Price to Income Ratio Approach in Housing Affordability

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Abstract—**There are many approaches to measure housing affordability. The approaches are Price to Income Ratio (PIR), Rent to Income Ratio (RIR), Housing Expenditure to Income Ratio, Market Basket Measure, Quality Based Measure and Residual Income Measure. Price to Income Ratio (PIR) is often used as indicators of measuring housing affordability. The objective of this research is to examine housing affordability in Pulau Pinang by using Price to Income Ratio (PIR) approach. The sample of this research comprises individuals who own a low-cost house at Pulau Pinang. The convenience sampling technique is used for this research with regression method as its analytical tool. The findings indicate that Price to Income Ratio (PIR) is a valid and easy approach to measure housing affordability in Pulau Pinang.**

Index Terms—**Housing affordability, price to income ratio,regression method.**

I. INTRODUCTION

Housing acts as a focus of economic activity, a symbol of achievement, social acceptance and an element of urban growth. To most individuals, housing represents the largest single investment of a lifetime. However, others see housing as a shelter and to fulfill their fundamental needs only [1]. Affordability is the ability of a person in providing something, which is usually referred to his ability in financial terms. A household is having affordability issues when there is a lack of adequate income to be used for household expenditures and other households needs besides housing [2]. Concept of housing affordability is generally to determine income affordability of a person to pay for housing monthly instalment. Socioeconomic characteristics as type of dwelling unit, length of stay, employment and income have shown positive effect on the overall housing satisfaction [3]. There are many research have been done about housing affordability and majority of the research are focused on housing affordability of tenant. Many approaches have been using to measure housing affordability.

There are six approaches identified to measure housing affordability such as Price To Income Ratio (PIR), Rent To Income Ratio (RIR), Housing Expenditure To Income Ratio, Market Basket Measure, Quality Based Measure and Residual Income Measure. These approaches are important to measure income affordability of a person to pay for monthly housing payment. Housing affordability measure are using for many reasons such as to explain the type of household expenditure, to analyze the trend with comparison on type of different household, to determine who are qualified to get a housing subsidies, to define

housing necessity for public policy, to predict household applicable to pay for a rent or housing loan and to choose housing unit before decide to buy or rent the house [4]. So, it is important to understand about housing affordability approach.

II. PRICE TO INCOME RATIO APPROACH

This research only focus on one approach namely Price To Income Ratio (PIR) which means the ratio of median house prices to median familial disposable incomes in percentage or years of income. Individuals applied this ratio as a basic component of mortgage lending. PIR are a measure of the affordability of housing. Increases in housing prices cannot deviate indefinitely from growth in the income of potential buyers. If housing prices outpace income growth, at some point households will no longer be able to afford buying and demand will dry up, bringing prices down [5]. PIR is a method that shows the ratio between current market value of housing unit that household plans to purchase to the total annual income of the household, which can summarize between Current Market Value of Housing Unit and The Total Annual Income of Household. For low income group and middle income group, a PIR method is the ratio between Mean Free-Market Price of Dwelling Unit to The Mean Annual Household Income. This shows the different between different group of income household. PIR provide a useful insight of the overall performance of the housing market for example, the total demand and supply of housing for a local market. PIR also provides information like the level of sustainability of human settlements with housing affordability such as the impact of market force and housing policies for example the new housing policy from China government.

A. Formula of PIR

The formula is;
For individual;

$$PIR = \frac{HP}{Y}$$

Price Income Ratio = $\underline{\text{Current market value for housing unit}}$

For group of household;

Price Income Ratio =

$$\frac{\text{Median ratio of free market price for housing unit}}{\text{Median of household annual income}}$$

PIR is a method by calculating the median house price

divided by gross annual median household income. It's also called a "Median Multiple" method. Two intermediate measures are required in this method, i.e. median annual household income and median house price.

1) Median household income: Household income is defined as gross income from all sources, including wages, salaries, incomes from businesses or informal sector activities, investment income, and, where information is available, income in kind such as consumption of agricultural product which might have been sold.

2) Median house price: The median-priced house is that house which has 50% of the houses priced below it, and 50% of the houses priced above it. Housing value is defined as the price at which a house would be sold if placed on the market for a reasonable length of time by a seller who is not under pressure to sell.

The impact of increasing rents and house prices has been most pronounced on households in the lower two income quintiles, which have experienced declining real incomes over that period. The growing disparity between house price, rents and median income, particularly for lower income households has been a global phenomenon. As building standards and codes have proliferated and grown increasingly stringent the gap between the cost of producing new housing and the house-buying power of low income United States families has widened [6]. They go on say that low income United States households have been plagued by falling real disposable incomes and rising tastes for housing quality, requiring greater proportions of their income to be spent on housing.

Workers are willing to pay higher rents and accept lower wages in order to live in high quality of life cities (e.g., mild climates, coastal locations). Because housing rent and wage directly affect housing price and income, this leads to higher price to income ratios in these cities [7]. Real house prices and real disposable income are co integrated at the 5% significance level [8]. While income is a major determinant of housing demand, other factors also play an important role. In particular, as most household need to borrow to buy houses, mortgage rates and credit conditions have a strong impact on housing demand. The responsiveness of housing supply, often restricted by land-use planning constraints, also affects prices. Hence, there is no simple relation between housing prices and income [9]. Econometric models have the advantage over simple ratios of taking into account all determinants of prices (provided the model is well specified). However, they have their own weaknesses. Notably, fundamentals explaining housing prices may be unsustainable, leading to the deceptive impression that prices in line with fundamentals are not vulnerable to sharp falls. Such unsustainable fundamentals may include levels of income, interest rates and the architecture of credit [10]. Fundamentals often cited in support of confident assessments of the housing market are surprisingly weak at explaining historical prices [11].

Nevertheless, high ratios may be a problem from different perspectives. For example, excessively high housing prices may cause social problems if access to decent housing becomes unaffordable for many households, leading in particular to overcrowding and homelessness. Social and economic inequalities may be exacerbated by unequal access to homeownership. In a tight market, the wealth gap between those able to put a foot on the housing ladder and those who rent may keep on widening. High housing costs may prevent a smooth functioning of the labour market and erode the competitiveness of the economy. Housing price increases that look unsustainable may raise concerns about financial stability. Altogether, the need for policy action should be assessed on the basis of the consequences of high price to income ratios. The appropriate policy instruments to use will depend on the nature of the problems associated with high price to income ratios. High housing prices may result from rigid housing supply linked to tight supply of land development, as in United Kingdom and Australia. In that case, supply-side measure, such as reforming land-use planning or developing infrastructure, may be warranted. A number of other structural factors, such as taxation and regulations, may raise the volatility of housing market [12]. Buoyant prices can also result from unsustainable demand, which could be reined in by monetary policy tightening or macro-prudential policies, and may indicate risks of financial crisis. The financial cycle is most parsimoniously described in terms of credit and property prices [13].

Every group of income such as low income people, medium income people or high income people, has different PIR. For example low income people in Beijing, on year 2002 the PIR is 13.1. PIR for medium income people is 9.24 and PIR for high income people is 3.68 [14]. It shows that PIR for low income people are higher than medium income people and high income people. Generally, the ratio of house PIR in Taiwan has been about 4 or 5; however, this affordability index rose from 4 to more than 13 during late 1980s because the house prices jumped threefold [15]. This is caused by rising house prices at Beijing. House price for low income people are higher compared with house price for medium income people and high income people. Hence, low income people will not buy a house but they only rent the house. Based on [14], the approach to reduce the PIR is active promotion of housing market for old houses or houses that sold by first owner of a house. Sale and purchase for this type of housing must be done easily and briefly. The purpose is to attract interest of potential buyer to buy the houses. [14] also used PIR to analyzed housing affordability at Beijing. [16] have been using this approach for study case at Khayelitsha, South Africa. [16], used PIR approach to investigate either the household afford or not afford to buy a house. From the explanations shows that PIR approach is a familiar approach using by previous researchers and was chosen to use for this research.

III. CONCEPT OF HOUSING AFFORDABILITY

Housing affordability is one of the key factors that can describe the socioeconomic stability and development of a country. Affordable housing is housing that is appropriate for the needs of a range of very low to moderate income households and priced so that these households are also able to meet other basic living costs such as food, clothing, transport, medical care and education. As a rule of thumb, housing is usually considered affordable if it costs less than

30 percent of gross household income.

In this context, affordable housing refers to housing that has been developed with some assistance from Malaysia Governments, including through planning incentives. It may include a range of housing types and sizes, including single or multi-bedroom units or houses, as well as studio apartments. It is only available in some locations and eligibility criteria apply.

The concept of housing affordability is measured by the income and expenditures of a household to pay for the price or rental of a house. The expenses allocated for buying a house is 30 percent of household monthly income. Affordable housing is referred to the ability of a household pay for a house. [18] stated that affordable housing concept pertains to the amount of income needed to pay for the house and other household expenditures. It is also defined as a house that can be obtained without serious financing risk which has been set by most countries worldwide as 30 percent income limit. Owning a home for shelter and comfort is central to most families' ultimate plans and also considered definition of personal success.

Housing affordability can be understood as the continuing costs of a mortgage or rents relative to income, problems of accessing affordable housing (e.g., first home ownership), not being able to afford housing costs after meeting other expenditures, or a problem of too low an income or too high housing prices. Even more problematically, affordability can be experienced by household types in different ways; that is, through the employment, transport, health, and other consumption trade-offs that have to be made by singles, sole parents and couples with children as they adapt their circumstances to high housing costs and/or low income. In the case of home buyers, concerns about affordability are typically about the accessibility of home ownership, or the ability of younger households to gain access to home ownership for the first time. So, house ownership is based on the affordability of a person to pay for house.

Source : http://www.malaxi.com/map_penang.html [19].

Fig. 1. Flat Setia Vista, Relau, Pulau Pinang.

IV. METHODOLOGY

The sample of this research comprises individuals who own a low-cost house at Flat Setia Vista, Relau, Pulau Pinang (Picture 1). There are 165 unit of house have been built by SP Setia Sdn. Bhd. with 650 square feet and three (3) bedrooms. The convenience sampling technique is used for this research with regression method as its analytical tool.

V. CONCLUSION

The findings indicate that Price to Income Ratio (PIR) is a valid and easy approach to measure housing affordability in Pulau Pinang. Overall, PIR are useful indicators to monitor, as deviations from their long-term average may reflect unsustainable developments in housing or mortgage markets. Nevertheless, the ratios are very persistent. If high ratios have adverse social and economic consequences, policy action guided by a careful analysis of underlying factors may be warranted.

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