How much rent do I pay myself?

Methods of estimating the value of imputed rental for the weights of the South African CPI

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Abstract

The South African CPI uses the rental equivalence approach (owners' equivalent rent) to owner-occupied housing (OOH). This approach was introduced as part of a wide-ranging set of methodological improvements in 2009. With no reliable value for the housing stock, respondents to the household expenditure survey were asked to estimate the market value of their property. There are a number of risks in this, but this value, to which a rental yield was applied, was used to determine the weight for OOH. Five years later, households had curiously doubled their estimate of the value of their properties – this during a period of economic stagnation.

In order to avoid a significant distortion to the CPI weights for 2013, alternative estimation methods were tested, and a more robust method, using a matching approach between the rented and owned market, was selected to estimate the weight for owner occupied housing. This obviated the need to obtain a value of the housing stock.

This paper will discuss the various methods tested, the results of each method and the impact on the South African Consumer Price Index. In addition, the paper will give an overview on the improvements in the IES 2010/11 with respect to owner occupied housing, as well as the issues that influenced the use of alternative measures of estimation.

1. Introduction

As in many countries, the weight of housing costs in the South African CPI is significant. There is little normative literature to guide CPI compilers on the most appropriate method for determining this weight. This may well be due to the varying natures of housing composition and markets in different countries. At the time of adopting the imputed rent approach (owners' equivalent rent) in 2009, a method of applying a rental yield to the value of the housing stock was used to obtain the weight for OER. In 2013, for the recalculation of the weights, a method of matching dwellings in the rented and owner-occupied stock was applied. This approach is more in line with the guidance presented in the ILO manual. Comparison of three different methods confirms the advice of the ILO manual that "estimating how much owner-occupiers would have paid in the weighting base period to rent their dwellings… is not something that owner occupiers can normally be expected to estimate reliably in a household expenditure survey." (p180).

2. Asking the right questions

Much in a CPI depends on the quality of the household budget survey on which it bases its weights. The weights of the South African CPI are derived from a comprehensive and detailed Income and expenditure survey (IES). The survey runs over a 12 month period using both a diary and recall questionnaire. In its current format an IES has been run in 2005/6 and 2010/11. A similar expenditure survey (but targeted more at understanding poverty dynamics) – the Living Conditions Survey – was run in 2008/09.

Each of the surveys asked three questions to determine the rental value of owner-occupied housing:

- If you had to rent this dwelling, how much would you pay for it per month?
- What would you estimate the value of the dwelling unit?
- Amount paid on mortgage bond – split between capital and interest?

Additional variables were included in the 2008/9 LCS and further additional information in the 2010/11 IES and the 2011 Population Census. The questions on additional characteristics allowed Stats SA to explore alternative methods to arrive at the weights for OOH.

3. Proportions of owner occupiers and renters

An important consideration in using the rental equivalence approach is whether the rental market adequately represents the owner-occupied market. Between the last three household budget surveys, the proportion of owner-occupiers to renters has not changed significantly. This is illustrated in table 1. Noting this consistency is important in ruling out shifts in these proportions as a possible explanation for the variations in results discussed below.

Table 1: Proportion of owner-occupiers and renters

	IES 2005/06	LCS 2008/09	IES 2010/11
Owner-occupiers	75.85%	77.19%	76.27%
Renters	20.40%	18.54%	20.57%
Other	3.75%	4.27%	3.16%

4. Various methods of calculating weights

Three methods have been identified to estimate a weight for owner-occupied housing in South Africa:

- Method w1 - Apply a rental yield to the total value of all residential dwellings (similar that that used in 2008); where the value of residential dwellings is calculated as the weighted sum of the question in the LCS "*What is the value of the dwelling unit".* Thereafter, the yield is applied.

- Method w2 - Calculate the weighted sum of owner-occupied housing based on the question "*If you had to rent this dwelling, how much would you pay for it per month?"*

- Method w3 – Derive the value by using an imputation method which matches the dwelling characteristics of households that rent to those that are owner occupiers. This estimates the service cost of owner occupiers by that of actual rentals recorded in the expenditure survey. Table 2 shows the variables that were taken into account to impute a value.

  The ranking of the variables is important to ensure that at least the basic requirements are met for the imputations. The ranking of variables was done on availability of data, so the variables that are most common are ranked higher than those that are not. For example if a matching dwelling could not be obtained, the variables are removed, stepwise, from the bottom up to get to a suitable imputation. Informal housing was treated differently and was matched on all variables with the exception of variables 8 to 11.

Table 2: Variables used for imputations

Variable	Ranking
Province	1
Type of settlement	2
Type of dwelling	3
Area/size of dwelling	4
Bedrooms	5
Bathrooms	6
Kitchen	7
Multi-purpose rooms (important for informal dwellings)	8
Garages	9
Living-room	10
Dining room	11

5. Results

5.1 Method w1

Method w1 is based on the perceived value of the property and assumes some knowledge of the property market in the area. The rental yields, as well as the value of the dwelling stock derived from the household budget surveys, are given in table 3. The rental yields were obtained from an external source (Roode and Associates) and the dwelling stock is the weighted sum of the value from the household budget survey.

Table 3: Method w1: applying a rental yield to the total value of the housing stock

	IES 2005/06	LCS 2008/09	IES 2010/11
Value of housing stock (Rm)	1,278,456	2,570,841	3,207,860
Yield	6.90%[1]	6.32%	8,00%[2]
Result (owner-occupied housing weight) (Rm)	88,213	161,963	256,708
Value as proportion of CPI values (Rm)[3]	784,350	1,015,385	1,473,816
Proportion of CPI	11.25%	15.95%	17.42%

Method w1 shows a significant increase in the value of the housing stock over the three periods. This would have the effect of a massive 55% increase in the weight for owner-occupied housing in the CPI.

[1] One yield applied across all provinces for IES 2005/06 and LCS 2008/09
[2] Each of the nine provinces had a different yield, this is the average yield; this yield is based on data from two quarters
[3] These will change as the owner occupied value changes and is included in the total CPI values

5.2 Method w2

This result of this method is based on the question from the survey "*If you had to rent this dwelling, how much would you pay for it per month?"* This question assumes that owner occupiers have knowledge of the rental market in their area.

Table 4: Method w2: estimated rental value

	IES 2005/06	LCS 2008/09	IES 2010/11
Estimated rental value (Rm)	110,980	157,766	256,734
Value as proportion of CPI values (Rm)	807,117	1,011,188	1,473,842
Proportion of CPI	13.75%	15.60%	17.42%

As observed in w1, there are large jumps in the values obtained from the different surveys. Looking across method w1 and w2, the LCS 2008/09 and IES 2010/11 give similar proportions, but for the IES 2005/06 there is a significant difference.

This difference coincides with the manner in which the value of the dwelling was reported in the IES 2005/06 compared to the latter two surveys. In the IES 2005/06, the question required an actual value to be obtained from each household, but in the LCS 2008/09 and IES 2010/11, the option was given to report on the actual value or to give an estimate within eight bracket ranges. When the latter option was selected by the respondent, the value allocated to the dwelling in the survey was the midpoint. The ranges are:

- Less than R50 000
- R50001 – R250000
- R250001 – R500000
- R500001 – R1000000
- R1000001 – R1500000
- R1500001 – R2000000
- R2000001 – R3000000
- More than R3000000
- Unknown

One of the drawbacks of using the ranges was that the value for informal housing was overestimated. Informal housing is mainly comprised of shacks, therefore when the first range option was selected by the respondent, a value R25 000 was allocated to the dwelling. The average value of a shack as given in the IES 2010/11 from respondents that answered the value question by giving an actual value was approximately R14 600. The average value is therefore estimated at R18 600.

5.3 Method w3

The third method estimates imputed rentals of owner occupiers by matching dwellings in the survey that are rented to those that are owner-occupied by means of their characteristics.

Table 5: Method w3: using actual rental values to impute for owner-occupied housing

	IES 2005/06	LCS 2008/09	IES 2010/11
Imputed value (Rm)	64,587	115,456	139,051
Value as proportion of CPI values (Rm)	693,755	968,878	1,236,632
Proportion of CPI	8.49%	11.92%	11.24%

Similarly to methods w1 and w2, method w3 shows a large increase (115%) in the value of imputed rent which would result in a 32% increase in the weight of this component in the CPI.

The difference between method w2 and w3 (which could be expected to be almost similar as both are based on rentals), is due to the difference in actual and estimated rentals reported in the surveys. For dwellings with similar characteristics, in similar areas, the estimated rental value is in most cases, higher than the actual rental value. This occurs over all housing types. (Refer to Appendix A for an example). This finding provides evidence that the assumption that households have knowledge of their local rental market does not hold.

In nominal terms, the percentage change in the three methods over the three surveys show different results, as illustrated in table 6.

Table 6: Percentage changes using the three methods

	2005/06 to 2008/09	2008/09 to 2010/11	2005/06 to 2010/11
W1	83.60%	58.50%	191.00%
W2	42.16%	62.73%	131.33%
W3	78.76%	20.44%	115.29%
FNB House price index[4]	15.81%	9.71%	27.02
Stats SA residential rent index[5]	12.01%	11.00%	24.3%
CPI (total country)[6]	24.52%	9.06%	35.80%

While acknowledging that the changes in the weight of OER are as much a result of changes in the rental yield as they are of changes in house prices, it is evident that the changes from all methods are massively

[4] The FNB House price index is compiled by a local bank using transactions financed by its mortgage division.
[5] As included in the official CPI
[6] Based on average inflation over the period of the budget survey

exaggerated when comparing to the house price index or the rental index. Changes in quantity of housing can also be ruled out as a factor.

6. Calculating a rental yield from survey data

Given the usefulness of a rental yield for the purposes of imputed rentals, it is possible to use the survey data to derive this.

A rental yield – which is the annual gross revenue made by the homeowner as a percentage of the value of the property - may be calculated in two ways:

- Method y1 – Result of method w2 (perceived rental) as a proportion of the value of housing stock
- Method y2 – Result of method w3 (matching method) as a proportion of the value of housing stock

Table 7: Calculation of yields

Method	IES 2005/06	LCS 2008/09	IES 2010/11
Yield from external sources	6.90%	6.32%	8,00%
y1	5.05%	6.14%	8.00%
y2	4.25%	4.59%	4.33%

The differences in the yield from external sources compared to y2 can be ascribed to the informal market that is not captured in any data source. This is substantiated by comparing the actual CPI rental data compared to the actual IES 2010/11 rental data. Price collection coverage for the CPI rental data includes only formal urban areas and formal dwellings. Refer to appendix B.

7. Conclusion

The data analysis presented above illustrates the difficulty in tying down a definitive value of housing stock for the country, and for the imputed rentals that are derived from that. It is evident that the general public has a skewed notion of the value of their property which overvalues it significantly. This is most likely based on a lack of knowledge of the local housing market. Similarly, the perceptions of the rental market are equally biased upwards – leading to unreliable results for owner-occupiers' assessment of rentals for their property. It is also evident that small changes to survey questions (eg: using inappropriate brackets) can lead to distortions in the data.

The decision was made to use the imputation method for the 2012 weights, rather than the estimated rent and yield approaches, as it was based on actual data values, rather than the perceptions of survey respondents. In addition, the rental yields generated by this method are consistent over time. However, had this method been used consistently across the three surveys, the weight for owner-occupied housing

would have increased by over 32% - difficult to justify on the basis of modest price increases for house purchases or rents.

This study may be amplified once the final detailed data from the 2011 Population census is available. The specific questions on housing characteristics found in the IES 2010/11 are also covered by the Census. But clearly, additional work is also required on refining the questions and interviewing techniques for housing in the household budget surveys.

Appendix A:

Province	PSU	Housing type	Average actual rents	Average estimated rents
Western Cape	10100017	House	271	3,500
Western Cape	17103876	Flat	3,075	3,600
Western Cape	17103895	House	800	770
KwaZulu-Natal	57201399	Flat	3,700	4,000
Gauteng	77400907	House	300	1,350
Western Cape	10100030	House	350	338
Western Cape	10100056	House	120	1,625
Eastern Cape	21401263	House	180	629
Eastern Cape	21401319	House	2,000	1,136
KwaZulu-Natal	57201027	Flat	320	500
KwaZulu-Natal	57201167	House	3,000	2,333
Gauteng	77302475	House	3,000	3,556
Gauteng	77303546	House	300	3,667

Housing type (total country)	Average actual rents	Average estimated rents
Houses	1,343	2,041
Traditional houses	446	601
Flats/Clusters/Townhouses	2,684	3,949
Informal and backyard structures	458	856

Appendix B: IES 2010/11 and CPI 2010/11 rental averages

IES 2010/11			CPI Rental data			Ratio
Prov	**Type**	**Average**	**Prov**	**Type**	**Average**	
1	House	2,098	1	House	5,729	0.366
1	Flat	1,811	1	Flat	3,547	0.511
1	Townhouse	1,960	1	Townhouse	4,778	0.410
2	House	1,060	2	House	5,356	0.198
2	Flat	1,477	2	Flat	3,187	0.463
2	Townhouse	2,993	2	Townhouse	4,699	0.637
3	House	915	3	House	6,497	0.141
3	Flat	2,263	3	Flat	3,048	0.743
3	Townhouse	1,775	3	Townhouse	5,712	0.311
4	House	580	4	House	4,056	0.143
4	Flat	1,869	4	Flat	2,210	0.846
4	Townhouse	2,264	4	Townhouse	3,725	0.608
5	House	1,225	5	House	5,479	0.224
5	Flat	1,591	5	Flat	3,817	0.417
5	Townhouse	2,037	5	Townhouse	5,097	0.400
6	House	904	6	House	4,076	0.222
6	Flat	1,622	6	Flat	2,908	0.558
6	Townhouse	2,200	6	Townhouse	4,146	0.531
7	House	1,126	7	House	5,404	0.208
7	Flat	2,113	7	Flat	3,070	0.688
7	Townhouse	3,940	7	Townhouse	4,491	0.877
8	House	1,145	8	House	5,814	0.197
8	Flat	1,972	8	Flat	3,418	0.577
8	Townhouse	4,600	8	Townhouse	5,071	0.907
9	House	1,355	9	House	4,938	0.274
9	Flat	2,042	9	Flat	3,130	0.652
9	Townhouse	3,088	9	Townhouse	4,222	0.731