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RENTAL YIELD AS AN ALTERNATIVE TO INTEREST RATE IN PRICING MUSYARAKAH MUTANAQISAH HOME FINANCING – THE CASE FOR MALAYSIA[1]

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Abstract

The current practice of the Islamic banks in Malaysia is relying on the market interest rate as the reference benchmark pricing for musyarakah mutanaqisah home financing. It has been a subject of intense debate among scholars, researchers, industry players, and policymakers. While it is not prohibited, Muslim scholars have highly discouraged this practice as it could lead to a possible convergence between the practices of the Islamic banks and the conventional counterparts. Therefore, this study proposes rental yield an alternative reference benchmark pricing mechanism for musyarakah mutanaqisah home financing. The aim of the study is to assess whether rental yield is reflective of the real economic conditions. In achieving its objective, the study tests the relationships between rental yield with the macroeconomic and housing market variables. The study focuses on Malaysia and uses annually data frequency covering the period from 1988 to 2015 using Autoregressive Distributed Lag (ARDL) cointegration test. The study provides evidence that the proposed rental yield has long-run and short-run relationships with macroeconomic and housing market variables. The analysis shows that a short period required for the model to converge to the long-run equilibrium. The findings of this study would provide important insights on the viability of rental yield as an alternative to interest rate in pricing musyarakah mutanaqisah home financing.

1.0 Introduction

Since the establishment of the first Islamic bank in Malaysia in 1983, the conventional interest rate has been adopted as a reference benchmark pricing for the Islamic financial products. The practice of setting on Overnight Policy Rate (OPR) would translate into the Base Financing Rate (BFR) by the financial institution. This is mainly due to the existence of Islamic financial institutions in operating the business in a dual banking system environment.

A continuous dependency on the interest rate as the benchmark to price Islamic banking products could result in similarities or even duplications between the Islamic banking propositions and the conventional banking. More significantly, the reliance on the interest rate as the reference benchmark pricing would also have wide socio-economic implications. If this practice was to continue with no alternative benchmark found, the ultimate aim of achieving the virtues of Islamic economics, which are characterized by equity, justice, and fairness, could be frustrated. Subsequently, the objective of an equitable society as envisioned in the objective of the *Shariah* (*maqasid Shariah*) will not be achieved.

Ideally, Islamic financial system should not benchmark the interest rate in the pricing calculation of the financial products. In an Islamic economy, pricing should reflect the real sector of the economy[2]. According to a prominent Muslim scholar, Muhammad Taqi Usmani[3] argues that interest rate does not advance the basic philosophy of promoting Islamic economy and whereby it makes no impact on the distribution system. Even though the practice is allowable, it is highly discouraged.

The Islamic *Fiqh* Academy under the Organization of Islamic Cooperation (OIC) in the 8th Conference on Currencies Issues, which was held in Jeddah on 18-19 Shawwal/10-11 April 1993 has unanimously passed a resolution to move away from an interest-based benchmark. The decision is about calling for the creation of a new *Shariah*-compliant benchmark as an alternative to interest-based rates

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[2] A. Mirakhor, "Cost of Capital and Investment in a Non-Interest Economy", *Islamic Economic Studies*, 4(1), (1996), 35–47.

[3] M. T. Usmani. *An Introduction to Islamic Finance*. New Delhi: Adam Publishers and Distributors, (2008).

to determine the profit margins[4]. This paper proposes rental yield as an alternative reference to the interest rate to price *musyarakah mutanaqisah* home financing. The objective of this paper is to assess whether rental yield is reflective of the real economic conditions.

2.0 Literature Review

At present, the Islamic financial industry still follows the benchmark set by its conventional counterpart. The practice is by benchmarking to the Base Financing Rate (BFR), which the rate follows the Base Lending Rate (BLR). The financier's profit rate that charged to the customer is influenced by any changes in the Overnight Policy Rate (OPR) and BFR. When the economy is stable, the customer has no issue to pay the instalment as usual. But then there is an increment in OPR, the BFR also increase. As the result, the profit charged also increase. The customer should pay an extra amount to cover the increment. It also gives more burden to the customer if the rate charged by the financier is high that may create uncertainty like conventional lending rate.

A study conducted by M. S. Shuib *et al.*[5] on the case study of Citibank Malaysia by interviewing the bank staff regarding the Islamic home financing product offered by the bank. The researchers focus on Citibank Home Partner-I, which the product is based on the contract of *musyarakah mutanaqisah*. The study reports on the finding that the ceiling rate Base Financing Rate is 8.9%, which follows the conventional rate. Another similar case study was conducted by M. S. Shuib *et al*[6], about home financing products. The study focuses to the contract of *musyarakah mutanaqisah* offered by RHB Islamic Bank

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[4] M. F. Academy, (1993), *Conference on Currencies Issues*, IRTI IDB OIC, Jeddah.

[5] M. S. Shuib, J. T. Borhan, and M. N. Md Hussain. "Pembiayaan Perumahan secara *Musharakah Mutanaqisah* di RHB Islamic Berhad (RHBIB): Analisis Kelebihan, Isu dan Cabaran dalam Penawaran Produk): Analisis Kelebihan, Isu dan Cabaran dalam Penawaran Produk". *Al-Basirah*, 1(1), (2011), 135–148.

[6] M. S. Shuib, J. T. Borhan, and A. Abu Bakar. "*Musharakah Mutanaqisah* Home Financing Products: An Implementation Analysis, Product Advantages and Issues at Citibank (Malaysia) Berhad". *Journal of Techno-Social*, 3(2), (2011), 43–54.

Berhad that highlights the issue on rental computation. The study finds that the rental charged is based on benchmarking BFR that follows conventional lending rate.

S. F. Muhamad *et al*[7] claim that the Islamic banks still use the conventional interest rate as a benchmark for the *musyarakah mutanaqisah* product. The current practice to determine the rental in *musyarakah mutanaqisah* home financing product is based on the conventional benchmark such as KLIBOR and LIBOR. Qureshi and Hidayat[8] also reveal that in practice some Islamic banks adopt the interest rate as the benchmark for *musyarakah mutanaqisah* home financing. In addition, Desai[9] studies the same issue that the usage of the conventional interest rate-based benchmark, such as LIBOR, creates a negative perception among investors. The perception on association of the Islamic financial system with the conventional financial system due to the usage of the interest-based benchmark.

The Islamic financial institution is placed at the mercy of the movement in conventional money market by using the conventional interest-based benchmark. As stated by Bank Negara Malaysia[10], the rental amount of *musyarakah mutanaqisah* contract can be determined fixed amount, reference to specified benchmarks, or combination of both. In determining the formula for calculation of profit, an Islamic financial institution may use a relevant pricing benchmark (for example, the current rental rate), or an Islamic reference rate, such as the Kuala Lumpur Islamic Reference Rate (KLIRR).

The rental issue is very important as its utilization in *musyarakah mutanaqisah* home financing that could replace interest rate as the benchmark. Recent evidence from Rahman *et al*[11], states

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[7] S. F. Muhamad, A. H. Abd Rahman and S. K. P. Khalid. "An Evaluation on *Musharakah Mutanaqisah* based House Financing by Islamic Banks in Malaysia" in *International Conference Social Science Research*, Penang, Malaysia, Vol. 53, (2013), 1689–1699.

[8] F. Qureshi and S. E. Hidayat, "Challenges in Implementing *Musharakah Mutanaqisah* Islamic Home Financing in Malaysia" *Journal of Islamic Financial Studies*, 2(2), (2016).

[9] I. E. Desai, "Islamic Finance: Opportunities and Challenges". *Journal of Islamic Banking and Finance*, 33(1), (2016), 86–90.

[10] Bank Negara Malaysia (BNM) Policy Document on *Musyarakah* (2015).

[11] A. Rahman, Hilmy H. Ahamed, A. Saifurrahman & R. Hassan, (2018),

that the *musyarakah mutanaqisah* home financing can solve the use of interest rate as a benchmark through the utilization of the rental income. The fluctuation of the rental price could be a problem in determining the pricing of *musyarakah mutanaqisah*. The rental price based on the market value increases over time[12]. However, there are some practical issues highlighted by the industry practitioners that include pricing and interest rate movement. The Islamic home financing product ties to interest rate movement is a major hurdle due to the absence of a proper benchmark for the industry[13].

Empirical research in this area provides some information pertinent to the reference benchmark pricing. A study by Mohd Yusof *et al*[14] uses a sample of the rental rate from the United Kingdom to analyze the possibility of relying on rental price for Islamic home financing. The study compares two models; the rental rate and lending rate with selected macroeconomic variables using the Autoregressive Distributed Lag (ARDL) and Vector Error Correction Model (VECM). The study finds that rental rate is found to be resilient to short-term economic volatility, while in long-run it truly reflective to economic fundamentals. The research output is extended by Mohd Yusof *et al*[15], which proposed the Rental Rate Index (RR-I) to be used in *musyarakah mutanaqisah* contract for home financing. The sample

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[12] "Gap Analysis Between BNM Regulation and *Musharakah Mutanaqisah* Application in Islamic Banking", *Journal of Islamic Finance*, 7(1), (2018), 038-050.

[12] N. M. Osmani and M. F. Abdullah, "*Musharakah Mutanaqisah* Home Financing: A Review of Literatures and Practices of Islamic Banks in Malaysia", *International Review of Business Research Papers*, 6(2), (2010), 272–282.

[13] Kevin Loke Ke Wei and Mohd Thas Thaker Hassanudin, "A Qualitative Inquiry into Islamic Home Financing: Evidence from Malaysia", *Qualitative Research in Financial Markets*, 9(2), (2017).

[14] Rosylin Mohd Yusof, Salina H. Kassim, M. Shabri A. Majid and Zarinah Hamid, "Determining the Viability of Rental Price to Benchmark Islamic Home Financing Products: Evidence from Malaysia", *Benchmarking: An International Journal*, (2011).

[15] Rosylin Mohd Yusof, Mejda Bahlous and Roszaini Haniffa. "Rental Rate as an Alternative Pricing for Islamic Home Financing: An Empirical Investigation on the UK Market", *International Journal of Housing Markets and Analysis*, 9(4), (2016).

data are from the United Kingdom to formulate a profit rate based on rental index and house price index. The newly proposed RR-I is used for financial simulation to measure the actual rate of return of the product.

Mehmet Saraç and Feyyaz Zeren[16] investigated the relationship between the returns on deposits in Turkey of all Islamic banks and interest rates on deposits in conventional banks. Based on data between 2002 and 2013, the empirical analyses show that the term deposit rates or 'profit share rates' are significantly cointegrated. Granger causality test verifies that the conventional banking rates cause the Islamic banking rates. However, developing and adopting genuine benchmarks are considered as important tasks to achieve the substance of Islamic finance and to provide a real alternative to the conventional financial system.

A recent study by Serhat Yüksel *et al*[17] examines the causality relationship between the interest rate of deposit banks and profit share rate of Islamic banks in Turkey. The result found that there is a significant causality relationship between these rates. It concludes that the interest rate of the deposit banks is the main indicator of the profit share rate of Islamic banks in Turkey. Another similar study by Meslier *et al*[18] address the issue of competition in dual banking markets by analyzing the determinants of deposit rates in Islamic and conventional banks using a sample of 20 countries with dual banking systems over years 2000 until 2004. The findings show significant differences in the drivers of Islamic and conventional bank's pricing behaviour. The conventional banks with stronger market power set lower deposit rates but market power is not significant for Islamic banks. The study concludes that conventional banks are influenced by the competitiveness of Islamic banks, whereas the Islamic banks are

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[16] M. Saraç and F. Zeren, "The Dependency of Islamic Bank Rates on Conventional Bank Interest Rates: Further Evidence from Turkey". *Applied Economics*, 47(7), (2015), 669–679.

[17] S. Yüksel, I. Canöz and M. Özsarı. "Causality Relationship between Interest Rate of Deposit Banks and Profit Share Rate of Islamic Banks in Turkey", in *EconWorld 2017*, Rome, Italy. (2017).

[18] C. Meslier, T. Risfandy and A. Tarazi, "Dual Market Competition and Deposit Rate Setting in Islamic and Conventional Banks". *Economic Modelling*, 63 (2017), 318–333.

only affected by their peers in predominantly Muslim countries.

Apart from studies on deposit products, financing accounts also have been the focus of discussion among researchers. Abdul Kader and Kok Leong Yap[19] investigated the impact of interest rate changes on the demand for Islamic financing in a dual banking system. The study using monthly data from 1999 to 2007 which adopts the methods of Vector Autoregressive (VAR) test, Johansen-Juselius (JJ) test and Granger Causality test. The result suggests that given the fixed rate of *bay' bithamal ajil* financing, any change in the base lending rate would influence customers' decisions to obtain financing from Islamic banks and vice versa. The study therefore, proposes that Islamic banks to detach themselves from fixed rate instruments and move into more profit-sharing financing. A viable alternative would be the property financing facility under *musyarakah mutanaqisah*. Beenish Akhtar *et al*[20] examine the impact of base lending rate, consumer prices, gross domestic product, money supply, Karachi stock exchange composite index, KIBOR and profit rate of Islamic banks on deposits of both conventional and Islamic banks in Pakistan. The empirical results reveal that variables such as interest rate of conventional banks, profit of Islamic banks, consumer prices, money supply and base lending rate have a different impact on conventional and Islamic bank deposits.

3.0   Research Methodology

The model specification of this research comprises one macroeconomic and the two housing market variables which may have the influence on the residential property rental yield in Malaysia. As such, the models to be estimated are as follows:

$$RY = \alpha + \beta_1(GDP) + \beta_2(HL) + \beta_3(BLR) + \varepsilon$$

where:

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[19]   R. Abdul Kader and L. Y. Kok, "The Impact of Interest Rate Changes on Islamic Bank Financing", in *International Business Research Conference*, Melbourne, Australia (2008).

[20]   B. Akhtar, W. Akhter and M. Shahbaz, "Determinants of Deposits in Conventional and Islamic Banking: A Case of an Emerging Economy", *International Journal of Emerging Markets,* 12(2), (2017).

RY	=	rental yield
GDP	=	gross domestic product
HL	=	housing loan
BLR	=	base lending rate

RY denotes for estimated residential property rental yield and the α, β_1, β_2, β_3 and ε are the intercepts (slope of the dependent variables), coefficients of the independent variables and the error terms, respectively.

This study uses secondary time series data in analyzing the residential property rental yield using annually frequency running over the period from 1988 to 2015. The rental yield is gathered from the Valuation and Property Services Department of Malaysia's Ministry of Finance through its publication; Malaysia Property Market. The report is available in annual publication for rental yield. There is one selected macroeconomic variable in this analysis, namely gross domestic product (GDP). While other variables in this study are the total housing loan/financing (HL) including conventional and Islamic financing, and the base lending rate (BLR). The GDP, HL and BLR data are in annual frequency which sourced from Bank Negara Malaysia's quarterly bulletin of various issues.

This study employs the Autoregressive Distributed Lag (ARDL) model proposed by Pesaran and Shin[21] to investigate long-run relationship between macroeconomic and housing market variables with rental yield in Malaysia. The model is employed to meet the objective on whether the rental yield is reflective of the real economic conditions, which aims to investigate the long-run relationship between the residential property rental yield with the GDP, HL and BLR. The regression model includes the current and also the lagged (past) values of the explanatory variables (the X's), which called a 'distributed-lagged model'. And the model includes one or more lagged values of the dependent variable among its

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[21] M. H. Pesaran, Y. Shin, "An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis". *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium,* (March 3-5, 1999), 1–31.

explanatory variables, which is called an 'autoregressive model'[22]. The ARDL model can be applied irrespective of whether the regressors are purely *I(0)* and purely *I(1)* or a mixture of *I(0)* and *I(1)*. However, the stationary test is essential to confirm that none of the variables are integrated of order two *I(2)* and allows for inferences on long-run estimates which is not possible under the alternative cointegration procedures[23].

4.0 Results and Discussion

There are two different unit root tests applied in this study; the Augmented Dickey-Fuller (ADF) unit root test and the Phillips-Perron (PP) unit root test. Two approaches are commonly applied to determine the optimal number of lags when performing the unit root test. The first approach is by fixing *p* (number of lags) as a function of T (t-test). The second approach is by applying the same information criteria, such as the Akaike information criterion (AIC), Schwarz information criteria (SIC) and the Hannan-Quinn information criterion (HQIC). In the context of this research, the upper limit of the lag-length is determined based on the SIC for the ADF test and using the Bartlett kernel for the PP test. Table 1 provides the results of the unit root tests for the residential property rental yield and selected macroeconomic variable and housing market variables. Based on the ADF and the PP unit root test, the findings indicate that the RY and BLR are stationary at the level form at the 1% level of significance. The GDP and HL are all stationary on the first differencing at the 1% level of significance. The mixture of stationary level, such as *I(0)* and *I(1),* for the variables suggest that it is good to proceed to the bounds test to investigate the long-run relationship among the selected variables; RY, LGDP, LHL, and BLR.

Table 1 Unit Root Test for the Variables

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[22] D. N. Gujarati & D. C. Porter, *Basic Econometrics*. 5/e. (Boston: McGraw-Hill. MLA, 2009).

[23] M. H. Pesaran, Y. Shin and R. Smith, "Testing for the Existence of a Long-run Relationship". *Journal of Applied Econometrics*, 16, (2001), 289–326.

Variables		ADF Test		PP Test	
		On Levels	On First Difference	Level	On First Difference
RY	Intercept	-3.246**	-5.632***	-3.311***	-6.446***
	Intercept & Trend	-3.214	-5.515***	-3.278*	-6.291***
LGDP	Intercept	-2.408	-5.590***	-3.275**	-5.592***
	Intercept & Trend	-1.611	-6.719***	-1.438	-6.831***
LHL	Intercept	-0.457	-4.957***	-0.577	-5.772***
	Intercept & Trend	-4.187	-4.854***	-2.972	-5.831***
BLR	Intercept	-2.001	-4.670***	-2.125	-4.861***
	Intercept & Trend	-3.262*	-4.580***	-2.632	-4.726***

Note: ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

In examining the long-run relationship (or cointegration), the estimation is conducted using the ARDL approach through an unrestricted error correction model (UECM) without trend. This research carries out the lag-length maximum of four lags in the model (based on the literature) with the model selection criteria of the Akaike information criterion (AIC). Next, the bounds test is conducted by comparing the F-statistic value with the critical value based on UECM.

The critical value provided by EViews statistical software is from Pesaran *et al*[24] (case III). However, Pesaran *et al*[25] critical values are only suitable for large sample sizes. Instead, Narayan[26] provides critical values for small sample sizes of 30 to 80 observations[27], which is suitable for this research, since the sample size is 31. Therefore, this research comparing the F-statistic with the

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[24] Ibid

[25] Ibid

[26] S. Narayan and P. K. Narayan, "An Empirical Analysis of Fiji's Import Demand Function." *Journal of Economic Studies*, 32(2), (2005), 158-168.

[27] J. Handa, S. G. Kahsay and G. Shibeshi, *Studies in East Asian Economies: Capital Flows, Exchange Rates and Monetary Policy*, World Scientific (2011)

critical bounds value provided by Narayan[28] for the case of restricted intercept and no trend (case II) as reported in Table 2. The calculated *F*-statistic values based on UECM are 15.3131 without determining the time trend. If the *F*-statistic values are outside the critical bounds value, it can be concluded that the null of no cointegration can be rejected at the 1% level of significance in case (II). Thus, this research will continue the analysis using case (II) and conclude that the residential property rental yield and the selected macroeconomic and housing market variables (GDP, HL and BLR) are found to be integrated in the long-run.

Table 2 Critical Values for the F-statistic, case (ii), (k=3, n=30)

Sign. Level	Case II (restricted intercept and no trend)		Case III (restricted intercept and with trend)	
	I(0)	*I(1)*	*I(0)*	*I(1)*
1%	4.614	5.966	5.333	7.063
5%	3.272	4.306	3.710	5.018
10%	2.676	3.586	3.008	4.150

Source: Narayan[29]

After performing the bounds test, the results support the first research objective, which confirms the existence of a long-run relationship between the RY and GDP, HL and BLR. The next step is to estimate the long-run coefficient and the error correction model using four maximum lags with the ideal ARDL (4,4,4,3) model specification. The results of the model are reported in Table 3 below. The goodness of fit of the model indicates that 82.53% of the rental yield can be explained by the model. Moreover, the F-statistic value 703.62 indicates that the model is statistically significant at the 5% level of significance for explaining the variation of the rental yield. Thus, the ARDL model indicates that the overall outcome of the goodness of fit is satisfactory.

Table 3 Autoregressive Distributed Lag Estimates Based on (AIC) (4,4,4,3), Dependent Variable is Rental Yield

Regressor	Coefficient	Standard Error	t-Statistics[Prob.]
RY(-1)	-0.1771	0.1735	-1.0205

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[28] Narayan (2015), op cit.
[29] Ibid

RY(-2)	-0.0741	0.1700	-0.4360
RY(-3)	0.4180	0.2272	1.8393
RY(-4)	-0.1853	0.6250	-0.6991
LGDP	6.3852	3.7949	1.6825
LGDP(-1)	-5.3227	5.1535	-1.0328
LGDP(-2)	-11.2830	5.5381	-2.0373
LGDP(-3)	-8.0386	5.1702	-1.5548**
LGDP(-4)	-9.4517	2.8390	-3.3292**
LHL	11.2830	4.9281	2.3116*
LHL(-1)	11.9585	2.9948	3.9930**
LHL(-2)	9.9701	3.5710	2.7919**
LHL(-3)	-8.7316	2.7944	-3.1246**
LHL(-4)	-5.9481	1.6125	-3.6887**
BLR	-1.4795	0.4446	-3.3277**
BLR(-1)	0.0583	0.3110	0.1875
BLR(-2)	-0.0467	0.2865	-0.1630
BLR(-3)	1.8909	0.4396	4.301***
Intercept	139.4462	53.5823	2.6024**

Goodness of fit indices	
R-Squared	0.9620
Adjusted R-Squared	0.8253
S.E. of regression	0.4462
F-Statistic[Prob.]	7.0363[.0200]
DW-statistic	2.7864

Note: ***, **, and * denote significance at 1%, 5% and 10% level, respectively

Table 4 presents the results of the long-run statistics, which indicate that all the macroeconomic and housing market variables have a significant statistical relationship with the residential property rental yield.

Table 4 Estimation of Long-Run Coefficients using the ARDL (4,3,4,4) Selection Based on (AIC), Dependent Variable is Rental Yield

Regressor	Coefficient	Standard Error	t-Statistic[Prob.]
LGDP	-27.2080	20.6394	-1.3182
LHL	18.3027	13.5755	1.3482
BLR	0.4153	0.2770	1.4991

Note: ***, **, and * denote significance at 1%, 5% and 10% respectively

For long-run equation, result from *p*-value shows significant in a long-run equation. The GDP has a positive long-run statistical relationship with the rental yield of residential properties at the 1% level of significance. The results indicate that at 1% increase in GDP will reduce the rental yield by 27.2080. This finding is consistent with several studies which show that house price has significance relationship with income level, for example, the study by Fernández-Kranz and Hon[30], finds a positive relationship between the house price and income across the cities in Spain, suggesting that income is an important determinant of house prices. However, the HL has a positive long-run statistical relationship with the RY at the 1% level of significance. The current study finds that a 1% increase in HL will increase the RY by 18.3027. Another interesting finding is that increase in BLR will reduce the RY by 0.4153.

After accepting the long-run coefficients of the rental yield equation, the next step is to find an error correction term of the ARDL model that adjusts the system to the long-run equilibrium after a short-run shock disturbance. The results obtained from the short-run estimation with error correction term from the ARDL model are presented in Table 5. The coefficient estimates provide further evidence concerning the existence of a short-run dynamic between the rental yield and both the macroeconomic and housing market variables.

The error correction term (ECM) measures the speed of adjustment that brings back the equilibrium in the dynamic model. More specifically, the ECM coefficient shows how quickly or slowly

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[30] D. Fernández-Kranz and M. T. Hon, "A Cross-section Analysis of the Income Elasticity of Housing Demand in Spain: Is There a Real Estate Bubble?" *Journal of Real Estate Finance and Economics*, 32(4), (2006), 449–470.

the relationship among the variables returns to its equilibrium path in the long-run. The negative sign and significance of the variable indicate the speed of adjustment whereby it measures the speed of which dependent variable responds to any short-run deviation from the long-run equilibrium. A highly significant ECM is additional proof of the existence of a stable long-term relationship[31].

Table 5 Error Correction Model Representation for the Selected ARDL Model, (4,4,4,3) Selected Based on (AIC) Criterion

Regressor	Coefficient	Standard Error	t-Statistics[Prob.]
Δ(RY(-1))	-0.1585	0.08783	-1.8052
Δ(RY(-2))	-0.2327	0.0867	-2.6828**
Δ(RY(-3))	0.1853	0.1226	1.5104
Δ(LGDP)	6.3852	1.8864	3.3848**
Δ(LGDP(-1))	28.7735	2.9093	9.8901***
Δ(LGDP(-2))	17.4904	2.5794	6.780***
Δ(LGDP(-3))	9.4517	1.7383	5.4373**
Δ(LHL)	11.3921	1.6870	6.7526***
Δ(LHL(-1))	4.7095	1.1956	3.9289**
Δ(LHL(-2))	14.6797	1.6753	8.7623***
Δ(LHL(-3))	5.9481	1.0325	5.7604***
Δ(BLR)	-1.4795	0.1881	-7.8637***
Δ(LBLR(-1))	-1.8442	0.1773	-10.4013***
Δ(LBLR(-2))	-1.8909	0.2096	-9.0228***
ECM(-1)	-1.0184	0.0801	12.7117***

Goodness of fit indices

R-Squared	0.9682
Adjusted R-Squared	0.9187

[31] A. Banerjee, J. Dolado and R. Mestre, "Error-correction Mechanism Tests for Cointegration in a Single-equation Framework", *Journal of Time Series Analysis*, 19(3), (1998), 267-283.

S.E. of regression	0.3325
DW-statistic	2.7864

Note: ***, **, and * denote significance at 1%, 5% and 10% level, respectively

From Table 5 above, the ECM_{i-1} coefficient is found to be negative and statistically significant at the 1% level of significance. It further confirms the existence of a stable long-run relationship between the residential property rental yield and both macroeconomic and housing market variables. The coefficient of ECM_{i-1} is estimated as -1.0184 and statistically significant at 1% level, which indicates the existence of a long-run relationship between variables. To calculate the speed of adjustment, the formula is as follows:

$$\frac{1}{ECM_{i-1}}; therefore \ \frac{1}{1.0184} = 0.9819 \ year \ or \ 11 \ months$$

Thus, 0.9819 or 11 months is required for the model to adjust back to the long-run equilibrium. The result suggests that the variables are moving fast in reaching to its equilibrium path. The result of ECM_{i-1} supports the result from the earlier bounds test.

To determine the suitability of the ARDL model for examining the relationship between the residential property rental yield and both macroeconomic and housing market variables, the research applied several diagnostic tests to the ARDL model. These included the serial correlation test, normality test, and the heteroscedasticity test. The results of the diagnostic test are reported in Table 6 below.

Table 6 Results of Diagnostic Tests

Test Statistics	LM Version
A: Serial Correlation	$X_{SC}^{2}(1) = 2.1662[.2617]$
B: Functional Form	$X_{FF}^{2}(1) = 3.0853[.0367]$
C: Heteroskedasticity	$X_{H}^{2}(1) \ = 0.4169[.9219]$
D: Normality	$X_{H}^{2}(1) \ = 8.1331[.0171]$

Notes: The figures in the squared brackets […] represent p-values of the statistical level of significance.
A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values
C: Heteroskedasticity test: ARCH
D: Normality test of residual

The table above shows that this regression passes the diagnostic tests for no serial correlation, no specification in functional form and no heteroscedasticity or conditional autoregressive serial correlation because none of the x^2 are significant. Except for the error term, which is not normally distributed, because its $X_H{}^2$ is significant. In addition, Figures 1 and 2 of the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMsq), which are the plots from the recursive estimation of the ARDL model, show the stability of the long-run coefficient for the sample period of the study. The graphs for CUSUM and CUSUMsq do not go beyond the critical boundaries at the 5% level of significance.

Figure 1 Plot of Cumulative Sum of Recursive Residuals
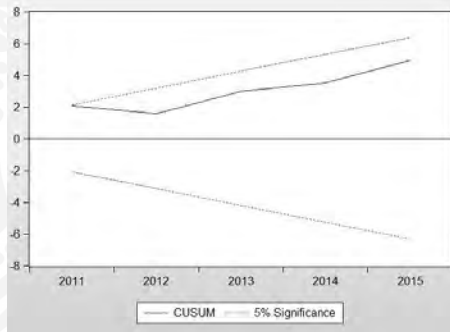
Figure 2 Plot of Cumulative Sum of Squares of Recursive
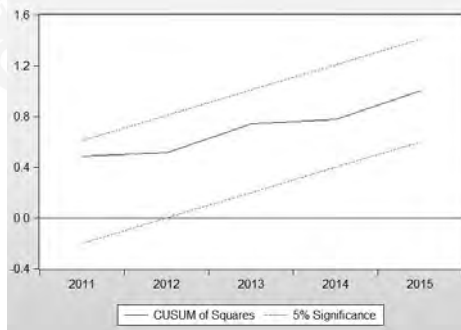
The ARDL cointegration test results indicate the existence of a

short-run relationship for rental yield against the macroeconomic and housing market variables; namely, gross domestic product, housing loan, and base lending rate. The study further tests the model and found the existence of long-run relationship for the rental yield against the macroeconomic and housing market variables. Meanwhile, in this study, the relationship between rental yield and the demand indicates that the income level is positive. This finding serves as evidence that even rental yield is influenced by income, the rental values is based on physical attributes of the property and should not be speculative in nature.

Most literature discuss on house price, rather than rental yield. Rental yield formula is also derived from the component of house price. Therefore, result of this study is consistent with the previous study that the gross domestic product, mortgage rate, mortgage to income ratio, and exchange rate each have long-run causality with house price[32]. Another study identifies the possible housing bubbles in the Malaysian residential property market. The main empirical findings show one positive historical bubble in 1997. A prominent possible bubble is detected, which commenced in 2010 and peaked around 2013. This is of long duration, and although exhibiting signs of gradual collapse, it is still persisting at the end of the study period. The study confirms that the assumption of a would-be bubble is not a bubble but a severe price cycle of the residential property market[33].

Pillaiyan[34] investigates the macroeconomic drivers of house prices in Malaysia using the vector error correction model (VECM) over a fifteen-year period. The key macroeconomic factors investigated were real GDP, bank lending rate, consumer sentiment, business condition, money supply, number of loans approved, stock market and inflation. The macroeconomic factors that are found to be

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[32] Y. C. Yin, W. W. Chyuan and W. K. Hoong, "Detecting Malaysian Housing Bubbles". *American Journal of Applied Sciences*, 13(3), (2016), 281–289.

[33] Y. C. Yin, C. C. Keong, W. K. Hoong and T. Y. Teng, "Housing Dynamic and Bubbles - A Statistical and Economic Investigation (The Case of Malaysia)". *International Journal of Applied Business and Economic Research*, 15(7), (2017), 241–253.

[34] S. Pillaiyan, "Macroeconomic Drivers of House Prices in Malaysia". *Canadian Social Science*, 11(9), (2015), 119–130.

significantly related to the Malaysian housing prices are inflation, stock market, money supply (M3) and number of residential loans approved. In contrast, neglecting the rental sector may have heavy economic costs. The rental sector should not only emphasize that it is not only for the poor, but that it also serves a positive economic function since the transaction costs for rental housing are lower than for owner occupied housing[35].

Ong[36] in his empirical results, finds that the gross domestic product, population and real property gain tax are the key determinants influencing housing prices. However, changes in housing prices may not necessarily be influenced by gross domestic product, population, and real property gain tax in Malaysia. The general finding of this paper strongly suggests that housing bubbles in the Malaysian residential property market are becoming bigger and stronger. Kamal, Hassan, & Osmadi [37] investigate the factors influencing the housing price from the developer's perspective and provide recommendations on strategies to tackle this issue. An online and face-to-face survey is conducted on housing developers operating in Penang, Malaysia. The results indicate that location, macroeconomics, demographic, land/zoning, and industry factors are the main factors influencing the housing price.

The model tested in this study is suitable for Malaysia, since the housing market is dominated by the private market, with only a small portion of the housing market owned by the government. The practice in Malaysia is different from other countries. For example, the nearest neighbouring country, Singapore, housing market is dominated by their government. The Singaporean government pursues a real estate policy through near monopoly of the housing

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[35] J. M. Quigley and D. H. Weinberg, "Intra-urban Residential Mobility: A Review and Synthesis." *International Regional Science Review*, 2(1), (1977), 41-66.

[36] T. S. Ong, "Factors Affecting the Price of Housing in Malaysia". *Journal of Emerging Issues in Economics, Finance and Banking*, 1(5), (2013), 414–429.

[37] E. M. Kamal, H. Hassan and A. Osmadi, "Factors Influencing the Housing Price: Developers' Perspective". *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, 10(5), (2016), 1676–1682.

supply, which acts as an effective stabilizer of house price fluctuation. Singapore's Housing Development Board has chosen to control more than 85 per cent of housing supply, which indicates that private initiatives are very limited[38].

5.0 Conclusions

The rental yield is found to be reflective of real economic movement when regressed against the macroeconomic and housing market indicators. The ARDL cointegration test results indicate the existence of short-run relationship for rental yield against the macroeconomic indicator, namely gross domestic product, and housing market indicators, namely housing loan and mortgage rate. The model is estimated to examine the short-run and long-run relationships among the variables. The econometric model, using *F*-statistics are computed for the bounds test and the joint significance of the lagged levels of variables. The long run cointegration hypothesis is tested between rental yield and dependent variables, and the result shows that all dependent variables are significant in this study. It can be concluded that the rental yield has a relationship with the income level, housing loan, and mortgage rate.

This study contributes to the Islamic banking and finance industry in its effort to operationalize the alternative reference benchmark in determining the pricing for Islamic financial products. This study is the first effort in Malaysia to operationalize the empirical analysis by using rental yield in the pricing of *musyarakah mutanaqisah* home financing. The evidence in this research benefits regulators in imposing the policy of introducing the alternative reference benchmark pricing to the Islamic banking and finance industry.

The study would beneficial to those stakeholders of Islamic financial institutions that want to refer to the rental yield as pricing benchmark for Islamic home financing. The rental yield proposed in this study is considered as a base rate for home financing and it is are recommended to add on the associated risks elements in the pricing

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[38] J. Lee, "Is There an East Asian Housing Culture? Contrasting Housing Systems of Hong Kong, Singapore, Taiwan and South Korea", *The Journal of Comparative Asian Development*, 2(1), (2013), 3-19.

calculation. Rental yield could be based on location rather than aggregate in pricing the product to ensure the consistency of market value of rental yield with the location of the house. By implementing this benchmark, the Islamic cooperatives are suitable institutions as a start to use the rental yield as the benchmark. Cooperative is a free reserves institution since the funding rate is not depending on the statutory reserves requirement and because the size of the cooperative institution is considered acceptable in managing their funds for financial products. This practice may expand to other Islamic banking and finance institutions in the future.

The findings of the study can shed light in order to gradually rid the Islamic financial system of *riba*. To enhance and enrich the findings, more analysis may be needed. This study only focused on the relationship of rental yield with the selected macroeconomic and housing market variables. Future research is suggested to extend the relationship of another possible benchmark; the residential rental index with economic variables. Even though the data for the residential rental index is not yet established in Malaysia, the proxy of the rental index can be selected for whichever data are available. It would also be beneficial if other statistical techniques could be conducted in future research to examine the relationship of the proposed reference benchmark pricing and economic variables.

Acknowledgment

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