Working Towards a Comparable House Price Inflation Measure in Europe *

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Abstract

The unprecedented increase in house prices during the last 15 years, together with the boom and bust cycles which accompanied the recent financial and economic crisis, have highlighted the need for reliable and comparable official house price inflation statistics. This paper describes the progress made in developing harmonized price indexes covering the purchase and ownership of dwellings for 29 countries in Europe. In doing this, a brief account of past pilot stages of this harmonization process and a summary of future steps are provided. The paper presents the main methodological and technical challenges that had to be dealt with and aims at providing guidelines that could help the work of all those interested in similar processes.

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1 Introduction

The importance of the housing market and of its effect on the economy has been particularly underscored in many of the last financial crisis. Due to its nature, it has the potential to influence individual wealth and consumption decisions and the economy as a whole.

In this context, the relevance of correctly measuring house price dynamics cannot be overlooked. By the same token, the existence of official house price statistics, which were, at least in early 2000s, almost non-existent in a considerable number of European countries, are essential to support the making of micro and macro level decisions on the basis of reliable and comparable information.

This paper outlines the main characteristics and output of a project regarding the creation of a system of official indexes on house price inflation in Europe. This project, which has been running since 2001 under the aegis of Eurostat, has provided the grounds for the development of official statistics in this area in Europe.

This text is organized as follows. Section two describes the process of development of house price indices in the framework of owner occupied housing for the Harmonized Index of Consumer Prices (HICP). Section three highlights the current state of the project and points out some of the main characteristics of it. Section four focuses on some of the technical issues that were encountered in the project. Section five addresses future developments of the project. A summary and some concluding remarks are presented at the end of the paper.

2 Definition of the problem and initial project work

2.1 Motivation and origins

In 1992, the Maastricht Treaty established the formation of a Monetary Union with a new currency, the Euro. This goal demanded the existence of a comparable inflation measure across Member States, which took the form of the HICP. In this indicator, inflation is perceived as a monetary phenomena and, as such, it is based on household final monetary consumption expenditure and on monetary transactions. The HICP has been produced by Member States since March 1997 on the basis of a set of common harmonized standards. These standards, which relate to methods, concepts, classifications, target population and covered geographic territory, are key aspects for the "harmonized" qualifier in HICP.

Some relevant expenditure flows, related with the acquisition of a house (such as mortgage and interest payments, costs related with the process of purchase and the ownership), were ruled out of the index, according to the "household final monetary consumption expenditure" concept. Also the concept of imputed rent, not being a real monetary transaction, fell

outside the scope of the HICP. The exclusion of these items aimed to ensure comparability across Member States of the indicator and also to ensure their adequacy to the objectives of monetary policy in the Euro area (Pasanen, 2007).

This exclusion has been considered the only possible alternative, and was itself a factor of non-harmonization, given the different way housing services are provided across Member States. These services show disparities in the output shares of the rental market, which gives place to a monetary transaction, and owner occupied housing classified as own account production, not subject to real market transaction . Even if this imbalance had not existed, omitting a significant component of the household monetary expenditure in housing was a gap for an inflation indicator that is intended to be robust (concerning the complete coverage of household expenditures).

At the same time, the perception for the need of comparable house price indices played also a role, at the time, in launching the project. The evolutions in house prices in EU following the launch of the project influenced policy makers' perceived need for these statistics. Following a prolonged boom, a reversal trend in house prices accompanied the economic and financial crisis from 2008-2009 and spurred an interest in house price statistics unseen before the crisis[1].

To conclude this subsection, it could be underlined that the motivation of developing house price indices in the EU was twofold. The first and main objective can be considered to have been an improvement in the harmonization of inflation measurement for the Euro area. The second objective, which in time gained importance, has been to use this favorable framework for producing stand alone house price indices.

2.2 Project design

At the beginning of 2000, Eurostat launched a program for developing a price index for owner occupied housing new to the household sector (OOHPI) and a house price index (HPI) as a by-product. The OOHPI aims at measuring the evolution of prices related to household expenditure on the acquisitions on houses for own use not included in the HICP (including those from own account production), on services related with those purchases and on services related with the asset ownership, on a net basis. The HPI intends to measure price developments for expenditure on houses actually transacted in the market (own account production excluded) whatever are the purposes for those transactions.

The conceptual framework of OOHPI considered the net acquisitions approach as the most appropriate method for measuring the price change. Generally, under the net acquisitions

[1] We should mention that the 2008-2009 crisis spurred an increased interest not only in house price statistics, but in many other macroeconomic statistics reflecting the internal and external economic imbalances (current account, net investment, private and government debt, budget deficit, etc).

approach, prices should reflect the change in the acquisition cost of the goods and services which are new to the household sector as a whole.

The main advantages of the net acquisitions approach for the OOHPI are the following: (i) it measures prices as they are commonly understood by the general public (i.e. it follows price developments of the prices people actually face); (ii) it reflects changes of true transaction prices, something which is in line with the HICP as a measure of monetary inflation[2]; (iii) it is conceptually simple and identical to the treatment of non-durables and services in consumer price index calculation (Makaronidis, 2007).
Opposite to the OOHPI, the HPI does not follow the net acquisitions concept and the price of land is included in prices and weights.

2.3 Summary of the project's phases

The pilot work was developed under a stepwise work program consisting of several successive phases.

The initial phase was launched with the participation of five countries. At the time, these countries represented a third out of the then 15 Member states. This stage can be considered as the starting point of the OOH project, concerning the identification of the main problems that were experienced by these five countries and the production of the first results (price indices for new dwellings were achieved on all five pilot-countries). One important outcome was the production of the first version of a methodological manual. Some of the most problematic issues were also identified: reliability of the indicator in small markets (few and volatile transactions), the weighting scheme, how to separate in the total transaction the price of the land (a conceptual aspect relevant to the "net acquisitions approach"). Summary of the work developed under this phase can be found in Makaronidis and Hayes (2006).

A second pilot exercise was launched extending the coverage of participating countries to more seven countries[3]. In total twelve countries were involved in this pilot work.
In addition to increasing the number of participating countries and covering a range of different information systems on housing transactions, the second pilot exercise established the following objectives:

- compile a price index for all dwellings purchased by households;
- estimate the effect of land prices;
- derive the all dwellings price index according to the net acquisitions concept excluding land by means of the land price index.

[2] An important concept of an inflation measure is that it should only include actual purchaser prices.
[3] While having achieved significant results in the previous stage their quality did not seem to meet the minimum criteria to satisfy the HICP quality requirements. For this reason, it was not reasonable at this point in time to extend the initial pilot study as it stood to all Member States and the then Acceding Countries.

The draft version of the technical manual on OOH from the initial pilot was also updated in connection to the pilot work developed by the participating countries and made available by early 2008. The intention to produce a provisional HPI for the euro area during the first half of 2007 was not achieved at that stage, but later, as it will be shown below.

In 2008, Eurostat commissioned a study on the separation of land from structure prices and in March 2009 a final report was presented to the HICP Working Group (Statistics Portugal, 2009).

A third pilot exercise (mid 2008 - end 2009), was launched by Eurostat now covering a bigger number of countries (reaching 26 participant countries). The expected outcome of the pilot was to work towards reliable price indices and respective weights so that: (i) an OOH component could be added to the HICP and (ii) a stand-alone house price indices (HPI) reflecting the changes of dwellings prices could be available.

To meet the requirements for the OOH project, the pilot work had as its objective:

- to develop feasible, harmonized methodology for temporal price measurement for all expenditures of owner-occupied housing based on the net acquisition approach; and
- to support the Member States in establishing statistical systems that would produce high quality and timely price indices on OOH on a regular basis.

The harmonized methodology developed under the second stage of the pilot was also improved to answer to the specific needs of the HPI and OOHI compilation. The latter lead to develop specific sections of the OOH Technical Manual, namely about the treatment of other costs related with the purchase of a dwelling, insurance, weights, scope and coverage of both indices, and improvement of the section on quality adjustment methods. The evaluation grid to be applied as an "evaluation template" to each participating country was also revised using an A / B / C methodology[4] combined with the European Statistics System (ESS) quality dimensions.

In short the specific objectives for the pilot participants which could vary according to their current state of development were:

- expanding indices for all types of dwellings covering the whole country, divided in the sub-indices for new and existing dwellings
- producing index for additional acquisition costs ;
- developing indices and / or methods for the land price component;
- developing indices and / or methods for major renovations and repairs;
- improving the quality of basic data: collection of prices and other price determining characteristics, improve the weighting data (both internal and aggregation weight);
- improving quality adjustment methodologies applied in the indices;

[4] A methods represented the most appropriate ones, "B" methods corresponded to those which can be used in the case an A method cannot be applied, and "C" methods grouped all those practices which shall not be used

- increasing the frequency of the indices from quarterly to monthly and decreasing the delay towards HICP standards.

The work plan and working method of the pilot introduced some improvements in the project organization as regards to the previous stages of the OOH pilot work:

- a Coordination function assumed by Eurostat assisted by an external expert (Statistics Portugal). This coordination team ensured a regular and efficient communication between the stakeholders of the pilot group. Also was in charge to provide technical assistance to the pilot countries;
- a Steering Group composed by representatives of Eurostat, DG ECFIN, the ECB and two invited Member States. This Steering Group followed regularly the developments of the project;
- exchange of knowledge among pilot countries with two workshops hold during 2009 as a forum of the best OOH practices and methods (know-how transfer).

To conclude, with assessment of the achieved results for this third stage of the owner-occupied housing pilot project, it can be stated that all the participant countries worked on implementing the plans that they had created to provide harmonized data at the European level. Moreover, during this stage Eurostat started preparing a dedicated EU legal framework which would ensure the continuation of the project after the end of the pilot phases (see also subsection 2.4).

A fourth phase, that lasted from 2010 until 2011, expanded the number of participating countries to 27 EU countries plus Iceland and Norway. During this phase, the first experimental series of HPI were released at the end of 2010 (see also subsection 3.4.1).

The table below summarizes the four stages of the project that have been completed until now.

	First stage	**Second stage**	**Third stage**	**Fourth stage**
Time frame	2001-2003	2006-2008	2008-2009	2010-2011
N. participants	5	12	26	29
Countries covered	Finland, Germany, Poland, Spain and the UK	All 5 initial participants plus Cyprus, France, Greece, Italy, the Netherlands, the Slovak Republic and Slovenia	All EU countries except Malta	EU countries and Iceland and Norway

In section 3 the output of the fourth phase is further developed with a particular focus on HPI compilation.

2.4 An EU legal framework for owner-occupied housing

As mentioned above, in order to assure the continuity of the project after the end of the pilot phase, Eurostat has been working, since the third phase of the project, on an EU Regulation which should provide for the regular production and transmission of HPI and OOHPI .

The role of the regulation in this project deserves to be underlined. On the one had, the regulation helps EU national statistical institutes to deal with other administrative offices which could provide relevant data (administrative sources). It can also potentially help in the financial planning, enabling statistical offices to ensure the allocation of funds towards this project. This will be even more relevant in the coming years, when most statistical institutes foresee to undergo further reductions in their human and financial resources, and priorities will have to be defined.

At the same time, the regulation provides a guarantee for Eurostat and the ESS that the considerable investments and efforts in this project made in the last twelve years' would pay off and to offer policy makers and the public at large house price data. Considering the costs that a stop and re-start of this process can incur for any statistical office, ensuring the continuation of this project is clearly important.

2.5 Methodological framework

The methodological framework of the owner occupied housing project has been defined in two statistical manuals. The first one is practical manual on OOHPI and HPI, being prescriptive in its nature. The second is a handbook on Residential Property Prices Indexes which offers the broad theoretical framework. Each of these manuals is briefly discussed below.

2.5.1 The OOH methodological manual

Even from the first stage of the project, it became clear that a methodological guidance was needed, and at that time it was not available in the form of an internationally agreed framework. Therefore, drafting a methodological manual on OOH became one of the priorities of the project. Starting from the theoretical recommendations available in the literature at the time, the manual developed from the invaluable practical experiences of statistical offices participating in the project. The manual was gradually improved and extended as the project expanded its coverage to more countries, and participants applied the recommendations from the manual and gave their feedback. The current version of the manual (Eurostat 2011b) is available on the dedicated housing section of the HICP website at Eurostat.

2.5.2 Handbook on Residential Property Prices Indexes

This handbook represents the first comprehensive overview of the conceptual and practical issues that statisticians should consider when compiling price indexes for residential properties. Initiated in 2009 by Eurostat, the RPPI handbook reached a final draft at the end of 2011. This document is planned to be released in paper version in 2012, in a similar way as existing International Manuals on Consumer Price Indexes, Producer Price Indexes and Import-Export Price Indexes that were produced under the auspices of the Inter-Secretariat Working Group on Price Statistics (IWGPS). The current version (Eurostat 2011a) is available on the dedicated housing section of the HICP website at Eurostat.

3 Project's house price index output

3.1 Used data sources

The evidence of the 29 countries participating in the project shows that the production of price indexes covering the purchase of dwellings is, in most cases, primarily based on a single data source.

Produced output also shows that public administrative data are, by far, the most typical source of information used in the compilation of price indexes for new and existing dwelling purchases[5]. At the end of the fourth stage of the project, around two thirds of the cases belonged to this category of data sources. The remaining cases seemed to rely totally or partly on survey data, which are typically drawn from a sample of real estate/construction companies or commercial banks.

This clear preference towards the use of administrative data in the project has essentially to do with the benefits that are typically associated to its use for statistical purposes, especially from the perspective of an official compiler. Its low cost, when compared to the design of a survey[6], is certainly among one of the benefits[7].

Other important factors for its use include its comprehensive coverage of the target population and its capability in providing an accurate measure of real dwelling transaction prices.

However, there are also some drawbacks in the use of administrative data sources. Most of them have to do with the fact that these data were not primarily collected to satisfy

[5] In general, if the information is primarily generated with a statistical purpose in mind, then its underlying source is categorized as "statistical" or "primary". Conversely, if the information is not primarily collected for a statistical purpose, then the data source is defined as "administrative". The latter data sources can be further divided into "public" or "private". An example of the former would be tax data on dwelling transactions and a typical example of the latter would be data on dwelling transactions taken from a private association of real estate professionals.

[6] Not to mention of a census!

[7] An additional point should be made here. The costs of using these data could be non-negligible if the appropriation of administrative data, which is not collected/"onwed" by a statistical office, turns out to be extremely bureaucratic and lengthy (even when a legal framework facilitating the appropriation of the data exists). In order to avoid this, it is advisable to build a good working relationship with data providers from the outset of the data capturing process.

statistical needs. In this context, price index compilers can only use "what they get" from data providers. For instance, the data may be lacking of important variables or exhibit, for those same variables, many missing values simply because they are not considered important for the data providers[8] activities.

In addition, the way the data are collected and processed by data providers may not be in line with the project's timeliness requirements. Moreover, administrative data may suffer from "under-reporting" of the final price, but the significance of this phenomenon for the final index has to be assessed in the specific context of the housing market in a particular country. Finally, there may be discrepancies between definitions and concepts, which are used in the project, and those underlying the data made available by the administrative source[9].

Overall, it can be said that despite these potential problems, the evidence provided by the project's participants (and our own experience in the field) suggests that the advantages of using administrative data clearly outweigh its underlying disadvantages.

3.2 Higher- and lower-level index formulas

As the project is developed using the HICP as its conceptual reference, the choice of higher- and lower-level index formulas is restricted to those allowed for this inflation indicator[10].

In practice, this implies that all of the national house price indexes produced under the scope of this project are annually chained Laspeyres-type indexes. At the elementary level, the overwhelming majority of produced house price indexes are based on geometric mean prices (i.e. Jevons elementary price indexes). The ratio of average prices is applied in only in a small minority of cases. Only one country calculates elementary price indexes using median prices. The average of price relatives, or the Carli elementary index, is not applied.

3.3 Quality adjustment

The way produced house price indexes adjust for changes in the quality/mix of dwellings vary from country to country. This is not surprising because the choice of the method is influenced by factors particular to each statistical office (e.g., available data sources and resources).

[8] Tax data may constitute an example on this. If tax authorities are only concerned in tax revenue, information on the location of sold dwellings may be considered not that important and could be missing or inaccurate in many records. Again, a good working collaboration with data providers can be useful to minimize these problems.

[9] The definition of "new" constitutes an example on this. The administrative data may not have information allowing price index compilers to separate new from existing dwelling transactions in the sense they are defined in the project (which uses occupancy as the key factor to make a drawing line between). See section 4.1.2 for more on this.

[10] It should be noted, in passing, that this "constrain" is, in itself, a factor that ensures fromk the start some degree of comparability to the different national house price indexes.

Despite country specificities there are, however, a few points that are worthwhile to highlight. First, from the countries already providing a separation between new and existing dwellings, only two are applying different methodologies in the compilation of these indexes.

Secondly, the predominant method to deal with changes in the mix of sold dwellings is the hedonic regression[11]. Indeed, more than half of the indexes provided to Eurostat at the end of the fourth phase are based on the use of the regression method. The stratification approach is used in nearly 40% of the cases. Appraised-based methods, such as the SPAR method, account for the remaining situations (less than 10%).

Thirdly, it is possible to highlight some of the most common characteristics used in hedonic regressions. As regards the method, only one country applied a variant of the time dummy approach. All the remaining cases fit into the characteristics prices or imputation method category (with a particular incidence on the hedonic re-pricing method). Although the price level and the log of the price level per square meter are used, taking logs of the full price is the most common form of the dependent variable. The log-linear relationship is, by far, the preferred specification of the hedonic function (to our knowledge, the linear form is not used at all and the log-log is applied only in a few cases). The parameters of the hedonic functions are usually estimated using Ordinary Least Squares. The Weighted Least Squares and other estimation methods are used in around one quarter of the cases applying the hedonic regression method in the compilation of national HPI.

Finally, when using the stratification approach, strata are typically defined using some sort of location variable and basic dwelling characteristics (e.g. variables identifying if the dwelling is "new" or "existent" and if it is an "apartment" or a "house").

3.4 Dissemination of produced output

3.4.1 Experimental house price indexes

In 2010, in the light of the progress achieved and also due to the interest manifested from policy makers, Eurostat decided to proceed to the dissemination of produced HPI. Given the pilot nature of available data, the way chosen to do this was to publish, on Eurostat's website, periodical research papers with experimental HPI data. In addition to the dissemination of the project's output, these papers aimed to help establish a regular production mechanism and to increase the quality, comparability and coverage of produced house price data.

A total of eight papers have been produced between December 2010 and April 2012, when the last publication, with data up to 2011Q4, was made available by Eurostat.

Despite the different time periods covered in each paper, an analysis of the data presented in each publication underlines the progress achieved during this period.

[11] In one situation, the hedonic index that is used by the statistical office is produced by a private entity.

For instance, while in the December 2010 paper, four countries were not able to produce data within the framework of the project (and were not, for this reason, able to provide any comparable data for EU and Euro Area aggregates), only one country was signalled to have remained in this situation in the last available publication of experimental house price indexes[12].

3.4.2 Emergence of new national house price index series

In recent years, a significant number of statistical offices have improved their series or have started to produce, on a regular basis, new information on house prices in the form of official indexes. The table below provides some examples[13].

Country	Start of dissemination	Relevant references
Ireland	May 2011	O'Hanlon (2011)
Luxembourg	January 2010	Lamboray (2010)
Spain	September 2008	INE (2008)
Netherlands	January 2008	Statistics Netherlands (2008)

The emergence of improved or new series was not only driven by the desire to satisfy the needs for official statistics in this area but also by the need to comply with forthcoming future legal requirements for the regular production of house price indexes in Europe. In such a context, improved or new house price series have contributed to and benefited from the outputs of the statistical project on owner-occupied housing.

4 Technical issues encountered in the course of the project

4.1 Issues related to the implementation of the OOHPI

4.1.1 The treatment of land

The treatment of land in the OOHPI and the implementation of a feasible technical solution for the decomposition of dwelling prices into land and structures components are issues that have remained unsolved during the course of this project.

In principle, it has been considered to exclude land from the OOHPI. The argument was that, being non-produced asset, it would not fall into the scope of a consumer price index using the net acquisitions approach (Santos and Evangelista, 2007).

[12] Several others countries had some delays in providing the HPI with the required timeliness of T+90 days after the reference period. Nonetheless, these countries are currently in an advanced stage towards a regular quarterly production of HPI, which is also provided in an EU regulation (see for more details section 2.4 and section 5).

[13] For the interested reader, examples on the methodology applied in the production of price index data series older than the ones provided in the table are Koev (2003) and Gouriéroux and Laferrère (2009). An annex to this paper provides more references on other countries house price series.

The land/structure split is tackled in a number of research papers (e.g. Koev and Santos Silva, 2008) and was the focus of a study supported by Eurostat (Statistics Portugal, 2009). More recently, this issue was devoted a separate chapter in the RPPI handbook (Eurostat, 2011a).

Despite the progress, proposed methodologies remain very difficult to implement due to, among other things, their data requirements and the likelihood of yielding implausible results due to multicollinearity and other problems.

In the owner-occupied project, the problem has also been approached from other angles, namely by using, as a deflator, a separate land price index[14] or through the estimation of prices net of the land component[15].

Up until now, the methods have not produced completely satisfactory results and, in practice, the statistical offices participating in the project follow an approach in which weights are estimated net of the land value and prices include, as in the HPI, land values[16].

In this context, it is expected that work on this issue will continue in the next phase of the project (which is described in section 5 of this paper)[17].

4.1.2 New and existing dwellings

Especially for someone dealing with the project for the first time, the drawing line between what is new and existing in the HPI and OOHPI is not always a clear issue. This has essentially to do with the fact that while for new dwellings the concept is the same, for existing dwellings a subtle difference exists. The HPI covers total existing dwelling transactions whereas, in the OOHPI (which follows the net acquisitions approach) only existing dwellings which are new to the household sector matter.

Available information may not be sufficient to make a clear separation between new and existing (in the sense defined in the project) and proxies have to be used in the compilation process. One of the proxies used is the age of the building, considering as new dwellings those that have an age less than a threshold given in number of years.

Thresholds vary from country to country and it may not always be straightforward to argue that the chosen proxy is always representative of the market. However, without further evidence on this, it is impossible to say whether the use of such proxies produces or not a bias in the house price indexes.

[14] See Eurostat (2011b: 61) for more details.

[15] These prices are normally calculated using land value appraisals or are based on (historical) administrative data on the price of the land on which the dwelling sits.

[16] This is sometimes called, in the context of the HICP, as the "net weights, gross prices approach". The net weights are based on national accounts data. It should be reminded that the land/structure split is only an issue in the OOHPI. The HPI does not follow the net acquisitions approach and is not affected by this issue.

[17] If we compare the "package" of land and structure to a bundle of goods, a split of land and structure is difficult to be verified against data, as most dwellings are purchased as a whole, as there is little possibility to buy only the land without the structure or vice-versa.

Definitions for new dwellings aside, it should also be mentioned that, as a general rule, data for new dwellings transactions is more difficult to obtain than data for existing dwellings. In many cases, administrative sources can provide quite a good account for transactions with existing dwellings, but much less so for new dwellings. For this reason, many countries had to develop surveys for construction developers, which are more costly and less sustainable than a regular access to administrative registers. In fact, for many participating countries, improving the indices for new dwellings (or for certain sub-categories of new dwellings) is one of the priorities for the current stage of the project[18].

4.1.3 Compilation of external weights

In a project with the characteristics described in this paper, national accounts provide a good common basis for the derivation of OOHPI external weights[19]. Despite the existence of this common basis, some difficulties may appear in practice, namely:

- obtaining all of the necessary data may be difficult;
- weights might turn out to be extremely volatile, depending on market conditions.

The first difficulty stems from the fact that national accounts were not developed with the concern of satisfying the specific information needs of the OOHPI. For instance, while the value of gross fixed capital formation by households in dwelling structures, which is available from national accounts, can be the basis for the derivation of the weight for "purchases of new dwellings", no valid counterpart exists in national accounts for "purchases of existing dwellings". In order to minimize the effects of these shortcomings, it is recommended that price index compilers work together with national accounts and other (e.g. construction statistics) experts in order to find reasonable estimates of missing information.

As regards the second difficulty, one solution could be provided by the use of averages of more than one year in the weights. Although a feasible solution, it would be desirable to investigate its differences from one-year averages[20].

Other technical issues regarding weights derivation include coherence between internal and external weights and rules for the annual update of weights (e.g. frequency and maximum time lag between the reference periods of the weights and of the index).

[18] Even for countries with long experience in producing an HPI for existing dwellings, the index for new dwellings is in many cases still at an initial experimental phase.

[19] i.e. weights at or above the levels defined in the future regulation on onwner-occupied housing.

[20] It should be taken into account that the OOH and HPI are compiled using transaction (flow) weighs. Compilers who would use stock weights can be expected to face also specific difficulties, in their case related to finding good estimates for the value of stock of dwellings.

4.1.4 Major repairs and maintenance, self builders and major renovations, and minor repairs

Some OOHPI sub-indices, namely those covering major repairs and maintenance, self builders and major renovations, and minor repairs, were the subject of some debate. This had not only to do with the inherent complexity in allocating expenditure to the particular items covered in each sub-index but also with the choice of appropriate data sources for their compilation. As regards the latter issue, Production Price Index has been largely used as a proxy for prices and weights (although its use is not in accordance with the principle of biding price). As regards the former issue, the way expenditures on major repairs and maintenance are separated from self builders and major renovations has not been a cristal-clear issue to statisticians working in the project.

In general, while expenditures on major repairs and maintenance are those that maintain the same level of service, major renovations imply an upgrade of the dwelling features.

The differentiation between minor and major repairs has posed similar identification problems. However, these were less complex as minor repairs are already covered in the HICP and major repairs are identified as gross fixed capital formation.

4.2 Data and econometric issues

Problems associated with the quality of the data and of its sources are normal to occur when developing house price indexes, sometimes from scratch.

The identification of outliers and the treatment of missing information are among of the most common issues tackled at the implementation or research stage of a house price index. As regards outliers, some of the normal procedures applied include the analysis of simple descriptive statistics and the use of algorithms for the detection of possible abnormal cases. In addition, and especially if the aim is the compilation of hedonic price indexes, outlier detection can also be done using regression analysis. In this context, leverage measures and the analysis of influent points can be explored and included in the compilation process. As regards missing information, problems associated with its presence can be tackled with the use of single or multiple imputation techniques.

The existence of measurement errors is also a common problem in survey and administrative data. In particular, measurement errors can be problematic if there are reasons to suspect that they are not independent and not randomly distributed[21].

One of the main messages stemming from the project is that, whatever problem may be

[21] An example of a mismeasured variable is given by the under declaration of transaction prices due to fiscal reasons. If there are reasons to suspect that the tax system allows for a persistent and downward bias in declared transactions prices, then there may be reasons for concern in using this data for the compilation of house price indexes. In any case, this bias should always be assessed, if not quantitatively, at least qualitatively by national experts. A good interaction with, say, national fiscal authorities may help to do this assessment.

affecting the information used, it is important, for the sake of produced output, to understand the underlying mechanism reducing the quality of the data[22].

As pointed out in subsection 3.3, many statistical offices participating in the project are using the hedonic regression method. For those entering into the realm of econometrics, model specification, its evaluation and selection are some of the issues that normally stand out in first attempts to grasp the method. Testing for parameter constancy is other issue that deserves some thought when deciding how often the hedonic function has to be re-estimated. Moreover, misspecification problems caused by, for instance, the omission of important covariates, are also among some the most common issues that have to be tackled. Workable solutions are usually found through a mixture of experience in econometrics, which is gained through a trial and error learning process, and knowledge in index number theory and in the functioning of the housing market.

A good survey of econometric issues related to the compilation of housing price indexes is provided in Ramalho and Ramalho (2011).

4.3 Treatment of special cases of transactions

In a project encompassing so many different markets and countries, it is natural that particular cases of transactions emerge. Although these have to be evaluated on a case-by-case basis, it essential to address the relevance of each situation with reference to what is being tried to be measured. This process can be highlighted with two particular cases: "bare ownership purchases" and "housing co-operatives".

4.3.1 Bare ownership purchases

The first situation is based on the idea that (full) ownership can be separated into "bare ownership" and "usufruct". Basically, in a purchase of this type, the buyer obtains, in the form of an immediate reduction, the equivalent of all updated rents that he/she would have collected over the an agreed fixed-period (e.g. 15 years) in which the usufruct of the property is not secured. At the end of the fixed-term usufruct, the bare-owner immediately becomes the full owner of the property[23].

The main question to be addressed is whether or not these transactions should be covered in a house price index. In fact, bare ownership should be, in principle, included in the HPI

[22] Providing house price data, especially if done for the first time, can be a very sensitive matter and, as such, a sound knowledge about its potential bias (including those that may stem from the "quality" of the data) is essential for a final decision on its dissemination/release.

[23] An example would be, for instance, the purchase of a permanent residence of someone living in, say, a touristic and very expensive location. In this situation, the buyer has the aim of acquiring a vacation home and does not mind to postpone his/her immediate usufruct since he/she feels that enough compensation is obtained in the form of an immediate price reduction of his/her future residence. A similar exercise could be done for the seller. However, in this case the compensation of the seller would be the possibility of living in the residence for an agreed fixed number of years and the payment of the (reduced) price.

and excluded in the OOHPI. As the scope of the HPI covers all dwelling transactions, there are no reasons to exclude bare ownership transactions from it. In the case of the OOHPI, a transaction only enters in its compilation if it is carried out for own occupancy. As a bare ownership purchase is closer to a "buy-to-let" concept, it is reasonable to assume that transactions falling into this situation are not carried out for own occupancy, but with an investment purpose in mind (and should, for this reason, be excluded from OOHPI).

4.3.2 Housing co-operatives

Housing co-operatives, the second case presented here, is a type of housing tenure that provides an alternative to renting or owning a dwelling. The main question to address is again to ask if this indirect form of ownership should (or should not) be covered in the house price index.

The idea is that although the persons living in a housing co-operative do not actually own the property in which they live in, they are nevertheless free to occupy and use it, very much in the same way an owner occupier would do.

As such, this type of housing tenure is considered similar to owner-occupied housing and should be covered in a house price index (Santos and Evangelista, 2012) is in accordance with rules for OOH indexes, both in OOHPI and HPI.

5 Future developments

The work carried out in the owner occupied housing project will be realised in the framework of a new stage, which started at the beginning of 2012 and will last until 2014. From 2014 onwards, the work will continue under the provisions of a dedicated EU legal framework.

The focus of the new stage - the fifth - of the project will be on improving the reliability and timeliness of already produced HPI output and, at the same time, developing elements/sub-indexes for the OOHPI.

The land issue is also going to be dealt with. In addition, this phase aims at covering a broader range of user needs, by extending the project to the compilation of house sales indicators and by providing a methodological framework for commercial property price indicators, areas which were not tackled in previous phases of the project[24] . All these will be briefly discussed in this section.

[24] An example of a new user need is provided by the use of the HPI produced under this project as an indicator for the surveillance of macroeconomic imbalances in European housing markets. This topic will be discussed later in this section and a more detailed reference can be obtained in Eurostat (2012).

5.1 Adoption of the legal framework for owner-occupied housing

The EU Regulation establishing the regular production of the HPI and of the OOHPI is expected to be adopted in 2012[25] . This Regulation signals September 2012 for the start of the regular transmission of national HPI, and September 2014 for the OOH index. While the regulation does not provide for an inclusion of OOH into HICP, it envisages, after five years from its entry into force, an evaluation on the degree of OOH compliance with HICP standards and on its suitability for potential integration into HICP[26] .

5.2 Additional indicators related to housing markets

Policy analysts and central banks have stressed lately the importance of availability of long back data series for house price indices. In order to identify, using time series analysis, the peaks and troughs of the housing market, they need back data, even estimates where actual data is not available. At the same time, due to the heterogeneous nature of housing market across regions, a geographical breakdown of housing indices can contribute to a better understanding of the housing markets across EU and can prove helpful, especially for local users.

Next to house price data, transaction data – at least at quarterly frequency – are considered necessary to assess the dynamics of housing market activities. This comprises both the number of residential dwellings sold as well as the transaction values. At the same time, land price indices are deemed useful to separate the land and structure components of a house price index, but also as a stand-alone indicator of asset price inflation. Eurostat's pilot work on owner-occupied housing should contribute to the development of a more systematic and harmonized approach to these statistics.

5.3 Commercial property price indicators

Indicators covering commercial properties are of high interest for both private investors and public institutions. However, at present Commercial Property Price Indicators (CPPI) are much less developed than their residential counterparts. Indeed, the concept of commercial property is not yet defined in official statistics and the links with related areas of official statistics, such as price statistics and national accounts, not yet explored.

In order to fill this gap, a recent conference was organized by Eurostat and the European Central Bank in cooperation with IMF, OECD and BIS. A strategy similar to the one

[25] In EU law, a Regulation is directly transposed into the legal systems of member states. As such, any dispositions or obligations that may be included in it become mandatory to countries adopting it.

[26] For the OOH to be implemented into HICP, it should first be produced with monthly frequency, compared to the quarterly frequency that is established by this Regulation. Nonetheless, users will be able to compile a quarterly aggregate of HICP including OOH once the OOH index will be available. It is needless to emphasize that the effect of a possible inclusion of OOH into HICP will depend on the relative weight of OOH in total HICP.

followed for the RPPI handbook was put in place, aiming to develop a handbook on CPPI. The handbook will be drafted by international experts under the coordination of Eurostat.

6 Summary and concluding remarks

This paper provides an account of a statistical project in which Eurostat has worked together with European statistical offices with the aim of producing a system of comparable price indexes covering expenditures related to the purchase and ownership of dwellings.

This was, from the outset, a daunting project as there were no specific international standards for this type of statistical output and embraced countries with markets of various sizes, different data sources and statistical offices with an "in-house" know-how on the production of house price indexes that ranged from almost non-existent to the regular production of official statistics in this area.

In this scenario, the project was designed in phases starting in 2001. A development strategy based on a "top-down" approach, using the HICP as its conceptual umbrella, together with the provision of technical support to the project's participants and the improvement of the methodological standards was put into place in the various phases of the project.

The project has stimulated the emergence of new price index series and contributed to a higher degree of comparability amongst the different national house price inflation measures in Europe.

Although based on the experience gained in the coordination of a project that is still progressing, it is possible to pinpoint some of factors that were, in our opinion, important for its development.

In practice, the achieved progress in the measurement of house price inflation in Europe is based on three interrelated pillars.

The first one, perhaps the most important of all three, is of a practical nature and refers to data availability. The experience gained in this project supports the idea that administrative data should be used, when available. Despite some disadvantages, the advantages of secondary data sources seem to outweigh those of primary data sources[27] [28].

The second pillar, technical and methodological support[29], has proved to be a very important factor to move the project forward. Throughout its course, particularly in its last phases, a team of experts offered technical support and several workshops were provided, allowing the exchange of experiences among participants and Eurostat. Likewise, the im-

[27] See section 3.1. for more on this issue.

[28] If these data is not available, the project showed that having a legal act supporting the project can help statistical offices to disentangle any bureaucratic or other problems surrounding its appropriation. A more detailed perspective on the technical issues encountered in this project was given in section 4.

[29] A more detailed perspective on the technical issues encountered in this project was given in section 4.

provement of the methodology was also reflected in the several technical manual updates[30], which was developed at the same time as the project advanced.

The third pillar, developing a dedicated legal framework, can, at least in the European case, help statistical offices to obtain the necessary resources for its participation in the project and, as already mentioned, ease the access to administrative and other relevant data sources. Moreover, it represents a legal guarantee for regular production and a warranty against the interruption of data provision.

Finally, metadata and its value can never be too much emphasized. In a project including so many statistical offices, "data on how data is compiled" is essential to increase the awareness of who is doing what, stimulate technical discussion on the degree of comparability of used methodologies and, last but not least, provide a benchmark to anyone aiming at implementing good practices. As such, the creation of a regularly updated inventory of sources and methods, especially if implemented from the outset, could turn out to be of great value in a project such as the one that is described in this paper.

[30] The last version of the manual is available in Eurostat (2011b).

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Annex A: Methodological references on national house price indexes

This annex provides a list of relevant methodological references underlying the building of some of the European house price indexes produced under the owner-occupied housing statistical project. The information provided can be seen as complementary to the one that is provided in Eurostat (2012).

Finland

- Although a bit old, Saarnio (2006) provides a good overview of available housing statistics at Statistics Finland. Methodological information is, in addition, available in Koev (2003).

France

- Gouriéroux and Laferrère (2009) provide an excellent overview of the Notaires-INSEE index. More methodological information on this index can be obtained through INSEE (2005

Iceland

- Methodological information on the Icelandic house price index can be found in Jónsdóttir and Guðnason (2008) and in Jónsdóttir and Jónasdóttir (2011).

Ireland

- Methodological information on Ireland's Residential Property Price Index can be obtained in O'Hanlon (2011).

Italy

- Some methodological information on ISTAT's recent work on house price indexes is available in Politi an Patacchia (2011).

Luxembourg

- Lamboray (2010) give a methodological account of its official price index for apartments.

Netherlands

- Statistics Netherlands (2008) is a methodology on its price index for existing dwellings. The index is based on the SPAR methodology.

Slovenia

- A methodological description of its Residential housing price indices is available in SORS (2011).

Spain

- The methodology of the Housing Price Index is (*Índice de Precios de Vivienda*) is available in INE (2008).

United Kingdom

- A description of the methodology on which the ONS (former DCLG and ODPM) house price index is based on is available in ONS (undated). Jenkins and O'Donoghue (2012) provide a very good overview of the ONS HPI.