Alternative profit rate shariah-compliant for islamic banking

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Abstract. Profit is the aims for Islamic banking and conventional banking. Determination of profit in Islamic banking in Malaysia depends on the profit rate, whereas profit rate is essentially from reference rate which is known as the base rate (BR). However, the determination of the components contained in the BR such as benchmark cost of funds and the statutory reserve requirement (SRR) is non-compliance with the Shariah because its directly proportional to the overnight policy rate (OPR). Therefore, an alternative formula for the profit rate are proposed which is known as the base profit rate (BPR). Construction of BPR formula is based on the principle that are more Shariah-compliant.

1. Introduction

Islamic banking is different from conventional banking due to its implementation is based on Islamic principles that compliance toward Shariah. Its main source is based on al-Quran, Hadith, Ijma and Qiyas. It is to ensure the Islamic banking does not have the forbidden element such as riba (usury) [2] [3]. Financial activities in Islamic banks should gain Allah blessings and support the welfare of Muslim ummah. This is because, the establishment of Islamic banking are based on two factors, namely the profit and religion [1]. Profit refers to the excess money from the principal taken by the bank from the customer to the buying and selling of assets such as houses and vehicles. If the surplus is taken by Islamic banks set before the contract in the buying and selling activities, the surplus or the profit is not considered as a riba. Besides that, in Islamic’s law, buying and selling activity in installments is justified [4].

However, the method used nowadays in Islamic products such as the determination of the profit are no different from conventional banking. This is because both banks use the same reference rate in determining the profit rate that is the base rate (BR) [5]. There are issues in the determination of the BR, the components used are not Shariah-compliant lead to overall profitability in Islamic products offered by the bank still have the element of riba [3]. Thus, the aim of this study was to develop an alternative formula for Shariah-compliant profit rate based on the opinion of the scholars and by the size of the economy bubble using GJLS model to reflect current economic conditions.
2. Reference Rate

The base rate (BR) (notation, \( w \)) formula that is used in Islamic banking products in Malaysia is given by equation (1) [5].

\[
w = F_c + \alpha
\]  

(1)

where \( F_c \) and \( \alpha \) is benchmark cost of fund and Statutory Reserve Requirement (SRR), respectively. From equation (1), the profit rate for Islamic banking is given by equation (2) [5].

\[
r = w + \lambda
\]  

(2)

where \( \lambda \) is the sum of components, which are operating cost, liquidity risk, credit risk and profit margin. This components are determine by bank.

Based on equation (1), BR components determine by Bank Negara Malaysia (BNM). Thus, benchmark the cost of funds and the SRR are directly proportional to the overnight policy rate (OPR). OPR is the interest rate between banks [6]. So, costs of the transaction between the bank use OPR as interest rate whether the conventional bank or Islamic banks. For example, consider Bank A borrows money from Bank B, Bank A need to pay back the borrowed money with interest rates (OPR). This transaction was carried out to ensure sufficient savings in the bank every day. However, the transactions that occur between the bank is based on money as a commodity rather than real assets. When the money is used as commodities in a transaction, it falls under the definition of \( \text{riba} \) [7]. Thus, when the OPR affect BR, profit rate of Islamic banking directly have the elements of \( \text{riba} \).

3. Alternative Profit Rate Model

An alternative profit rate suggested is known as a base profit rate (BPR). This formula construct for financing instrument based on deferred installment contract. Construction of BPR is transparent in terms of principal and profits. BPR formula is given by equation (3).

\[
u_t = 33.33\% + gt
\]  

(3)

where \( u_t \), 33.33\%, \( g \) and \( t \) is base profit rate (BPR) in \( t \) year, profit margin, bubble size rate per year and number of years, respectively.

The profit (notation, \( a \)) generated by using equation (3) is given by equation (4).

\[
a = P \times u_t
\]  

(4)

where \( P \) is principal.

The total amount (notation, \( Z_t \)) which will be paid by customer is given in equation (5).

\[
Z_t = P(1 + u_t)
\]  

(5)

From equation (5), considering a deferred payment on a monthly basis \( (n = t \times m) \), where \( m \) is number of times per year \( 1 \leq m \leq 12 \), the monthly periodic payment is calculated and given by equation (6).

\[
X = \frac{P(1 + u_t)}{n}
\]  

(6)
3.1. Profit Margins Based On Shariah

Refer to equation (3), 33.33% is obtained as follows:

$$\frac{\frac{1}{3}P + P - P}{P} \times 100\% = 33.33\%$$ (7)

where 1/3 is the profit rate of the payment in the present set by the majority of scholars [8]:

1. Shafi’i scholar assign 1/3 of the market price.
2. Hanbali scholar assign 1/3 or 1/6 of the market price.
3. Maliki scholar assign 1/3 of the market price.

This rate is set to prevent the occurrence of ghahn fashisy (i.e. the difference exaggeration of the actual market price). The market price is the price of capital or principal.

3.2. Bubbles Size As A Proxy

Rational speculative bubble can be defined as positive acceleration of prices above intrinsic value [9]. The Generalized Johansen Ledoit Sornette (GJLS) model have been developed as flexible tool to identify the size of rational speculative bubble. This model combines the economic theory of rational expectation bubbles with finite-time singular crash hazard rates, behavioral finance on imitation and herding of investors and traders as well as mathematical statistical physics of bifurcations and phase transitions [9]. Hence, based on the equation (3), \( g \) is used in BPR formula to describe current financial economic condition.

A financial bubble is modeled as a regime of accelerating or super-exponential power law growth punctuated by short-lived corrections organized according the symmetry of discrete scale invariance [9]. The super exponential power law is argued to result from positive feedback resulting from noise trader decisions that tend to enhance deviations from fundamental valuation in an accelerating spiral.

Formation of GJLS model is determined by modification of the JLS model [9]. Hence, the simplest form of a log-price dynamics up to the end of the financial bubble is given by equation (8) [9]:

$$\ln E[p(t)] \approx A + B(t_c - t)\beta + C(t_c - t)\beta \cos(\omega \ln(t_c - t) + \phi)$$ (8)

where \( p(t) \) is the price of a stock index or other specific asset at time \( t \), \( A = \ln(p(t_c)) > 0 \) is the logarithm of the price at the critical time \( t_c \) and \( B < 0 \) for a growing bubble before the crash. \( t_c \) is the most probable time for the crash. If \( C \neq 0 \), then the presence of log-periodic behaviour is indicated. The term \( \beta \) must in the range of \( 0 < \beta < 1 \) for an important economic reason otherwise the price would go infinity when approaching \( t_c \) (if the bubble has not crashed yet). Parameter \( \omega \) is the frequency of oscillations during the bubble period, while \( \phi \) is a phase parameter.

The Generalised Johansen Ledoit Sornette Model is formed by inferring fundamental value of stock in equation (8). Extension of equation (8) is said to be GJLS model that proposed by [9]. The price dynamics of an asset in equation (9):

$$dp = \mu(t)pdt + \sigma(t)p \, dW - k(p - p_1)^7 \, dj$$ (9)

where the \( \mu(t)pdt + \sigma(t)p \, dW \) describes the statistical Geometrical Brownian Motion and the third term is the jump.
When the crash occurs at some time \( t^* \) (indicate \( \int_{t^*}^{t^+} dj = 1 \)), the price drops abruptly by amplitude.

\[
k(p(t^*) - p_1)\gamma
\]

where \( k = \gamma = 1 \), the price drops from \( p(t^*) \) to \( p(t^+) = p_1 \). The price changes from its value just before crash to a fixed well-defined valuation \( p_1 \).

Concluded that no-arbitrage condition \( E_t[dp] = 0 \) to equation (9) leads to equation (11).

\[
\mu(t)p = k(p - p_1)\gamma h(t)
\]

Conditional on the absence of a crash, the dynamics of the expected price obeys the equation (12)

\[
dp = \mu(t)pdtdt
= k(p - p_1)\gamma h(t)dt
\]

and the fundamental price must obey the condition \( p_1 < \min p(t) \). For \( \gamma = 1 \), the solution is

\[
\ln[p(t) - p_1] = F_{LPPL(t)}
\]

where \( F_{LPPL(t)} \) is given by equation (8). For \( \gamma \in (1, 0) \), the solution is \( (p - p_1)^{1-\gamma} = F_{LPPL(t)} \). Do not consider the case \( \gamma > 1 \) which would give an economically non-sensible behaviour, namely the price diverge in finite time before the crash hazard rate itself diverges.

In summary, [9] considered a model as shown below.

\[
p_1 + \exp F_{LPPL(t)}, \gamma = 1
\]

There are algorithm involves for estimating the parameters of the model equation (14). Firstly, identify three consecutive price peaks \( i, j, k \). Next, estimate the values of \( t_c, \omega \), and \( \phi \) from gyrations: \( t_c = (\rho k - j)/(\rho - 1) \), \( \omega = 2\pi/\log(\rho) \) and \( \phi = \pi - \omega \log(t_c - k) \), where \( \rho = (j - i)/(k - j) \). Lastly, estimate values of \( A, B \) and \( C \) using ordinary least squares (OLS) method [10].

In this study, the final model equation (14) was applied to the Kuala Lumpur Composite Index (KLCI) to estimate the fundamental value and size of the rational speculative bubble that appeared during the year 1997 and 2008. KLCI data is used in this study because Malaysia stock market developments have an important impact on the country. It serves as a key indicator of economic performance.

4. Result

As a first step, we predict the bubble size by using GJLS model. We estimate the \( \omega \) value by three consecutive price peaks. The best result is chosen based on MSE value. The results of the bubbles size as shown in Table 1.

From the Table 1 bubbles size rate for 11 years is 18.07\%. Table 2 show the illustration execution by using BPR model. This empirical test on alternative profit rate by using real data as below:
Financing amount: RM300,000.00
Tenure (years): 9
Tenure (months): 108

The bubbles size rate per year will be:

\[ g = \frac{18.07\%}{11} = 1.64\% \]  \hspace{1cm} (15)

By using equation (15), the base profit rate (BPR) will be:

\[ u_t = 33.33\% + 1.64\%(9) \]
\[ u_t = 48.09\% \]  \hspace{1cm} (16)

From the equation (16), the profit gained by the bank will be:

\[ a = 300000 \times 0.4809 \]
\[ a = 144270 \]  \hspace{1cm} (17)

The selling price will be:

\[ Z_t = 300000(1 + 0.4809) \]
\[ Z_t = 444270 \]  \hspace{1cm} (18)

The periodical payment that will be paid by the customer will be:

\[ X = \frac{300000(1 + 0.4809)}{108} \]
\[ X = 4113.61 \]  \hspace{1cm} (19)

| Time interval       | \( \omega \) | MSE   | Bubble size |
|---------------------|--------------|-------|-------------|
| 29/01/1993 – 28/02/1997 | 65.93    | 0.2978 | 716.01     |
| 28/08/1998 – 31/01/2008 | 73.79    | 0.06182 | 845.38     |

The result in Table 1 show that, financial bubble usually happened every 10 years [7]. Hence, bubble size is in line with the economy that make it relevant as a proxy in BPR model. Besides that, in Table 2 the selling price generate is RM444270.00.00, where the principal is RM300000.00. This show that, BPR model more shariah-compliant because no element of *ghabn fashisy*. 
Table 2. Illustrate the execution by using BPR model.

| Period | Periodical payment, X | Profit amortisation | Principal amortisation | Remaining principal |
|--------|-----------------------|---------------------|------------------------|---------------------|
| 0      |                       |                     |                        | 300000              |
| 1      | 4113.61               | 1335.83             | 2777.78                | 297222.22           |
| 2      | 4113.61               | 1335.83             | 2777.78                | 294444.44           |
| 3      | 4113.61               | 1335.83             | 2777.78                | 291666.67           |
| 4      | 4113.61               | 1335.83             | 2777.78                | 288888.89           |
| ...    | ...                   | ...                 | ...                    | ...                |
| 104    | 4113.61               | 1335.83             | 2777.78                | 111111.11           |
| 105    | 4113.61               | 1335.83             | 2777.78                | 83333.33            |
| 106    | 4113.61               | 1335.83             | 2777.78                | 55555.56            |
| 107    | 4113.61               | 1335.83             | 2777.78                | 2777.78             |
| 108    | 4113.61               | 1335.83             | 2777.78                | 0.00                |

5. Conclusion
We have done an empirical test towards alternative profit rate model. It is proved that, the establishment of base profit rate (BPR) can be applied in the real world. Besides, the value of the bubbles size as a proxy is relevant to the financial economy and the profit margin that determine based on majority scholars’ opinion to make sure there are no problem in ummah because of the difference opinion. This is because, in Islamic banking, the Shariah regulation should be clear in all activity to make sure bring prosperity in ummah.

It can be concluded that, this new model is more compliance towards Shariah because determination of the profit rate is transparent and clear. There are no element of riba that can be detected in this model because the profit rate is determined before the contract is approved by both parties buyer and seller.

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