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# Rental index rate as an alternative to interest rate in Musharakah Mutanaqisah home financing: a simulation approach

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# Rental Index Rate as an Alternative to Interest Rate in Musharakah Mutanaqisah Home Financing: A Simulation Approach[1]

## 1.0 INTRODUCTION

Islamic financing has been experiencing a steady growth according to Ernst & Young World Competitiveness Report 2014-15. Compounded annual growth rate (CAGR) of Islamic financing in rapid-growth markets such as Qatar, Indonesia, Saudi Arabia, Malaysia, United Arab Emirates, and Turkey stands at 11 to 32 percent (Ernst & Young, 2015).

Among non-Islamic countries, United Kingdom is positioning itself as the western hub for Islamic finance with US$19 billion of reported Islamic finance assets (UK Trade & Investment [UKTI], 2014). More than 20 international banks operating in the UK are offering Islamic finance banking and finance products. Six of these are fully *Shariah*-compliant (UKTI, 2014). The growth in Islamic finance in UK is primarily due to supportive government policies, including removal of double-tax on Islamic mortgages and extension of tax reliefs (Belouafi & Chachi, 2014). In particular, the government of UK has introduced an Islamic mortgage aid scheme which enables *Shariah*-compliant banks to also offer affordable home finance (Islamic Finance News [IFN], 2014). These initiatives have further boosted the growth of Islamic financing in UK and levels out the playing field for Islamic and conventional banks.

In Malaysia, on the other hand, Islamic banking has long been established since 1983. Malaysia's Islamic banking industry is a global leader with a 16.7 percent global market share and around 20 percent of total domestic banking market share (Ernst & Young, 2015). Islamic financing enjoys a 23 percent CAGR from 2009 to 2013 as compared to 11 percent of that of conventional financing.

Home financing is offered both by conventional and Islamic banks in countries such as UK Malaysia, Indonesia and the Gulf Cooperation Council (GCC) countries. The main difference between Islamic and conventional banks is that, the former operates in accordance with the rules of *Shariah*, the legal code of Islam, while the latter is based on secular principles, not religious laws (Shanmugam & Zahari, 2009). Conventional banks are primarily debt-and interest-based, and permit risk transfer. In contrast, Islamic banks are asset-based, prohibit interest (riba), and promote risk sharing (Hasan & Dridi, 2010).

According to Usmani (2002), it is formidable task to restructure financing in Islamic bank in an interest environment since people believe that abolishing interest from bank and financial institutions only make them charitable rather than commercial. Interest free loan are meant for cooperative and charitable activities. As far as commercial financing is concerned, the *Shariah* has different set up for that purpose. However, the exclusion of interest rate does not mean the bank cannot earn profit. If financing is for commercial purposes, it can be based on profit and loss sharing, although to some extent, *Musharakah* and *Mudarabah* are not workable and feasible for certain businesses.

1

The most common structures of Islamic home financing are *al-bay' bithaman ajil* (BBA) and *musharakah mutanaqisah* (MM) contracts (Meera & Abdul Razak, 2005). The BBA is basically a sale contract which provides buyers the benefit of a deferred payment, whereby the deferred price of the sale object carries an additional profit. It is an extension of the *murabahah* (cost plus) contract, whereby the commodity exchanged is "delivered" immediately but the sale price (with profit) is paid in installments, over a long period. *Musharakah mutanaqisah (MM)* is a partnership between the financier and the customer to acquire property under a diminishing *musharakah* arrangement where the customer agrees to rent the bank's portion and pays rental on the bank's share. Subsequently, the customer gradually purchases the bank's share in the partnership. As the customer's ownership in the property grows, the bank's share diminishes until the customer has fully bought the bank's equity in the property. While *Musharakah Mutanaqisah* (is deemed to be more *shariah* compliant and has beneficial potentials to both customers and banks in Islamic Home Financing.

Meera & Abdul Razak (2005) cites that while the BBA is widely used in Malaysia, Indonesia, Brunei and few other countries, it has been subjected to much controversy among the *fuqaha* worldwide with regards to its permissibility; where most of the Middle East scholars have rejected it. Meera & Abdul Razak (2005) argued that the current BBA home financing is not very much different from the conventional home financing. Instead of charging interest to the customer, financiers in BBA charge a profit derived through a buy-and-sell contract which is permitted in Islam, but the profit rate is still dependent on the market interest rate. Thus, while the BBA is practiced as *Shariah* compliant in some countries, it is nonetheless, converging to the conventional mode. This is attributed to the computational formulas that are similar to that of conventional and where the profit rate tracks the market interest rate. The current difference between the fixed-rate BBA and the conventional mode is that once the profit rate is fixed in the BBA, it will remain the same for the entire duration of financing. This even causes more problems for the financiers as it is difficult to estimate accurately the cost of funds and hence the appropriate profit rate over long periods like 20 years, due to the volatility of economic conditions. Another issue in BBA is its documentations which show that the bank merely acts as a financier rather than a seller and excludes the bank of all liabilities (Meera & Abdul Razak, 2005). This ignores the *Shariah* principle of "*al-ghorm bil ghonm*" (no reward without risk), "*ikhtiar*" (value-addition or effort) and "*al-kharaj bil daman*" (any benefit must be accompanied with liability), thereby rendering the BBA profit to be implicated with riba.

Asmadi (2011) cites the judgement in Affin Bank's case against Zulkifli in Malaysia in 2006, in which the High Court treated the *al-bay' bithaman ajil* (BBA) transaction as a normal conventional loan, has become a milestone in diverting Islamic banks' concentration from using BBA. The current practice in Islamic financing has particularly attracted many criticisms and is further challenged to become more Shariah-compliant (Rosly, 2005; Khan, 2010). Amidst criticisms on BBA, *MM* is seen as a more *Shariah*-compliant alternative model (Meera & Abdul Razak, 2005; Asmadi, 2011).

The *MM* concepts have been adopted by a number of Islamic financial services providers worldwide. Successful cooperative-type models include the Islamic Housing Cooperative (Canada), Ansar Cooperative Housing (Canada) and the Ansar Housing Limited (U.K). *Musharakah Mutanaqisah (MM)* models are also adopted by financial institutions in the U.S., Pakistan and United Kingdom (Meera & Abdul Razak, 2005). In Malaysia, *MM* products are among new retail products of Islamic banks. It is implemented by leading local

banks with Islamic bank subsidiaries and at least one full-fledged Islamic bank (Asmadi, 2011).

In determining the rental rates in *musharakah mutanaqisah*, home financing offered by some Islamic banks all over the world are still tied to the implied or indicative conventional interest rates. Although benchmarking against the conventional interest rates is permissible, an alternative must be sought which is not dependent on the conventional interest rates (Yusof, Kassim, Majid, & Hamid, 2011).

Yusof *et al*. (2011) analyze the possibility of relying on the rental rate to price Islamic home financing product in Malaysia instead of the conventional interest-based lending rate. They find consistent evidence that the rental rate is a better alternative than the lending rate to price Islamic home financing product. In particular, the rental rate is found to be resilient to short-term economic volatility, while in the long run, it is truly reflective of the economic fundamentals.

On the other hand, Hasan, (2012) compared the *Muharakah Mutanaqisah* model with Zubair diminishing balance model. In this paper, he demonstrated the formula to determine the fixed installment payments in home amortisation. This paper also proposes an alternative home finance model and that is claimed to be cheaper while the margin of return of the bank is not reduced. Interestingly, this paper attracts no juristic doubts.

Our current paper departs from those of existing literature [for instance, Meera & Abdul Razak, (2005, 2009); Eroglu *et al*., (2010); Yusof *et al*., (2011); Hassan (2012)] by incorporating the actual values of rental price index and house price index in determining rental rate. This rate represents the rate of return to both the customer and the bank associated with owning the property and thus enables us to make a comparison with the prevailing interest rate via simulation approach.

The next section, Section 2, discusses the theoretical underpinnings and literature review. Section 3 presents Rental rate Model for *Musharakah Mutanaqisah* (MM), Section 4 highlights findings for Simulation Approach and finally Section 5 provides conclusion and recommendations for future research.

## 2.0 THEORETICAL UNDERPINNINGS AND LITERATURE REVIEW.

In line with the finding of Hui et al. (2007), Marco (2007) and Adegoke (2014), this paper seek to determine Islamic rental rate focusing on distinguished simulation approach as it captures comparative true rate of return of owning a house for conventional and Islamic banks and at the same time as it truly reflects the physical attributes of the property (captured by rental index) and its market price (captured by house price index). It is not within the ambit of this paper to analyze the impact of physical attributes on rental markets across locations or among matured and emerging markets. In order to capture the rate of return on rental properties in the case of UK housing market, more precisely the London residential market, the London Rental rate is employed. Using the data on London as a proxy for UK market can be justified as London is the most active residential market in the UK. Nevertheless, we can expect to fairly generalize the results of this present study to other markets in the UK.

Compared to financial securities, the determination of the accurate market value of a property is more complicated due to the heterogeneous nature of the market with low velocity, decentralized nature of the property and asymmetric and high volume of private information.

Although prices paid for housing is accepted as the best indicator of value by property professionals, economists are more inclined to take a longer term view of value rather than a shorter term one which normally highlights inefficiency in the housing market. The longer term view acknowledges the tendency of property markets to overshoot the "fundamental value", which is defined as yields incorporating a function of average price earnings over a long period of time (Shiller, 2005; Hargreaves, 2008).

Based on Discounted Cash Flow Model, the intrinsic value of a real estate asset can thus can be defined in terms of present value of expected future cash flow associated with owning the asset (also referred to dividend discount models). Therefore, the future income can be discounted at a rate reflecting the opportunity cost of interest as follows:

$$V = \sum_{t=0}^{T} \frac{(R_t - C_t)}{(1+i)^t} \quad (1)$$

Where V, value of the asset, t, holding the period; R, rent; C, annual cost; *i,* discount rate and

$$V = \frac{R-C}{r} \quad (2)$$

And *r* is the capitalization rate.

$$V = \frac{R}{r} \quad (3)$$

Heady (1953) elaborated that the discounting formula as in equation (1) is reduced to equation (2) when the income stream is assumed to be in perpetuity. In the rental housing market where investors are normally unsophisticated, gross income is used instead of net income and thus the equation (2) is further reduced to Equation (3). In addition, according to Wendt (1974), investors normally evade from focusing on annual cost (C) due to difficulties in assessing the repairs and maintenance expenditures.

Expounding further on the capitalization rate, *r* which is normally defined as Net Income divided by the Price (or Value). It is also referred to as a minimum standard to compare investments against bank account or in mutual funds. This is the same as saying that if we bought the property at cash, the value of the property can thus be defined as:

$$V = \frac{R}{HP} \quad (4)$$

where HP is the House Price.

In this study, we assume that the actual value of the property is derived from the rental value which normally captures the physical attributes of the property and divided by the initial investment of owning the property which is the House Price (HP). Having a benchmark for the housing market is also imperative to indicate a general market value that

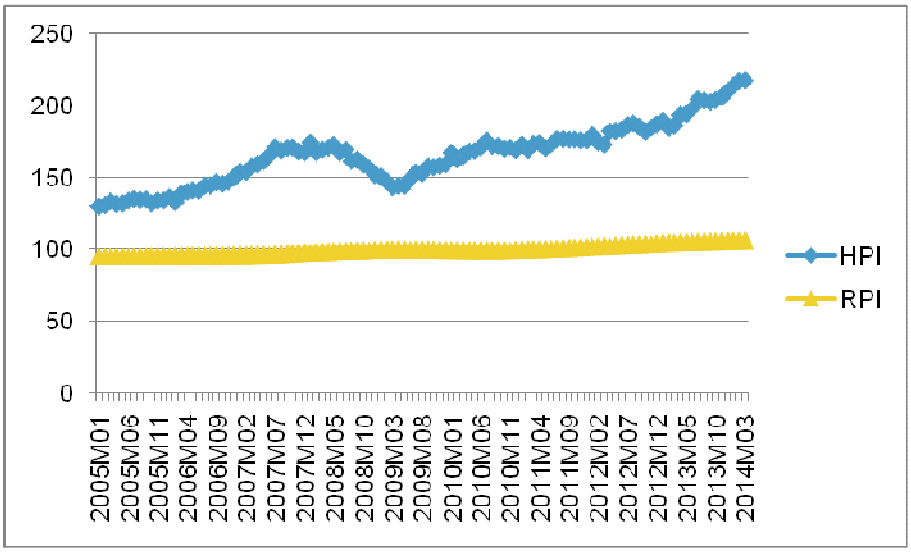
captures all property types across all locations and yet can truly reflect the macroeconomic conditions of a country (Adegoke, 2014).

Several factors have potential effects on the value of the property, leading to the determination of house price and rental price. Linz and Behrmann (2004) provide three characteristics of the factors determining house prices, namely physical, locational, and generally price variables characteristics. Day (2003) categorizes the various attributes of housing into structural, accessibility, neighborhood, and environmental characteristics. Meanwhile, Can (1990) highlights the importance of neighborhood characteristics in determining rental price which include quality of schooling system, level of noise pollution, air quality, proximity to parks, proximity to bodies of water, and quality of transportation system. Other influential characteristics are physical characteristics, such as number of bedrooms, number of bathrooms, floor area, and age of property; demographic characteristics, such as median household incomes, crime rate, and cultural attractions; policy-specific characteristics, such as rent regulations and rent subsidies; and amenities/facilities characteristics, such as the availability of in-door pools, gymnasiums, and covered parking.

Other studies analyze the relevance of macroeconomic variables in determining the rental values of property, such as economic output (GDP), prime interest rate and vacancy rate (Chow et al., 2002); and consumer expenditure, employment and economic output (White et al., 2000). The study by Matysiak and Tsolacos (2003) analyzes rental pricing from a different dimension by examining the role of selected economic and financial series which are used as leading indicators in explaining the monthly variation in property rents in the UK. The leading indicators comprised of five financial variables (Treasury Bill rate, yield of 20-year gilts, narrow money supply, broad money supply and price on FTSE), three real economy variables (car registration, volume of retail sales and job vacancies), and two sentiment indicators (consumer confidence and expectations in the property market development). Other economics related variables are also employed to predict average rental rate adjusted for inflation like occupancy rate, change in employment and change in population (Hanna et. al, 2013). Studies conducted specifically on real estate returns measured in terms of prices and rental values are also conducted by De Wit & Van Djik (2003) on Asia, Europe and USA cities. They find that GDP and inflation positively affect office prices and office rentals. For UK market, Kohlert (2010) also documents evidence that macroeconomic determinants such as GDP, total investment and unemployment affect real estate returns. By employing GMM for the data running from 2000-2007, Fereidouni & Bazrafshan (2012) find that inflation, population, GDP and unemployment in Iran affect the returns on housing.

In this present study we focus on a developed and matured housing market such as in the UK to study the behavior of the housing and the rental markets. Our main source of data are, UK Office for National Statistics, IMF and Bank of England. As observed in Figure 1, there seems to be an upward trend in the HPI where the movement exhibits more volatility compared to markets. On contrary, the rental price (RPI) suggests a more stable trend during the period of 2005M1 to 2014 M3 even during the periods of 2007-2008 Global financial crisis.

Figure 1: The trends for House Price Index (HPI) and Rental Price Index (RPI) in UK




Source: UK Office for National Statistics, IMF and Bank of England.

According to Islamic Finance News Report (2015), UK has one of the most advanced Islamic financial markets in the western world and has the largest Islamic banking sector outside the Middle East and Asia. Islamic mortgage market in the UK is gaining ground in catering to the needs of nearly 3 million Muslim minorities, representing around 4.8% of the total population in the UK (Pew Research Centre, 2015) as well as Muslims particularly from the Middle East, who are keen to own properties in the UK as holiday residence but are reluctant to engage in interest-bearing financing facility (Asutay, 2012). Therefore, the supply of innovative Islamic mortgage products by Islamic banks may boost the housing market.

Islamic banks in the UK generally offer three types of mortgage products based on the principles or contracts that are *shariah*-compliant, namely, *Murabaha* (Cost Plus Sale), *Al-ijarah muntahia biltamleek* or sometimes referred to as *Ijarah wa iqtina* (Leasing ending with a sale) or *Musharakah Mutanaqissah* (Diminishing partnership). *Murabaha* is typically a sale contract whereby the bank purchases the property identified by the customer from the developer and then resells it to the customer at a marked up price. The customer then pays the bank in installments at an agreed financing period with the title of the property being charged to the bank as collateral until all payments are settled. The installments paid by the customer must be fixed since it is a sale contract with an agreed fixed price and thus, is not dependent on the interest rate fluctuations. *Ijarah*, on the other hand is a leasing contract whereby the customer of the bank undertakes to purchase the usufruct of the asset. In home financing, the bank will purchase the property identified by the customer and rents it to the customer over the financing period. At the end of the financing period, the bank then sells the property to the customer at an agreed price. The monthly installment charged by the bank is normally comparable to the prevailing compounded interest based loan offered by conventional banks.

*Musyarakah Mutanaqisah* (MM) or Diminishing Partnership is a relatively new innovation in Islamic home financing products which is not found in Islamic classical literature. It is one of the most recent modes of mortgage financing offered by the five Islamic banks in the UK, namely, Al- Buraq (Arab Banking Corporation), Al- Rayan Bank (formerly Islamic Bank of Britain), United National Bank (Pakistan- based), Ahli United Bank and HSBC Amanah. Unlike the first two products which to some extent are dependent on interest rate benchmarks, MM should be based on the actual rental value of the property and as such is deemed more *shariah-compliant*. However, based on scrutiny of the banks' websites, the rental rates imposed by two banks are found to be still tied to LIBOR or the conventional interest rates without referring to the actual rental values of the property.

The relationship between housing prices and mortgage rates has been extensively investigated mainly in the aftermath of the financial crisis in an attempt to shed some light on the factors that fueled the mortgage crisis not only in the US but also globally. Several studies have concluded on a negative and significant link between the change in interest rates among other factors and the change in house prices. For instance, one of the main contributions is that by Hubbard and Mayer (2009) who examines the behavior of house prices in an attempt to consider the role of interest rates, the mortgage market, and other fundamental factors in explaining the boom-bust cycle of the 2000s. In their paper, Hubbard and Mayer (2009) point out that it is the convexity of the relationship that explains the housing market collapse. When interest rates are very low, a small increase in interest rates will have a dramatic negative impact on house value and vice versa. The authors therefore argue that the lower the level of interest rates, the more sensitive are house price changes to movements in interest rates.

Attempts to construct a mathematical computation for *Musharakah Mutanaqisah* (MM) home financing model based on rental rate has been limited to arbitrarily assigning fixed and variable amount of monthly rent (Meera & Abdul Razak, 2005, 2009). Meera & Abdul Razak (2005) argued that there are challenges in implementing MM home financing product. They argued that theoretically the rate of return to MM is determined by the rental rate based on the market rental value and not by market interest rates. They propose that some kind of real estate index, like the House Price Index in the case of Malaysia be used as a benchmark to price MM since many real-estate studies have shown that the property price is a significant variable in determining the rent.

This present study extends the proposal of Meera & Abdul Razak (2005, 2009) by incorporating the ratio of UK rental price index over house price index to compute for the rental rate which can be used in MM home financing product. This study is also consistent with the recommendation of the Central Bankof Malaysia (BNM) to enhance the MM contracts by considering a rental rate that is more indicative of the actual rental price while taking into account the competitiveness of the product (BNM, FSPS, 2007).

There are several studies that illustrated computational models for *musharaka hmutanaqisah* (Meera& Abdul Razak, 2005, 2009; Eroğlu, Kalaycı, Özdemir, Çetin, &Usul,

2010; Lung, 2014). These studies have highlighted the general acceptability of *musharakah mutanaqisah* as an alternative mode for Islamic home financing. Meera & Abdul Razak (2005) makes a straight-forward comparative analysis between the *al-Bay BithamanAjil* (BBA) and *Musharakah Mutanaqisah* based on constant repayments. They show that as long as the annual profit rates are the same, the total interest in the conventional loan equals the total profit in the BBA. They further show that, when customer wants to settle the financing earlier, the loan balance under the BBA is always higher than under the conventional loan. On the other hand, the total payments and loan balances are lowest in the MM as compared to BBA and conventional loan.

A subsequent study discusses practical issues that need to be addressed with the implementation of MMP such as changes in rental rates; revaluation of property; redemption, defaults, termination of contract and proposed solutions in dealing with these situations (Meera& Abdul Razak, 2009). Eroğlu et al. (2010) derives a general formulae for the case in which repayments occur as a linear-gradient series for the MM model. Lung (2014) investigates how MM works in practice by analysing an offer letter of a customer of HSBC Amanah Malaysia and conducting further research on home financing packages offered by ten local Islamic banks and six foreign Islamic banks in Malaysia. Lung (2014) finds that HSBC Amanah Malaysia is not using market rental rate but instead uses base financing rate which is the same as base lending rate in the conventional housing loan. In addition, other local and foreign banks are also using similar base financing rate to determine the rental rate.

The major challenge in the existing computational models of *MM* is the determination of market rental rate. In the previous studies, the amount of rent is assumed for computational purposes. Meera& Abdul Razak (2009) argued that theoretically the rate of return to MMP is determined by the rental rate based on the market rental value and not by market interest rates. They further argue that rental is most suited for use in Islamic finance since it measures the true usufruct of the asset, unlike interest charges that are apparently not tied to the asset's usufruct. Hence the rental rate can differ among houses within a same row of houses or among different floors within a condominium block. But interest rates are generally independent from such factors.

However, estimating the rental can be cumbersome or costly. Some MM operators use the services of independent real estate agents to provide them with the estimates; sometimes using average of as many as three agents' estimates in order to be more just. These can impose additional costs on bank as well as the customer (Meera& Abdul Razak, 2009). Meera& Abdul Razak (2009) propose that some kind of real estate index, like the House Price Index in the case of Malaysia be used as a benchmark to price MM since many real-estate studies have shown the property price is a significant variable in determining the rent.

This present study attempts to fill this research gap by showing a different computational model of *musharakah mutanaqisah (MM)* using actual market rental rate that is based on the ratio of rental price index over house price index. This study is actually the extension of similar study conducted by Meera & Abdul Razak (2009) and Hasan (2012). Erogl*u et al*. (2010) formulates the general formulae *for Mushrakah Mutanaqisah* contracts but also makes assumption that rental amount is assumed to be fixed. The main difference with these studies is the replacement of $x$ as rental rate that incorporates different actual monthly redemption amount by customer. In this regard, Meera& Abdul Razal (2009),

assumed a monthly rental while Hasan (2012) did not elaborate further the rate of return on capital. Although Hassan (2012) claimed that the rate is cheaper than conventional mortgage but the issue of rental rate replacing interest remains unresolved. Two main questions arise:
i) Why the rate of return on capital namely rental is assumed fixed throughout the financing period?2) Why do we still benchmark it against the conventional rate when rental rate can in fact be independent of the interest rates?. Therefore, this paper attempts to reconstruct the rental rate to address this issue and to propose new model of rental rate that is fair, equitable and sustainable to both customer and the financier.

## 3.0 RENTAL RATE MODEL FOR MUSHARAKAH MUTANAQISAH AND ITS SHORTCOMINGS

The computational models of Meera& Abdul Razak (2005, 2009) has been used by other researches (Eroğlu et al., 2010; Lung, 2014) in studying the application of *musharakah mutanaqisah* in Islamic home financing. Meera& Abdul Razak (2005) shows the computational model of MM is based on constant repayments. Their subsequent study provides more illustrations assuming that both rental prices and market value of property change periodically (Meera& Abdul Razak, 2009). Instead of applying the conventional rate in calculating monthly redemption amount, the Meera& Abdul Razak, (2009) proposed the usage of *rental rate*,*x*, as follows:

$$A = \frac{x(P - (1+x)^n B_0)}{(1+x)^n - 1} \tag{5}$$

Where A is the monthly redemption amount to the bank. This redemption amount is used to buy certain amount of the bank's share. The other variables in Equation 1 are specified as follows;

$x$ = *rental rate*, e.g. monthly rental divided by the original asset price.
$P$ = Price of asset, e.g. a home.
$B_0$= the initial contribution of the bank in the purchase price.
$n$ = the number of months or periods for the customer to fully own the asset.

As demonstrated in the authors' paper, the monthly redemption amount equation is similar to the conventional calculation. However, here the conventional interest rate is replaced by a *rental rate*. The rate is calculated based on monthly rental price. Meera & Abdul Razak (2009) further proposed the following equation;

$$x = \frac{RP}{HP} \tag{6}$$

Here *RP* is a monthly rental price and *HP* is the house price. For example, if the house price is RM300,000 and the monthly rental rate is RM1,500 with financing period n= 240 months, then the rental rate (as a replacement to the traditional interest rate) is 0.005. By employing Equations 5 and 6, the monthly redemption amount can be calculated. With an assumption that the house price and the monthly rental price are as in the previous example and customer pays an initial 20 percent of the price, it means the customer share is RM60, 000 and the financier share is RM240,000. Thus, the additional monthly payment to pay for bank's share for 20 years payment duration is RM219.43.

$$A = \frac{0.005 * [300000 - (1 + 0.005)^{240} * 60000]}{(1 + 0.005)^{240} - 1}$$

The monthly payment is calculated as Equation 3.

$$MP = MRP + A \quad (7)$$

Thus, the monthly payment amount for this example is RM1719.43 (RM1500+RM219.43).

### 3.1 Shortcomings of Rental Rate Model

In the Rental Rate Model, the monthly rental price is used in determining the rental rate as in Equation 4. The rental price also is used in calculating monthly payment amount as shown in Equation 5. The issue here is how to determine the monthly rental price? In the present practice, most financiers determine monthly rental price by employing independent assessors. This practice incurs high overhead costs due to vast areas to be covered and various types or factors that have to be considered. Certain banks might have to deploy more than one assessor to get a fair price. This practice also will delay the financing calculation because the financiers will have to wait for the assessors to complete their valuations which may indirectly lead to problems of asymmetric information.

In addition to the above issues, the monthly rental price is also at the subjective discretion evaluation of the assessor. The assessors might quote a very high or very low evaluation price, as he/she might tends to not consider quantitative and objective determinants of rental rates that will accurately reflect the true value of the property. The evaluation of rental price should not be merely based on the market price. The market price tends to be over- estimated as they are also subject to speculative elements, uncertainties and vulnerabilities of the prevailing macroeconomic conditions. In this current study, we posit that the rental rate should not be susceptible to the macroeconomic vulnerabilities and thus should be more stable, fair priced, reflecting the true physical attributes of the property and in the end leads to achieving *maqasid al-shariah.*

To further strengthen the implementation of true rental values in MM financing, this study seeks to propose a simulation approach. This approach will be able to calculate the monthly payment by automating the monthly rental price, rental rate calculation, regardless of how long the payment duration required by customers, etc.

The computerization of the MM supporting automation is difficult to realize with the rental rate model. To automate the calculation, the monthly rental price needs to be available online or can be generated by using various data. This cannot be done if the determination of the monthly rental price is just based on subjective discretion of property assessor's input. Our current proposed computerized financial simulation approach therefore attempts to address this issue.

For instance, in the case of customers seeking for a reduced monthly payment with extended payment period, a computerized system will automatically calculate the new rental price, the adjustment values and other relevant payments associated with the customer's request. This therefore leads to a more efficient method of calculation by the banks.

### 3.2 RENTAL RATE INDEX (*RR-I)* MODEL

This current study proposes different ways of calculating rental rate and determination of the monthly rental price. Both calculations will use published data sources in determining monthly rental price. It utilizes rental index and house price index. The employment of external assessors is eliminated here, and thus it potentially eliminates all inherent problems of using subjective discretionary evaluations of assessors for the rental price determination. Rental Rate Index (*RR-I)* model utilizes rental index and house price index in calculating the rental rate and the monthly rental price. The rental rate is calculated as follow:

$$RRI = \frac{\frac{RPI}{HPI}}{n} \tag{8}$$

Where RPI is rental index and HPI is house price index. *RR-I*(rental rate index) will replace interest rate (rental rate) in Equation 4 with period of financing *n*=240 months. Thus, the equation can be written as follows:

$$A_{RR} = \frac{RRI\ (P\ \ (1+RRI)^n B_0}{(1+RRI)^n - 1} \tag{9}$$

This equation produces basic rental rate to calculate monthly redemption value and can be a basis to determine monthly rental price. In the interest of banking sector, in order to protect business risk, some permissible *shariah* risk values can be added to this proposed rate RR-I. This will be discussed further in the next section.
In determining the monthly rental price, the following equation is proposed:

$$MRP = RRI * P \tag{10}$$

Here *MRP* is the monthly rental price and P is the house price.

Since *MRP* is a function of *RR-I* where *RR-I* is derived from rental index and house price index, it can be regarded as true reflection of the real rental physical attributes. For example, if *RPI* is 94.60 and *HPI* is 131.10 and then divided by *n*=240, the *RRi*will be 0.0030 (Equation 4). By employing Equation 5, the monthly redemption amount is RM503.27. Thus, the monthly rental payment(MRP) as in Equation 6 is RM902.

#### A) Simulation Approach

By employing the same data as in the rental rate model and new equations as in Equations 4, 5 and 6, several other calculations can be computed. From the rental amount, which in this case is RM902, 20% will go to customer and 80% will go to financier. These are translated to amount of RM180.40 and RM721.60 accordingly.

#### Case 1: *MM* mode based on proposed *RR-I*

Usually the customer portion will be added to the monthly redemption amount thus the customer's share will be increased. With the redemption value RM503.27 and the amount the customer gained from the rental (RM180.40), the total redemption value is RM683.66. After the first month payment, customer total share payment amount is

RM60683.66. This amount when translated to customer share over total amount of RM300000 is 20.23% (an increment of 0.23%). The calculation is shown in Table 1.

Table 1A: Customer share after 1st and 2nd month payments with proposed *RR-I*

| | **Customer redemption amount** | **Customer gain from rental** | **Customer share in amount** | **Financier share in amount** | **Customer share in percentage** |
|---|---|---|---|---|---|
| Month-0 | | | **60000.00** | **240000.00** | **0.20000** |
| Month-1 | 503.27 | 180.40 | 60683.66 | 239316.34 | 0.20228 |
| Month-2 | 503.27 | 182.45 | 61369.38 | 238630.62 | 0.20456 |

Table 1B: Total Financier Gain & Financier Profit for *RR-I* Model

| Case 1: Proposed Rental Rate (*RR-I*) Model (with *RR-I* = 4% | |
|---|---|
| Monthly Redemption: | 503.26 |
| Monthly Rental Payment (based on RPI/HPI) | 902 |
| Total Monthly Payment: | 1405.26 |
| Financier Total Gain | 337262.25 |
| Financier profit | 97262.75 |

By applying the calculation as in Table 1, monthly financier gain is RM1405.25. After 240 months payment duration, the bank will receive a total of RM337,262.25. Since the financier initial payment was RM240,000 then the financier profit is RM97,262.25. As mentioned previously this value is calculated by using the basic *RR-I* without incorporating the risk elements such as credit risk, etc. The calculation is almost similar with the Rental Price Model by Meera & Abdul Razak (2009) below. The only difference is that ours is derived from the actual rental rate values of *RPI/HPI* while for the monthly rental payment in M & R Model is assumed to be determined by subjective assessment of the assessor.

**Case 2:** ***MM Mode based on Meera & Abdul Razak (M&R)(2009)***

If the contract is purely based on *M & R* mode where the value of monthly rental is fixed at RM1500 and the monthly redemption value remains at RM219. Thus, the total share for customer becomes RM60519. The calculation is shown in Table 2. For the 2nd month, the customer redemption amount is remained RM501.5 and the customer share is increased to 20.34%.

Table 2A: Customer share after 1st and 2nd month payments with M&R Model

| | Customer redemption amount | Customer gain from rental | Customer share in amount | Financier share in amount | Customer share in percentage |
|---|---|---|---|---|---|
| Month-0 | | | **60000.00** | **240000.00** | **0.20000** |
| Month-1 | 219 | 300 | 60519 | 239481 | 0.20170 |
| Month-2 | 219 | 301.50 | 61039.50 | 238960.50 | 0.20336 |

Table 2B: Total Financier Gain & Financier Profit for *M&R* Model

| Case 2: M&R Model (Rental Fixed at RM1500) | |
|---|---|
| Monthly Redemption: | 219 |
| Monthly Rental Payment (Assumed) | 1500 |
| Total Monthly Payment | 1719 |
| Financier Total Gain | 412560 |
| Financier profit | 172560 |

Tables 1B and 2B show calculation values derived from the respective Equations 4-6. From the tables, all calculations exhibit the same pattern except that the monthly rental values differ in terms of the derivation methods. For Table 1B, the value is derived from RR-I while Table 2B, the rental value is based on an assumption.

***Case 3: Conventional Banking Mode***

Table 3A:Customer share after 1st and 2nd month payments with Conventional Interest rate *(IR)* Model

| | Interest payment | Capital repayment | Monthly Payment | Customer share | Financier share |
|---|---|---|---|---|---|
| Month-0 | | | | **0** | **100** |
| Month-1 | 800 | 654 | 1454 | 0 | 239346 |
| Month-2 | 800 | 654 | 1454 | 0 | 238692 |

Table 3B: Total Financier Gain & Financier Profit for Conventional Interest Rate (*IR*)Model

| Case 3: *IR*Model (with IR= 4%) | |
|---|---|
| Monthly Capital Repayment | 654 |
| Monthly Payment (Interest Rate) | 800 |
| Total Monthly Payment | 1454 |
| Financier Total Gain | 348960 |
| Financier profit | 108960 |



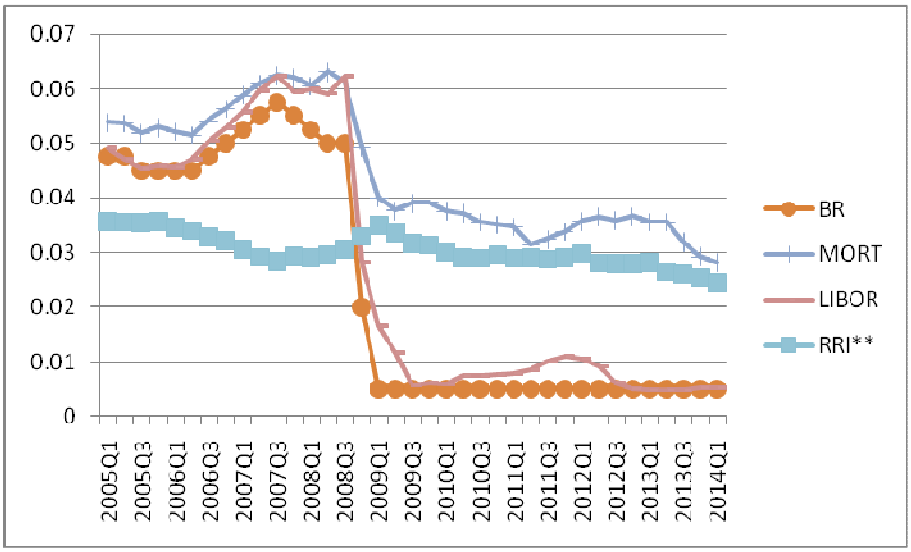
Juxtaposing Cases 1, 2 and 3, we find that in the case where actual value of *RR-I* is adopted, the financier gain is not significantly less compared to the conventional interest rate model. However, the benefits come from the fact that the rental value is based on the actual value of the property in terms of the physical attributes and not dependent on the interest rate or subjective evaluation of the assessor. This therefore lends support to our hypothesis that the *RR-I* is fair, equitable and at the same time is competitive to the interest rate pricing as offered by the conventional banks.

**4.0 Simulation with Rental Index**

We further extend our analysis in order to demonstrate the stability (less fluctuated values) with the $RR_i$ model, this work has employed published real rental index and house price index data from London. These data is selected due to the fact that UK is a developed and matured housing market and has a complete set of available data besides having prominence in Islamic banking and finance Industry.

The data taken is from the first quarter of 2005 until the first quarter of 2014. The $RR_i$ for each quarter is calculated and compared to all types of interest rates in the UK namely base Rate, Mortgage rate and LIBOR. As evidenced in the above graphical illustrations (Figure 2), our proposed RR-I seems to be more stable with less fluctuations during the period of analysis from 2005Q1 to 2014Q1. It also exhibits resilience during the periods of 2007-2008 Global financial crises.

Figure 2: Comparison Between Proposed Rental Rates (RR-I) and Interest rates



Source: UK Office for National Statistics, IMF and Bank of England data simulations



### 4.1 Mortgage Simulation

We further extend our analysis by employing the calculation simulation as being practiced in conventional banking. By replacing the interest rate into rental rate index as calculated in previous Equation (4-6), the following Table depicts another approach with more technical calculation. This Table also employs the similar data to give a clearer picture on the calculations and we also employ the online Mortgage calculator for UK banks to generate installment amounts for each case i.e RR-I, M&R & IR models.

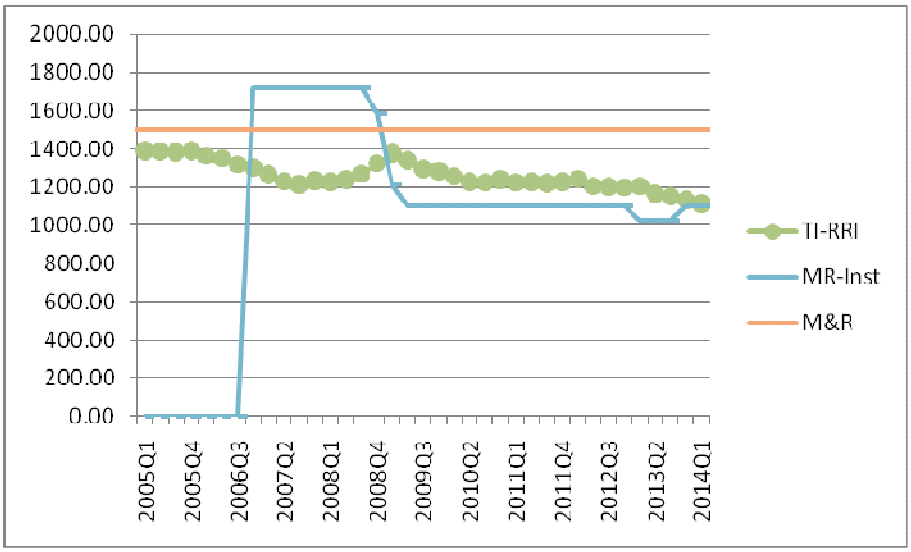
Table 4: Comparison between installments based on RR-I, M&R, and IR

Mortgage Details:
House Price: RM300000
Customer share: 20% = RM60000
Financier (Bank) share: 80% = RM2400000
Rental Price Model (Meera & Abdul Razak, 2009): MRP/HP (M&R)
Proposed RR-I (Current study): RPI/HPI=RRI
Interest Rate Model (Conventional); Mortgage Rate= MR

| Obs | TI-RRI | MR-Inst | M&R | *IR* |
|---|---|---|---|---|
| 2005Q1 | 1392.03 | 1584 | 1719 | 1454 |
| 2005Q2 | 1389.71 | 1584 | 1719 | 1454 |
| 2005Q3 | 1386.10 | 1584 | 1719 | 1454 |
| 2005Q4 | 1393.37 | 1584 | 1719 | 1454 |
| 2006Q1 | 1364.63 | 1584 | 1719 | 1454 |
| 2006Q2 | 1351.30 | 1584 | 1719 | 1454 |
| 2006Q3 | 1320.11 | 1584 | 1719 | 1454 |
| 2006Q4 | 1305.25 | 1719 | 1719 | 1454 |
| 2007Q1 | 1265.37 | 1719 | 1719 | 1454 |
| 2007Q2 | 1232.33 | 1719 | 1719 | 1454 |

| | | | | |
|---|---|---|---|---|
| 2007Q3 | 1214.40 | 1719 | 1719 | 1454 |
| 2007Q4 | 1233.85 | 1719 | 1719 | 1454 |
| 2008Q1 | 1229.41 | 1719 | 1719 | 1454 |
| 2008Q2 | 1240.17 | 1719 | 1719 | 1454 |
| 2008Q3 | 1268.87 | 1719 | 1719 | 1454 |
| 2008Q4 | 1324.80 | 1584 | 1719 | 1454 |
| 2009Q1 | 1377.88 | 1,214 | 1719 | 1454 |
| 2009Q2 | 1343.38 | 1,104 | 1719 | 1454 |
| 2009Q3 | 1296.08 | 1,104 | 1719 | 1454 |
| 2009Q4 | 1286.39 | 1,104 | 1719 | 1454 |
| 2010Q1 | 1256.20 | 1,104 | 1719 | 1454 |
| 2010Q2 | 1229.54 | 1,104 | 1719 | 1454 |
| 2010Q3 | 1226.38 | 1,104 | 1719 | 1454 |
| 2010Q4 | 1240.30 | 1,104 | 1719 | 1454 |
| 2011Q1 | 1226.00 | 1,104 | 1719 | 1454 |
| 2011Q2 | 1229.92 | 1,104 | 1719 | 1454 |
| 2011Q3 | 1221.14 | 1,104 | 1719 | 1454 |
| 2011Q4 | 1227.82 | 1,104 | 1719 | 1454 |
| 2012Q1 | 1243.72 | 1,104 | 1719 | 1454 |
| 2012Q2 | 1205.23 | 1,104 | 1719 | 1454 |
| 2012Q3 | 1202.51 | 1,104 | 1719 | 1454 |
| 2012Q4 | 1200.99 | 1,104 | 1719 | 1454 |
| 2013Q1 | 1207.32 | 1025 | 1719 | 1454 |
| 2013Q2 | 1165.90 | 1025 | 1719 | 1454 |
| 2013Q3 | 1154.58 | 1025 | 1719 | 1454 |
| 2013Q4 | 1134.40 | 1,104 | 1719 | 1454 |
| 2014Q1 | 1113.77 | 1,104 | 1719 | 1454 |

Figure 3: Comparisons of Installments paid by customers for RRI, M&R&MR



Source: UK Office for National Statistics, IMF and Bank of England and data simulations.

Based on Table 4, for total installments based on RR-I(T-I RR-I), the results suggest that the amount of installments that customer has to pay varies within narrow limits on quarterly basis. This seems to better reflect the macroeconomic conditions without disregarding the physical attributes of the property. For Meera & Abd.Razak Model (M&R), the total installment is assumed fixed throughout the financing period. For the conventional Interest Rate Model (IR), the total installments paid seem to be more volatile as they more susceptible to macroeconomic vulnerabilities as captured by the interest rates. From this, we can also infer that the proposed RR-I, provides a more stable financing, fairer as it also reflects the true value of the property according to the physical attributes, interest free (not depending on interest as a benchmark) and therefore more sustainable.

The *RR-I* rate proposed in this work is considered as base rate for alternative Islamic financing tools. From the banks' point of view, they have to take into account several financing risks to mitigate financing lost or to generate more comprehensive calculation. This risk comprises of cost of fund and risk premium. The components of the risk premium comprises of credit risk, market risk and operational risk. This study recommends that banks have the option to use rental rates as the benchmark compared to the current conventional interest rates and at the same time are free to add on the associated risks elements that are deemed necessary.

This paper has elaborated on possibility of employing rental index and house price index as an alternative method to calculate base rate for *Musyarakah Mutanaqisah* home financing instrument. The present calculation of financing rate is strictly benchmarked against the conventional interest rate. Secondly, the monthly rental rate is determined by employing an independent assessor. All these lead to several shortcomings, such as high overhead costs, vulnerable to the assessor's evaluation and difficulty in computerizing the processes to automate the MM implementation. By incorporating the actual data for RPI and HPI, the previously mentioned shortcomings of subjective, independent assessment on the value of property by assessors can thus be resolved and eliminated. This paper has also demonstrated through the simulation that the *RR-I* is much more stable and it is less volatile compared to mortgage rate in London.

As from the *Shariah* perspective, although MM is considered to be more *Shariah*-compliant yet some elements of non-compliance should be removed and included in future study. For example, simulation approach should also incorporate some unresolved issues in MM such as default payment, abandoned projects, early settlement, the issue of *wa'ad* etc.

## 5.0 CONCLUSION AND RECOMMENDATION

The *RR-I* proposed in this work is considered as base rate for alternative Islamic financing tools. From the banks' point of view, they have to take into account several financing risks to mitigate financing lost or to generate more comprehensive calculation. This risk comprises of cost of fund and risk premium. The components of the risk premium comprises of credit risk, market risk and operational risk. This study recommends that banks have the option to use rental rates as the benchmark compared to the current conventional interest rates and at the same time are free to add on the associated risks elements that are deemed necessary.

Consistent with the recommendation by BNM (2007) for further enhancements of MM contracts, our study hopes to shed some light that by employing the proposed rental rate (*RR-I*), the pricing of home financing to a certain extent captures the true value of the property. Our study also provides evidence that the proposed rental rate is fair, equitable, sustainable and resilient to economic vulnerabilities and at the same time remains competitive with the conventional banking as the rates are comparable yet without depending on and benchmarked against the interest rates.

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APPENDIX

| Period | Pymt No | EQ C(M) | EQR C (%) | RRI (%) | MR | Rental | RS-C (M) | APymt (C) | TI -RRI | EQF(M) | EC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 60000 | 20 | 0 | 0 | | 20 | 0.00 | 0.00 | 240000 | |
| 2005Q1 | 1 | 60177.81 | 0.200593 | 0.04 | 0.05 | 889.0343 | 177.8069 | 503.00 | 1392.03 | 239288.8 | 0 |
| 2005Q2 | 2 | 60355.15 | 0.201184 | 0.04 | 0.05 | 886.706 | 177.3412 | 503.00 | 1389.71 | 238579.4 | 0 |
| 2005Q3 | 3 | 60531.77 | 0.201773 | 0.04 | 0.05 | 883.1029 | 176.6206 | 503.00 | 1386.10 | 237872.9 | |
| 2005Q4 | 4 | 60709.85 | 0.202366 | 0.04 | 0.05 | 890.3736 | 178.0747 | 503.00 | 1393.37 | 237160.6 | 0 |
| 2006Q1 | 5 | 60882.17 | 0.202941 | 0.03 | 0.05 | 861.6319 | 172.3264 | 503.00 | 1364.63 | 236471.3 | 0 |
| 2006Q2 | 5 | 61051.83 | 0.203506 | 0.03 | 0.05 | 848.296 | 169.6592 | 503.00 | 1351.30 | 235792.7 | 0 |
| 2006Q3 | 7 | 61215.25 | 0.204051 | 0.03 | 0.05 | 817.1066 | 163.4213 | 503.00 | 1320.11 | 235139 | 0 |
| 2006Q4 | 8 | 61375.7 | 0.204586 | 0.03 | 0.06 | 802.25 | 160.45 | 503.00 | 1305.25 | 234497.2 | 0 |
| 2007Q1 | 9 | 61528.18 | 0.205094 | 0.03 | 0.06 | 762.3688 | 152.4738 | 503.00 | 1265.37 | 233887.3 | 0 |
| 2007Q2 | 10 | 61674.04 | 0.20558 | 0.03 | 0.06 | 729.3273 | 145.8655 | 503.00 | 1232.33 | 233303.8 | 0 |
| 2007Q3 | | 61816.32 | 0.206054 | 0.03 | 0.06 | 711.4 | 142.28 | 503.00 | 1214.40 | 232734.7 | 0 |
| 2007Q4 | | 61962.49 | 0.206542 | 0.03 | 0.06 | 730.8451 | 146.169 | 503.00 | 1233.85 | 232150 | 0 |
| 2008Q1 | | 62107.77 | 0.207026 | 0.03 | 0.06 | 726.4116 | 145.2823 | 503.00 | 1229.41 | 231568.9 | 0 |
| 2008Q2 | | 62255.21 | 0.207517 | 0.03 | 0.06 | 737.17 | 147.434 | 503.00 | 1240.17 | 230979.2 | 0 |
| 2008Q3 | | 62408.38 | 0.208028 | 0.03 | 0.06 | 765.8685 | 153.1737 | 503.00 | 1268.87 | 230366.5 | 0 |
| 2008Q4 | | 62572.74 | 0.208576 | 0.03 | 0.05 | 821.8042 | 164.3608 | 503.00 | 1324.80 | 229709 | 0 |
| 2009Q1 | | 62747.72 | 0.209159 | 0.03 | 0.04 | 874.8818 | 174.9764 | 503.00 | 1377.88 | 229009.1 | 0 |
| 2009Q2 | | 62915.8 | 0.209719 | 0.03 | 0.04 | 840.3837 | 168.0767 | 503.00 | 1343.38 | 228336.8 | 0 |
| 2009Q3 | | 63074.41 | 0.210248 | 0.03 | 0.04 | 793.0781 | 158.6156 | 503.00 | 1296.08 | 227702.4 | 0 |
| 2009Q4 | | 63231.09 | 0.21077 | 0.03 | 0.04 | 783.3878 | 156.6776 | 503.00 | 1286.39 | 227075.7 | 0 |
| 2010Q1 | | 63381.73 | 0.211272 | 0.03 | 0.04 | 753.1992 | 150.6398 | 503.00 | 1256.20 | 226473.1 | |
| 2010Q2 | | 63527.04 | 0.211757 | 0.03 | 0.04 | 726.5414 | 145.3083 | 503.00 | 1229.54 | 225891.9 | 0 |
| 2010Q3 | | 63671.71 | 0.212239 | 0.03 | 0.04 | 723.3847 | 144.6769 | 503.00 | 1226.38 | 225313.2 | 0 |
| 2010Q4 | | 63819.17 | 0.212731 | 0.03 | 0.04 | 737.3047 | 147.4609 | 503.00 | 1240.30 | 224723.3 | 0 |
| 2011Q1 | | 63963.77 | 0.213213 | 0.03 | 0.03 | 722.9989 | 144.5998 | 503.00 | 1226.00 | 224144.9 | |
| 2011Q2 | | 64109.16 | 0.213697 | 0.03 | 0.03 | 726.9174 | 145.3835 | 503.00 | 1229.92 | 223563.4 | 0 |
| 2011Q3 | | 64252.79 | 0.214176 | 0.03 | 0.03 | 718.1448 | 143.629 | 503.00 | 1221.14 | 222988.9 | 0 |
| 2011Q4 | | 64397.75 | 0.214659 | 0.03 | 0.03 | 724.8168 | 144.9634 | 503.00 | 1227.82 | 222409 | 0 |
| 2012Q1 | | 64545.89 | 0.215153 | 0.03 | 0.04 | 740.717 | 148.1434 | 503.00 | 1243.72 | 221816.4 | 0 |
| 2012Q2 | | 64686.34 | 0.215621 | 0.03 | 0.04 | 702.2269 | 140.4454 | 503.00 | 1205.23 | 221254.7 | 0 |
| 2012Q3 | | 64826.24 | 0.216087 | 0.03 | 0.04 | 699.5138 | 139.9028 | 503.00 | 1202.51 | 220695 | |
| 2012Q4 | | 64965.84 | 0.216553 | 0.03 | 0.04 | 697.9911 | 139.5982 | 503.00 | 1200.99 | 220136.7 | 0 |
| 2013Q1 | | 65106.7 | 0.217022 | 0.03 | 0.04 | 704.3194 | 140.8639 | 503.00 | 1207.32 | 219573.2 | 0 |
| 2013Q2 | | 65239.28 | 0.217464 | 0.03 | 0.04 | 662.8993 | 132.5799 | 503.00 | 1165.90 | 219042.9 | 0 |
| 2013Q3 | | 65369.6 | 0.217899 | 0.03 | 0.03 | 651.5755 | 130.3151 | 503.00 | 1154.58 | 218521.6 | 0 |
| 2013Q4 | | 65495.88 | 0.21832 | 0.03 | 0.03 | 631.3976 | 126.2795 | 503.00 | 1134.40 | 218016.5 | 0 |
| 2014Q1 | | 65618.03 | 0.218727 | 0.02 | 0.03 | 610.7721 | 122.1544 | 503.00 | 1113.77 | 217527.9 | 0 |

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