

THE CONSTRUCTION OF A NEW MATHEMATICAL MODEL FOR ISLAMIC HOME FINANCING

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Published online: 20 March 2019

To cite this article: Ghazali, P.L., Syed Jaaffar, S.A., Mohammed Foziah, N.H., A Tambi, A.M., Md Nawawi, F.A., Mamat, M., Mohammad, S.B., Wan Daud, W.M.N., and Mahmud, M.S. (2019). The construction of a new mathematical model for Islamic home financing. *Asian Academy of Management Journal*, 24(Supp. 1), 33–41. <https://doi.org/10.21315/aamj2019.24.s1.3>

To link to this article: <https://doi.org/10.21315/aamj2019.24.s1.3>

ABSTRACT

Islamic financial institutions apply few mathematical formulas in constructing Islamic home financing models. However, the available products in the markets are deemed to be a burden to the low to medium income earners, while the mortgage takaful only compensates selected cases such as death and total permanent disability without including the protection against those who lose an effort to work. Hence, this study derives a new formula of Islamic home financing where the profit is calculated based on one-third of the total amount of financing, while the new model of mortgage takaful will compensate those who are losing effort to work. Therefore, this study aims to derive a new formula of home financing and mortgage takaful model by using an integrated model.

Keywords: mortgage takaful, total permanent disability, Islamic home financing, integration model, Barakah model home financing

INTRODUCTION

Islamic banking started to enter the Malaysian market in 1963 with the operation of Tabung Haji. Previous conventional home financing is not aligned with the Islamic principle as *riba* (usury) and *gharar* (uncertainty) are integral part of the financing and because of that many people start to be aware of *halal* and *haram* transactions (Ali, Raza, Puah, & Karim, 2017). Considering that the financial institution progress was encouraging, gradual setting up of Islamic financial institutions was observed throughout the country.

The government has been enhancing the development of the Islamic banking industry in Malaysia. During Malaysian economic crisis in 1997, many house owners were burdened with the existing conventional loans. With conventional banking, there is no ceiling rate to cap on the fluctuating rate if the economy had gone worst. As a consequence, people are more aware of the benefit of the products offered by Islamic banks that depends on their financial performance. There are many perspectives of distinguishing Islamic banking from the conventional system (Salah, 2010). A conventional bank that wishes to turn into an Islamic bank needs to form a shariah (Islamic principles) board/council to ensure conformity and minimisation of shariah risk. The coexistence of Islamic and conventional banking systems creates a dual market in which Islamic banks must compete. This requires them to maintain their alignment with shariah requirements that represent the very essence of the religious rules of Islam.

Takaful gives each policyholder the option to get protected against loss or damage by contributing money into a pooling system based on the principle of mutual assistance. The unique characteristics of takaful differentiate it from conventional system in that it is aligned with shariah guidelines. The takaful market has widened in tandem with the global expansion of Islamic banking together with the broadening of the mutuality concept of business performance. The present study aims to construct a new mathematical formulation of Islamic home financing that involves repayment schedules and complementary takaful plans that cater for a wide range of customer income groups. Hence, the authors called it mortgage takaful model.

LITERATURE REVIEW

According to Ahmed (2014) and Amin (2008), Islamic home financing differs from the conventional system in that interest charges and uncertainty elements are outlawed. The only permissible element is profit rate that mirrors a transparent and

clear transaction (Amin, 2008). The main reasons for practicing Islamic banking is to control the amount of monthly payments that comply with shariah requirements and profit rates that do not fluctuate with business performance (Hamid & Masood, 2011).

Malaysia's first practice in Islamic banking is through *bai bithaman ajil* (BBA) or deferred payment sale. Normally, this principle is used for property, vehicle, and personal financing. BBA is a trading transaction that is *halal* (permissible) or comply with the shariah law. According to the Islamic perspective, a valid transaction between two trading parties must demonstrate a fair and observable exchange process that is represented by the acts of *ijab* (offering) by the initiator and *qabul* (accepting) by the receiver of the item being traded. The legal marriage of the two declarations establishes a contractual obligation between the trading parties that is free from all prohibitions (Ayub, 2013). In general, Muslim jurists hold that, intrinsically, if the three essential elements of a contract namely, *halal*, *ijab*, and *qabul* are not observable, the contract is deemed to be invalid.

Musarakah mutanaqisah (MM) is another financing scheme that gives consumers the needed protection from financial risks so that they will regularly be paying reasonable amounts of the outstanding balance of financing that, in total, never exceed the original price of asset (Meera, Kameel, & Abdul Razak, 2005). In this respect, MM financing is better than BBA. Certain Islamic financial institutions in Malaysia use *tawarruq* to raise money quickly and easily without violating the shariah. Here the customer buys an asset through a *mutawarriq* (seller) from an Islamic financial institution at a marked-up price, to be paid at a later date, and quickly sells the asset to raise cash. In conclusion, every *tawarruq* transaction creates a debt (Siddiqi, 2007).

METHODOLOGY

The formulations for BBA, MM, and *tawarruq* home financing approaches are shown below.

***Bai Bithaman Ajil* (BBA)**

The monthly instalment amount:

$$PMT = [FA (1 + r)^n r] / [1 + (1 + r)^n - 1] \quad (1)$$

where,

- PMT = payment of monthly instalment
- FA = facility amount
- r = profit rate (per month)
- n = periodic payment (number of months)

Musyarakah Mutanaqisah (MM)

According to Meera et al. (2009), in MM, the same formula used by conventional banks applies to calculate the PMT. The rental rate is calculated as follows:

$$x = X/P \quad (2)$$

where,

- X = monthly rental payment
- P = total value of the asset

The conventional banks' formula to calculate the periodical payment is:

$$PV = PMT/i [1 - 1/(1 + i)^n] \quad (3)$$

$$PV = PMT = I = n = PMT = i (1 + i)^n PV / (1 + i)^n - 1 \quad (4)$$

where,

- PV = present value
- PMT = periodic payment amount (payment of monthly instalment)
- n = number of compounding periods
- i = interest rate

In the MM formula, we replace the interest rate (i) with the rental rate (x) as follows:

$$M = x (1 + x)^n B / (1 + x)^n - 1 \quad (5)$$

where,

- M = periodically payment to the bank (include the additional amount of rental)
- x = rental rate periodically
- n = number of periods
- B = initial bank share

Example:

Given that the rental is RM2,000 but the customer pays RM2,500 instead where the additional RM500 is the amount that can be used to redeem the bank's share until the customer owns 100% of the asset. The additional amount that the customer needs to pay to increase ownership will be:

$$A = x [P - (1 + x)^n C_o] / (1 + x)^n - 1 \quad (6)$$

where,

x = rental rate

P = total value of the asset

C_o = contribution of the customer to the purchase of the asset

Tawarruq

Tawarruq is one of the shariah compliant modes used in cash-based financial instruments to provide cash liquidity. The concept suits most of the facilities provided by conventional banking, such as deposit loan, bond, and money market instruments. This mode of cash-based instrument, which is widely known in the Gulf Region, has recently become popular in Malaysia as an alternative to *bai al-inah* (a sale and buy-back agreement) that was adopted in the early days. *Tawarruq*, as it is being practised by Islamic financial institutions nowadays, is divided into two segments namely, standard *tawarruq* and classical *tawarruq*. The formula for calculating the periodical payment is shown below:

$$C = [r P (1 + r)^n] / [(1 + r)^n - 1] \quad (7)$$

where,

P = total amount

n = facility period term (month)

r = profit rate (per month)

FINDINGS AND DISCUSSION

The scope of the research covers two types of financial product, which are home financing and takaful.

Home Financing

The authors introduce a new Barakah model home financing that puts a cap on the ratio of profit to principal financial amount. Here, a profit ratio of one-is-to-four is used. This amount is less than the one-third limit proposed by Wahbah Az-Zuhaili (Asilah, 2014). The cap does not in any way limit the amount of profit that can be made, because profit is function of the price of the property. Islam basically has no standard restrictions or standards on profit-making. The merchant is free to determine the desired profit from item sales. The following is the mathematical formula used in Barakah model home financing that is based on Ghazali, Mohd, Mamat, and Ahmad (2011):

$$\begin{aligned} \text{Barakah model home financing amount} &= \text{Principal} + \text{profit (one-fourth of the} \\ &\quad \text{principal)} \\ &= \frac{\left[P + \frac{1}{4}P(1 + rn) \right]}{n} \\ &= \frac{P + \frac{1}{4}P + \frac{Prn}{4}}{n} \\ &= \frac{P\left(1 + \frac{1}{4} + \frac{rn}{4}\right)}{n} \\ &= \frac{P}{n} \left[\frac{5 + rn}{4} \right] \end{aligned} \tag{8}$$

where,

P = principal of the total amount of home financing

r = profit rate per month

n = periodic payment of home financing in month

Example:

The following calculations are performed to determine the 240-monthly instalment in a Barakah model home financing situation where the amount of financing is RM225,000 and profit is set at 6% per year.

$$\begin{aligned}
 \text{Monthly instalment amount} &= \text{Financing (above formula)} + \text{takaful home financing} \\
 &= \frac{225,000 \left[5 + \left(\frac{0.06}{12} \right) (240) \right]}{4(240)} + \text{RM30.00} \\
 &= \text{RM1,483.13}
 \end{aligned}$$

We had computed the cost of home financing using the Barakah model, BBA, MM, and *tawarruq* using suitable data and found that the Barakah model was the cheapest alternative.

Takaful

The derivation of the takaful model is based on Ghazali’s integration model (Ghazali, Mohd, Ismail, Mamat, & Ahmad, 2012; Ghazali, Mohd, Ahmad, & Mamat, 2012; Ghazali et al., 2015; Ghazali et al., 2017) that combines various types of personal contributions namely, *khairat* (the allocation used to cover funeral costs), education allowance, hospital costs, and death coverage. All these can be accumulated under one contribution life table as shown in Table 1. The value of *khairat*, loss of ability to work, and hospital bill are in ratio term off the value of X , which equals RM1,000. For example, if the ratio of *khairat* is $3X$, so the actual value of *khairat* is RM3,000. The total of partition ratio of the *tabbarru* account = $3X + 300X + 15X = 318X$. Say for example, the mortgage takaful plan corresponds to monthly payments of RM30, then one unit of the plan will cost $\text{RM30}/318 = 0.0943$.

Table 1
Partition of benefits in integration model

Items	<i>Khairat</i>	Loss of ability to work	Hospital bill (ward)	Total
Partition ratio of <i>tabbarru</i> account	$3X$	$300X$	$15X$	$318X$
Partition ratio of collection	$3(0.0943) = 0.28$	$300(0.0943) = 28.29$	$15(0.0943) = 1.41$	RM29.983 = RM30.00 (GST not included)
Total payment of 240 months	RM67.20	RM6,789.60	RM338.40	RM7,200.00 (GST not included)

Note: GST = government and services tax

According to Table 1, the takaful total benefit of RM7,200.00 corresponds to a monthly payment of RM30 for 240 months.

CONCLUSION

The integration model is introduced to acknowledge clients' call for a monthly-payment plan worth a value that includes augmented features, including *khairat*, compensation for loss of ability to work, and medical expenses. The premium life table would highlight affordable monthly prices together with extra benefits to supplement takaful mortgage schedules that meet the specific needs of customers of various income groups.

ACKNOWLEDGEMENTS

The authors would like to thank the Research Management, Innovation and Commercialization Centre, Universiti Sultan Zainal Abidin, Terengganu, Malaysia for providing the financial assistance (grant no. UniSZA/2017/DPU/70) to support the publication of this article.

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