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Owner-occupied housing in Norway: Why the rental equivalence approach is preferred^{*}

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Abstract

The Norwegian consumer price index is meant to be a compensation index guided by the economic theory of cost-of-living. The costs of owner-occupied housing are in the Norwegian CPI measured by the rental equivalence approach. The paper focuses why Norway has chosen this approach in spite of the relatively small rental sector in Norway and that the characteristics of the rental households are quite different from the owner-occupied households. Due to the hypotheses that the physical characteristics and the geographic location are similar for both rental and owner-occupied dwellings we believe that the rental equivalence approach provides a good approximation for owner-occupiers. Analyzes of the rental sector shows that dwellings owned by private households who typically own one dwelling in addition to their own resident, count for a significant proportion of the rental dwellings. The housing market in Norway has also relatively few professional landlords and almost absence of rent control.

Key words: consumer price index, cost of living index, owner-occupied housing, rental equivalence, user cost function

1. Introduction

In Norway the cost of living (COL) approach provides a conceptual framework for the Norwegian consumer price index (CPI). An index supposed to provide an approximation to a COL index should ideally relate to the costs of consumption or use, assuming that consumption or use rather than acquisition provides utility. Especially in the case of consumer durables, which can have a lifetime of many years, the distinction between acquisition and use is important. The purchase of a durable can be considered as an investment, designed to provide consumption services over a future time span. For practical reasons, the distinction between acquisition and consumption is ignored in the compilation of the CPI, with one exception: owner-occupied housing. A house has normally an extremely long lifetime and is according to System of National Accounts regarded as a financial investment.

Buying a house requires very high acquisition costs that usually are spread over time by taking out a mortgage. It is reasonable to assume that living in a house each month generate a flow of consumption services. It is within the COL framework to price the flow of these services - the monthly cost of living in an own dwelling, see for instance Triplett (2001). For rental dwellings the price of the service

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- the rent - is covered in the CPI by a monthly rental survey. For owner-occupied dwellings, two common approaches have been analyzed:

- Rental equivalence
- User cost function

In rental equivalence approach, one estimates the change in monthly cost for owner-occupied housing by the change in monthly rents for dwellings of similar types that are rented. This principle was introduced in the CPI in august 1967 and is still used with some methodological modifications.

Another way to estimate the cost of owner-occupied housing is the user cost function approach. The user cost approach originates from capital theory that relates the price of houses, the cost of providing housing services and the interest rate for housing investment. The user cost function approach has so far been rejected in the CPI due to the difficulties to implement a reliable method. In this paper some of the difficulties will be emphasized together with some empirical results.

To illustrate the impact of owner-occupied housing based on a user cost function compared to the rental equivalence measure, three alternatives of the user cost approach has been simulated based on Norwegian data; interest rates, house prices, capital gains and depreciating rates. The first version result in quite volatile and even negative user costs due to high capital gains. In this model both unrealized and realized capital gains are included. In the next version, capital gains are reduced to the share of dwellings actually disposed. Thus, only realized capital gains are included in the model. This version leads to less volatile and only positive user costs for the period. The last version is based on expected values of interest rates, house prices and thereby expected capital gains. The only parameter affecting the user costs is the expected price movement of house prices. Thus, the index is really smooth compared with the other versions.

The remainder of this paper is organized as follow. Section 2 and 3 describes the rental and owner-occupied sector in Norway. Section 4 outlines factor that are supposed to determine the rent. In section 5 housing in the CPI is described while section 6 discuss a user cost function as an alternative approach. Section 7 gives some concluding remarks.

2. The rental sector in Norway

After the Second World War, Norway has become a country dominated by owner-occupiers. In 1960 around 40 percent of the Norwegian households were tenants. According to the Population and Housing Census 2001, the rental share is now 23 percent. During the nineties there has been a slight increase of the rental share probably due to rising house prices from 1993.

2.1 The supply of rental dwellings

Norway has a sufficiently active rental sector, though only a minority of Norwegian households are tenants. The stock of rented dwellings is quite heterogeneous as regards both to the distribution of different types of landlords and the size and type of dwellings. Rented dwellings can be divided into the following segments:

- Secondary units in single-family houses or in other house types
- Other private dwellings owned by non-professional landlords
- Public and privately dwellings owned for employees
- Social rental housing
- Private dwellings owned by professional landlords

A secondary unit means that the house is divided into one main and one secondary flat. Many single-family houses in Norway are designed so that a secondary housing unit, normally situated in the first floor or in the basement, can either be let out for hire or used as a part of the resident. Secondary units in single-family house form a quantitatively important part of rental dwellings in Norway. The segment other private dwellings owned by non-professional landlords includes dwellings owned by single persons (or household). Either the owner has an extra dwellings often acquired through inheritance, or he is temporarily absent from his ordinary dwelling.

The two segments "secondary units" and "other private dwellings owned by non-professional landlords" are the dominant types of private rental arrangements in Norway. These have one thing in common; the "landlords" are single persons or households. Furthermore, they typically own only one or a small number of rental dwellings. For owners of secondary units the decision is to letting the house out on hire or use the unit. Letting is correlated to the financial situation, e.g. when the mortgage is high, while own use often corresponds with the family size or when the children are becoming teenagers. Owners of extra dwellings often regard the dwelling as a financial investment and the decision is whether to let out on hire or to sell. Selling often correspond with increasing house prices.

A rental dwelling is classified as being owned by a professional landlord if either a company owns it or if it is privately owned and situated in a multi-family building, e.g. a block of flats, in which the majority of the dwellings are rental units. The share of the rental sector held by professional landlords is quite low in Norway.

Rental dwellings owned by employers (either in private or public sector) and let out for hire to employees also constitute a low share of the Norwegian rental sector. Hospitals and to some extent armed forces mostly own those few dwellings of this kind that are still present in the housing stock. However, this kind of rental dwellings is declining.

Social rental housing also counts for a low share in Norway. According to the Population and Housing Census 2001, rental dwellings where the municipality works as a landlord count for less than 4 percent.

The central idea in this paper is that the stock of rental dwellings in Norway does not consist of a special type of dwelling. It is possible to find both small-occupied units and large rental units and the rented dwellings covers different types of buildings. The geographical distribution of rental dwellings is quite similar in both rural and urban areas. According to Norwegian Social Research (2003), the rental share is 18 percent in the most rural areas while the rental share in the largest cities is just over 25 percent. In smaller towns the rental share varies around 21 percent.

2.2 The demand of rental dwellings

The choice of tenure status is believed to be determined as a part of the financial and living situation of a household rather than as characteristics of a dwelling. In Norway it is primarily young people and to some extent the elderly who rent a dwelling. To rent has become a transitional phenomenon for mostly younger people before starting a family and deciding where to live on a more permanent basis. According to the Population and Housing Census 2001, the share of tenants in the age under 25 year is dominating. A relatively high share of tenants is also found among people over 80 years. Around 1/3 of the tenants under age 30 is living with short-term tenancy agreements, while lifelong tenancy is a much more common among elder tenants. During the last 10 years, the share of tenants among younger people has increased slightly, especially in the capital city and other major cities. This is probably due to increasing house prices

3. Owner-occupied sector in Norway

The tax advantage of owner-occupiers is probably one reason why household in Norway do prefer to be owner-occupiers. Owner-occupiers pay income tax based on an imputed rental income. However, this income is calculated in a way that leads to a very low effective tax on the return of owner-occupied housing capital. Before the imputed rental income is calculated a deduction is subtracted from the assessed value. Imputed rental income is set to 2.5 percent of the difference between the assessed value and the deduction of a dwelling. The tax rate for imputed rental income is 28 percent, the same as income from other assets. This rate applies for all taxpayers that are in a position to pay capital income taxes. Interest payment is fully deductible in taxable income and the deductibility is not tied to loans for specific purposes. Owner-occupiers (as well as landlords) can deduct interest payment from the taxable income.

As a main rule, actual income net of operating costs, from rental dwellings is taxed as “normal” capital income with a tax rate at 28 percent. However, owners of second units do not pay tax on the actual income as long as the second unit covers less than 50 percent of the dwelling they actually lives in. In Norway capital gains on rented dwellings are taxed on realization.

According to Statistics Norway's House Price Index, the prices of owner-occupied dwellings¹ have increased by around 70 percent in the period 1989 – 2003². In the early eighties Norway experienced a liberation in the housing market and in the giving of credit. This caused a major increase in the house prices. In the period 1989 - 1992 Norway faced a recession corresponding with a major decrease in the house prices. Since 1993 the house prices has grown by an average of around 9 percent each year. However, after the year 2000, the prices increase more slowly. The development in the house prices is illustrated in figure 1.

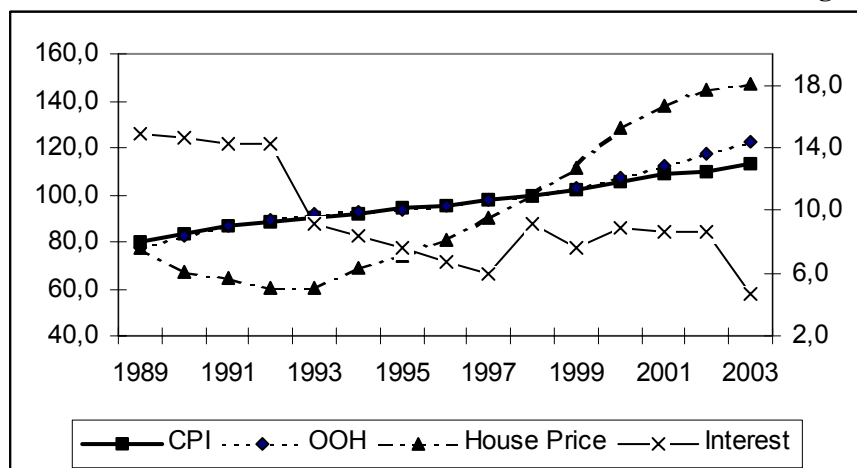
The yearly average nominal interest rate on mortgage accessible from all commercial and savings banks has decreased from almost 15 percent to nearly 5 percent in the period 1989 - 2003, see figure 1.

As illustrated in figure 1, both owner-occupied housing and the overall CPI have had a similar growth from 1989 - 1999. After introducing some methodological changes in the method of estimating the implicit rent of owner-occupiers in 1999, the owner-occupied housing has increased more than the overall CPI.

¹ Household living in co-operatives are according to the principle of National Accounts, classified as owner-occupiers in CPI. The increase in owner-occupied dwellings includes housing co-operatives.

² From 1992 - 2003 the figures are based on Statistics Norway's House price index. From 1989 - 1991 figures from Norwegian Association of Real Estate.

Figure 1. The development in interest rate, house prices, owner-occupied housing and the overall CPI from 1989 - 2003. Index 1998=100. Interest = change in percent.



4. Rent determining factors

To a certain extent the rents are a function of the characteristics and geographical location of the dwellings. Other factors that are supposed to determine the market rent of dwellings are:

- Supply and demand of rental dwellings
- The behavior of the landlords
- The behavior of potential tenants
- Tenancy agreement (contracts) and rent acts

4.1 Supply and demand of rental dwellings

In a perfect competitive market all agents are small, the products are homogenous and the agents believe that the market price is given and the agents' action do not influence the market price. If this was the case in the rental and owner-occupied sector, the dwellings would have been homogenous and consumer would not have preferences over tenure. Both sectors would have been competitive; hence neither the tenants nor the landlords would have power to set the prices.

Much of the rental dwellings in the Norwegian rental sector can be sold to owner-occupiers, and owner-occupied dwellings can be transformed into rental dwellings. Hence, the dwellings are highly heterogeneous yielding thin segments in which the landlords or owners of private dwellings have some sort of market power. The fact that owners of extra dwellings and second units quickly can withdraw from the rental sector will influence the rent of the existing stock of the rental dwellings.

The owners of extra dwellings often regard the dwelling as a financial investment. The decision is whether to let out for hire or to sell the dwelling. The rent must be high enough to cover the operating cost, e.g. maintenance, repairs, insurance, water sewage, chimney sweeping, heating, etc, and give a capital gain at least as high as an alternative investment. With increasing house prices, it is reasonable to assume that the extra dwelling will be sold and thereby reduce the stock of rental dwellings. This could lead to maintaining of the existing rent or even an increase within a specific area. Due to increasing house prices potential buyers of houses may be forced to rent instead of buying, at least temporary until the house prices starts to decrease. Assuming the supply of dwellings fixed, this would lead to increased rents. However, increasing house prices is often corresponded with falling interest

rates. If the fall in the interest payment is relatively higher than rise in the house prices, consumers may still afford to buy a house instead of renting.

Professional landlords with many dwellings to let out for hire do not have the same opportunity to immediately sell the dwellings and thereby withdraw from the rental sector. In general, private landlords do not care who the tenants are as long as they are reliable payers. It is assumed that these professional landlords have the highest asking rent for rental dwellings and the most prices determining behavior. If decreasing demand for rental dwellings, one strategy to maintain the rent at a high level is keeping some rental units vacant for one or more periods.

Owners of single family houses that are split up into a main and a second unit have normally not the opportunity to sell only one of the units. The choice is whether or not to let out for hire the second unit. The owners of second units have an increased tendency of let out for hire when facing high costs, e.g. interest payment or/and operating costs. Keeping all other factors constant, high costs should increase the supply of rental dwellings and thus decrease the average rent level. Simultaneous, if the owners become unemployed, he is likely to rent out for hire to compensate for lower income. Still, it is reasonable to assume that the opportunity to help relatives and/or friends by letting a given part of the house yields a positive utility for the owner. Hence, the rent for second units may be lower than the actual market rent in the specific area.

Recently Norwegian households has experienced repeatedly fall in the interest rate. It is reasonable to assume that this will reduce the supply of rental dwellings like extra dwellings and second units and thus keeping the average rent at the same level or even increase it.

Assuming a tax-reform that keeps the tax-advantage of owner-occupiers but at the same time introduce to tax net rental income³ from second units at the same rates as net rents from other types of rental dwellings. Full taxation of net rents would most likely decrease the supply of this kind of rental dwellings. Changes in the taxation of the return of housing capital, e.g. a reduction in the tax-advantage of the imputed rental income, will probably increase the demand for rental dwellings.

On very short term, one must assume that both the supply and demand for rental dwellings is given. The market rent will than depend on among others the solvency of potential tenants. A practice of arranging a showing of the dwelling for several potential tenants is common in Norway. The opportunity of viewing the dwelling before renting it is crucial for tenants to decide whether to rent a specific dwelling or not. If a specific dwelling is situated in a very popular area, e.g. near downtown or close to a university, this practice may even cause an increase in the rent because several potential tenants will bid to get the dwelling. However, if a specific rental dwelling is located in a less popular area, this could lead to a negotiating and thus a decrease in the rent.

As mentioned earlier one characteristic of tenants is that renting often is a choice for households who plan to stay for quite a short time in a dwelling. One can assume that short-term tenants are of less concern regarding the actual level as well as the future development of rents

If a tenant wants to change tenure or remains a tenant but wants to move to another rented dwelling, he would face moving costs. It is reasonable to assume that the presence of moving costs causes tenants to move less frequently and that a landlord (or owner of private dwellings) in a situation with decreasing rents thus will maintain the rent level.

³ Net rental income equals rent minus the operations costs of a rental dwelling.

4.2 Contracts and rent acts

Contracts in the rental sector are either of fixed duration or by request (at-will). Less than 30 percent of tenants have no contract mostly due to that they rent from family or friends. About one-half of the tenants in the Norwegian rental sector have at-will contracts while around 20 percent have short-term contracts of three years duration or less. The Norwegian Rent Act from 1999 states as a general rule that a dwelling cannot be let out for a shorter period than three years. The tenant can end terminable rental contracts when they want, whereas the landlord faces strict requirement for giving a tenant notice to move out.

The act accepts the going market rent for new tenancies. However, according to the act, the market rent is never to be regarded as unfair. Only a rent that is unreasonable high compared to the market rent causes the contract unlawful. Further, the act opens for rent in ongoing tenancies to be adjusted to the market level. This favors the landlord when the rents are rising and the tenant when rents are falling. The Rent Act allows index regulation of the rent on an annual basis based on the CPI.

5. Housing in the CPI

5.1. The rental survey in the CPI

The monthly cost of living in a house is in the CPI covered by a monthly rental survey with about 1,300 responses from tenants. The sample of tenants is drawn from the population of tenants from the Population and Housing Census 2001. The sample is drawn by probability sampling techniques. The sample of rental dwellings corresponded with the tenants in the sample is kept fixed. This means that whenever a tenants move, a new tenant in the specific dwelling should be captured unless the new occupant is an owner-occupiers. In this way both new and ongoing tenancies are being captured by the monthly rental survey. A new sample of tenants is drawn annually.

The sample is established through a postal scheme that together with the attributes from the Population and Housing Census gives quite a few characteristics of the rental dwellings as well as some characteristics of the tenants. When the sample is established, the collection of the rents is conducted monthly by a computerized assisting telephone interview. This interview gives an opportunity to ask the tenant several control questions, e.g. about the change in the rent and change in tenure.

5.2. Rental equivalence approach

The rental equivalence approach uses information from the rental sector to estimate owner-occupied housing. It can be argued that the cost of living in an own house cannot be less than the rent that one can receive from a tenant. An owner-occupier always forgoes this amount when he lives in his own house. It can also be argued that over a long period, the cost cannot be greater than the rent of similar rental dwellings, assuming the existence of a sufficiently active rental market, since the owner-occupier always has the possibility of acquiring equivalent housing services at this price.

The rental equivalence approach is incorporated in the CPI given the assumption that the rents charged are a function of the characteristics and geographical location of the dwellings. The approach was adopted in august 1967. However, a major methodological change was conducted when the consumption classification COICOP⁴ was introduced in August 1999. Among others, the possibility to identify changes in rents, e.g. publicly subsidized rents that are not representative for owner-occupiers and recognize rental dwellings of similar types to owner-occupied dwellings were improved. The

⁴ Classification of individual consumption by purpose.

approach is since 1999 used both to derive the expenditure share as well as the implicit rent movement for owner-occupiers. Before 1999, the index of owner-occupiers was assumed to follow the average growth in the rents for both rental- and co-operative dwellings as a whole and the expenditure share was deducted from expenditures on the mortgage interest rate.

There are several strong objections to the rental equivalence approach. Firstly, if rent control and publicly subsidized rents are dominant, changes in rents may not measure monthly costs for owner-occupies dwelling as well. In Norway rent control is limited to a few types of dwellings in limited areas and publicly subsidized rents are not central.

There is also the argument that owner-occupied and rental dwellings are different markets and their prices do not move together. Another strong objection is that rental market is "thin" when it comes to the exact type of housing that is owner-occupied. The primary assumption when introducing the rental equivalence approach is whether data from rental dwellings can be used to develop measures that are representative of owner-occupied units. As discussed above, the Norwegian rental sector do not consist of a special type of dwelling and that much of the rental dwellings as well as owner-occupied dwellings can easily be converted between tenures.

Analyzing the monthly rent survey shows that geographical locations as well as the size of the dwellings gives a significant explanation of the rent level. To derive appropriate expenditures of owner-occupied housing, the data from the rental survey is therefore stratified into geographical regions and the size as well as the type of dwellings.

Based on the rent survey the index of owner-occupied housing in the CPI has increased by around 20 percent for the period August 1999 - December 2003. The index has grown steadily during the period August 1999 to the turn of the year 2002/2003. After this, the index shows a more decreased growth-rate but still positive. January each year shows a greater change than the rest of the months.

6. The user cost approach: an alternative ?

6.1 User cost function

If the rental sector is not representative to provide a good estimate of the cost of owner-occupied housing, the user cost function is an option. One controversial factor is that this approach includes both investment as well as consumption elements.

A simple formulation of the monthly cost for a household, C_m , could be expressed as:

$$1. C_m = i_m P_m - [P_m - P_{m-1}] + dP_m$$

Rewritten:

$$2. C_m = (i_m + d)P_m - \Pi_m P_{m-1} \quad \text{where} \quad \Pi_m = \frac{P_m - P_{m-1}}{P_{m-1}} = \frac{P_m}{P_{m-1}} - 1$$

where i is the appropriate interest rate for housing investment, P is the price of the house itself in month m , Π is equal to the change in the average house price from one month to another, that means the capital gain (or loss) and d is a fixed rate of depreciating - the potential rate of deterioration of the physical capital (the dwelling).

Introducing tax into the user cost function gives the following expression:

$$3. C_m = [i_m(1 - T_t) + d]P_m - \Pi_m P_{m-1}$$

Rewritten as:

$$4. C_m = a_m P_m - \Pi_m P_{m-1} \quad \text{where } a_m = i_m(1 - T_t) + d$$

where T_t is the tax rate in year t .

A rise in the house prices has two effects on user costs. As seen in equation (4) the direct effect occurs because the house price is multiplied by interest and depreciating rate. The second effects is due to that capital gains lower users costs while capital loss will cause higher user costs.

Rearranging expression 4 gives:

$$\text{If } a_m \frac{P_m}{P_{m-1}} > \Pi_m \Rightarrow C_m > 0 \quad \text{or} \quad a_m \frac{P_m}{P_{m-1}} < \Pi_m \Rightarrow C_m < 0$$

The cost element $a_m \frac{P_m}{P_{m-1}}$ is always positive, while the capital gain (or loss) Π_m is correlated to the development in the prices of dwellings. Decreasing prices of dwellings yields positive user costs, while increasing prices of dwellings cause either a positive or a negative user costs depending on the size of the capital gain. When capital gains are high (typically when house prices are speeding up), they may be large enough to create negative user costs. Once house prices starts to fall, the user costs will become sharply positive. This is one of the main difficulties with the user cost function.

The effect of tax changes depends on the relationship between interest payment and the imputed rental income and the size of these two components. A lower tax-rate will cause lower deducted interest payment. If the interest payment is higher than the imputed rental income, the user costs will increase. However, if the interest payment is lower than the imputed income, the user costs will decrease.

Due to the low effective tax on owner-occupied housing capital, the tax-parameter will be ignored in the simulation of household's user costs. Operating costs such as heating and maintenance are left out as well since they are rather unproblematic to measure. The index from one month to another is thus given by:

$$5. I_m = \frac{C_m}{C_{m-1}} = \frac{i_m P_m - \Pi_m P_{m-1} + dP_m}{i_{m-1} P_{m-1} - \Pi_{m-1} P_{m-2} + dP_{m-1}}$$

In the simulation of the user cost below, month will be replaced by quarter since the data used are on a quarterly basis.

The user cost above is a rather simplicity of the real world, assuming active rental and re-sale markets, no uncertainty and no friction cost. When a household is buying a house, normally both a mortgage as well as own equity is required to finance the investment. In the expressions above the mortgage interest rate is assumed to equal the opportunity cost of equity capital⁵. The reason why is the

⁵ Gillingham (1983), defines a user cost function where he separates the (unpaid) mortgage and the equity (the amount sum to the price of a house), and introduces an interest rate on the equity as well.

difficulties to estimate an appropriate indicator of the equity capital due to all the existing alternative investments.

An attempt to estimate an actual historic user cost for the period August 1999 to December 2003 has been done. Three different alternatives have been simulated for this period. Version 1 and 2 can be regarded as historical user costs, while version 3 is future user costs based on expectations in July 1999.

In all the three alternatives the market value capital value of the stock of owner-occupied dwellings by the end of 1998 as estimated in the National Account is used to get a "reference price level" of owner-occupied dwellings. To get the running market value of the stock of owner-occupied dwellings, each quarter the stock of dwellings is being multiplied with the change in Statistics Norway's House price index.

The House price index is used as an indicator of the development in the house prices. This indicator is quarterly and is based on registered purchaser prices of all dwellings sold on the open market during the quarter in question. For co-operatives, both deposit and joint debt is included in the price. To estimate the index, Statistics Norway receives data from the Norwegian Association of Real Estate agents and The Association of Real Estate Undertakings, as well as other real estates agencies that are not members of these associations. The House price index is quality adjusted due to characteristics of the dwellings.

The interest rate is an average of the nominal quarterly mortgage interest rate from all possible commercial and savings banks. This interest rate varies from 4.4 to 9.5 percent during the period. The depreciation rates are in National Account a fixed annual rate of 2.5 percent.

In the first model, the capital gain (or loss) is measured as the change in the value capital of dwellings due to the development in the House price index. That means that both unrealized and realized capital gains are included in the model. Hence the user cost is influenced by the total change in the value of the investments (the dwellings).

It is an important question whether the CPI should be influenced by unrealized value changes. In the second alternative we use the same data as in the first model except that the capital gain is reduced to count only for the share of owner-occupied dwellings that has been disposed in each quarter. This will normally lead to a positive user costs. Of course, limit the model to the actual realized capital gains is no guarantee that the user costs always will be positive. If a sufficient part of the stock of dwellings is being disposed, this can lead to quite capital gains and thereby negative user costs. However, according to the statistics on transfer of properties, the share of the dwellings that are disposed each year is limited to around 10 percent.

A further way of smoothing the user cost is to introduce a long-term fixed interest rate and an expected rate of capital gain. The reason for estimate user costs based on a long-term expected interest rate is due to the assumption that short-term changes in the interest rate are of concern to financing and not housing consumption. Formally such a user cost function can be expressed as:

$$6. C_m = E(a_m P_m) - E(\Pi_m) P_{m-1}$$

where E indicate the expected values of the cost elements, future house prices and capital gains.

In the version based on expected interest and house prices, none of the data except for the market capital value of the stock of owner-occupied dwellings by the end of 1998 is being used. Given the assumption that owner-occupiers are likely to take a long-term view on their costs, the 10-years interest rate on government bonds is chosen to represent the interest rate of mortgage. The expected

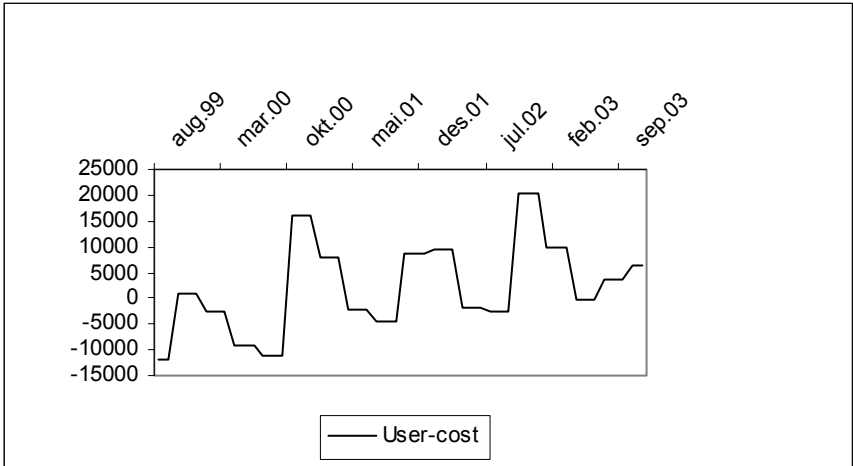
trend in the movements of the house prices is based on the historic movement for the period 1989 - 1998. This would normally provide a user cost function that is less volatile and has a more similar trend to the index based on the rental equivalence approach.

6.2 Results

As illustrated in figure 2, 3 and 4, none of the three versions of the user cost track the rent movement that has been incorporated in the CPI in the period August 1999 - December 2003. Appendix 1 gives a briefly overview of the basic findings.

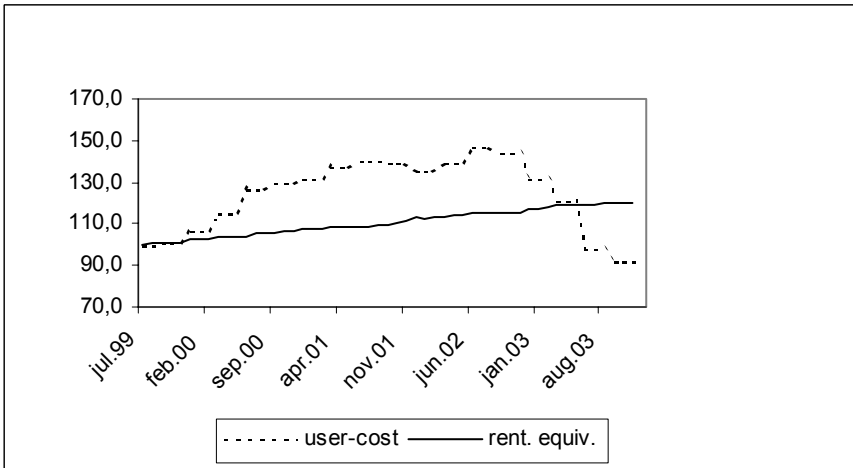
The first version gives (as expected) an extremely volatile index and in some periods even negative user costs due to major increases in the capital gain from one quarter to another. The costs per households are shown in figure 2. The changes in the capital gain are corresponded with the changes in the nominal interest rate. The volatility in the user costs per household is caused by the great variation in the capital gain from one quarter to another.

Figure 2. User cost per household (version 1). Figures in NOK.



By reducing the capital gains to the share of dwellings actual disposed in each quarter, negative user cost is avoided. However, as illustrated in figure 3, the index is still volatile due to changes in the interest rate. The growth in the index is much bigger compared to the rental equivalent approach, except for 2003 where the index is falling. This period correspond with decreasing interest rate.

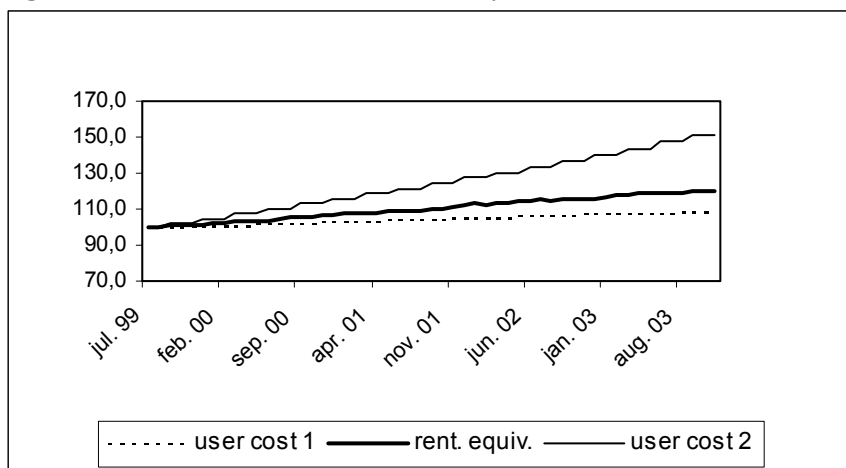
Figure 3. User cost index, version 2. July 1999=100



The third version based on an expected long-term fixed interest rate and expected increase in house prices, is illustrated in figure 4. In July 1999 the long-term interest rate on government bonds was 5,8 percent yearly. The development in house prices and thus the capital gain is based on what household in 1999 would have expected for the next 10 years. However, household expectations are normally based on adaptive expectations, hence the price trends as observed. Assuming that households for the period 1999 - 2009 expect the house prices to develop as they did in the period 1989 - 1999 will give an average increase of only 2.0 percent each year due to the recession in the period 1989 - 1992. If households in 1999 instead did expect the house prices to growth by the same rate as the latest 5-years period (1994 -1998), this would imply an average of almost 10 percent each year.

As seen in the figure, taking the long-term interest rate and the historical average house price trend really smooth the index. Since both the expected interest rate and the expected capital gain are kept fixed, the only difference from one quarter to another is the increase in house prices. If the house prices were expected to move as they did from 1989 - 1998 (2.0 percent on average each year), the third version is contributing less to the overall CPI since the expected house price trend is lower than the actual growth in the rents in the same period. However, if households expected the house prices to growth as they did from 1994 – 1998 (9.8 percent on average each year), the user cost approach would have caused higher monthly costs of owner-occupied housing than the rental equivalence approach. As a comparison the yearly average house prices increase has been around 8 percent in the period 1999 - 2003.

Figure 4. User cost index, version 3. July=100



7. Concluding remarks

The purpose of this paper has been to conduct a theoretical and empirical framework to establish that the rental equivalence approach is appropriate to measure the cost of owner-occupied housing in Norway. The reason why we believe that the rental equivalence is conducting an adequate estimate of the owner-occupied cost is among other that the distribution of rental- and owner-occupied dwellings by characteristics covers essentially the same area in characteristics space.

From an operational point of view, the rental equivalence is also preferable due to the short-term volatility of a basic user cost function. Given the use of the CPI, e.g. escalate both private and public expenditures and judging the impact of observed wage and salary changes upon consumer standard of living, one important question to be answered is whether changes in house prices and interest rates should influence these. From a practical view an index based on less volatile components are more

appropriate when it comes to escalate private and public expenditures. Volatile and negative user costs are avoided by incorporating expected future changes in the house prices and a long-term fixed interest rate into the user cost function. However, introducing values based on expectations in the CPI raises the question of whose expectations and how to measure such future changes in an appropriate way.

As discussed by Triplett (2001), the treatment of owner-occupied housing in consumer price indices is a central issue in the debate between advocates and opponents of the COL-theory. For instance Turvey (1999) presents several arguments against inclusion of imputed values to represent the cost of owner-occupied housing. Regarding the Harmonized Consumer Price Index (HICP), Eurostat has rejected the rental equivalence approach because it is considered as imputation. Among others Eurostat argues that imputed rents are the opportunity costs to owner-occupiers of living in their houses rather than a reflection of actual prices faced by them as consumers. However, the HICP is considered as an inflation index and according to Eurostat no opportunity costs are regarded as part of inflation. More information about owner-occupied housing in the HICP is given in Eurostat (2000).

In the spring 2001, The Central Bank of Norway was given new guidelines for the monetary policy. The central bank is instructed to apply the instruments of monetary policy to establish stable and low inflation. The operational target is an annual growth in consumer prices that over time is near 2.5 per cent. In general, the direct effects on consumer prices resulting from changes in interest rates, taxes, excise duties and extraordinary, temporary disturbances shall not be incorporated into the central bank's monetary policy decisions.

To provide an appropriate target for the monetary policy, Statistics Norway has developed a constant tax index based on the CPI adjusted for both real changes in taxes and energy prices (CPI-ATE). The use of a user cost approach would introduce interest rates into the CPI. Since changes in interest rates should not be incorporated in the monetary policy decisions, owner-occupied housing eventually based on a user cost approach, also must be removed from this constant tax index.

Further work will be done to improve the rental survey within next year. Among others, the sample will be increased and the use of a hedonic rent index will be considered.

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Appendix 1.

Period	Average nominal quarterly interest rate. Commercial and savings banks.	10-year long-term interest rate on government bonds	User cost (alt. 1) Figures in NOK	User cost index (alt. 2) jul99=100	User cost index (alt. 3) jul99=100		Rental equivalence jul99=100
					Assuming house price change = 2.0 %	Assuming house price change = 9.8 %	
Jul.99		5.8	-11709	100.0	100,0	100.0	100.0
aug.99	7.8	5.8	-11709	100.0	100,0	100.0	100.0
sep.99	7.3	5.8	1030	100.7	100,5	100.0	100.7
okt.99	7.3	5.8	1030	100.7	100,5	102.5	100.7
nov.99	7.3	5.8	1030	100.7	100,5	102.5	100.7
des.99	7.1	5.8	-2600	106.1	101,0	102.5	101.0
jan.00	7.1	5.8	-2600	106.1	101,0	105.0	102.6
feb.00	7.1	5.8	-2600	106.1	101,0	105.0	102.7
mar.00	7.1	5.8	-9152	115.6	101,5	105.0	102.9
apr.00	7.1	5.8	-9152	115.6	101,5	107.5	103.5
mai.00	7.1	5.8	-9152	115.6	101,5	107.5	103.5
jun.00	7.4	5.8	-11091	127.2	102,0	107.5	103.8
jul.00	7.4	5.8	-11091	127.2	102,0	110.2	104.0
aug.00	7.4	5.8	-11091	127.2	102,0	110.2	105.3
sep.00	8.1	5.8	16248	129.4	102,5	110.2	106.0
okt.00	8.1	5.8	16248	129.4	102,5	112.9	105.6
nov.00	8.1	5.8	16248	129.4	102,5	112.9	106.4
des.00	8.5	5.8	7913	132.0	103,0	112.9	106.3
jan.01	8.5	5.8	7913	132.0	103,0	115.6	107.5
feb.01	8.5	5.8	7913	132.0	103,0	115.6	107.8
mar.01	8.5	5.8	-2151	136.9	103,6	115.6	107.8
apr.01	8.5	5.8	-2151	136.9	103,6	118.5	108.2
mai.01	8.5	5.8	-2151	136.9	103,6	118.5	108.4
jun.01	8.5	5.8	-4662	140.0	104,1	118.5	108.6
jul.01	8.5	5.8	-4662	140.0	104,1	121.4	108.6
aug.01	8.5	5.8	-4662	140.0	104,1	121.4	108.9
sep.01	8.5	5.8	8498	138.8	104,6	121.4	109.7
okt.01	8.5	5.8	8498	138.8	104,6	124.3	109.9
nov.01	8.5	5.8	8498	138.8	104,6	124.3	110.6
des.01	8.4	5.8	9579	135.3	105,1	124.3	111.8
jan.02	8.4	5.8	9579	135.3	105,1	127.4	112.8
feb.02	8.4	5.8	9579	135.3	105,1	127.4	112.4
mar.02	8.0	5.8	-1934	139.4	105,6	127.4	113.1
apr.02	8.0	5.8	-1934	139.4	105,6	130.5	113.6
mai.02	8.0	5.8	-1934	139.4	105,6	130.5	114.3
jun.02	8.0	5.8	-2672	147.2	106,2	130.5	114.7
jul.02	8.0	5.8	-2672	147.2	106,2	133.7	115.1
aug.02	8.0	5.8	-2672	147.2	106,2	133.7	114.9
sep.02	8.5	5.8	20295	143.6	106,7	133.7	115.1
feb.02	8.5	5.8	20295	143.6	106,7	137.0	115.1
nov.02	8.5	5.8	20295	143.6	106,7	137.0	115.4
des.02	8.5	5.8	9942	131.1	107,2	137.0	115.6
jan.03	8.5	5.8	9942	131.1	107,2	140.3	117.1
feb.03	8.5	5.8	9942	131.1	107,2	140.3	117.4
mar.03	7.5	5.8	-74	121.2	107,8	140.3	117.8
apr.03	7.5	5.8	-74	121.2	107,8	143.8	118.8
mai.03	7.5	5.8	-74	121.2	107,8	143.8	119.0
jun.03	6.6	5.8	3667	97.6	108,3	143.8	119.2
jul.03	6.6	5.8	3667	97.6	108,3	147.3	119.3
aug.03	6.6	5.8	3667	97.6	108,3	147.3	119.4
sep.03	4.8	5.8	6211	91.9	108,8	147.3	119.6
okt.03	4.8	5.8	6211	91.9	108,8	150.9	119.7
nov.03	4.8	5.8	6211	91.9	108,8	150.9	119.9
des.03	4.4	5.8	1657	91.9	108,8	150.9	120.1