent based concept rather than the composition of the EU and is hence based on the national market prices for Austria, Belgium, Denmark, Norway, Sweden, France, Germany, Netherlands, Ireland, Italy, Poland, Portugal, Spain, Switzerland and the UK. However, EU and euro area data are also calculated by IPD. The euro area aggregate currently includes Austria, Belgium France, Germany, Netherlands, Ireland, Italy, Portugal and Spain.

IPD compiles the weights for their European aggregates using their own estimates of the capital value of the professionally managed investment market in each country (see table). This has several drawbacks: 1/. The estimates, while the best that are possible, are subject to considerable uncertainty; because commercial property is affected by new additions and decommissioning frequently. 2/. IPD only estimate market size for the countries that it is active in.

Table 3:

Pan European Annual Property Database

	Total market size estimate (€ bn)	Pan -European country weights (%)	IPD estimated market coverage end 2010 (%)
Belgium	41.9	2.9	18.3
Czech Republic	10.7	0.7	25.0
Denmark	33.6	2.3	41.6
Germany	269.8	18.7	17.1
Ireland	2.9	0.2	82.9
Spain	39.8	2.8	21.3
France	209.5	14.5	54.3
Italy	84.1	5.8	21.2
Netherlands	114.7	8.0	33.8
Austria	22.0	1.5	26.1
Poland	15.2	1.1	28.1
Portugal	15.6	1.1	63.1
Finland (KTI)	39.9	2.8	51.4
Sweden	104.2	7.2	24.1
UK	271.8	18.8	57.9
Norway	39.8	2.8	39.4
Switzerland	127.2	8.8	42.2
IPD Eurozone	840.3	58.2	32.3
IPD Pan-European	1442.7	100.0	37.7

Source: IPD.

While Finland is listed in Table 3 the data are not, as yet, available for the ESCB.

As mentioned above, for the ESCB CPPI dataset, the default data source is IPD, but NCBs are invited to provide better national data where it exists in order to replace or complement the IPD data. This also means that the ECB has to make its own compilation of European aggregates, which requires a weighting system for the national data. In its October 2012 meeting the WGGES agreed that there is no simple choice for how national data should be aggregated to European results. In principle for a price index the

prices and weights should refer to the same phenomenon. Hence in the case of CPPIs, the commercial property prices of a country should ideally be weighted by the total size of the commercial property market in that country or the value of the annual turnover. As such data are not available; a suitable proxy has to be found. An exploration of several weighting methods was undertaken. These included:

National accounts non-financial data: This approach covers both, gross fixed capital formation (transaction weights) and balance sheet data (volume weights). The data refer to *other buildings and structures* (AN. 1112)¹³ from the European System of Accounts (ESA 95). Due to the low country coverage, e.g. data on Spain and Portugal is currently unavailable, a volume based weighting scheme based on balance sheet data is not possible. As regards to a transaction weights, the country data is available for both the nominal and the volume of grossed fixed capital formation. Hence in Table 4 both approaches are taken into consideration.

- GDP weights: The advantage of using a weighting scheme based on GDP results is that the country coverage is complete. The values for GDP data as of 2009 are shown below (the same weighting scheme is used when calculating the euro area aggregate for the residential property prices).
- Stock of enterprises: The number of enterprises per country may also be considered to aggregate a volume-based measure, since they may indicate the demand for commercial property¹⁴. Thus the weighting scheme of the euro area aggregate for this indicator might be applied in the case of commercial property prices. However, the given weighting scheme does not provide values for Ireland due to data unavailability. In this case, the weight for Ireland is set to two which is similar to the estimates from the Irish GDP and gross fixed capital formation (prices) data. Moreover, the weights are derived from the 2006 stock of enterprise data which is the latest set of data available to the ECB.

For the computations in the next table, the weights available are redistributed to those nine euro area countries, for which IPD reports data. The table below shows the respective weights of the countries according to the different methods. For the gross fixed capital formation with a fixed weight over the observed time period, a three-year average was taken for the most recent available data (for prices this includes the years 2008 to 2010, while for volumes – the years 2009 to 2011).

¹³ Ideally, data on *other structures* (AN.11122) should be used for this approach. However, due to the lack of data for most euro area countries, the weights are based on data for *other buildings and structures*.

¹⁴ This approach might also be misleading as a small retail kiosk business is given the same weight as a huge shopping mall.

Table 4: Possible country weighting schemes for the euro area aggregate*

	Stock of enterprises	GDP- volumes	GFCF – current prices	GFCF - volumes
BE	4.08	4.14	3.23	3.25
DE	20.17	28.87	20.96	20.07
IE	2.00	1.82	1.93	2.75
ES	18.08	12.39	18.96	19.81
FR	15.43	22.53	25.66	24.68
IT	29.32	18.05	15.68	16.23
NL	4.19	6.86	6.52	6.44
AT	1.65	3.33	4.03	3.97
PT	5.07	2.01	3.02	2.91

* As additional country's data becomes available the weights would be adjusted accordingly.

Users prefer transparency and simplicity in the methods used. As such the GDP weight methods, which can be updated relatively quickly and do not suffer any issues relating to missing observations were agreed by the WGGES as the best weighting method to use at this juncture. This is also supported by the fact that the Gross Fixed Capital Formation data can be quite volatile and the weights would therefore change significantly, as well as a wish to ensure that the residential and commercial property indices use the same methodology.

The calculation of the weights is as follows:

- A moving 5-year average of GDP weights is applied to the annual percentage change of the IPD data (or where available an NCB recommended alternative is used).
- A European aggregate is produced only when there is at least 70% of the national coverage (for the valuation based indices) and, because the coverage is lower, 50% for the transaction linked indices¹⁵.
- Implicitly this implies that the missing countries are assumed to have the same dynamics as the average of the available data.

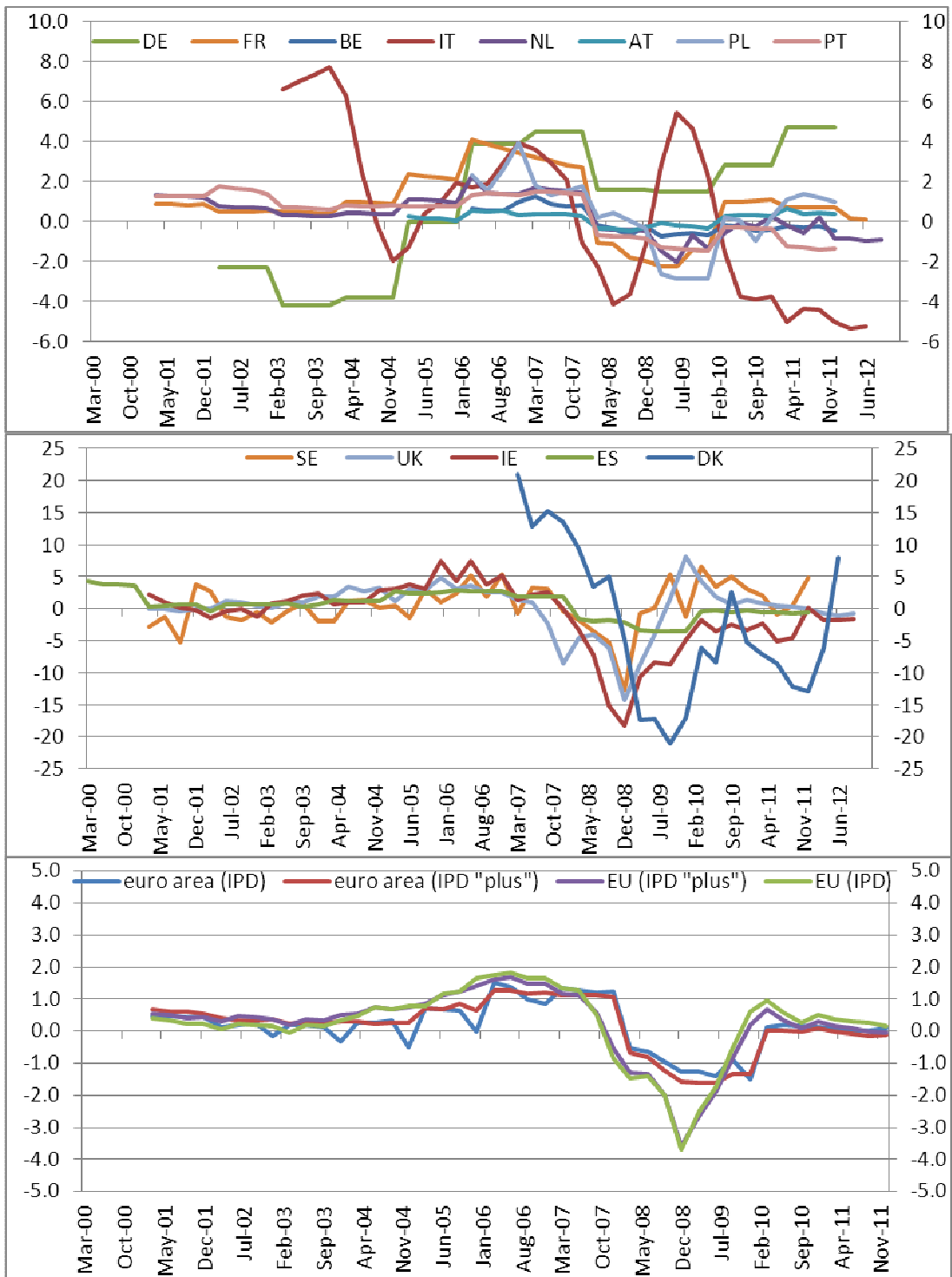
6. The interim approach: publication of data

IPD have gained experience in producing the data required for ESCB purposes and are now willing to commit to a regular publication timetable of T+2 months after each quarter. As a result, the ECB believes it will be able to eventually publish European data a week later at around T+65 days. The data available

¹⁵ IPD solve this low weight problem – which is caused by some country's only having very few observations on transactions in a particular country within a quarter – by creating regional indices. The ECB will examine if the provision of these regional data can be made available so as to improve the coverage of the IPD plus estimates. Alternatively, if Italian nationally recommended data became available this would also increase the coverage.

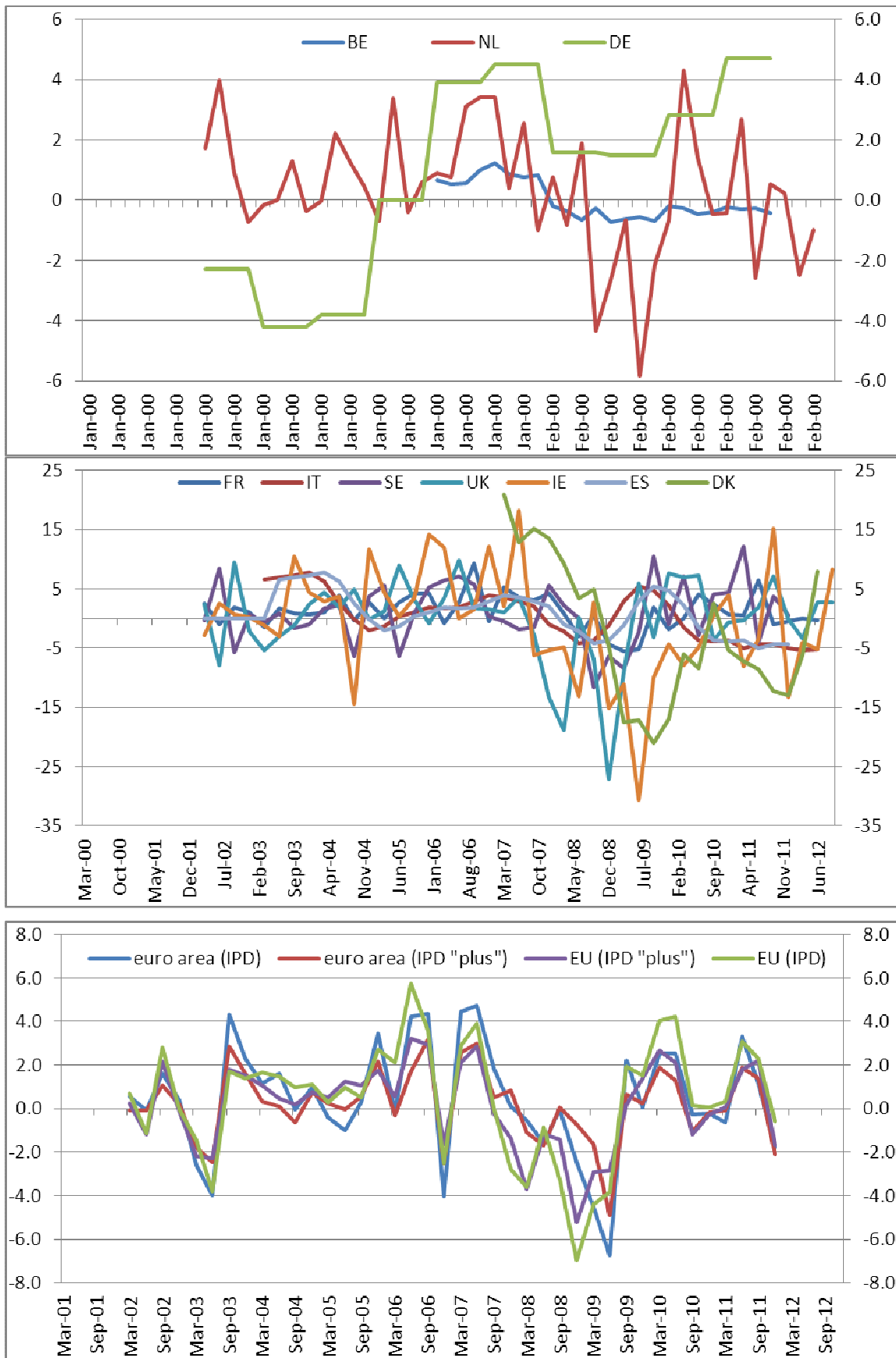
so far, which is still subject to revision prior to any publication, is shown in the chart(s) on the following page.

Graph 1: Experimental IPD “plus” valuation based data (annual percentage changes)



Source: ECB calculations based on IPD data.

Graph 2: Experimental IPD “plus” transaction linked data



Source: ECB calculations based on IPD data.

It is expected that this experimental data¹⁶ will be further developed over the coming months and once it is ready to be released to the general public An article on commercial property including extensive discussion about the methodology of the compilation is planned will be included in the ECB Monthly Bulletin and updated on a regular basis.

The data will be declared as experimental statistics and as ECB estimates based on IPD and other national data.

Given the inherent uncertainties in the data at first it is likely that only the euro area and the EU aggregate will be published. For internal uses only the national data for Austria, Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Poland, Portugal, Spain, Sweden and the UK will be available. Where both IPD data and a national source are available both the one used in the European aggregates calculation and the alternative will be made available to ESCB users.

At the moment metadata and methodological information are not fully available from IPD with the data and are therefore insufficient. Therefore, further metadata and methodological documentation should be made available for the data users as a priority.

7. The interim approach: further development

The WGGES identified the following issues to further improve the experimental dataset over the coming months and years until official and more harmonised data becomes available:

- The establishment of allied indicators such as vacancy rates will be important in order to aid in the analysis of the data.
- The way that the data are currently weighted together within a particular country: As described above the individual valuation/transaction data are simply summed to a country aggregate using the total information of each of the properties reported by IPD data respondents. This could mean that, for instance, the index is dominated by office properties while the structure of the market is different. The ECB plans to look closer at this aspect and to investigate whether weighting solutions can be found to correct the anomaly both within a country and/or when aggregating to the European levels.
- Interpolation methods: At present where national data are supplied only at an annual frequency data are interpolated linearly. It may be that explanatory variables can be found that would allow this process to be enhanced.

¹⁶ ECB experimental statistics were discussed in detail in the paper entitled “Experimental data as part of the ECB’s statistical production and dissemination policy” by Aurel Schubert (see <http://q2012.gr/articlefiles/sessions/26.2-Experimental-statisticsECB-Aurel-Schubert.pdf>). They are defined as “...economic and financial data, collected and compiled by the ECB, whose quality is somewhat lower than that of other ECB statistics, for example because full harmonisation has still to be achieved or because less costly data are considered sufficient for a certain purpose. These datasets are nevertheless regarded as sufficiently reliable and accurate to be useful for monetary policy purposes and various ESCB tasks, and may therefore also be of interest to users outside the ECB (e.g. international and national organisations, authorities, national supervisors, the European Systemic Risk Board (ESRB), academics, financial analysts, the media and the general public).”

- Use of geographical information: To further enhance the transaction linked data a research project is underway at the ECB which examines the geographical position of the underlying properties and, where a transaction takes place, uses spatial autocorrelation i.e. the situation where similar values of a random variable tend to cluster in some locations. Applied to the CPPI data this means that high (low) commercial property prices would be geographically clustered rather than being randomly observed. One potential approach would then be to override changes in the valuation based data for close neighbours with an actual transaction price movement.
- National datasets: NCBs might develop or detect better sources for national data than the IPD data set. Such data will be included in the ESCB dataset as it becomes available while trying to preserve the length of the time series and keeping revisions limited.
- Quality adjustment of the data is an important but data intensive and technically challenging area for longer-term research (although to some extent this may already be included by valuers as part of the valuation process).
- If further data become available from official sources, which can increase the coverage of transactions, these will be incorporated into the dataset.

8. Conclusions

The work undertaken by WGGES on the subject of Commercial Property Price indicators over the last two and a half years has been productive – and while it remains work in progress - initial estimates have been calculated. . The aspect of metadata is likely to be particularly relevant in this case as the indicator is subject to significant caveats including the basing of the data principally on valuations; sub-optimal harmonisation of concepts; potential issues of being representative and other methodological issues. Nonetheless, what has been achieved thus far is in line with the conclusions of the worldwide conference that was held on the topic at the ECB premises and is likely to prove a useful addition for the analytical framework. The approach might be considered as innovative, very pragmatic, and fast. However, despite basing the CPPIs on multiple sources and the aforementioned caveats, the experimental statistics on CPPIs once fully developed are likely to be appropriate to guide users on the overall trends in commercial property prices. The expected publication of European aggregates is the starting point and the data can and will be further enhanced. As normal for ECB experimental statistics it will also be important to monitor the quality of the indicator over time to ensure that it performs well under periods of market stress and to ensure that it appropriately identifies turning points. Interest in and critique of the data might lead to significant further development and additional data sources in the medium term.