

The Willingness of the Musharakah Mutanaqisah Partnership in Bearing the Loss – An Actuarial Approach to Evaluate the Bank’s Investment Income by the Case of Abandoned Housing Project

Shamsul Rijal Muhammad Sabri
 School of Mathematical Sciences,
 Universiti Sains Malaysia, 11800 USM, Pulau Pinang,
 Malaysia
 Email: rijal@usm.my

Abstract — *This paper suggested a development of the rate of failure of abandoned housing project that can be incorporated by the bank in implementing the Musharakah Mutanaqisah Partnership (MMP) replacing the current controversial housing financing namely, Bay’ Bithaman Ajil (BBA) facility. The paper found out that, the higher the rate of failure due to the abandoned housing project, the less the bank in earning the profit. This would be reflected by the size of debtors committing into this facility and the tenure.*

Index Terms - *Musharakah Mutanaqisah Partnership; Actuarial Method; bank’s yearly investment income; abandoned housing project*

I. INTRODUCTION

The critics on the Murabahah / Bay’ Bithaman Ajil (BBA) facility practiced by the Islamic bank (IB) in Malaysia has been raised publically even the Islamic consumer society urged the Central Bank of Malaysia (BNM) to review the legal terms in implementing such facility that was claimed to be prejudice to the debtors especially in purchasing the properties through financing facility. This Islamic method of purchasing and selling commodities at the mark-up price contract has been argued legally and practically. For instance, the legal documentation allows the IB to purchase the house directly from the debtor after obtaining the sales and purchase (S&P) agreement between the developer and the debtor. The IB then sells the house back to the debtor at a higher price. The selling of the goods at higher price when the deferred mode of payments to be implemented, is permissible in Islam as to distinguish the trading and *riba* as per said in [2] (2:275) saying that *Allah* (God) permits trading and prohibits *riba*. By right, in selling the goods, since the house belongs to the IB, within financing period, the IB, in Islam, should be responsible towards the house sold to the debtor even it is still being under construction. Meanwhile, in conventional bank (CB), since the contract means in lending money, the CB is free of such responsibility. Those are why the practice of buying and selling at higher price may seem to be similar to the CB, thus arguing that the IB is merely acting like a financier, morally.

The Islamic scholars then suggested the innovation of financing facilities of the IB that are more humanize to the debtors. For example, the Musharakah Mutanaqisah partnership (MMP) (see [13] and [15]) and Bay’ al Istisna’ (BaI) (see [17]) facilities. These three facilities have been describe deeply by [1], [3], [5], [6], [7], [8], [11], [12], [14], [15] and [16].

In Malaysia, the housing development practice is critical as they implement the so called “sell then build” contract. In Islam, this trading is by right prohibited as the principles of trading must be existed such as buyer and seller, the goods to be traded, and the contract to be made between both parties. If these pillars are being restricted, then it is a sin for the developers to sell the incomplete houses to public! And so does the IB that allows the contracts of BBA. But, the Islamic scholars have determined the permissibility rule such as Bay’ al Istisna’ contract in which the bank hires the developer to construct the house first and then pay out all remaining amount upon completion, this contract is valid, but is suitable for the BaI and MMP facilities as the ability of the these facility to bear the loss of such defection (see [1]).

The question remaining here, as the presence of the prejudice of the developer in running the housing projects, will the bank be able to bear all losses due to case of abandoned housing project? It is necessary for the IB to construct the study of the abandoned housing project suffered by her debtors. The illustration had been done by [14] finding out that the less tenure invites the less probability of earning profit. Furthermore, the IB has the right to increase the profit / rental rate to bear such loss. Here, I extended the study by assuming that the time of housing project is being abandoned follows an exponential distribution with a constant rate, μ . I furthered this experiment by reviewing various values of μ to observe the probability of bank’s profit.

Section II of this paper presented an actuarial model of the profit earned (i.e. present value of investment income minus amount of financing) by the bank when considering the decrement factor or probability of abandoned housing project within certain period of

construction for the incomplete housing development project. Section III illustrated the effect of the profit earned by the bank when utilizing MMP with the presence of the abandoned housing project risk, and finally section IV concluded.

II. ACTUARIAL APPROACH TO MEASURE THE PROFIT WHEN THE ABANDONED HOUSING PROJECT IS CONSIDERED

In projecting the monthly installment of deferred payment of the property in MMP, [13] and [9] have demonstrated the mathematical derivation of Islamic facilities in determining an optimized financing term for the MMP product. [13] showed that by implementing MMP, we manage to settle out our finance earlier. By right, this can be done if the rental rate is too small. As the rental rate can be fluctuated from time to time as per determined through market forces (see [15]), there might be possible the rental rate becomes higher, and thus results in the financing tenure being longer. [11], in his argument towards the MMP facility, illustrated such case using traditional amortization table which the calculation of the installment is very much as the conventional loan. From my point of view, I conclude that the interest theory is a contribution towards Islamic financing product as it provides transparent calculation of installments and outstanding financing balances, as per demonstrated by [13], [15] and [11], and thus, this method is proposed to answer the willingness of the bank in bearing the loss.

Here, I presented the calculation of monthly installment consisting of annuity factor that has been derived by [10]. In annuity payment of installments, the monthly payment, P for the n -year duration of financing at a fixed profit rate, can be viewed as in Fig. 1.

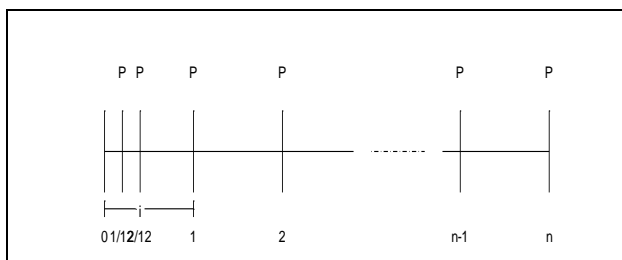


Figure 1. Annuity method of monthly payment for n -year duration.

By assuming the profit rate to be fixed at rate i throughout the years, the monthly installment can be obtained by incorporating (1)

$$F = 12P\alpha_{n\bar{i}}^{(12)} \tag{1}$$

where, in the contract, the amount of financing, F and profit rate, i , are determined. The annuity factor is derived in (2)

$$\begin{aligned} \alpha_{k\bar{i}}^{(12)} &= \frac{1 - (1+i)^{-k}}{i^{(12)}} = \frac{i}{i^{(12)}} \frac{1 - (1+i)^{-k}}{i} \\ &= \frac{i}{i^{(12)}} \alpha_{k\bar{i}} \end{aligned} \tag{2}$$

This annuity factor derived is based on the known profit / rental rate and duration of financing, k . As the installments are paid up upon monthly mode, the annualized percentage rate (APR) of profit / rental, $i^{(12)}$ is calculated as $1+i = [1+i^{(12)}/12]^{12}$ (see [10]). In Fig. 1, I assumed that the installments have been committed until at the end of n year, in which $12n$ payments of P to be paid up. In BBA and BaI, the property sold is agreed at price of $12nP$ which is greater than F . In MMP, the agreed selling price remains F , but the buyer is subject to pay the rent based on the effective annual rate of i .

In Malaysia, the selling of incomplete properties practice is usually done by most of the developers by claiming that the complete properties are usually more expensive, and also a necessary to finance the developers in running out the projects. Of course, by implementing of such practice, there may be the risk, when the developers are not able to complete the projects on time due to many serious problems. This will reflect the buyers as commonly, they have committed in paying out the installments to the financiers, but yet, they are still renting the houses. For such case, the financiers, even the IB who implements the Murabahah or BBA facility will not be willing to bear this risk. That was why the Islamic scholars urged the Islamic banks to implement MMP product which consists of the element of profit loss sharing of the properties between the parties (the debtors and the financiers). In addition, they claimed that the MMP product is cheaper (see [13] and [15]).

However, [13] and [15] did not consider the issue of the abandoned housing project in their illustration towards MMP product. They simply anticipated the house price indices as the proposed rental rates, which these indices (based on geographical factor) should be extensively debated. By right, the determination of the rental rates should be accorded by the presence of the risks of the banks suffering the loss to be borne. The risks might be the market value of the house that is less than the outstanding finance when the buyers fail to make regular installments within certain period that is less than the contracted financing tenure, and the loss of abandoned housing project.

In my previous paper (see [14]), I have illustrated possible reason why the banks will not be willing to bear the loss due to the abandoned housing project. I also managed to show why the IB should increase the profit / rental rates to cover this loss.

In determining the yearly investment income in deferred payment for the MMP facility, I follow [14] by setting k^* as 5. This yields

$${}_k B = \begin{cases} 12P \times a_{\overline{k+1}|r}^{(12)} - F & k = 0, 1, \dots, 4 \\ 12P \times a_{\overline{n}|r}^{(12)} & k = 5, 6, \dots, n-1 \end{cases} \quad (3)$$

In (3), the IB proposes the MMP in which the IB pays up to the developer an amount of F at the beginning of the period of financing. Then, the debtor has to pay the monthly installments of P that have been calculated in (1). Here, B is the random variable of the present value of investment income from the MMP business activity. If the housing development is not completed within five years, then the house financed is considered as abandoned. Here, the IB will lose the money amounting $F - 12P \times a_{\overline{k+1}|r}^{(12)}$ when k is less than 5. After 5 years, it is expected that the house developed is completed. Then, the bank is free of such loss and earns $12P \times a_{\overline{n}|r}^{(12)}$. After earning the investment income from the MMP facility, the IB then rolls business using the money earned at r yearly bank's investment rate of return. The mean of this random variable is derived as follows

$$\begin{aligned} E(B) &= \sum_{k=0}^4 \left[12P \times a_{\overline{k+1}|r}^{(12)} - F \right] \times {}_k q_0 \\ &\quad + \sum_{k=5}^{n-1} \left[12P \times a_{\overline{n}|r}^{(12)} \right] \times {}_k q_0 \\ &= \sum_{k=0}^4 \left[12P \times a_{\overline{k+1}|r}^{(12)} - F \right] \times {}_k q_0 \\ &\quad + \left[12P \times a_{\overline{n}|r}^{(12)} \right] \times {}_5 p_0 \end{aligned} \quad (4)$$

In (4), the term q_k , is defined as the probability of project to be abandoned within time k and $k+1$. [4] in Actuarial Mathematics, explained the term ${}_5 q_0 + {}_6 q_0 + \dots + {}_{n-1} q_0$ in (4) is derived as $1 - {}_5 p_0 = \prod_{k=0}^4 p_k$. (4) can be considered as profit if the mean is greater than financing amount, F . In order to find the variance of the IB's profit, Hattendorf's theorem can be anticipated. Here, the second moment of the B is presented in (5), that is

$$\begin{aligned} E(B^2) &= \sum_{k=0}^4 \left[12P \times a_{\overline{k+1}|r}^{(12)} - F \right]^2 \times {}_k q_0 \\ &\quad + \left[12P \times a_{\overline{n}|r}^{(12)} \right]^2 \times {}_5 p_0 \end{aligned} \quad (5)$$

And finally, the variance of the investment income can be obtained by

$$Var(B) = E(B^2) - [E(B)]^2 \quad (6)$$

For the case of M debtors want to be financed with the same financing amount and tenure, by assuming that they are facing the same risk of tolerance (same probability of failure project) and they are also independent, we manage to determine the random variable of total investment income of the banks as per stated in (7)

$$S = B_1 + B_2 + \dots + B_M = \sum_{m=1}^M B_m = MB. \quad (7)$$

In (7), if M is known value and by assuming independent and identical distributed of profit of housing project, then S is normally approximated with the mean and variance defined in (8)

$$\begin{aligned} E(S) &= M \times E(B). \\ \text{and} \\ Var(S) &= M \times Var(B). \end{aligned} \quad (8)$$

If M is unknown, or is a random variable number of customers purchasing the house under this financing facility, with the mean and variance respectively being μ and σ^2 , then the unconditional S is normally approximated with the mean and variance being

$$\begin{aligned} E(S) &= \mu E(B). \\ \text{and} \end{aligned} \quad (9)$$

$$Var(S) = \mu Var(B) + \sigma^2 [E(B)]^2.$$

From the presence of failure housing project random variable, the IB is able to make up the decision by considering the probability of making profit if the bank is committing in financing the customers. Here, the total financing of this business is $M \times F = MF$, and using normal approximation, the probability of profit of the bank is given in (10), that is

$$\begin{aligned} P(S > MF) &= P\left(Z > \frac{MF - E(S)}{\sqrt{V(S)}} \right) \\ &= 1 - \Phi\left[\frac{MF - E(S)}{\sqrt{V(S)}} \right]. \end{aligned} \quad (10)$$

III. THE EFFECT OF THE RISK OF FAILURE OF ABANDONED HOUSING PROJECT TOWARDS BANKS'S PROFIT

In this section, I assume the time to fail for the housing construction being distributed as exponential distribution with the constant μ from 0.01 to 0.1. At $\mu = 0.01$, this means that the expected time to fail the project is 100 years where as $\mu = 0.1$ means that the expected time to fail the project is 10 years. The less the

value of μ indicates the lower the risk of the abandoned housing project. Using [3], the probabilities are shown as follows

$$\begin{aligned}
 q_0 &= 1 - e^{-\mu} \\
 {}_k p_0 q_k &= e^{-k\mu}(1 - e^{-\mu}) \\
 \text{and} \\
 {}_k p_0 &= e^{-k\mu}
 \end{aligned}
 \tag{11}$$

Here, the actuarial probabilities by assumption of exponential distributions are formed in Table 1.

TABLE I. The probabilities of failure of exponential distributions

μ	q_0	${}_1 p_0 q_0$	${}_2 p_0 q_0$	${}_3 p_0 q_0$	${}_4 p_0 q_0$	${}_5 p_0$
0.01	0.0100	0.0099	0.0098	0.0097	0.0096	0.9512
0.02	0.0198	0.0194	0.0190	0.0186	0.0183	0.9048
0.03	0.0296	0.0287	0.0278	0.0270	0.0262	0.8607
0.04	0.0392	0.0377	0.0362	0.0348	0.0334	0.8187
0.05	0.0488	0.0464	0.0441	0.0420	0.0399	0.7788
0.06	0.0582	0.0548	0.0517	0.0486	0.0458	0.7408
0.07	0.0676	0.0630	0.0588	0.0548	0.0511	0.7047
0.08	0.0769	0.0710	0.0655	0.0605	0.0558	0.6703
0.09	0.0861	0.0787	0.0719	0.0657	0.0600	0.6376
0.10	0.0952	0.0861	0.0779	0.0705	0.0638	0.6065

Using the model above, we illustrate probabilities of profit of MMP facility. Here, the financing amount is RM 200,000 with fixed profit rate of 6% for 20 years tenure, payable monthly and the bank’s yearly return is set up as fixed 3%. It results in installments of RM 1,414.58 per month. The probabilities of bank’s earning profit (as formed in (10)), is shown in Fig 2.

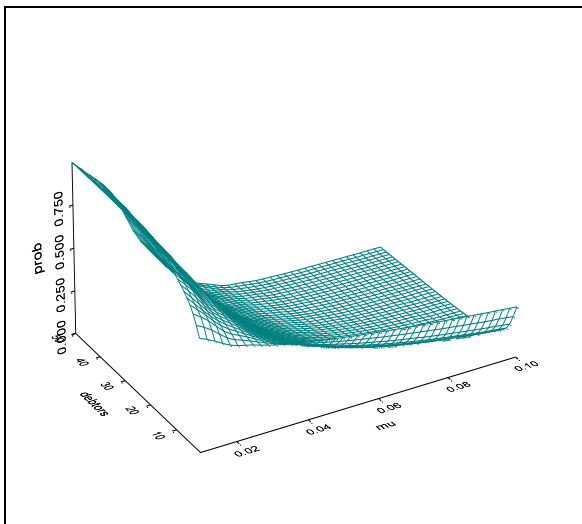


Figure 2. The plot of probability of profit of the bank at profit rate of 6% per annum with investment return of 3% per annum. The tenure is set as 20 years. The x-axis is defined as the values of μ s from 0.01 to 0.10. The y-axis is defined as the size of debtors (from 1 to 50) committing into this facility.

From Fig. 2, it is seen that the increasing of risk (i.e. the value of μ) reflects the banks in making profit. The less the value of μ (at 0.01 and 0.02 only) may encourage the bank to offer the MMP facility to the customers as seen that the increasing of the probability in earning

profit. Until at μ equals to 0.03 onwards, the probabilities are decreasing with the increasing of size of debtors. This means, at the profit rate of 6% and bank’s earning rate of return of 3% annually, the bank will offer the 20-year MMP facility to the debtors as the risk is less than 0.02 only (by assumption of risk being exponentially distributed).

We then illustrate probabilities of profit of MMP facility by considering an RM 200,000 financing amount with fixed profit rate of 6% for the number of debtors being 30. With the bank’s yearly return being fixed 3%, the probabilities of bank’s earning profit (as calculated in (10)) is shown in Fig 3.

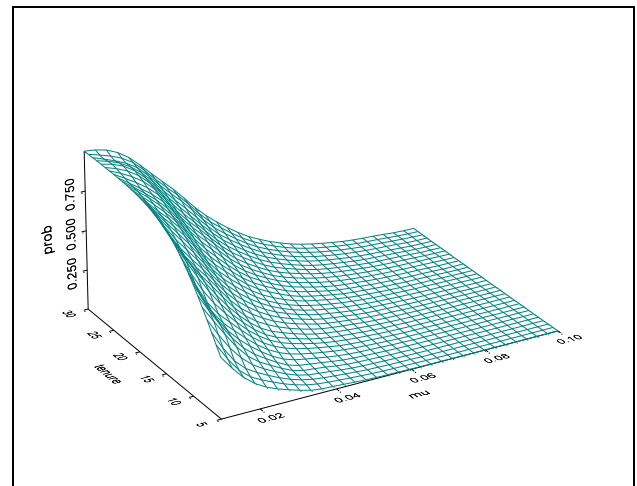


Figure 3. The plot of probability of profit of the bank at profit rate of 6% per annum with investment return of 3% per annum. The number of debtors committed is 30. The x-axis is defined as the values of μ s from 0.01 to 0.10. The y-axis is defined as tenure (from 5 to 30 years).

From Fig. 3, it is seen that the increasing of risk (i.e. the value of μ) also reflects the banks in making profit. The less tenure invites the higher risk in making profit. This is the reason why the bank prefers to offer the loan / financing at longer tenure. However, even the longer the tenure, if the risk of failure of housing development is too high, it also does not guarantee the bank in making profit of this financing scheme. Therefore, it is suggested that the bank should increase the profit rate as shown in [14].

IV. CONCLUSION

The Islamic financing is principally designed to facilitate the debtors to payout the finance that is free from *riba*. It is different with the conventional bank which provides a loan (which is totally different with the definition of financing) to the debtors with condition to pay back with an excess of money that is called *riba* in a duration of time determined. Since one of the Islamic financing designs is to sell the commodity in deferred payment (i.e. Murabahah or BBA), the IB is actually “trapped” with the business rules in which she has to provide warranty to the customers when the good sold is

defected. The word “trapped” means that the IB should distinguish the term *riba* and the trade clearly as per accorded in [2] (2:275). Thus, the practice of trading must be implemented wisely. The terms – no reward without risk, effort, and the benefit must be accompanied with liability (see [13] and [15]) – must be accorded as the goods are significantly expensive and to be used in the longer term (such as properties). Meanwhile, this term is by right not restricted to the CB as she is lending out the money to the debtors. Even if the housing project is abandoned, the debtors must pay back the debt to the CB as the house in contract, does not belong to the CB.

Thus, the Islamic scholars have proposed the more humanize MMP replacing the controversial BBA / Murabahah practicing in this country. The concept of MMP means in sharing the properties by two parts, namely the IB and the debtors. Of course, when the good held is defective, both parts must bear the loss. Therefore, it is prominent to investigate the behavior of the defectiveness of goods held before committing into this facility. In this case, the good is the incomplete house to be held and the defectiveness is the abandoned housing project. It is noble for the bank to bear the loss due to the abandoned housing project as per said in [2] (2:280)

“And if the debtor is in hard time, then grant him time till it is easy for him to repay, but if you remit it by way of charity, that is better for you if you did but know”

However, this paper explained rationally why the Islamic bank finds difficulties in bearing the loss. The high risk of abandoned housing project may result in unwilling of the bank to take an extra effort to proceed a legal action to the developers due to loss suffering by the bank. This expenditure should also be taken into consideration in determining the profit / rental rate so that the bank will be expectedly earning the profit in the long term. As per shown in Fig. 5, if it is deserved for the bank to be borne the loss of abandoned housing project, the bank has the right to increase the rental rates, not to accord the house price index as per recommended by [13] and [15]. However, constructing the rental rates indices according to the geographical factor, as stated by them, is strongly recommended with condition that, the rental rate must also take account for the factor of this risk.

Finally, as the difficulties of the trading of housing development in selling the complete project here, the bank should lead into constructing the decrement table due to the abandoned housing project happening in this country. The innovation of constructing this decrement table should be extensively done and deserved the involvement not only from the financial institutions, but also from the Ministry of Housing and Local Government (for instance) which provides the information of the abandoned housing project. Otherwise, the government must strictly rule the method of selling the properties practiced by the developers.

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