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HOUSE PRICES AND INFLATION IN THE EURO AREA

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by Boris Cournède

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Abstract

The inflation measure used by the European Central Bank excludes housing costs that are borne by home owners even though they make up more than a tenth of household final consumption expenditure in the euro area. Has the exclusion of owner-occupied housing costs driven a wedge between the official harmonised index of consumer prices (HICP) and the cost of living? To answer this question, a measure of the user cost of housing capital has been constructed for every euro area country (except Luxembourg). User costs are measured taking into account property taxes but net of tax breaks that home owners enjoy on mortgage repayments. The user cost measure is combined with the HICP to derive a “broad” inflation estimate. For the sake of comparison, an alternative estimate has been put together using imputed rents. The main conclusion is that owner-occupied housing costs have an impact. Another important conclusion is that the effect of owner-occupied housing costs on inflation varies noticeably with the method used to incorporate them into the price index. The paper finally discusses the choice of the method from the point of view of economic policy makers.

This Working Paper expands on material presented in the 2005 OECD Economic Survey of the Euro Area (www.oecd.org/eco/surveys/eu).

JEL classification: E300; E310.

Keywords: inflation; housing; HICP; Eurostat; ECB; user cost; imputed rents.

Résumé

Bien qu'ils représentent plus de dix pour cent de la consommation finale des ménages dans la zone euro, les coûts de logement qui sont supportés par les propriétaires occupants ne sont pas inclus dans l'indicateur d'inflation employé par la Banque centrale européenne. L'exclusion de ces coûts a-t-elle enfoncé un coin entre l'indice des prix à la consommation harmonisé (IPCH) et le coût de la vie ? Pour répondre à cette question, une mesure du coût d'usage du capital a été construite pour les logements occupés pour chacun des pays appartenant à la zone euro (à l'exception du Luxembourg). Il s'agit d'une mesure du coût net d'impôts et de taxes, qui tient compte à la fois des taxes foncières et des allègements d'impôt dont bénéficient les propriétaires occupants. Cette mesure est ensuite adjointe à l'IPCH pour obtenir une évaluation de l'inflation « élargie ». Pour les besoins de la comparaison, une autre estimation a été effectuée en utilisant des loyers imputés. La principale conclusion est que les coûts du logement pour les propriétaires occupants font une différence. Une autre conclusion importante est que l'impact de ces coûts dépend sensiblement de la méthode qui est employée pour les intégrer à l'indice de prix. En conclusion, l'étude examine la question du choix de la méthode du point de vue des opérateurs de la politique économique.

Ce Document de travail prolonge des travaux réalisés pour l'Étude économique de l'OCDE de la zone Euro 2005 (www.oecd.org/eco/etudes/ue).

Classification JEL : E300; E310.

Mots-clefs : inflation ; logement ; IPCH ; Eurostat ; BCE ; coût d'usage ; loyers imputés.

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HOUSE PRICES AND INFLATION IN THE EURO AREA

By Boris Cournède¹

1. The European Central Bank's mandate to maintain price stability is a central pillar of economic policy in the euro area. To implement this mandate, the ECB is targeting inflation, as measured by the harmonised index of consumer prices (HICP). This index, however, excludes housing costs borne by home owners. The national accounts for 2002 put these costs at € 413 billion - more than a tenth of household final consumption expenditure in the euro area. The recent experience of strong house price inflation in several euro area countries begs the question as to whether the exclusion of owner-occupied housing costs might have driven a wedge between the HICP and the cost of living. The presence of any such wedge clearly matters because many important economic decisions, such as wage settlements and consumption choices, are directly influenced by changes in living costs.

2. This paper first recalls the reasons behind the exclusion of owner-occupied housing from the HICP before highlighting the advantages of the opposite choice. It then presents broad inflation estimates which, for the purpose of illustration combine the HICP and owner-occupied housing costs. The main conclusion is that owner-occupied housing costs matter as their inclusion in inflation measures can make a sizeable difference. Operationally, their inclusion requires care since a number of methodological choices have to be made which can significantly impact on the resulting inflation measure.

1. The rationale for excluding owner-occupiers' housing costs from the HICP

3. As far as housing costs are concerned, the HICP only includes rents actually paid by tenants and light maintenance expenditure by renters and owner-occupiers.² The implicit rents paid by home owners are excluded from this measure. The main reason for this choice lies in the very divergent treatment of owner-occupied housing across countries. For instance, only four of the 12 euro area countries include estimates of owner-occupied housing costs in the national consumer price indices, and these four countries use three different methods. It therefore proved impossible to agree on a measure for owner-occupied housing when the HICP was first introduced. Furthermore, the scope of the HICP has been defined as actual monetary transactions undertaken for final private consumption purposes, which in principle excludes imputations (Eurostat, 2004). The final monetary private consumption approach warrants that the purchase of assets, including dwellings, lies outside the scope of the index.

4. The goals of cross-country comparability and verifiability are important motives for restricting the HICP to actual transaction prices (Eurostat, 2001). Using tangible prices limits the need for imputed values which can be more difficult to audit and to compare. However, even with actual prices, a recurrent co-ordinating process is needed, and is indeed operating, to harmonise the methods used to adjust collected price information for changes in quality.

5. Another reason for excluding owner-occupied housing costs is that the HICP is officially defined as a "pure inflation index" or as "not being a cost of living index" (Eurostat, 2004). The pure inflation concept clearly refers to measuring changes in prices of goods and services purchased by means of monetary transactions. From a conceptual point of view, this suggests that the "pure inflation index" should broadly correspond to the deflator of household real money balances. Such an approach warrants

excluding imputed costs but, symmetrically, it calls for taking into account changes in the prices of assets purchased by households, including shares and bonds, as advocated by Fisher (1911). A choice of this nature would raise considerable measurement issues and make the index very different from cost of living indices (Diewert, 2002). Such a choice would also deviate from the final consumption approach the HICP is simultaneously based on. Furthermore, the pure inflation approach underpinning the HICP is in tension with the recommended adjustment of prices for quality changes that imply “a significant difference in utility to the consumer” (Eurostat, 2001). Indeed, the use of quality adjustment makes no sense outside the theory of cost of living indices (Cecchetti and Wynne, 2003).

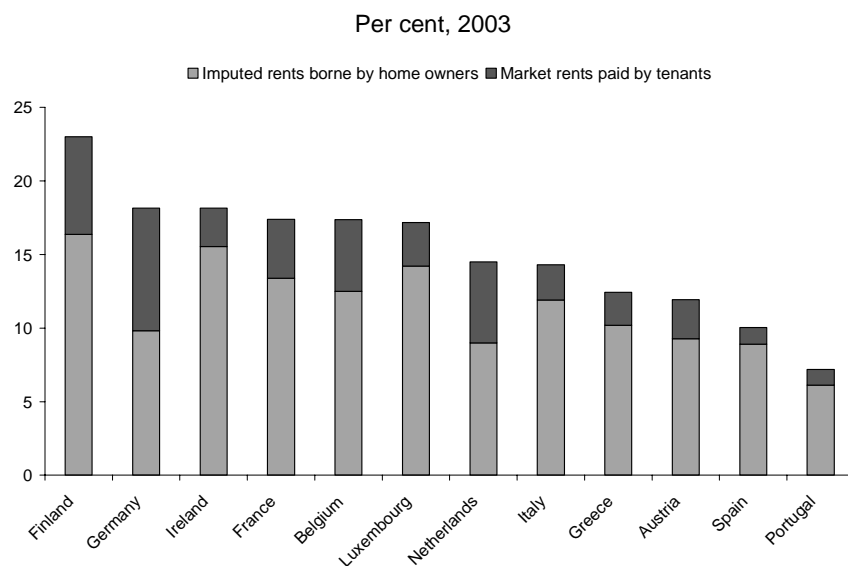
6. A “pure inflation index” could also be understood as an Austrian school-type inflation measure - that is to say an inflation measure that reflects only those price developments that are caused by changes in money supply and not by real factors. Measures of this kind have been constructed for the United Kingdom by Quah and Vahey (1995) and for the euro area and the Netherlands by Fase and Folkertsma (1999). Even though it is called a “pure inflation index”, the HICP clearly does not belong to this category as it is calculated as a consumption-weighted mean of observed price changes with no attempt at filtering out real effects.

2. The advantages of inclusion

2.1 *An important component of private consumption*

7. House prices affect the user cost of capital associated with home-ownership. The negative effect of higher house prices on the cost of living is clear for renters and for prospective home owners who forgo any wealth effects. It is real for existing owner-occupiers too. Even though they see their wealth increase when residential property is booming, they are also confronted with a higher cost of living as they face a higher opportunity cost of capital for the same volume of housing services.

8. Owner-occupied housing services make up a sizeable part of private consumption (Figure 1). On very conservative estimates, national accounts value imputed rentals for owner-occupiers at more than 10.4% of euro area household final consumption in 2002. Following Marshall (1898), the System of National Accounts foresees that “the imputed values of the housing services are recorded as final consumption expenditures of the owners” (Inter-Secretariat Working Group on National Accounts, 1993). Major repairs and improvements, another expenditure item not covered in the HICP basket of goods and services, made up 0.9% of household final consumption in the euro area in 2002.

Figure 1. Housing services make up a large share of private consumption

Source: OECD National Accounts Database.

9. Given the importance of owner-occupied housing services in private consumption, changes in their prices will affect household decisions. For instance, increasingly expensive owner-occupied housing services imply a higher cost of living, which will influence wage-setting behaviour and then potentially other prices through wage-price spiral effects. The effect of higher owner-occupied housing costs is clear and instantaneous for prospective first-time buyers and for existing home-owners looking for more spacious dwellings. For other existing home-owners such a rise in the price of housing services is accompanied by an increase in property income in the form of higher imputed rents. Therefore, wage claims following an increase in the price of owner-occupied housing services may take more time to materialise than for other prices. Nevertheless, because it still corresponds to a fall in the value of money, such a price rise will eventually bear on household decisions in the same way as other forms of inflation (Goodhart, 2001).

10. In practice, households pay attention to housing costs when they make economic decisions. The absence of owner-occupied housing costs from the HICP may help explain the emergence of a debate on a disconnect between recorded and perceived inflation. In Italy, Marini *et al.* (2004) estimate that more than 6 percentage points must be added to the HICP inflation rate each year since 2002 to make survey-based measures of changes in households' financial situation match national accounts data on household disposable income deflated by the HICP. Even if this estimate appears to be on the high side, and if other factors are likely to be at play,³ it gives substance to the view that the HICP may diverge to some degree from the cost of living as perceived by European households.

2.2 Better comparability across countries and over time

11. Another benefit of taking owner-occupied housing into account in a price index is to improve cross-country and inter-temporal comparability. The international System of National Accounts recommends imputing rents to home owners largely because "The ratio of owner-occupied to rented dwellings can vary significantly between countries [...], so that both international and intertemporal comparisons of the production and consumption of housing services could be distorted if no imputation were made for the value of the own-account housing services (Inter-Secretariat Working Group on

National Accounts, 1993)."⁴ The ratio of owner-occupied to rented dwellings varies considerably among euro area countries, and so does the share of rent in HICP expenditure, which ranges from 2% in Portugal to 11% in Germany (ECB, 2005).

3. Current practice and plans in some countries

12. In Canada, Japan and the United States, monetary authorities are relying on price indices which include the cost of owner-occupied housing (Table 1). In the euro area, Eurostat, supported by the ECB, identified the inclusion of owner-occupied housing in the HICP a priority in 1997 and a task force was set up in 1998 to devise its implementation, but the project is still at the pilot stage.

Table 1. The treatment of housing in price measures used by central banks in major monetary areas

Monetary policy authority	Price measure	Compiling agency	Treatment of owner-occupied housing costs
Federal Reserve	Personal consumption deflator	Bureau of Economic Analysis	User costs calculated by applying a mortgage-rate dependent rent-to-value ratio to house prices.
	Consumer price index	Bureau of Labour Statistics	Imputed rents based on actual rents adjusted for quality differences between owner-occupied houses and other dwellings.
European Central Bank	Harmonised index of consumer prices (HICP)	European Commission (Eurostat)	Not included in the index.
Bank of Japan ¹	Consumer price index excluding fresh food	Statistics Bureau	Imputed rents based on actual rents.
Bank of England	Consumer price index (national name for the HICP)	National Statistics	Not included in the index.
Bank of Canada	Consumer price index excluding food, energy and indirect taxes	Statistics Canada	User costs consisting of mortgage interest cost, depreciation, property taxes, maintenance, insurance premiums and other fees.

1. Country where price stability is not the primary target pursued by the monetary authorities.

13. There are indications that Eurostat may choose to integrate owner-occupied dwelling prices in the HICP, on an acquisition basis, net of land prices. The choice of an acquisition basis would imply an apparently consistent treatment of housing and other consumer durables as the index would reflect actual price changes in the housing market to the extent that they influenced household decisions at a given point of time. This choice would make it easier to achieve high standards of cross country comparability while maintaining the principle that the index should be based on the prices of market transactions.

14. Nonetheless, this approach has serious drawbacks.

- Land prices reflect the value of location and owner-occupiers derive utility from the locations of their homes as much as from their structures. Land prices affect the cost of living to the same extent as the cost of structures. Excluding land prices would imply that the owner-occupied component of the new HICP would reflect only a fraction of housing costs, because land typically represents about half of house prices in European countries (Calmfors *et al.*, 2005).

- Land prices are the most volatile component of house prices since they represent the scarcity value of a non-reproducible asset: excluding them would seriously reduce the information content of the new measure in terms of tracking changes in living costs.
- The rationale behind extending the treatment of consumer durables to housing is debatable. The main reason why consumer durables are included in a consumer price index in full at the time of purchase instead of imputing rental values is that their life span is sufficiently short to make the approximation acceptable. As remarked early by Marshall (1898), this approximation can hardly be valid for houses and flats, that last decades, if not centuries.

4. Simulations for euro area countries

4.1 A method based on user costs

15. For illustrative purposes, a direct method based on the concept of user costs has been used to assess the impact of home-owners' housing costs on inflation. The implicit price of housing services for owner-occupiers is estimated by calculating the user cost associated with their housing capital valued at market prices. Examples of official price indices incorporating owner-occupied housing costs calculated in this way include the US private consumption deflator (Lebow and Rudd, 2003) and the Icelandic Consumer price index.

$$UC = (i^a + \tau + f - \pi)P \quad (1)$$

16. The user cost of owner-occupied housing is calculated following a method proposed by Poterba (1992) and summarised above in equation (1). UC stands for user costs, i^a for the after-tax nominal mortgage interest rate, τ for the property tax rate on owner occupied houses, f for recurring holding costs (consisting of depreciation, maintenance and the risk premium on residential property), π for the expected house price inflation rate and P for house prices.⁵

$$RR = i^a + \tau + f - \pi \quad (2)$$

$$UC = RR \cdot P \quad (3)$$

$$\text{Log}(UC) = \text{Log}(RR) + \text{Log}(P) \quad (4)$$

17. Condensing the right hand side of equation (1) and taking its logarithm underlines that user cost inflation is the logarithmic sum of changes in house prices and in the rate of return on housing capital (4). Defined by equation (2), the rate of return on housing capital RR is mainly driven by the after-tax mortgage rate because f is fixed, π varies little and there is little volatility in property taxes τ . Mortgage rates and house prices are jointly the main drivers of user cost inflation. An important consequence is that, when housing booms are fuelled by falling mortgage rates, user cost inflation is lower than house price inflation. Figure 2 illustrates that changes in the rate of return on housing capital often have a fairly large effect on user cost inflation.

18. Owner-occupied housing user costs have been combined with the HICP to produce an illustrative estimate of broad consumer price inflation. The indices for the HICP and the estimated user costs have been weighed together using the breakdown of household final consumption expenditure in the *OECD Annual National Accounts* database.

Figure 2. User costs are driven by the rate of return as much as by house prices

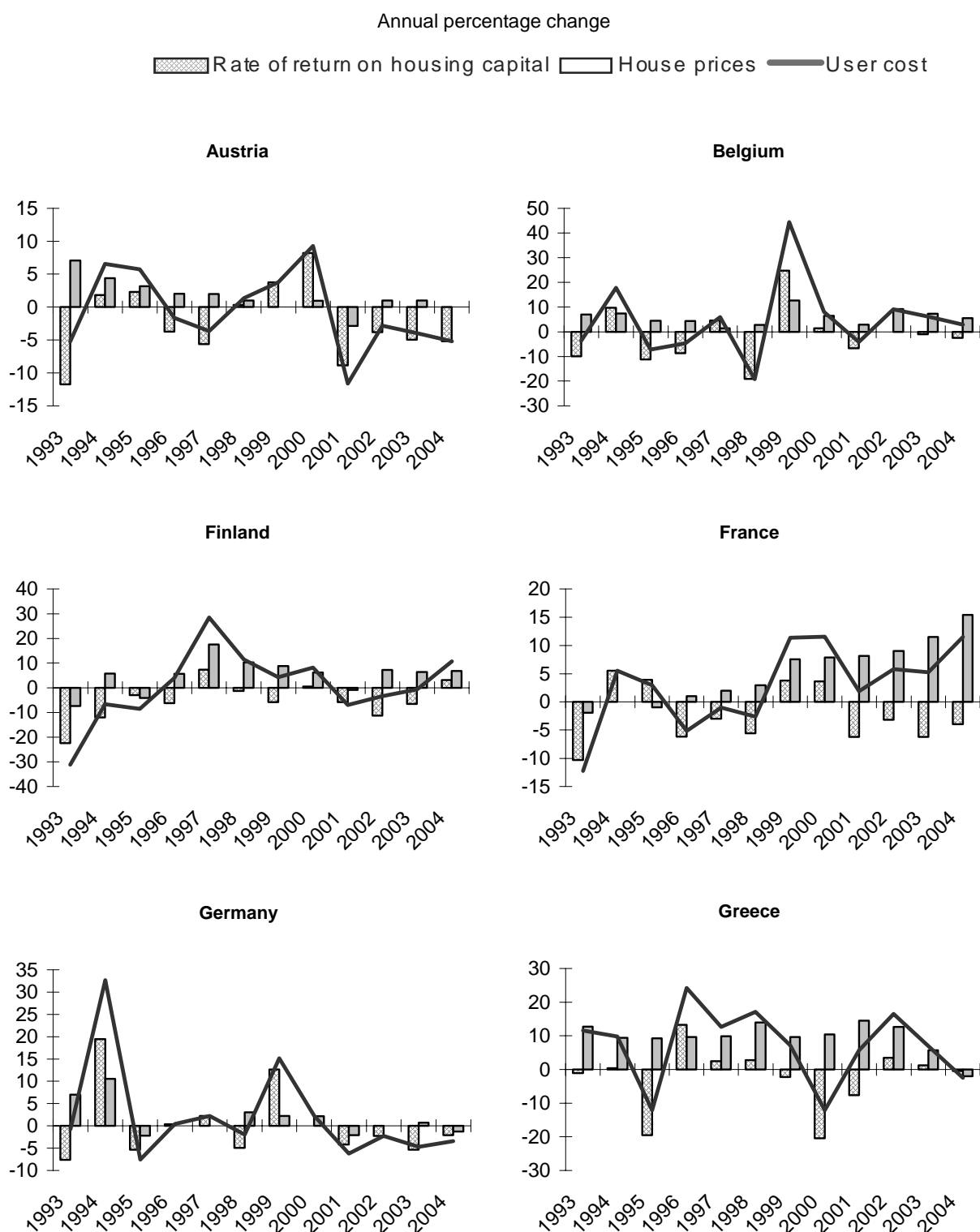
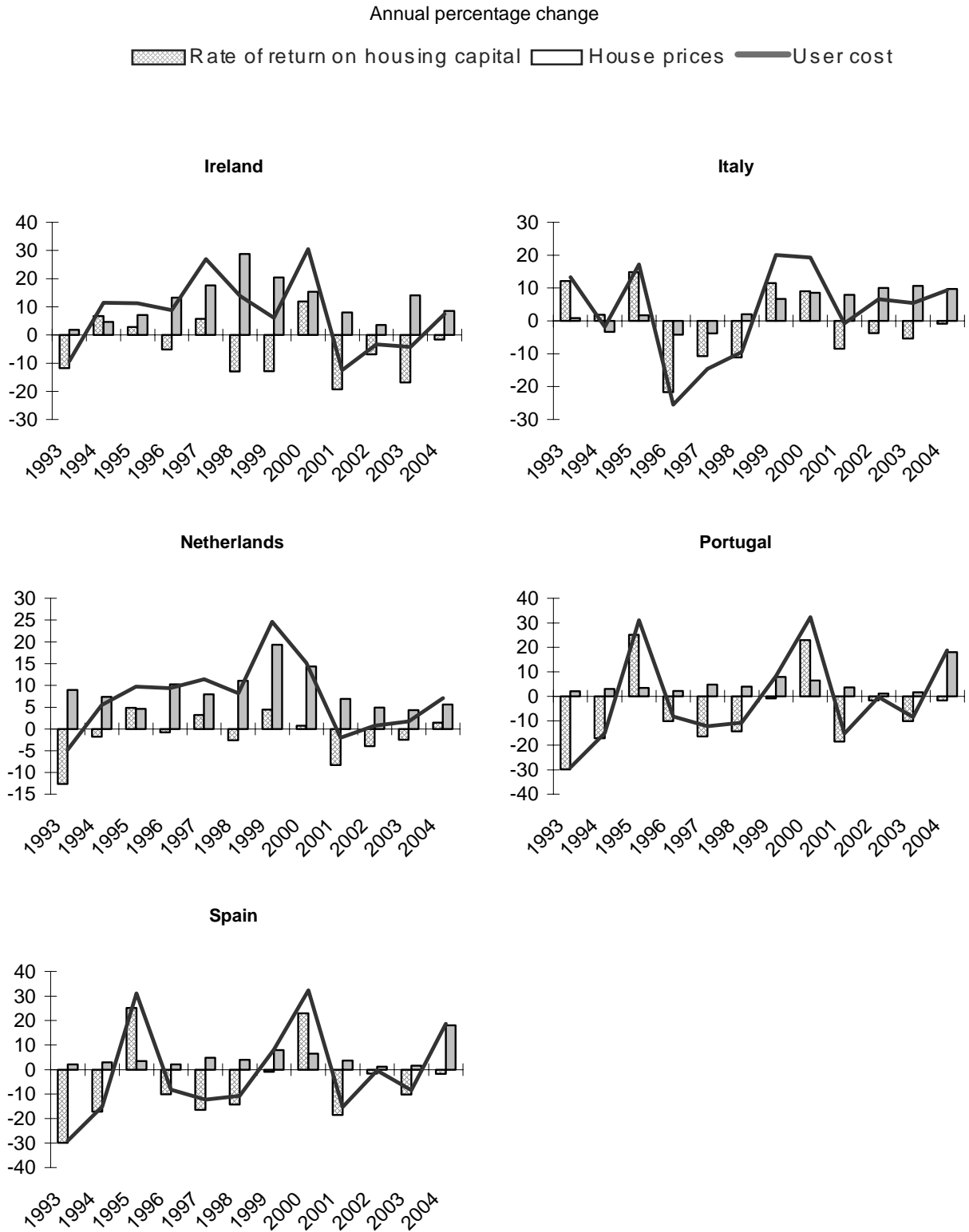


Figure 2. User costs are driven by the rate of return as much as by house prices (cont.)



4.2 An alternative method based on imputed rents

19. When incorporating owner-occupied housing costs into a consumer price index, an alternative option is to impute rents to home owners (on the basis of observed rents for similar properties). Estimates using this alternative option have been computed here by complementing the HICP with the price of owner-occupiers' imputed rents taken from the *OECD Annual National Accounts* database. As before, the weights come from the breakdown of household final consumption expenditure in the *OECD Annual National Accounts* database.

4.3 The results suggest that owner-occupied housing costs matter

Table 2. Broad inflation estimates

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria												
HICP inflation	3.2	2.7	1.6	1.8	1.2	0.8	0.5	2.0	2.3	1.7	1.3	2.0
User cost-based broad inflation	2.6	3.0	1.9	1.5	0.7	0.9	0.8	2.7	0.8	1.2	0.7	1.2
Rent-based broad inflation	3.4	3.0	2.1	2.1	1.4	0.8	0.9	1.9	2.3	1.7	1.6	
Belgium												
HICP inflation	2.5	2.4	1.3	1.8	1.5	0.9	1.1	2.7	2.4	1.6	1.5	1.9
User cost-based broad inflation	1.7	4.3	0.2	1.0	2.1	-1.7	6.7	3.4	1.6	2.5	2.1	2.0
Rent-based broad inflation				2.0	1.5	0.9	1.1	2.5	2.4	1.6	1.6	
Finland												
HICP inflation	3.3	1.6	0.4	1.1	1.2	1.4	1.3	3.0	2.7	2.0	1.3	0.1
User cost-based broad inflation	-1.8	0.3	-1.1	1.5	5.7	3.0	1.8	3.8	1.1	1.1	1.0	1.9
Rent-based broad inflation	3.7	3.7	1.7	0.6	1.4	1.9	1.7	1.6	3.1	2.8	2.3	
France												
HICP inflation	2.2	1.7	1.8	2.1	1.3	0.7	0.6	1.8	1.8	1.9	2.2	2.3
User cost-based broad inflation	0.4	2.2	1.9	1.1	1.0	0.2	2.1	3.2	1.7	2.4	2.5	3.5
Rent-based broad inflation	2.8	2.4	1.8	1.8	2.0	1.3	0.8	0.7	1.8	1.7	2.0	2.2
Germany												
HICP inflation	4.4	2.7	1.7	1.2	1.5	0.6	0.6	1.4	1.9	1.3	1.0	1.8
User cost-based broad inflation	4.0	5.4	0.9	1.1	1.6	0.3	2.1	1.5	1.1	1.0	0.5	1.2
Rent-based broad inflation	5.3	4.7	2.9	1.9	1.4	1.6	0.6	0.7	1.4	1.8	1.3	
Greece												
HICP inflation	14.4	10.9	8.9	7.9	5.4	4.5	2.1	2.9	3.7	3.9	3.4	3.0
User cost-based broad inflation	14.1	10.7	6.5	9.7	6.3	6.0	2.7	1.2	3.9	5.3	3.8	2.4
Rent-based broad inflation				8.2	5.7	4.6	2.2	2.9	3.6	4.0	3.6	
Ireland												
HICP inflation	1.4	2.3	2.5	2.2	1.2	2.1	2.5	5.3	4.0	4.7	4.0	2.3
User cost-based broad inflation	0.4	3.3	3.4	2.8	4.0	3.5	2.9	8.5	1.8	3.6	2.7	3.1
Rent-based broad inflation	3.6	1.8	2.5	3.0	2.9	2.8	3.7	3.5	6.0	5.3	5.3	
Italy												
HICP inflation	4.5	4.2	5.4	4.0	1.9	2.0	1.7	2.6	2.3	2.6	2.8	2.3
User cost-based broad inflation	5.4	3.5	6.8	0.5	-0.1	0.6	3.9	4.6	2.0	3.1	3.2	3.2
Rent-based broad inflation	5.0	4.8	5.9	4.4	2.2	2.2	2.1	3.0	2.5	3.0	3.0	2.6
Netherlands												
HICP inflation	1.6	2.1	1.4	1.4	1.9	1.8	2.0	2.3	5.1	3.9	2.2	1.4
User cost-based broad inflation	1.1	2.4	2.2	2.2	2.8	2.4	4.4	3.7	4.4	3.6	2.2	2.0
Rent-based broad inflation	2.0	2.4	1.7	1.7	2.1	2.0	2.1	2.4	4.9	3.8	2.3	
Portugal												
HICP inflation	5.9	5.0	4.0	2.9	1.9	2.2	2.2	2.8	4.4	3.7	3.3	2.5
User cost-based broad inflation	3.8	3.7	5.7	2.2	0.9	1.3	2.6	4.7	3.2	3.4	2.5	3.5
Rent-based broad inflation	6.2	5.1	4.0	3.0	2.0	2.2	2.2	2.8	4.3	3.7	3.2	
Spain												
HICP inflation	4.9	4.6	4.6	3.6	1.9	1.8	2.2	3.5	2.8	3.6	3.1	3.1
User cost-based broad inflation	3.3	4.5	6.0	2.0	2.2	2.1	3.1	6.3	3.1	3.4	4.1	4.0
Rent-based broad inflation				3.9	2.2	2.0	2.3	3.5	2.9	3.6	3.2	
Euro area												
HICP inflation	3.4	2.8	2.6	2.3	1.7	1.2	1.1	2.1	2.4	2.3	2.1	2.1
User cost-based broad inflation	3.1	4.0	3.0	1.5	1.5	0.9	2.8	3.4	2.0	2.5	2.4	2.7
Rent-based broad inflation				2.6	1.8	1.4	1.3	2.2	2.4	2.4	2.2	

20. Even though they have been derived under conservative assumptions, the illustrative results show that owner-occupied housing costs can have a sizeable impact on inflation measures. The user cost-based broad inflation rate, the main estimate in this study, exceeded the HICP inflation rate by two-thirds of a percentage point in 2004 for the euro area. Differences are much greater at the country level as for instance in the case of France where user cost-based broad inflation was 1.2 percentage points above HICP inflation in 2004. In Germany, the sluggishness of the housing market meant that user cost-based broad inflation was only 1.2% the same year, half the 1.0% rise recorded by the HICP.

21. Differences are less marked when imputed rents are used instead of user costs in the estimation. In a world of perfect markets and statistics both measures should yield the same results. In the real world, disequilibria between rental and purchase markets can separate actual rents from the opportunity cost of holding the property (Verbrugge, 2004). Besides, imputing actual rents to home owners requires adjusting for differences in quality between rented and owned dwellings (Kurz and Hoffmann, 2004). As the information needed to perform this adjustment is not publicly available for most euro area countries, the imputed rents underlying the rent-based broad estimates in Table 2 have been taken directly from the national accounts - with no guarantee of cross-country comparability. The lack of cross-country comparability also makes aggregation rather heroic, implying that a large degree of statistical uncertainty surround the estimated rent-based broad inflation rate reported in Table 2 for the euro area. By comparison, the user-cost based estimates of broad inflation offer a higher - even if still imperfect - degree of cross-country comparability. For these reasons, henceforth, broad inflation refers to user cost-based estimates unless otherwise mentioned.

4.4 *Implications for economic policy*

22. The impact of owner-occupied housing has noteworthy implications for future inflation developments. If the housing boom were to continue at close to its recent pace, the effects on broad inflation would be more dramatic than they were before 2004. In 2002 and 2003, the strong house price rises recorded in countries such as Ireland or Italy did not translate into massive increases of housing costs because they occurred in conjunction with a dramatic fall in mortgage rates. The situation changed in 2004 when house prices kept booming while mortgage rates stabilised, and this explains why the difference between HICP and broad inflation widened in 2004.

23. Cross-country differences also imply that the geographic dispersion of estimated broad inflation is higher than recorded by the HICP. On average over the 1993-2004 period, the standard deviation of HICP inflation rates across euro area countries was 1.6 percentage points - a figure that rises to 2.0 when broad inflation estimates are used instead. This indicates that the adjustment of real exchange rates following the misalignments present at the inception of the euro has been proceeding more quickly than is usually thought. In this regard, it is particularly telling that, in the 1999-2004 period, the estimated broad price index for Germany added up to a cumulated (negative) difference of 3% relative to the German HICP. On the other hand, the use of the incomplete HICP (or of national price indices that also exclude owner-occupied housing costs) for wage bargaining hampers cross-country adjustment.⁶

24. Overall, including owner-occupied housing in the HICP appears desirable. This raises the question of which method is best.

- Imputed rents present the advantage that, once data on free market rents are collected and adjusted for differences in quality between rented and owned dwellings, integrating them in a price index is relatively straightforward.
- User costs are attractive because they can track changes in marginal costs closely, but their implementation for operational purposes raises several questions. The results shown in Table 2

have been derived after making a number of methodological choices, and the numerical values are partly dependent on these choices. The International CPI Manual (ILO *et al.* 2004) describes several other ways of implementing a user cost approach, each of which may produce somewhat different results from the present ones.

- The acquisition approach, net of land prices, appears the least appropriate, primarily because it excludes an essential component of the costs of housing services.

NOTES

1. The author works in the OECD Economics Department, 2 rue André Pascal, 75775 Paris Cedex 16, France; boris.cournede@oecd.org. This paper draws on material originally produced for the *OECD Economic Survey of the euro area*, which was published in July 2005 under the authority of the Economic and Development Review Committee. An earlier draft was presented to the International Seminar on Inflation Measures “Too High – Too Low – Internationally Comparable?”, 21-22 June 2005, OECD, Paris. The author is indebted to David Carey, Pietro Catte, Andrew Dean, Johannes Hoffmann, Peter Hoeller, Vincent Koen, Paul van den Noord, Dave Rae, Paul Schreyer and Jack Triplett for their comments and suggestions. Special thanks to Deirdre Claassen for technical assistance.
2. Major repairs and improvements are not included in the HICP.
3. Inflation perceptions may also have been distorted by the fact that price increases after the changeover were unusually large for low value but frequently purchased items (ECB, 2003 and Del Giovane and Sabbatini, 2004).
4. The System of National Accounts guards against extending imputations to “the production of domestic and personal services for consumption within the same household such as the preparation of meals, care and training of children, cleaning, repairs, etc”, noting that “it is clear that the economic significance of these flows is very different from that of monetary flows. For example, the incomes generated are automatically tied to the consumption of the goods and services produced; they have little relevance for the analysis if inflation or deflation or other disequilibria within the economy (Inter Secretariat Working Group on National Accounts, 1993).”
5. The primary source for data on house prices and mortgage rates is the European Mortgage Federation’s annual Hypostat report (2000-04 issues). The *OECD Economic Outlook No. 77* database has been used as an additional source for interest rates. Property tax rates are taken from ECB (2003). The calculation of effective, after-tax mortgage interest rates follows the method outlined by van den Noord (2005). The value of 8% for f and the estimation of π as a moving average of consumer price inflation are taken from Poterba (1992). *OECD Economic Outlook No. 77* data underlie the calculation of π .
6. In addition to the HICP, which is mandatory under Council Regulation No 2494/95/EC of 23 October 1995, all euro area countries except Luxembourg compute specific consumer price indices (CPI). Headline national CPIs exclude owner-occupied housing costs in Belgium, France, Greece, Italy, Portugal and Spain. France, however, publishes an additional CPI that includes owner-occupied housing.

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