Measuring Housing Affordability: The Two Approaches

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Abstract

Measuring housing affordability has become an important field of research and an essential step in housing policy response. Through a review of previous studies from the early 1990s, this study provides a description of the two main approaches to measuring affordability – the ratio and the residual income measures. The objective is to present descriptions of the measures from the perspectives of different authors and the ongoing debate on their relative suitability as affordability measures. The review revealed lack of consensus on the most suitable approach. Some researchers advocate replacement of the ratio approach with the residual income approach while some argue for continued use of the ratio approach. Yet others advocate modified measures that account for the short-comings of the two main measures. Some scholars have actually developed and applied such modified measures. By bringing the diverse views of scholars on the subject over a relatively long period to a single platform, the paper has made valuable contribution to the housing affordability literature. The implication for research is the need to develop methodologies for measuring housing affordability which reflect the housing market practices of developing countries.

Introduction

The past three decades have witnessed growing concern about housing affordability. In developing countries, rapid urbanisation amid inefficient housing programmes, poor governance and low incomes, is exerting pressure on urban housing. Housing affordability has consequently become a major challenge (Aribigbola, 2011; Ndubueze, 2009). In the advanced economies, changing circumstances have worsened housing affordability (Haffner & Boumeester, 2010; McLaren, 2016; Pittini, 2012; Stone, 2004; Worthington, 2012). Consequently, research on the subject has continually gained attention (Bramley,1992, 1994; Burke, Ralston, & Stone, 2010; Kellett, Morrissey, & Karuppannan, 2016; Nwuba, Kalu & Umeh, 2015; Stone, 2006a, 2006b; Saberi, Wu, Amoh-Gyimah, Smith, & Arunachalam, 2017; Shaqra'a, Baradarulzaman, & Roosli, 2015; Sohaimi, Abdulla, & Shuid, 2017).

In particular, measuring housing affordability has become increasingly important in housing studies and housing policy response. However, the question of how to appropriately measure it has occupied researchers and policy makers for decades. Yet the results have revealed

conflicting ideas. There are two main approaches to measuring housing affordability – the ratio measure and the residual income measure. This study reviews the literature on the two methods from the early 1990s, the period when the debates on which of the two measures is more appropriate gained considerable momentum (Bramley, 1994; Hancock, 1993; Hulchanski, 1995; Stone, 1993). The objective is to present descriptions of the measures from the perspectives of different authors and the ongoing debate on their relative suitability as affordability measures. The paper also articulates the debate and highlights works that have advanced the methodologies for measuring housing affordability through some modified or composite measures.

Methodology

The paper is a general review. To assemble the works for the review, we applied the following search methodology. First, we examined some housing affordability works (Bramley, 1994; Ndubueze, 2009; Stone, 2006b). Then, we used author citations to do snowball search using articles' DOI where available and generally on Google Scholar to find works that are potentially relevant to the study. Further, we used the phrase 'measuring housing affordability' to search

for abstracts and texts on the search engines of Scopus and Google Scholar back to 1990 to cover the period the debates among scholars on the ratio approach versus the residual income approach gained substantial momentum. We scanned through the abstracts to exclude irrelevant works. We then went through the texts to select works that discuss any of the measures of the ratio approach, the residual income approach and the debates on the two approaches.

Further, we selected some works to support assertion for increasing trends in housing affordability research, housing affordability problems, and advancement in methodologies for measuring housing affordability. The final result was 49 works for the study. Through the review of these works, we provided discussions on the two main approaches to measuring housing affordability and the debates on their relative suitability as affordability measures and then highlighted housing affordability problems, the increasing trends in housing affordability research and the developments in the methodologies for measuring housing affordability.

Approaches to Measuring Housing Affordability

Housing affordability expresses the relationship between a household's income and its housing costs. It can be expressed in terms of access such as qualifying for home mortgage or the ongoing costs of housing such as rents. The approaches to measuring housing affordability are described in the literature with three concepts - the normative, behavioural and subjective (Li, 2014). Research and policy application have focused mainly on the normative approach. The main normative approaches, the ratio and the residual income are the subject of this paper.

The Ratio Approach

The ratio approach is the traditional and most widely used housing affordability measure. It conceives housing affordability as a measure of the relationship in ratio terms between housing costs and household incomes. This relationship could be expressed in terms of ability to access housing as in house price-to-income ratio or on-going costs of housing as in rent-to-income ratio. The values are taken at different levels such as the median, quartile or at household level.

Hulchanski (1995) identified six contemporary uses of the housing expenditure-to-income ratio – description of household expenditures, analysis of trends

and comparison of different households, defining eligibility criteria and subsidy levels in public housing, definition of housing need for public purposes, prediction of ability of a household to pay the mortgage or rent, and as a criterion in the decision to rent or provide a mortgage. The author asserted that the practical or applied use of the concept in the US and Canada relates mostly to defining ability to pay for housing.

Application of the ratio measures involves methodical questions as to the choice of ratio. Measurement is with reference to a 'rule of thumb' benchmark. However, the proportion and how it is applied varies across countries. In the US, the standard threshold is 30% of income for housing including utilities, above which the household is referred to as being 'housing cost burdened', and those spending more than 50% as seriously or severely cost burdened (Belsky, Goodman, & Drew, 2005).

In contrast, the UK uses the lower quartile ratio as the standard affordability indicator (National Housing and Planning Advice Unit [NHPAU], 2010). The UK however has no official definition of housing affordability but both the National Housing

Federation and the Department of Communities and Local Government define affordable rents as those below 25% of household income for new tenants (Tang, 2009). Australia applies the '30/40 rule' which uses a benchmark 30% housing cost to income ratio to define potential affordability problems and focuses on outcomes only for households in the lowest two quintiles of the equivalised disposable income distribution (Yates & Gabriel, 2006).

Models of the ratio measure include the rent-to-income ratio (RIR) for rental housing affordability, the house price-to-income ratio, (PIR), mortgage-to-income ratio (MIR) and the qualifying income (QINC) for various aspects of homeownership affordability.

House price–to–income ratio, PIR
The house-price-to-income ratio gives a general indication of whether house prices are affordable in relation to incomes. It compares house prices and household incomes at different levels such as the median. The World Bank recommends it as one of the key housing indicators (Mayo & Stephens, 1992). The United Nations Department for Policy Coordination and Sustainable Development also recommends

it as a key measure of housing affordability, and one of the indicators for social aspects of sustainable development (United Nations, n.d.). Both organisations recommend its application at median level and define it as the ratio of the median free-market price of a housing unit and the median annual household income. The measure, which is one of ten key housing indicators approved by the Commission for Human Settlements (Resolution 14/13) to be collected by all countries, provides information on the overall performance of housing markets and valuable insights into several housing market dysfunctions (United Nations, n.d.).

However, notwithstanding its simplicity in expressing how expensive housing is in relation to incomes, it does not provide a direct indication of either how easy or difficult it is for households to access housing or meet their on-going housing costs. (National Housing and Planning Advice Unit [NHPAU], 2010). In addition, it has a limited applicability as a housing affordability measure over time because it does not take account of interest and mortgage repayments (Jones, Watkins, & Watkins, 2011). Nevertheless, some major housing research organisations, such as the Demograghia International and the Joint Centre for Housing Studies of the Harvard

University use the measure to assess the affordability of urban housing markets. Cox and Pavletich (2017) have argued that the more elaborate indicators which often mix mortgage affordability and housing affordability can mask the structural elements of house pricing and are often not well understood outside the financial sector.

Rent–to–income ratio, RIR

The rent to income ratio, RIR, determines the percentage of income that a renting household spends on its housing costs. It uses the ratio of rent to income both as a measure and an indicator of affordability for tenants, given that for housing to be considered affordable, a household should not spend more than a prescribed percentage of its income on rent.

As an aspect of housing expenditure-to-income ratio, the rent-to-income ratio is used for several purposes such as part of eligibility criteria for subsidised public rental housing and in determining ability to pay rent often used in the private sector (Hulchanski, 1995). The public sector uses the measure to set income benchmark to exclude high income households from accessing subsidised housing while some private landlords use it to set income benchmark to exclude the lower income

households from accessing their rental housing (Hulchanski, 1995).

The World Bank and the United Nations recommended the rent–to-income ratio as a key indicator for rental housing affordability and define it as the ratio of the median annual rent of a housing unit and the median annual household income of home renters (Mayo & Stephens, 1992; United Nations, n.d.).

Affordability of mortgage

The mortgage-to-income ratio (MIR) evaluates the affordability of mortgage payments to households that have taken a mortgage to purchase their homes given that the mortgage payment should not exceed a given percentage of household income. If the household's monthly mortgage payment is above the prescribed benchmark (say 30%), the housing is unaffordable to the household. The QINC on the other hand measures the threshold income required to qualify for a loan on a typical dwelling. It determines the limitation imposed on the amount of loan a household can obtain granted that it should not spend more than a given percentage of its income on housing.

It is commonly used by financial institutions to assess a mortgage applicant's qualification for a mortgage amount or to determine the mortgage amount an applicant will qualify for.

These measures are often computed as index commonly referred to as housing affordability index, HAI. Existing indices include the National Association of Realtors (NAR) HAI and the Housing and Urban Development HAI in the United States, the Real Estate Institute of Australia and AMP Home Loan Affordability Index, the Commonwealth Bank of Australia and the Housing Industry of Australia Housing Affordability Index.

The computation of the NAR index assumes 25% qualifying ratio and a down payment of 20% of the price of the home (National Association of Realtors, 2017). Therefore, monthly payment of the principal and interest will be a maximum of 25% of the median family monthly income. An index value of 100 indicates that a family earning the median income has just the exact income to qualify for a mortgage on a median-priced home. An index above 100 means that a family earning the median income has more than the income required to qualify for a mortgage on a median priced home.

An index of 150 for example indicates that a

family that earns the median family income has 150% of the income necessary to qualify for a conventional loan covering 80% of median-priced existing single-family home. A similar but differently designed index is used in Korea. In contrast to the NAR HAI, in the Korea Housing Finance Corporation HAI, the higher the index, the less affordable home purchase is. An index value exceeding 100 implies that a household earning a median income cannot afford a median-priced house with a mortgage on standard terms (Kim & Cho, 2010).

The Residual Income Approach

The residual income approach to measuring housing affordability views housing affordability in terms of households maintaining a minimal standard of living reflected in the ability to meet non-housing needs at some minimum level of adequacy after paying housing costs. It focuses on the income left for non-housing expenditures after meeting housing costs. In the residual income measure, the appropriate indicator of the relationship between housing costs and incomes is the difference between them rather than a ratio (Stone, 2006b),

The concept is directly related to the underlying concept of affordability but it is closely connected to the more general welfare system (Marshall, Grant, Freeman, & Whitehead, 2000). The residual income approach arises from the recognition that housing costs tend to be inflexible and make the first claim on the disposable incomes of most households (Stone, 2006a). It calculates how much of the income is left for housing (mortgage payments or rents) after taking the relevant non-housing expenditure items for different household types into account; if the amount left is insufficient for housing, a household has a housing affordability problem (Burke, Stone, & Ralston, 2011).

To operationalise the approach as a housing affordability indicator requires setting a minimum standard for expenditure on non-housing necessities. While arguing strongly in favour of the measure as an alternative to the ratio approach, Stone, Burke, and Ralston (2011) pointed out however that there are practical issues such as how to specify the monetary level of minimum standard of adequacy for non-shelter items involved in operationalising the residual income as affordability measure. The methods usually applied for it are the poverty line and the budget standard (Tang, 2009).

Burke and Ralston (2003) described the

residual income method as 'non-shelter first claim' approach as against 'shelter first claim'for the ratio affordability method. This means that in the ratio approach, housing makes the first claim on household income while in the residual income approach, non-housing items make the first claim.

However, Stone, et al (2011) stated that the distinction is erroneous. The authors stated that both approaches assert that housing costs have the behavioural tendency to make the first claim on disposable income. Therefore, in both approaches, a household has an affordability problem if, after paying housing costs, it does not have sufficient residual income to meet its non-housing needs at some normative level of adequacy. The difference, they said, is that the ratio approach defines the normative standard as a percentage of income while the residual income approach defines it as a monetary amount, which is independent of income.

Stone, Burke & Ralston (2011) further explained that in principle, the residual income method evaluates the adequacy of a household's residual income to meet the household's non-housing needs but by procedure, it subtracts the appropriate non-housing monetary standard from the household's disposable income to arrive at the maximum amount the household can afford for its housing. The result is the amount *affordable* for housing and not the amount *available* for housing as stated by Burke and Ralston (2003). (Stone *et al.,* 2011).

The logic of the residual income approach is that housing affordability indicator should be the ability to afford a minimum standard of living rather than ability to pay a prescribed percentage of income for housing. This implies that the determinants of affordability will be not only income and housing costs but also the costs of non-housing goods, which will largely depend on the size and composition of the household. One implication of this is that measures to solve housing affordability problems will go beyond the housing and labour markets to the larger consumer market.

Ratio Approach vs. Residual Income Approach

The ratio measure has attracted criticisms in the literature both in its percentage of income for housing costs as affordability indicator and in the rule of thumb percentage as affordability standard. Some of the strongest critics who also advocate

for the residual income measure (Hancock, 1993; Stone, 1993, 2006b; Burke, Stone & Ralston 2011) argue that the ratio approach is conceptually and logically flawed and that the nornative standard of percentage of income for housing is arbitrary as there is no clear rationale that underpins it. This school of thought argues that the residual income approach is more appropriate as it recognises that different types and sizes of households would require different amounts to maintain a minimum standard of living that cannot be explained by a ratio or percentage of income basis.

In the seminal work, Shelter Poverty, developed in an earlier study, Stone (1993) and Stone (2006b) contended that neither the concept of housing cost-to-income ratio nor the particular ratio or ratios applied in its measurement has any logical or theoretical basis. Stone pointed out that the measure provides no means for assessing whether households are achieving minimum standards for non-housing necessities after paying for housing, which is the essence of housing affordability measurement.

Insisting that the ratio concept is logically flawed, Stone argued for the 'conceptual soundness' of the residual income approach. Similarly, Hancock (1993) argued that 'from economic first principles' it is more logical to define housing affordability with some form of residual income than a prescribed ratio of housing cost to income. Hancock contended that the rent-to-income ratios provide very misleading information for economic policy.

Again, Bramley (1994) stated that: The most coherent normative concept of affordability is one that links normative judgements about housing needs/standards with judgement about minimum income requirements for non-housing consumption. This implies that housing affordability is closely bound up with the definition of poverty line and that the key ratios are likely to be expressed in terms of residual income (after housing costs) relative to that line (p104).

In the 'housing-induced poverty' concept, Kutty (2005) argued that a sensible housing policy response would target housing subsidy to household that will be unable to pay for non-housing needs after paying for housing. Likewise, Hulchanski (1995) strongly criticised the ratio measure, arguing that the application of the housing expenditure-to-income ratio is invalid and unreliable in the definition of housing needs, measuring ability to pay for housing

and in minimum income criteria for granting of mortgages. However, Hulchanski did not offer an alternative. Also, Heylen and Haffner (2010) suggested that in contrast to the residual income approach, the affordability standard of the ratio measure is not meaningful. The researchers outlined the advantages of the family budget method of the residual income over the ratio measures to include allowing for more accurate differences across household types and being more useful in studying low-income households.

Furthermore, the ratio measure fails to recognise that the lowest income households would not have sufficient residual income even if they spent so little on housing, whereas higher-income households would likely have more than sufficient residual income even if their housing expenditure was in excess of the prescribed benchmark ratio (Bourassa, 1996). A single ratio cannot be suitable for all households because housing and non-housing costs vary for different household types (Chaplin & Freeman, 1999). Moreover, high housing expenditure-to-income ratios could be an indication of strong taste for residential comfort (Thalmann, 2003).

Interestingly, some researchers have

contended that the residual income measure not only has its drawbacks but also suffers some of the limitations of the ratio measure (Chen, Hao, & Stephens, 2010; Robinson, Scobie, & Hallinan, 2006). Henman and Jones (2012) consented that the benchmark percentage of the ratio approach is arbitrary but also argued that the major weakness of the residual income method is that it is more complex to apply.

Belsky et al (2005) criticised the ratio approach for its several drawbacks but maintained that it has its advantages which include being easy to compute and simple to understand, applicability across a range of places to track affordability changes and explore differences across households, and is based on readily available data. They advocated for the development of models that control for quality and other factors ignored by the conventional methods. Although not a perfect measure because it does not account for build quality or house sizes, the median multiple (house price-to-income ratio at median values) is the only index that allows a quick comparison of different housing markets, and it is best approximation of housing affordability measures available to date (Hartwich, 2017)

In addition, Yates and Gabriel (2006) agreed

that the choice of 30% benchmark of the ratio approach is arbitrary but suggested that the ratio-based 30/40 rule used in Australia is 'a sound anchor measure'. The researchers argued that it is accessible, simple to interpret, has public appeal, and is clearly informing regarding the degree of the issue it represents. They further contended that the residual income approach has the weaknesses of requiring judgment to determine the non-housing needs and possibility of complexity and more onerous data requirement. In addition, both measures have the weakness of misclassification of households that have housing affordability problem (Ndubueze, 2009).

Ironically, Burke, Stone & Ralston (2011) who have fervently criticised the ratio measure also recommend its continued use in broad measure of affordability (scale of affordability problems across all households). Furthermore, in contrast to an earlier position on normative concept of affordability (Bramley, 1994), Bramley (2012) argued from empirical evidence that the ratio measures, especially the traditional benchmark 25% of income in the UK, is better aligned with households' reported housing payment problems than the residual income. Bramley (2012) justified its continued use as a rule of thumb tool for

policy. The findings suggested that the traditional affordability ratios are still the better single ratio measure with the residual income ratios in supporting role. The author however concluded that the best affordability measures are composites of ratio and subjective payment problems.

Notwithstanding its limitations, the ratio approach continues to enjoy wide application. A review of housing affordability literature revealed that more articles have adopted the ratio approach than the residual income approach (Li, 2014). As the debate continues, a number of studies have adopted modified or composite measures through econometric modelling to account for the shortcomings of the two conventional measures such as trade-offs in transport, housing quality and amenities which households make in bid to afford housing (See for example, Cai & Lu, 2015; Fisher, Pollakowski, & Zabel, 2009; Ndubueze, 2009; Philipp, 2015; Ramlan & Ramlan, 2016; Saberi, Wu, Amoh-Gyimah, Smith, & Arunachalam, 2017; Sohaimi, Abdullah, & Shuid, 2017).

Although some of these affordability models are based on either the ratio or the residual income standards, their increasing number signals a departure from the conventional to

more advanced and more rational methodologies.

Conclusion

There is an on-going debate about which of the two major affordability measures – the ratio and the residual income - is more appropriate. There is lack of consensus on the issue which suggests that neither of them two is sufficient on its own as a housing affordability measure.

Overall, the residual income measure is a more rational approach than the ratio measure. Its affordability indicator and affordability standard are more logical than those of the ratio measure. A monetary amount as basis for affordability is more realistic than a percentage or ratio of income which in reality may not reveal adequacy or otherwise. The proportion of housing cost to income is not a realistic indicator of hardship imposed by housing costs which is the rationale for the measurement of housing affordability. It does not show which households can or cannot afford housing. Moreover, there is no logical basis for prescribing a certain benchmark percentage of income for housing.

In addition, a household's decision to deploy a greater percentage of its income than the benchmark to housing may be out of choice

rather than necessity. If the household can still afford the prescribed standard for non-housing expenditure, it should not be considered as having a housing affordability problem as the ratio measure does. Policy response to affordability problems should aim at the households who will be unable to obtain a minimum standard of living after paying housing costs rather than those who have exceeded a certain percentage as housing costs.

However, the difficulties in operationalising the residual income approach as affordability standard with respect to its onerous data requirements and establishing the minimum standard for the non-housing needs constrain its applicability especially in developing countries like Nigeria where availability of reliable data is a persistent challenge. The implication is the need for governments in developing countries to set up machineries for regular availability of up-to-date data on welfare and establish welfare systems that set minimum living standards.

By bringing the diverse views of various scholars over a relatively long period on measuring housing affordability to a single platform, the paper has made valuable contribution to the housing affordability literature. An implication of the paper for

research is the necessity to develop methodologies for measuring housing affordability which reflect housing market practices of the developing countries. The paper does not claim to have covered all the works published during the period of study on the subject. However, the review covered the significant works.

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