

12th meeting of the UN Expert group on Price Statistics
(Ottawa group)
New Zealand
4-6 May 2010

**From Mkhukhus to Mansions:
The problem of heterogeneous housing types for the
South African CPI**

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1. Introduction

The measurement of price changes for Owner Occupied housing (OOH) in a Consumer Price Index (CPI) has long been a complex debate. Over time, three standard approaches have been developed – each of which has its distinct advantages and drawbacks. These three approaches were devised mainly with a developed economy context in mind. Their application to a developing country environment with an extremely diverse housing market throws up a new set of complexities and challenges. South Africa is a country of massive social diversity and inequality, and housing heterogeneity is of both a cross-sectional nature (formal and informal housing) and longitudinal in that the sort of housing being built today is qualitatively different to the bulk of the housing stock.

The ILO manual on CPIs asserts that the selection of an approach for owner-occupied housing in the CPI depends on the principal purpose of the CPI – inflation or cost of living indicator. It further recognises, however, that the dual use of CPIs as a macroeconomic indicator and for escalation purposes can lead to tensions in the approach to OOH. It is further recognised that data availability may influence the decision on which approach to select. The South African CPI is used for both inflation targeting and cost of living adjustments.

The three methods are discussed in much detail in a range of manuals and papers. Briefly there are three basic approaches:

1. Use – which provides for either a user cost or rental equivalence method;
2. Payments – mainly measuring interest rates and the price of housing; and
3. Acquisitions – tracking the price of new dwellings sold to the household sector.

This paper is aimed at exploring a series of questions about the measurement of OOH for a CPI, rather than providing clear answers. It is a journey rather than a destination. It firstly looks at attempts to measure OOH by means of a rental equivalence and net acquisition in South Africa and some of the difficulties

associated with these efforts. It then examines the challenges of the diverse housing market and concludes with a discussion of efforts to obtain better information on the housing stock through the Population Census to be held in 2011.

2. Housing in the CPI of developing nations.

A recent BIS paper (Moreno, nd) suggests that the while a number of middle income emerging economies do include OOH in their CPI, most outside of Asia and Eastern Europe appear not to. This may be “because of data constraints and some perceived disadvantages in the measures for such housing”. He does not elaborate on what these disadvantages may be.

The United Nations’ practical guide to producing CPIs suggests that the rental equivalence method may be best suited to developing countries in which there is a high proportion of housing stock where the cost is not officially recorded. In truth, the rental equivalence method may be the easiest to implement as it requires only a survey of housing rentals.

3. Historical treatment of OOH in the South African CPI

Prior to 2009, the prime interest rate was used as the measure of owner occupied housing in the CPI. The prime interest rate is the benchmark rate for consumer lending and is pegged at 4 percentage points above the SA Reserve Bank’s ‘repo’ interest rate. This method was closest to a payments approach although it was never formally defined as such. The weight was calculated on the basis of total repayments (capital and interest) made by households to mortgage lending institutions and other costs associated with property transfers, among others¹.

¹ Specific questions in the Household expenditure survey included: Monthly instalments; Amount received from employer or discount in loan instalment; Additional (voluntary) loan repayments; Property transfer and registration costs; net expenses incurred as an owner of a holiday home.

The housing component of the CPI was excluded from the measure tracked for inflation targeting purposes. Instead, the CPIX (CPI excluding the interest rate on mortgage bonds) was used as the official inflation measure.

In 2009, Stats SA dropped the prime interest rate as its measure of OOH in the CPI. Instead, it adopted a rental equivalence method (labelling it Owners' Equivalent Rent). Although rental equivalence belongs to the family of user cost indices, it was accepted as part of the inflation target measure. CPIX was then replaced by the comprehensive CPI as the inflation target measure. It is measured through a survey which tracks the monthly rental of units managed by letting (estate) agents.

The ILO manual guides that the objective of the CPI should inform the measure used for OOH. In South Africa, as in many countries, implementation of this directive is clouded by the dual nature of the CPI as a macroeconomic indicator of inflation and as a cost of living escalator.

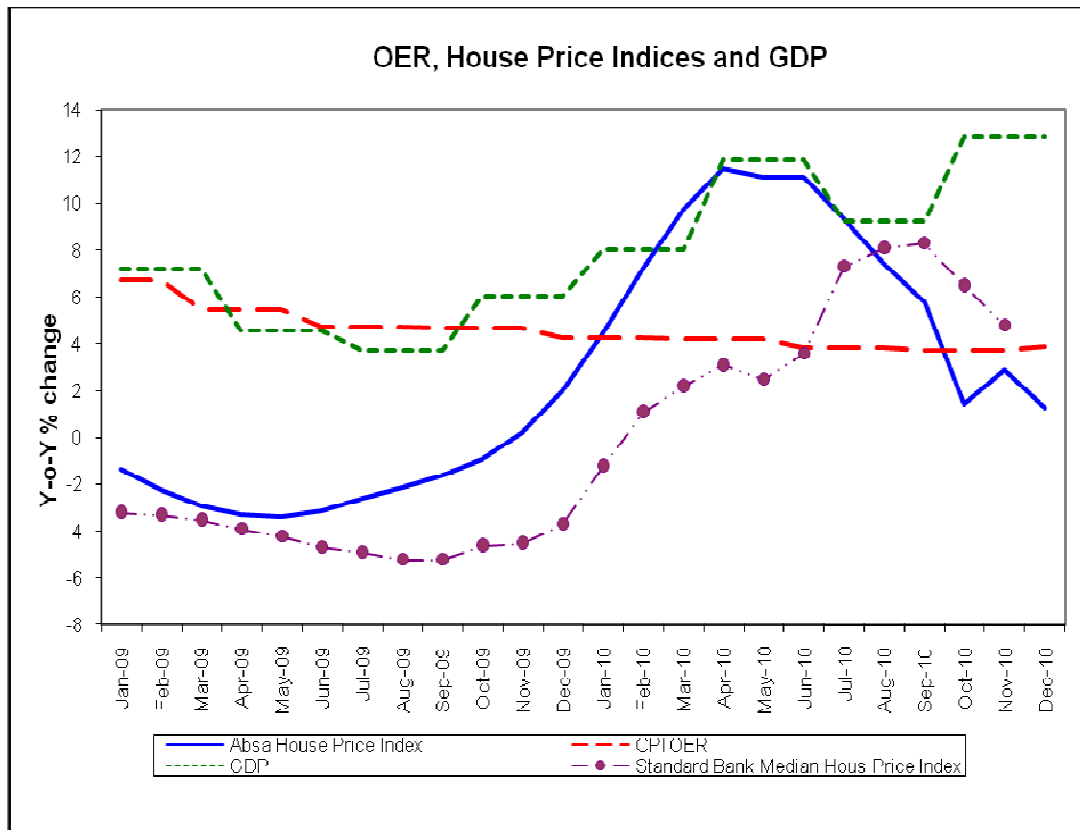
The reasons for the use of Owners' Equivalent Rent (OER) approach in South Africa are simplicity of calculation, ease of data collection (rental survey) and that no proper data exists for any other approach. In particular, there is no reliable data source for the value of the housing stock which is usually needed as a denominator for net acquisitions and user cost approaches.

4. Comparison of OER to other house price indices in South Africa

Owners' equivalent rent measures the value of the housing services that households 'pay' themselves when living in their own houses. It is because there is no actual transaction that an imputation of some sort is required. Aside from operational quality checks, how do we know if our index is correct? Do we expect the imputed value of OOH to follow some other economic variable such house prices? Or perhaps GDP growth? The graphs below provide a

comparison of owner occupied housing in the CPI, GDP at market prices, and two different house price indices from banks ABSA and Standard Bank².

Figure 1: Comparing housing inflation indicators and GDP growth



From the graph above it is clear that the CPI OER does not follow other house price indices or GDP. The Standard Bank house price index has a 0.82 correlation with GDP, whereas the rental equivalence index is negatively correlated by 0.54. Consequently, a similar negative correlation exists between CPI OER and the Standard Bank house price index. This implies that the OER of CPI does not follow, lead or reflect market movements. One of the reasons for this are that rental leases are normally agreed to over a period of a year, and

² ABSA House Price Index (HPI) measures the nominal year on year house price movements of houses purchased through approved mortgage loans from ABSA. Standard Bank's data are based on the median house price of the full spectrum of houses, using a five-month moving average

may even be held constant for even longer periods. Research in Japan (Shimizu et al, 2009) showed that housing rents there were approximately three times as sticky as rents in the USA. They do provide a set of local factors that explains this. However, these factors are not replicated in South Africa and the South African rental series does not seem to respond to economic events even with a considerable lag. This does raise the question of whether the OER index is actually reflecting any kind of inflationary pressures experienced by households.

A further limitation of using OER is that the rental market in South Africa is less than 25% of the total housing market. This poses the question of its representivity. Johannesen (2004) reports similar proportions of renters in Norway and argues for the continued use of the rental equivalence method despite this. He cites a number of supporting factors such as the low number of 'professional' landlords, the ease of transferring units between the rented and owner occupied sectors, and the fact that the index does show actual change in response to economic conditions. The South African market is similar on the first two features, but clearly fails on the third.

5. Net Acquisitions Survey

Largely due to these conceptual concerns over the rental equivalence approach Stats SA initiated a pilot survey of housing developers to measure OOH according to the net acquisitions approach. The survey is constructed as in Table 1.

Table 1: Pilot survey overview

Item	Description
Starting period	April 2010
Housing types	Houses, townhouses and flats
Sample	Top 50 housing developers selected from homebuilders' database from the National Home Builder Registration Council.

Collection frequency	Quarterly
Collection method	Telephone, fax, e-mails and internet
Type of price	Price including land and excluding land (both are requested from the respondent, but if only one can be given, it is accepted). These are actual prices and not hypothetical prices.
Number of price quotations in sample	April 2010 started with 200 quotes, currently (Mar 2011) 400 quotes
Quality adjustments	None (matched sample approach used)

The survey has now been running for four quarters, which is admittedly limited for any proper analysis. The survey has a number of conceptual and practical difficulties. Practical difficulties, while important for the sustainability of the survey, will not be dealt with here.

Implicit in the net acquisitions approach are a number conceptual concerns which are well documented elsewhere (for example Diewert, 2003). Specific difficulties in following a net acquisitions approach in South Africa turn on the marginal nature of the building of new homes.

The core problem is that the types of buildings constructed are not reflective of the composition of the total housing stock. Due to a number of social and economic factors, South African urban areas are becoming increasingly densified. This manifests itself in three main ways. The first is that a significantly higher number of flats (apartments) are being built. While flats have always been a feature of the centres of South African cities, they are now increasingly being built in suburban areas. Additionally, as businesses abandon traditional CBDs, former office blocks are converted into blocks of flats.

The second feature is the dominance in new construction of 'gated communities'. These are 'estates' of either townhouses (semi detached or single storey walkups) or stand alone houses (commonly called cluster homes) with a

communal wall and a common point of access, usually with some private security presence controlling entry and exit. Historically, South African suburbs have consisted of stand-alone houses with a garden or backyard and a dedicated point of entry. Increasingly, one sees large single homes being demolished to make way for new gated communities consisting of many dwellings.

We could refer to this changing composition of the housing stock as longitudinal heterogeneity. The impact of the change in the composition of buildings currently being built compared to the established stock means that it is tenuous to derive price changes from this index and apply them to the housing stock as a whole. This may not be a problem if the index is designed only as a macroeconomic indicator. But in the situation of a dual use index also servicing indexation and escalation, this is likely to cause problems.

A third manifestation of densification is that most housing construction only takes place in the 'bigger towns'. These centres experience net inward migration mainly because of their economic power. This causes a further practical problem as the South African CPI is weighted at the level of a sub-provincial region. This absence of building activity in these areas would result in no movement on a significant number of elementary indices.

An additional problem is that the survey does not include small-scale building contractors. These are typically active in the lower end of the market where significant number of houses are built, many of them with government subsidies, but the value of each development may be relatively small. Typically these contractors only work periodically in the year, further complicating data gathering on the price of their construction.

The index calculation on the survey is further complicated by the fact that once a dwelling is no longer built/sold, a substitution is required and quality adjustments would be needed at almost every point in the data.

6. Results of the net acquisitions survey

The net acquisitions survey pilot has been running for exactly one year, implying that the results may not be sufficient for comparison between the current method used in the CPI and this survey. However the data below illustrates the differences between the net acquisitions approach and the rental equivalence approach so far.

If a net acquisitions approach were to be adopted, it would firstly alter the weight of the OOH in the whole of the CPI from the current 12,2% to 4,3%. This is in line with the ILO manual advice that:

“one result of adopting the uses approach to owner-occupied housing is that its weight in the overall CPI is greater than when the acquisitions approach is used. ...Over a period of years, the uses approach may well give twice as much weight to owner-occupied housing as the acquisitions approach. (ILO Manual; Chapter 4)”.

Tables 2 and 3 show the quarterly changes in OER and Net Acquisitions, based on their respective weights. The quarterly changes for OOH based on the Net Acquisitions method are declining over time. This would be in line with the generally held view that the housing market is currently at a low point. Despite the big difference in weight, the divergence of the two OOH methods has no impact on the headline CPI.

Table 2: CPI with Owners Equivalent Rent

Weights based on OER	Q2:2010	Q3:2010	Q4:2010	Q1:2011
CPI Headline (Rebased to Q2:2010) Quarterly % change		0.8	0.5	2.4
OER (Rebased to Q2:2010) Quarterly % change		0.8	1.0	1.1

Table 3: CPI with Net Acquisitions

Weights based on Net Acquisitions (including land)	Q2:2010	Q3:2010	Q4:2010	Q1:2011
CPI Headline (Rebased to Q2:2010) Quarterly % change		0.7	0.5	2.4
OER (Rebased to Q2:2010) Quarterly % change		1.9	0.4	0.0

7. Diversity of the South African Housing Market

The measurement of OOH in South Africa by any method is complicated by the diverse range of housing types and hence the title of this paper. The South African housing stock consists of formal, informal, tribal, and other accommodation in backyard or shared property housing. The dominant form of housing in terms of both value and expenditure is formal housing. This includes stand-alone houses (both government subsidised and fully paid private houses), townhouses and flats (apartments), whereas informal housing includes shacks and backyard homes.

Backyard housing consists of dwellings that are situated in a backyard of a property that has an existing (usually formal) main house. Shared property housing occurs when more than one dwelling is constructed on a single stand. In addition, certain types of formal dwellings (especially townhouses) may be deemed as either full or sectional title. The distribution of the South African housing market according to the Census of 2001 is as follow:

Table 4: Tenure status - all housing in SA (Census 2001)

Housing type	Total	Owner-	Renters (%)
Houses	6,238,454	66.1	45.6
<i>Subsidised housing</i> ³	<i>1,074,028</i>	<i>9.6</i>	<i>-</i>
Flats	589,109	2.9	16.3
Townhouses	319,868	3.3	4.1
Informal	1,836,230	10.3	18.4
Traditional	1,654,787	15.0	4.1
Backyard or shared	532,986	2.4	11.5
Total	11,171,434	100.0	100.0

³ National Treasury estimate

Table 5: Percentage of tenure status by dwelling type (Census 2001)

Housing type	Owned	Rented
Houses	81.4%	18.6%
Flats	35.1%	64.9%
Townhouses	70.7%	29.3%
Informal	62.8%	37.2%
Traditional	91.7%	8.3%
Backyard or shared property	38.7%	61.3%
Total	75.1%	24.9%

All formal housing is constructed by builders and/or property developers, except for tribal and informal housing. A monetary transaction takes place with the building of formal housing by financing the dwelling with the money of the buyer or a mortgage bond. The building of the dwelling is also recorded at the local municipality and deeds office. While for tribal and informal housing, no or very little, monetary transactions take place. In cases where monetary transactions take place it will be of a personal nature (e.g. a personal loan), and mainly, the dwelling is not recorded at a municipality.

According to the population census of 2001, approximately 1,8 million households live in informal dwellings in South Africa, and 1,4 million households in traditional dwellings. This constitutes approximately 31% of all households in South Africa. Problems with these types of housing are the following:

- No organised market exists,
- No reliable estimates exist about the costs, and
- It is difficult to measure.

8. Challenges for measuring OOH caused by housing type diversity

The current rental survey only covers formal housing rented through letting agents. A household survey would be required to capture all other rentals, including informal rentals. This may now be possible as Stats SA recently started a quarterly, household-based, Labour Force Survey.

Expanding the net acquisitions approach to the informal sector would require an estimate of the costs of construction which could possibly be estimated on materials costs. In order to calculate this, a detailed profile of the quantities of different material and the respective sizes of informal and traditional homes would be required. A user cost approach would be even more complicated but is worth exploring to make a decision based on comprehensive evidence.

9. The Population Census as a basis for complete housing data

Any attempt to accurately estimate the price changes of owner occupied housing needs a reliable estimate of the value of the housing stock. The Personal Consumption Expenditure component of the National Accounts includes an estimate of the value of the housing stock. This should reflect the value of the housing services provided to the owner over the useful life of the dwelling (Eurostat, 2010). In South Africa, the SA Reserve Bank compiles the Personal Consumption Expenditure data. The value of the housing stock is estimated by multiplying the rents paid for dwellings by the total number of dwellings of different types. The quarterly escalation is derived from the increase in the CPI for housing rentals.

These housing imputations are subject to the same constraints facing those in the CPI, namely poor details on the quality and diversity of different housing units and ignoring any price changes in the informal sector.

Survey experience in South Africa shows that the best (albeit far from perfect) method of obtaining the monetary value of a dwelling is to ask households what they think the value is.

Information on the value of housing has previously only been asked in the household Income and Expenditure Survey, because of its use in compiling the CPI weights. Opportunity has now been made of the decennial population census (to be taken in October 2011) to include questions that will provide a

much more detailed picture of the composition of the housing stock. The same set of questions are now appearing in the annual general household survey and the three-yearly household expenditure surveys.

The new questions will provide:

- a more detailed breakdown of the type of dwelling to account for changing dwelling types spurred by densification,
- the material of construction to assess cost of construction,
- the size of the house (based on the number of different rooms) to further differentiate between houses of different value,
- the estimated value of the property, and
- the age of the property.

The data from the census should allow for a detailed model of housing stock to be created and values attached to a range of different housing combinations. Calculation of depreciation rates should also be possible, based on the age of the dwelling.

Conclusion

This paper has thrown up a number of conceptual difficulties with employing either the rental equivalence or the net acquisitions approach in the context of a developing economy such as South Africa. Based on the initiative to collect better housing data through the Census, it might be possible to explore a user cost approach. Most likely this would equally have a number of difficulties. Ultimately, perhaps this journey should search for method that equally meets the requirements of an inflation indicator and that of a cost of living escalator.

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