

## OWNER-OCCUPIED HOUSING AND ITS EFFECT ON THE MEASUREMENT OF INFLATION FOR MALTA<sup>§</sup>

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**Abstract.** This paper discusses the issue as to whether owner-occupied housing (OOH) should be taken into account when measuring inflation. So far, OOH has been excluded from the Harmonised Index of Consumer Prices (HICP), which is used to measure inflation at EU level. Alternative methods for the inclusion of OOH in the HICP are considered, bearing in mind data constraints. Results for Malta show that due to the nature of the housing market in this country, the inclusion of OOH in the HICP generates additional volatility in the inflation index.

### Introduction

Eurostat data show that in most EU countries, more than half of the households are home owners in some member states, home ownership by households reaches 90 per cent.

However, prices paid for owner-occupied housing (OOH) are not included in the HICP, which provides the headline inflation rate for the EU. The present HICP covers the expenditure for dwelling rents, but not OOH. The international comparability of the index is thereby adversely affected. Information on housing prices in various member countries show high rates of growth in recent years, with possible bubbles in some of them. The European Forecasting Network Report (2004) notes that "It seems that the exclusion of prices of owner-occupied houses from the HICP is generating a downward bias in consumer price inflation rates."

Due to the exclusion of expenditure on homeownership from the HICP, measured inflation may not be a true representation of the inflation rate

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<sup>§</sup> The views contained in this article are the author's personal views, and are not expressed on behalf of the Central Bank of Malta.

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experienced by households. Eurostat and the ECB have expressed their concerns on this in numerous occasions, and the likelihood that in the near future all Member States shall incorporate owner-occupied housing in the HICP cannot be overlooked. As such, this paper aims to give an indication of data which would be required for the insertion of OOH in the HICP index and the likely impact on measured inflation.

Developments in residential property prices may also be an important consideration in monetary policy decisions aimed at maintaining price stability over the medium term. At present, while property prices are not included in the HICP, their impact on the rent sub-component is recorded in this index, through changes in rental prices and demand for property.

## **Housing Markets in the European Union**

The share of home owner occupation differs quite substantially across European countries. Table 1 shows the weights of rent in the HICP and the proportion of owner-occupied housing in different European countries.

A negative relationship exists between the weight given to the rent sub-component of the HICP and OOH as a percentage of the total dwelling stock.

Generally speaking, countries with high owner-occupied shares would have a low weight to rent in the national HICP, while relatively high rent weights are found in countries with a relatively low share of owner-occupation. In light of these differences and of the exclusion of house prices, the HICPs for countries with a high rental share tend to capture a larger share of total housing-related costs than are actually borne by those households in countries with a low rental share. These tend to miss a fraction of actual housing costs affecting household expenditure. Therefore, the extension of the HICP coverage to OOH would at least in theory enhance the overall index comparability between countries.

When analysing residential property prices throughout Europe a strong overall growth pattern emerges. However, as Table 2 indicates, there appears to be growth rates varied considerably between 1998 and 2000, and in some cases property prices have decreased, particularly in Germany.

**Table 1**  
**Proportions of Owner-Occupation Weights of the**  
**Rent Component in the HICP**

	<b>Weights of Rent in the HICP</b>	<b>Proportion Owner-Occupied Housing</b>
	(% of total)	(% of total dwelling stock)
Belgium	6.4	68
Czech Republic	3.2	47
Denmark	7.8	53
Germany	10.8	45
Ireland	3.2	77
Greece	2.9	74
Spain	2.3	82
France	6.8	56
Italy	2.2	68
Cyprus	1.4	68
Latvia	0.9	79
Lithuania	0.6	91
Luxembourg	3.3	67
Hungary	0.3	92
Malta	0.6	70
Netherlands	7.7	55
Austria	3.7	58
Poland	2.4	58
Portugal	2.0	75
Slovenia	1.9	84
Slovakia	1.7	74
Finland	8.6	63
Sweden	9.4	46
United Kingdom	4.9	69

*Source:* Eurostat

Home ownership rates vary considerably throughout the EU. These rates differ among the countries for various reasons including cultural differences, income constraints, financial sector developments, or a diverse legislative and political setup. As can be seen in Table 3, in the past decade, home owner occupancy rates have increased in most European countries.

**Table 2**  
**Annual Percentage Changes in Residential Property Prices**

Year	1998	1999	2000	2001	2002	2003	2004	2005
Belgium	6.7	8.7	7.1	6.7	7.7	6.1	10.7	17.2
Germany	-1.0	0.8	0.3	0.2	-1.2	-1.3	-1.5	-1.6
Greece	14.4	8.9	10.5	14.5	13	5.7	2.6	n.a
Spain	5.8	7.7	8.6	9.9	15.7	17.6	17.4	13.9
France	1.9	7.1	8.8	7.9	8.3	11.7	15.2	15.3
Ireland	28.5	21.0	15.7	8.1	10.1	15.2	11.4	11.5
Italy	1.6	5.3	7.9	8.4	9.8	10.2	10.3	8.1
Luxembourg	3.9	7.7	8.2	13.8	11.7	12.9	10.0	n.a
Netherlands	11.7	16.2	16.4	11.2	8.5	4.9	4.2	4.8
Austria	-5.0	-1.9	-1.2	2.1	0.2	0.3	-2.1	5.1
Portugal	3.9	7.9	6.5	3.6	1.1	1.6	0.4	n.a
Finland	10.2	8.9	6.0	0.7	6.1	6.3	7.3	6.1
Malta				5.0	8.7	13.3	20.3	9.8

*Sources:* NCB's and ECB (2005,2006) calculations (OECD PAPER 4) and CBM calculations for Malta (2006).

East European countries like Latvia, Slovakia, Slovenia, and Hungary have shown impressive growth rates in owned dwellings due to reforms in the renting and housing market. In more developed countries, the rate of increase was slower. Developments in the residential property prices are closely monitored by economists and statisticians along with home ownership rates. High home ownership rates may indicate that a large percentage of the population has monetary commitments to finance the owning of a residential home, which may not be captured by the HICP.

### **Theoretical Approaches for the Inclusion of OOH in the HICP**

Housing can be considered both as an investment and also as consumption. However studies by Goodhart (2001) to calculate the impact of price changes from an asset perspective have shown that "the empirical problems involved are enormous".

This paper deals with the measurement of house price inflation from a consumption perspective, analysing the 'shelter' element of housing.

**Table 3**  
**Owner-Occupied Dwellings (% of total stock)**

	1990 - 1995	2000 - 2003	Change
Austria	54	58	4
Belgium	67	68	1
Cyprus	64	68	4
Czech Republic	38	47	9
Denmark	52	53	1
Finland	67	63	-4
France	54	56	2
Germany	43	45	2
Greece	76	74	-2
Hungary	79	92	13
Ireland	79	77	-2
Italy	68	na	na
Latvia	42	79	37
Lithuania	na	91	na
Luxembourg	70	67	-3
Malta	68	70	2
Netherlands	48	55	7
Poland	na	58	na
Portugal	67	75	8
Slovakia	49	74	25
Slovenia	61	84	23
Spain	80	82	2
Sweden	46	46	0
United Kingdom	67	69	2

*Source:* Housing Statistics in the European Union

There are four consumption-based approaches which can be utilised for the inclusion of OOH in the HICP.

#### *User Cost Approach*

The user cost approach encompasses actual and imputed costs for owner occupation, including the opportunity costs caused by owner occupation. If house purchases are partly financed by mortgage borrowing and partly by

own funds, one way to express user cost is the following formula.<sup>1</sup> This user cost (UC) approach adds up each month's actual and imputed costs for owner occupation.

$$UC = RM + IE + D + RC - K,$$

where:

UC - user cost

RM - interest payments on mortgages

IE - the opportunity cost in the form of foregone income that could have been earned if funds are invested otherwise.

D - depreciation

RC - other recurring costs, which consist of straightforward items like electricity, water, maintenance and minor repairs, which are covered in the CPI, regardless of the OOH method adopted.

K - potential capital gains.

This equation can be interpreted as the difference between the cost of purchasing the dwelling in the beginning of the period, then living in it and the returns from reselling the dwelling at the end of the period.

This method includes the opportunity cost of tied up funds and the potential capital gains and losses. Since financing items, such as opportunity cost and interest payments, are not considered in any other HICP items, this method may be controversial. The inclusion of such variables, especially capital gains, might introduce potential volatility in the user cost index. Moreover the inclusion of the interest component might lead to perverse measurements. Monetary policy measures intended to raise interest rates and combat inflation might lead to perverse results as this method might generate a faster rate of inflation in such case.

The user cost model is rather complicated and of limited applicability, especially in those countries where the necessary data are not readily available. A simplified version of the model excluding opportunity costs and capital gains is used in some cases. However, this simplified model might still give rise to problems vis-à-vis the exact measurement of the depreciation rate, as the price of land increases faster than the price of a building in a residential structure, as an apartment.

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<sup>1</sup>The formula is taken from ILO (2004:10.10).

*Rental Equivalence Approach*

The observed rents paid by tenants are used to impute the equivalent rents that would be payable for owner-occupied housing. The model rests on the premise that house owners are not willing to pay more than a tenant, otherwise they would rent rather than purchase a dwelling (and vice versa, thus:).

$$RL \leq M \leq RT$$

where:

RT is a proxy for the OOH costs (what the tenant is paying)

RL is a proxy for what a landlord will receive

M = Monetary Transaction

This method requires that:

- there is a market for rented dwellings and a significant amount of rented dwellings with characteristics similar to those of owner-occupied dwellings;
- the rental market is competitive and not heavily regulated;
- rented and owner-occupied housing are not subject to different tax regimes; and
- the rental statistics do not include services like electricity and insurance but represent purely the rental cost.

One weakness of this model is that home owners and renters generally do not reside in the same type of dwellings. The houses of owner occupiers are usually of a higher standard when compared to those available in the rental market, and the variety of dwellings in the rental market is limited.

This weakness may be addressed by obtaining data either by questioning home owners directly as to how much they would pay to rent their home or by imputing actual rent figures.

*The Payment Approach*

This approach assumes that dwelling inflation moves in line with the actual payments made by owners due to service liabilities such as mortgage payments. However this method is not widely used as in practice it does not give sound results.

### *Net-Acquisition Approach*

The net-acquisitions approach differs from the above approaches as it deals with the prices actually paid for housing at the time of the actual purchase. The treatment of price changes is the same as for all other durable goods in the HICP. In terms of OOH, the net-acquisition approach thus requires the quantification of all the expenditures by new owners for acquiring a dwelling for shelter purposes and would cover all additional expenditures related to the acquisition and maintenance of houses at the time they occur.

In this method, the purchase of a house is seen as an input for housing services. By referring to the actual market transactions, the acquisition approach comes closest to the HICP conceptual framework as laid down by the relevant Council Regulation which calls for the measurement of “final monetary and consumption expenditure.”<sup>2</sup> This method does not impute any transactions and does not estimate any hypothetical prices for non-monetary transactions.

The model includes:

- the acquisition of newly-built dwellings;
- the acquisition of second-hand dwellings from outside the household sector;
- major repairs and extensions; and
- other costs related to OOH, such as transfer costs, insurance, estate agents charges etc.

In this model, the “net” in the title refers to the fact that the acquisition approach excludes the purchases of dwellings from other households, in line with the treatment of durable consumer goods in the HICP, as purchases and sales of goods within the household sector cancel out. This method necessitates also that the land component is excluded, because land cannot be consumed. Diewart (2003) believes that the major advantage of the net-acquisitions approach is that it treats durable and non-durable purchases in a consistent manner.

From a practical point of view, however land and buildings are normally purchased in a single package, and a separate price for the structure component is not distinguishable. It is therefore very difficult, but not

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<sup>2</sup>Council Regulation/EC No 1687/98, Article 3

impossible, to construct an index which excludes land. Another drawback of the net-acquisitions method is that in small markets the number of transactions may be few, thus hindering the reliability of the index.

## **Including OOH in the Measure of Inflation: Empirical Approaches**

Different countries are considering different approaches to include OOH in the measure of inflation.

Table 4 indicates that despite the fact that OOH is presently not taken into account for the compilation of the HICP, some countries have deemed it appropriate to cover OOH in their national consumer (retail) price indices. However, most countries in the EU exclude OOH from the national consumer price indices. The table also suggests that the rental equivalence approach is the most popular method among the countries considered.

It can be noted that following the use/introduction of the rental equivalence approach in such countries as the US and Norway, no great changes were observed in measured inflation. In other countries, such as the UK and Sweden, the use of the user cost approaches lead to significant differences between the inflation indices that include and exclude OOH. Generally the adoption of the user cost approach translates into more volatility, due to the complications that are encountered to collect of the necessary data.

The net-acquisition approach is only used in Australia and New Zealand. However, the preliminary results of a pilot study conducted at EU level suggests that this might be the best option. Eventually the pilot studies for the inclusion of OOH in the HICP, if deemed satisfactory, may result in the inclusion of OOH in the HICP for all the EU member states. Eurostat and the ECB tend to prefer this method over the others for the simple reason that it is in line with the HICP methodology.

Figure 1 shows some preliminary estimates for price inflation by the Organisation for Economic Co-operation and Development (OECD) using the user -cost approach, and by the ECB using the rental-equivalence approach and the net-acquisitions approach. At a glance, it is noted that if the user cost approach is utilised, there would be an increase in the volatility of the euro area HICP, as was evident especially in the years 1999 and 2000.

**Table 4**  
**Treatment of Expenditure on OOH in CPI's**

	EU Countries	Other
User cost approach	FI (to 2005), SE, UK*	CA
Rental equivalence approach	CZ, DE, DK, CY, NL	CH, JP, NO, USA
Payments approach	IE	-
Net-acquisitions approach	(Pilot study for HICP) at EU land, FI( from 2006)	AU, NZ
Other methods	HU, AT, SK	-
Exclude OOH	BE, GR, EE, ES, FR, IT, LU, LV, LT, MT, PL, PT, SI, UK*	-

\* The UK RPI includes OOH in the user cost variant whilst the CPI excludes O

If we consider Figure 1 above, the use of the rental equivalence methods yielded similar results to the actual HICP excluding OOH, indicating that rent inflation was not significantly different from the overall HICP.

Looking at the methodology of the net-acquisitions approach we notice that its main problem is the land component. To this end, the ECB used its residential property price data and Eurostat's construction price data, giving the two series equal weights.

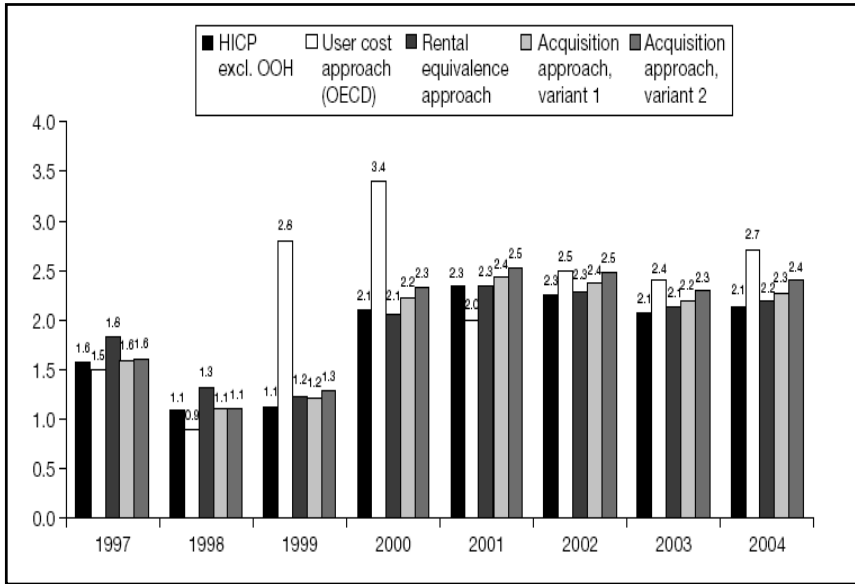
As reflected in Figure 1 there are two variants of the net-acquisitions approach. The first assumes that the expenditure to purchase owner-occupied dwellings represents five per cent of households' total spending on consumer goods; the second ten per cent.<sup>3</sup> When a five per cent weight is applied, the impact is at most 0.1 percentage points higher than the actual HICP. However if a ten per cent weight is considered the difference is on average 0.2 percentage points higher.

#### *Weights for the Inclusion of OOH in the HICP*

A problem encountered in including OOH in the HICP relates to the determination of the weight to be applied to OOH for its inclusion in the

<sup>3</sup> Available statistics from some Member States suggests that OOH has an average weight of 7.5%.

**Figure 1**  
**Euro Area Rate of Increase HICP Including OOH**  
**(Experimental Results with Different Methods)**



Source: ECB, Eurostat, OECD.

inflation index, particularly since the appropriate weights depend on the chosen method.

Weights in the acquisition approach need to be established by observing prices for new as well as existing dwellings. The number of transactions of house purchases from newly-built category or second hand housing from institutions (for example government) has to be recorded. Typically, the newly built houses form the major part of the transactions. Therefore, the weight applied would mainly reflect the expenditure on the purchases of new houses.

Ideally, the price of land should be removed from the net-acquisition computation. However, this is easier said than done. Therefore, an alternative house price index may be used in the calculation of the consumer price index including the OOH. Applied weights have to be adjusted accordingly. In markets with large house price dynamics, a house price index including the

land component would have higher volatility than one considering structure only. Therefore, to counteract for this higher volatility, a smaller weight may be applied.

ILO (2004) also states that “if the rental or leasing markets for durable exist and durable has a long useful life, then the expenditure weights implied by the rental equivalence or user cost approaches will typically be much larger than the corresponding expenditure weights implied by the acquisitions approach.”

Diewart (2003:15) estimates that “under normal conditions and over a longer time horizon, households’ expenditure on consumer durables using the user cost approach will tend to exceed the corresponding money outlays on new purchases of the consumer durable. When applied to housing the acquisitions approach in the CPI is likely to give one half the expenditure weight that the user cost would give.”

The latter finding is a very important one and needs to be kept in mind when applying the weights to the different measures of owner occupation. One possible reason as to why the net-acquisition approach has a lower frequency than the other two methods pertains to the method of measurement.

In the net-acquisition approach, weights are determined by expenditure and frequency. The purchase of a house is not as frequent as the purchase of daily needs, nor is it as frequent as the imputed, often monthly, rent. With the net-acquisitions approach, the dwelling is only inserted once at the time of purchase.

Although the expenditure weight is very large compared to income, the frequency of purchasing a house when taken across the whole basket is low. As a result, the weight applied in the net-acquisitions approach can be lower.

Table 5 gives a summary of actual weights applied to CPIs in various countries. Whilst all countries include the rent component in the national consumer (retail) price indices, OOH is not dealt with in all the consumer price indices. The weights are quite high, indicating that countries not considering housing in their measurement of inflation are affecting the credibility of the inflation index, particularly if the numbers of homeowners is high.

**Table 5**  
**Weights Applied to Rent and Owner-Occupied Housing in CPIs.**

	<b>Method of Measuring Owner-Occupied Housing (OOH)</b>	<b>House Weights (%)</b>		
		OOH	Actual Rent	Total
Australia	Net-acquisition	11.21	5.22	16.43
Belgium	Not included		6.39	6.39
Canada	User cost	15.98	6.14	22.12
Euro area	Not included		6.32	6.32
France	Not included		6.14	6.14
Italy	Not included		2.70	2.70
Germany	Rental equivalence (OOH included in actual rent)	n.a	21.17	21.17
Japan	Rental equivalence	13.60	3.48	17.08
Mexico	Rental equivalence	11.97	2.52	14.49
Netherlands	Rental equivalence	9.13	6.69	15.82
Poland	Rental equivalence	11.97	4.54	16.51
Portugal	Not included		2.02	2.02
Russia	Not included		12.53	12.53
Singapore	Rental equivalence (includes rental values and OOH)	14.00	14.00	
Spain	Not included		2.31	2.31
Sweden	User Cost	16.07	10.75	26.82
Switzerland	Not included		18.72	18.72
United States	Rental equivalence	23.44	5.83	29.27

*Source: IFC (2006)*

The calculation of the correct weight in the measurement of inflation is fundamental to the role of housing in the HICP indicated by Eurostat (2007a): “more work needs to be done concerning the weighting within the aimed wider housing price index and which OOH weights are needed when data is included into the HICP.”

## **The Application of the Rental Equivalence Method in Malta**

The idea behind the rental equivalence method is to use a proxy for the rent that homeowners would pay for their dwelling if they had to rent it from the market. This is either computed from rental data directly gathered from the market or by imputing rent from actual rent market indices available. This index must be then augmented by giving an adequate weight to represent the homeowners' expenditure on the imputed rent. As seen earlier this is the most common method used for the inclusion of OOH in the HICP.

Unfortunately, there is no rental market data available in Malta. Ideally, an index monitoring the rental market dynamics should be available and the necessary imputations would then be made from such an index. Moreover, some rents in Malta are capped under the 1939 rent law. Eaglesperger (2006:71) states that: "if the share of rented housing is very small, it may be cumbersome or almost impossible to collect reliable rental equivalent data. In addition regulated rent markets or the existence of a separated rental market for rent and for owner occupation imply challenges to applying the rental equivalence approach in practice."

Despite the limited information available, the application of the rental equivalence method to OOH in the HICP shall still be applied.

In Malta, the only rental market index available is the 'Actual Rent' subcomponent in the HICP. Data from the Actual Rent subcomponent are available from 1996 at a monthly frequency. The Actual Rent subcomponent is updated on an annual basis with new index values becoming available every November.

In the absence of more accurate data, only this index can be used as a proxy of imputed rent for the purposes of the rental equivalence method. A weight of ten per cent and separately of fifteen per cent will be applied to this index and inserted in the HICP. Countries using the rental equivalence method have an average weight of about thirteen per cent.<sup>4</sup>

In addition, Eurostat applied a scenario of expenditure weight of five per cent and ten per cent for the net-acquisitions approach. Diewart (2003)

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<sup>4</sup> The average for Japan, Mexico, Poland and the Netherlands is 12% including the United States the average of 14%.

argues that the weight applied to the rental equivalence should be larger than that for the net-acquisitions approach. The weights applied in the case of Malta are in line with Diewart's recommendations.

Table 6 shows the annual averages of the indices. The first column shows the HICP 'Actual rent subcomponent index' whilst the second column shows the Total HICP Index. The third column shows the computation of the indices recalculated by applying a weight of fifteen per cent to the actual rent index and of 85 per cent weight to the HICP index. The last column shows the computation of the index applying a weight of ten per cent and 90 per cent accordingly.

Figure 2 shows that there is little or no change in the inflation rate if the actual rent index is given a higher weight in the HICP to represent OOH. In the early years of the index, it can be noted that if a higher weight is applied to the rental subcomponent, the measured inflation rate drops slightly. During 2005 a higher weight to the HICP actual rent subcomponent did not affect the inflation rate. However, from the last quarter of 2006 the actual rent sub component index was shifted upwards, from 101.46 to 104.27. This resulted in a higher inflation rate when considering the weighted actual rent index.

Apart from the increase in the actual rent index, the total HICP fell during the last months under consideration, resulting in a double effect.

The coefficient of variation (CV) is a measure of relative dispersion. It is defined as the ratio of the standard deviation to the mean.

Distributions with  $CV < 1$  may be considered low-variance, while those with  $CV > 1$  may be considered high-variance. In this case all the values for the inflation rates are less than 1, indicating a low variance. Moreover, the indices move very close to each other, but according to the coefficient of volatility, the reweighted indices are less volatile than the actual HICP index alone. On the other hand, the rate of change of the Actual Rent subcomponent index alone is more volatile than the other indices.

It is important to keep in mind that this index is not updated regularly/ monthly and does not always provide the current rental price information. Furthermore, the rental market and the market for owner-occupied dwellings are very different in Malta, and the imputed rent is difficult to calculate.

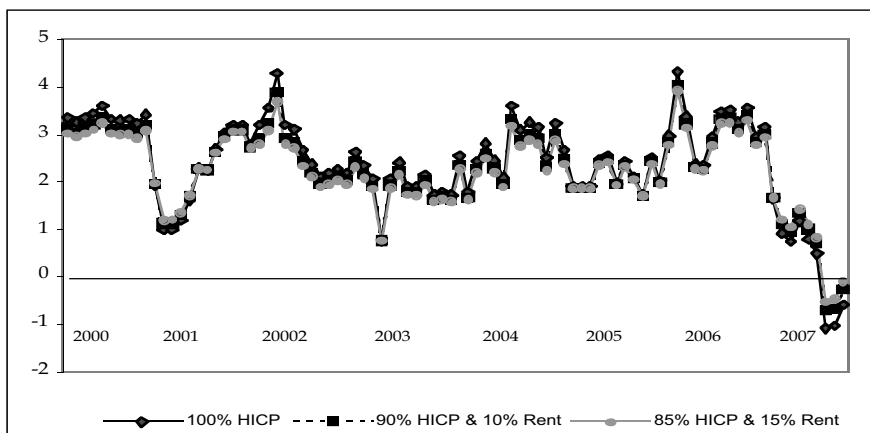
**Table 6**  
**Actual HICP Indices and Recalculated Indices (annual average)**

Base year 2005 = 100

	HICP	HICP	Recalculated Index	
	Actual Rents	Actual Index	0.15 - 0.85	0.1 - 0.9
1996	88.83	77.97	79.60	79.06
1997	89.99	81.02	82.37	81.92
1998	97.03	93.51	94.04	93.86
1999	92.80	85.94	86.97	86.63
2000	94.20	88.55	89.40	89.12
2001	96.07	90.77	91.57	91.30
2002	96.07	90.77	91.57	91.30
2003	97.43	94.95	95.32	95.19
2004	98.37	97.53	97.66	97.62
2005	100.00	100.00	100.00	100.00
2006	101.93	102.58	102.48	102.51
2007	104.27	101.74	102.12	102.00

Sources: Eurostat and Author's Estimations

**Figure 2**  
**HICP Inflation Rates**



Source: Author's Estimation.

**Table 7**  
**Variation in Inflation Rates–Rent**

	<b>Standard Deviation</b>	<b>Mean</b>	<b>Coefficient of Variation</b>
Total HICP	1.077	2.394	0.450
Actual Rent Index	0.773	1.453	0.532
0.10 Rent – 0.9 HICP	0.961	2.521	0.381
0.15 Rent – 0.85 HICP	0.906	2.457	0.369

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However, this method has the advantage that it does not measure housing at the moment of purchase.

### **The Application of the Net-acquisitions Approach in Malta**

In Malta, a price index for construction is not available and therefore only the property price indices can be utilised. The two property price indices available for Malta (compiled by the NSO and the CBM) shall be included in the recalculated HICP index below. Two new indices shall be assessed for the purpose of this study, applying weight of five per cent and ten per cent to each of the property price indices.

At present Eurostat includes “all dwellings (both new dwellings and existing ones) including the price of land.” According to Eurostat (2007) it is expected that “Indices should be divided into indices for second-hand dwellings and new dwellings and take gross expenditure weights into account. A price index for additional acquisitions costs related to the purchase of dwellings (i.e. transfer costs) should also be developed and compiled on a regular basis.” An index for the second hand dwellings is needed so it can be stripped from the net-acquisitions approach calculations as the second hand market may be speculative. Therefore, in the absence of the dwelling index, which differentiates between new and second-hand dwellings, the NSO and CBM property price indices shall be utilised in this analysis.

## **The Inclusion of the NSO Property Price Index**

The NSO property price index considers all the transactions carried out in the housing market, and is calculated from prices as registered in legal contracts. This is not in line with the requirements of the net-acquisitions approach where only the dwellings acquired from the construction sector should be considered and where second-hand homes and the land component of the properties should be excluded. In addition to this, however, due to lack of alternative data for Malta, like in most EU countries, this index is used to recalculate the HICP.

All indices have been rebased so that 2002 Q1 is equal to 100. The indices have also been averaged into quarters, to enable comparison with the CBM index, which is on a quarterly frequency. Weights of five per cent and ten per cent are applied to the property index. The results are shown in Table 8 are obtained.

Table 8 shows the data for the NSO property price index and the HICP total index (averaged into quarterly data) in the first two columns. The next column shows computation of the index in the first two columns recalculated by applying a weight of five per cent to the NSO property price index with the remaining 95 per cent weight applied to the actual HICP index. The last column shows the computation of the index applying a weight of ten per cent attached to the property price index.

An analysis of the changes in the year-on-year inflation rates reveals a high degree of volatility. Figure 3 shows there is a spike in the inflation rate in the fourth quarter of 2005 of around seven per cent. The gap between the inflation rates narrowed after that quarter, and data for the last quarter of 2006 and the first quarter of 2007 show that the inflation rate was below one per cent. This reflected the drop in the property price index. Table 9 shows that the volatility increased as the All Property Price Index (APPI) was inserted in the HICP.

The larger the weight applied to the NSO APPI, the larger is the volatility in the inflation rates. In fact, the coefficient of variation increased from 0.33 (actual HICP) to 0.45 (HICP/NSO APPI) when considering inflation rates for the period 2003–2007.

**Table 8**  
**HICP and Recalculated Indices\***

	Rebased 2002 Q1 = 100 NSO All		Recalculated Indices	
	Property Price Index Quarterly	Total HICP Quarterly	0.05–0.95	0.10–0.90
2002 Q1	100.00	100.00	100.00	100.00
2002 Q2	98.26	103.62	103.35	103.08
2002 Q3	101.47	104.82	104.66	104.49
2002 Q4	103.71	102.81	102.86	102.90
2003 Q1	100.83	101.75	101.71	101.66
2003 Q2	104.10	105.68	105.60	105.52
2003 Q3	106.92	106.66	106.67	106.69
2003 Q4	108.83	105.14	105.32	105.51
2004 Q1	114.60	104.25	104.76	105.28
2004 Q2	120.51	109.18	109.75	110.32
2004 Q3	125.27	109.82	110.59	111.36
2004 Q4	118.86	107.41	107.98	108.55
2005 Q1	130.02	106.66	107.82	108.99
2005 Q2	126.46	111.56	112.31	113.05
2005 Q3	145.42	112.11	113.77	115.44
2005 Q4	154.83	111.22	113.40	115.58
2006 Q1	148.49	109.38	111.33	113.29
2006 Q2	153.44	115.38	117.28	119.18
2006 Q3	153.51	115.72	117.60	119.49
2006 Q4	153.46	112.46	114.51	116.56
2007 Q1	155.12	110.28	112.52	114.76

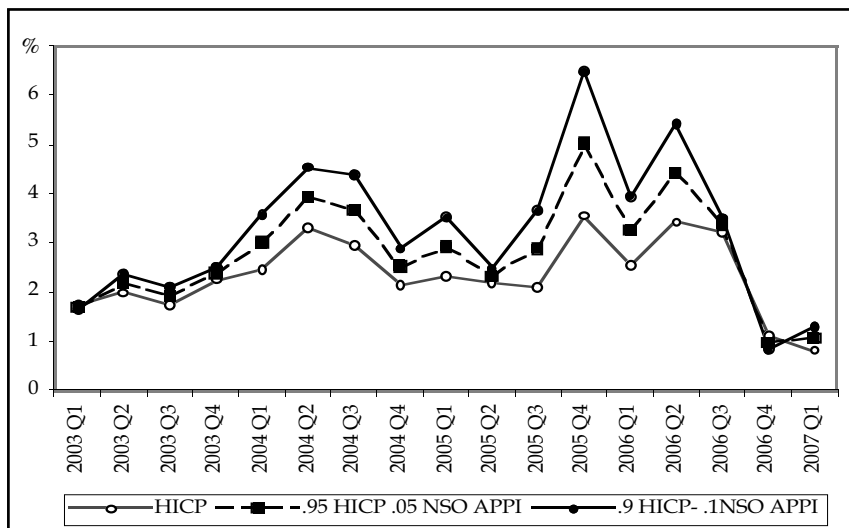
*Source:* NSO, Eurostat, author's estimations

\* The HICP and NSO's property price index are taken as an average of the quarter for comparability intents and purposes.

## **The Inclusion of the CBM House Price Index**

The CBM index monitors the market prices from advertised prices and therefore includes all types of dwellings for sale, including second-hand homes.

**Figure 3**  
**Annual Inflation Rates**



Source: Author's estimations.

The land component is also present in this index. The data for the property price index compiled by the CBM are available from 2000 at quarterly frequency and was rebased in Table 10 so that 2002 Q1 is 100, in line with the actual HICP.

**Table 9**  
**Variation in Inflation Rates-NSO**

	Standard Deviation	Mean	Coefficient of Variation
HICP	0.77	2.35	0.33
NSO APPI	49.70	64.20	0.77
0.95 HICP - 0.05 NSO APPI	1.10	2.80	0.39
0.9 HICP - 0.10 NSO APPI	1.47	3.25	0.45

According to the annual percentage changes in the indices, it is seen that the inflation rates are similar between 2001 and 2002 and from 2006 to the second quarter of 2007. Figure 4 shows that the gap in the inflation rates has narrowed as the rapid growth in house prices experienced in 2004 slowed down. The index shows that there is a spike in the second quarter of 2004, and as a result, when the weight of ten per cent is applied, the inflation rate was close to seven per cent. This is directly comparable to the spike seen in the last quarter of 2005 in the property price index of the NSO. The time lag reflects the time elapsing between advertising a property for sale, which is registered in the property price index of the CBM, and signing the contract.

The coefficient of variation for the CBM/HICP index shows that there is no appreciable change in the volatility of the inflation rates when a weight of five per cent is applied to the property price index of the CBM. However, when a weight of ten per cent is applied, volatility increases. The coefficients of variation for the CBM/HICP indices are higher than the NSO/HICP indices. The property price index of the CBM captures the high volatility in inflation rates, in line with the booms experienced in 2004 and the decrease in property inflation experienced more recently.

## **Conclusions and Recommendations**

The traits exhibited by the housing market in Europe suggests that the market is very dynamic. Moreover, owner occupation rates are different, stemming from the fact that countries have different cultural and political realities. The fact that these characteristics are totally excluded from the HICP makes this index not fully comparable across countries.

It is a known fact that the higher the owner occupancy rate, the lower is the weight of rent in the national HICP. Thus, property price increases in countries where the home ownership rate is high would not be adequately reflected in the inflation rate measure.

The increase in prices would only be transmitted indirectly through increases in the rental market prices, if and only if the rental market is functioning properly. However, if the actual rent subcomponent in the HICP has a small weight, the full extent of the increase is not captured in the HICP. Furthermore, if the rental market is subject to rent regulation, changes in property prices

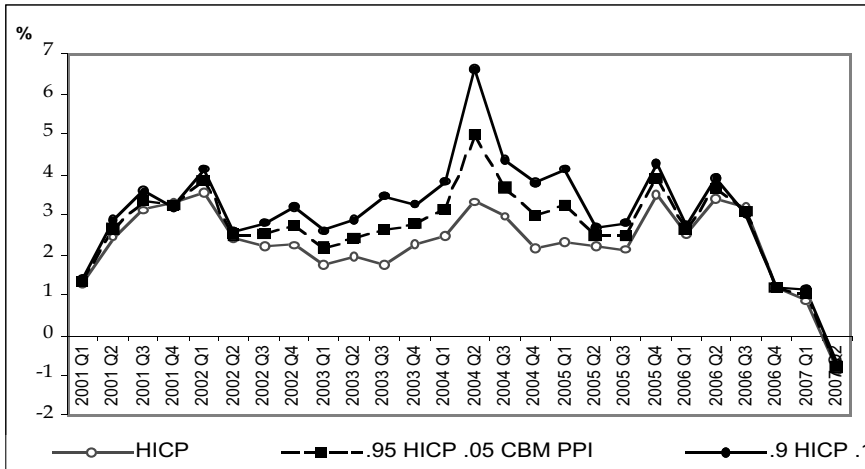
**Table 10**  
**HICP and Recalculated Indices\***

	CBM House Index	Total HICP	Recalculated Index	
			0.05 – 0.95	0.10 – 0.90
2000 Q1	88.74	95.37	95.04	94.71
2000 Q2	82.79	98.82	98.02	97.22
2000 Q3	88.95	99.45	98.92	98.40
2000 Q4	95.26	97.35	97.25	97.14
2001 Q1	91.16	96.58	96.31	96.04
2001 Q2	88.98	101.21	100.60	99.99
2001 Q3	96.36	102.54	102.23	101.92
2001 Q4	97.20	100.55	100.38	100.22
2002 Q1	100.00	100.00	100.00	100.00
2002 Q2	92.88	103.64	103.10	102.57
2002 Q3	104.33	104.81	104.79	104.76
2002 Q4	109.00	102.80	103.11	103.42
2003 Q1	110.25	101.74	102.17	102.59
2003 Q2	103.92	105.67	105.59	105.50
2003 Q3	124.07	106.64	107.52	108.39
2003 Q4	121.81	105.12	105.96	106.79
2004 Q1	127.01	104.23	105.37	106.51
2004 Q2	142.09	109.17	110.82	112.46
2004 Q3	142.72	109.80	111.45	113.09
2004 Q4	141.70	107.40	109.11	110.83
2005 Q1	149.30	106.64	108.78	110.91
2005 Q2	150.29	111.59	113.52	115.46
2005 Q3	153.13	112.14	114.19	116.24
2005 Q4	155.27	111.15	113.35	115.56
2006 Q1	155.44	109.34	111.64	113.95
2006 Q2	161.40	115.36	117.67	119.97
2006 Q3	155.95	115.71	117.72	119.73
2006 Q4	156.75	112.47	114.69	116.90
2007 Q1	160.23	110.26	112.76	115.26
2007 Q2	161.74	114.35	116.72	119.09

*Source:* CBM, Eurostat, Author's estimations

\* The quarterly average of the HICP index is used, so as to be at the same frequency as the CBM house price index.

**Figure 4**  
**Annual Inflation Rates**



Source: Author's Estimations

are not reflected in higher rents. It can be argued therefore that credibility of the HICP may be enhanced if the OOH is included in it.

Furthermore, the exclusion of OOH from the HICP might be the reason for the large differences between the actual and perceived inflation in most countries.<sup>5</sup> This possibility has also been highlighted by the European Forecasting Network, (2004) as one of the main drawbacks of the HICP. Empirical evidence shows that indices including the OOH component tended to register higher inflation rates. This is also confirmed by the results of a pilot study conducted at EU level. This downward bias on the inflation rate differs between countries.

The inclusion of OOH in the HICP is therefore justified. However, the practical implementation of this requires careful consideration of a number of issues. From the four methods described in this paper, the net-acquisitions

<sup>5</sup> Perceived inflation values are estimated from consumer surveys. A review of country results tends to show that the perceived inflation rate by consumers is higher than the actual inflation rate. ("Assessing the Gap between Observed and Perceived Inflation in the Euro Area: Is the credibility of the HICP at Stake?")

**Table 11**  
**Variation in Inflation Rates**

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	<b>Standard deviation</b>	<b>Mean</b>	<b>Coefficient of Variation</b>
HICP	0.97	2.29	0.42
CBM House Price Index	7.66	9.57	0.80
0.95 HICP – 0.05 CBM	1.11	2.67	0.42
0.9 HICP – 0.10 CBM	1.35	3.06	0.44

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approach seems to be preferred over the others since it is in line with the HICP methodological requirements, as it deals with housing as if it were a durable good and its purchase value is included in the index in the time of acquisition.

When analysing the other options available to represent OOH in the consumer price indices, it transpires that the rental equivalence method is the most common.

When applied to Malta, the rental equivalence approach gives very close results to the actual HICP. This is consistent with empirical evidence as inflation rates were found to be less volatile than other methods when the rental equivalence method was applied. However Malta faces a problem in this respect since the price index of rents is updated only once every year and the existing rental regulations undermine the proper functioning of the market. Moreover, the difference between the housing and rental units is rather large. Nevertheless, the imputation of data using an actual rent index is compliant with the rental equivalence approach.

On the other hand, the user cost approach, or simplified variants of it, as applied in different countries and studies, gives more volatile results and is more difficult to estimate.

In the case of Malta, a construction price index showing the developments in construction prices is not available. Only the property price indices of the NSO and the CBM could be utilised, and their inclusion in the HICP resulted in higher volatility. In fact, the larger the weight applied to the NSO or CBM

property price indices, the greater the coefficients of variation. The fact that no construction price data has been utilised possibly makes the index for Malta even more volatile.

Apart from this consideration, there is also the issue of data availability. Not all data are available in Malta, and where available it is not timely as required for the compilation of the HICP. Moreover, although the Census has been carried out months ago, the volume on the population and housing was not yet published at the time of completion of this paper. The availability of this information would have enabled the calculation of more reliable and accurate weights to be applied to the OOH component in the HICP. In this analysis, only baseline scenarios could be considered.

On a wider level, due to the lack of harmonisation in the OOH data, introducing OOH before the correct structures are in place might harm the HICP index and threaten its credibility more than the exclusion of OOH. The introduction of OOH in the HICP might give rise to more volatile results and jeopardize the comparability to a greater extent than it is presently.

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