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Assessing the gold Murabahah in Islamic banking

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Abstract
Purpose – This paper analyzes the gold Murabahah contract, which tends to be very popular in the Indonesian Islamic banking industry. As the contract is very sensitive to the gold price movement and speculative motive, a comprehensive assessment is done to assess the behavior of the gold price movement, behavior of the investors and the limits of the gold Murabahah contract. It proposes recommendations to manage the gold Murabahah contract and to mitigate its potential risks.

Design/methodology/approach – The paper examines the gold price, termination of contract and limitation of the amount of funds in the gold Murabahah transactions by using quantitative formulas, such as variance, expected prices and probability of occurrence. In addition, it includes a qualitative analysis of the historical pattern of daily gold prices in the past 12 years. As such, a combination of both approaches generates a comprehensive analysis and recommendations to policymakers, Islamic bankers and investors.

Findings – It finds some interesting outcomes with regard to the behavior of gold prices, behavior of investors regarding the gold Murabahah contract and intention of investors to terminate gold Murabahah contracts prior to their maturity date. Such outcomes become the material for the policy recommendations of the paper. Particularly, it proposes the margin of the Murabahah gold contract, tenor of the contract, down payment and a review of the base gold Murabahah regulation to manage the gold Murabahah contract and to mitigate risks.

Research limitations/implications – The paper does not consider macroeconomic variables such as inflation, exchange rate and economic growth which may affect the movement of the world’s gold prices. It does not examine the gold Murabahah contract in other countries, as it is believed that the gold Murabahah contract is very popular only in the Indonesian Islamic banking industry.

Originality/value – To the best of the author’s knowledge, this is the first paper examines the gold Murabahah contract in relation to the Indonesian Islamic banking industry.

Keywords Murabahah, Down payment, Gold

Paper type Research paper

1. Background
Murabahah is, in fact, the dominant Islamic contract in Islamic banking besides Mudarabah, Musharakah and Ijarah. It is a sales contract between the bank and its client for the sale of an asset or some assets with an agreed margin (profit) for the bank. Practically, a Murabahah contract involves the purchase of an asset by the bank to be sold to the client at an agreed mark-up with usually a deferred payment basis (Antonio, 1999). Such a contract captures around 60-80 per cent of the total Islamic bank financing, as it:

• generates a pre-determined profit (margin);
• is less risky than other financing; and
• applies to short- to medium-term trade-based financing.
The same as other countries with an Islamic banking industry, Murabahah financing in the Indonesian Islamic banking industry is the most favored form of Islamic financing. As per February 2012, such a contract dominates 56.24 per cent of the total Islamic financing, followed by Mudarabah financing (18.54 per cent) and Musharakah financing (9.76 per cent) (Ismail, 2011). Furthermore, the types of assets financed with Murabahah financing are usually working capital assets, such as machines, vehicles and small buildings (shops) (Bank Indonesia, 2011a; 2011b).

However, in late 2010, there was a new Murabahah contract, namely, a gold Murabahah endorsed by the Indonesian National Sharia Board (DSN) (National Sharia Board, 2010). It is a Murabahah contract which allows Islamic banks to finance gold trading with a margin (profit) for the bank and on a deferred payment basis. In fact, the gold Murabahah is very prospective for several reasons, particularly:

• the increasing trend of the world gold price has encouraged investors to purchase gold;
• gold is a liquid asset tradable in the market; and
• some Islamic scholars and economist believe that gold may protect wealth from inflation or the trend of decreasing value of money (Karim, 2006).

Nevertheless, the gold Murabahah in Islamic banking transactions faces some risks, such as market, liquidity, credit, default and reputation. In general, such risks appear when the price of gold in the market fluctuates and causes losses to investors who purchase gold at a higher price than the current market price. Similarly, when investors bear losses, it then affects the performance of Islamic banks in the form of credit risk, liquidity risk, default risk and reputation risk (Ayub, 2007).

Despite the issue of permissibility of the gold Murabahah in Sharia (Islamic law), the paper attempts to analyze the behavior of gold prices as the most determinant factor for investors to purchase gold including the gold Murabahah and the behavior of gold investors in purchasing or selling their gold Murabahah, in the case of the Indonesian Islamic banking industry. At the end, it proposes some recommendations to regulate the gold Murabahah contract in the Islamic banking industry. Particularly, it aims to maintain the robust performance of the Indonesian Islamic banking industry, to mitigate risks of the gold Murabahah and to secure the implementation of the gold Murabahah in the operation of Islamic banks.

The following sections will elaborate:

• the underlying finance theory related to the probability of occurrence and expected prices of gold;
• the analysis of gold Murabahah financing in Islamic banking; and
• regulating gold Murabahah.

In particular, specific analyses are conducted with regard to:

• the pattern of the historical gold price;
• expected price of gold and probability of occurrence;
• risk of gold price fluctuation; and
• the behavior of investors to terminate the gold Murabahah prior to its maturity date.

2. Underlying finance theory

2.1 Probability of occurrence and expected price

Gold investors should make some estimation before putting funds in gold. Particularly, this relates to the expected price of gold and probability of occurrence. Such estimations benefit investors, in that they know the future price of gold, the behavior of gold prices and the time to purchase gold. Investors investing in gold should consider the future price of gold, probability of the gold price and the current position of the gold price, otherwise the investment may face market risk or even risk having losses.

Technically, the transactions of the gold Murabahah involves the on the spot price of purchasing gold and expected price of gold due to the volatility gold prices in the market. Mathematically, the expected price of an asset such as gold can be formulated as (Benninga, 2000):

\[ E(V_t) = r_{t+1}(V_{t+1}) \]

where \( E(V_t) \) stands for the expected price of gold in the certain period; \( r_{t+1} \) is the probability of occurrence of the gold price in the certain period, and \( (V_{t+1}) \) is the price of gold in the next period. The probability of occurrence is determined by constructing intervals and locating prices in the intervals based on certain divisions.

For example, in an observed period, the highest price of gold is \( b \) and the lowest one is \( a \). Then, the difference between the highest and the lowest price of gold or \( (x) \) is divided into four intervals of gold prices. Such four intervals is determined in order to capture the behavior of gold prices which will then be responded to by investors before and after purchasing gold under a Murabahah scheme. Assuming \( y \) is the actual prices of gold spreading in each interval, the formula of each interval is as written in the following:

\[
\begin{align*}
\text{Interval 1: } & y_1 < (a + x / 4) \\
\text{Interval 2: } & (a + x / 4) < y_2 < (a + x / 2) \\
\text{Interval 3: } & (a + x / 2) < y_3 < (a + 3x / 4) \\
\text{Interval 4: } & y_4 > (a + 3x / 4)
\end{align*}
\]

As such, in one interval there are gold prices \( (y_t) \) and together with other prices \( (y_1 + y_2 \ldots + y_4) \) from other intervals, they become a basis on which to count the probability of occurrence of gold prices in a certain interval. Later, the probability of occurrence of a gold price in a certain interval is another basis to compute expected price of gold in a certain period. The formulas of the probability of occurrence per interval and expected price of gold are written as:
Probability of interval 1: \[ r_1 = \frac{y_1}{\sum_{t=1}^{t=4} y_t}; \] thus its expected price is, \[ E(V_1) = \left(\frac{y_1}{\sum_{t=1}^{t=4} y_t}\right) V_1 \] (2)

Probability of interval 2: \[ \frac{y_2}{\sum_{t=1}^{t=4} y_t}; \] thus its expected price is, \[ E(V_2) = \left(\frac{y_2}{\sum_{t=1}^{t=4} y_t}\right) V_2 \] (3)

Probability of interval 3: \[ \frac{y_3}{\sum_{t=1}^{t=4} y_t}; \] thus its expected price is, \[ E(V_3) = \left(\frac{y_3}{\sum_{t=1}^{t=4} y_t}\right) V_3 \] (4)

Probability of interval 4: \[ \frac{y_4}{\sum_{t=1}^{t=4} y_t}; \] thus its expected price is, \[ E(V_4) = \left(\frac{y_4}{\sum_{t=1}^{t=4} y_t}\right) V_4 \] (5)

2.2 Risk of gold price volatility
By assessing the expected price of gold, the risk of gold price volatility is identified, which is a variance between actual price of gold and expected price of gold multiplied by the probability of occurrence. The general formula of risk applied to measure the gold price volatility is (Fiedler, 2000):

\[ (Var_r) = r_d[(V_t - (EV_{t+1})] \text{ or } (Var_r) = \left[\frac{y_1}{\sum_{t=1}^{t=4} y_t}\right] V_t - \left(\frac{y_1}{\sum_{t=1}^{t=4} y_t}\right) V \] (6)

The high variance (high risk) means a high gold price volatility, while the low variance (low risk) means a low gold price volatility. Normal investors prefer low variance, as they seek for low risk, while speculative investors love high variance, as they look for a high price margin from a very volatile gold price in the market.

2.3 Termination and maximum limit of gold Murabahah
After analyzing the patterns and behavior of the gold prices in the market, the Murabahah contract including gold Murabahah tends to follow such patterns and behaviors. Hence, for an Islamic bank which has a gold Murabahah financing facility, it may face some risks related to the gold Murabahah contract, such as delivery, early termination, default, market and product.

Among those risks, early termination risk is the most important one that needs to be anticipated by Islamic banks and banking regulators (Ahmed, 2000). Particularly, the early termination risk is a risk happening prior to the maturity date of the gold Murabahah contract. This occurs if the gold price in the market exceeds the initial price of gold in the Murabahah contract when it is first agreed upon.
If the initial price of gold is named Po and price of gold Murabahah is Pt with margin r, then the next price of gold is formulated as:

$$P_t = rP_0$$  \hspace{1cm} (7)

Then, with a monthly installment of (It), the gold Murabahah is determined by subtracting the down payment (D) from Pt and divided by the installment period (t) or:

$$I_t = \sum_{t=1}^{T} \frac{(P_t - D)}{t}$$  \hspace{1cm} (8)

In this case, the debtor has a chance to terminate the gold Murabahah prior to its maturity date if the future price of gold is higher than the current market price or (Pt+1) > (Pt).

However, with regard to the maximum limit of the gold Murabahah contract, it can be simulated with two possible scenarios of maximum gold Murabahah financing or (Mo) which are maximum Rp250 million and Rp150 million per debtor (Bank Indonesia, 2011a; 2011b). First, with these scenarios, the debtor is assumed to be maximizing his/her maximum gold Murabahah transaction (Mo) every month (N) until the optimum level is where the value of transaction reaches its maximum level or formulated as:

$$M = \frac{M_0}{n} \text{ or } N \sum_{n=1}^{n} p_n = M_0$$  \hspace{1cm} (9)

Second, in the beginning of each month, there is a possibility for debtors to terminate the gold Murabahah contracts prior to their maturity date, especially if the price of gold in the market is higher than the original price of gold in the Murabahah contract. As such, the total amount of the early termination of the gold Murabahah under both scenarios is formulated as:

$$M_t = (p_1n_1) + (p_2n_2) + (p_3n_3) + \ldots + (p_tn_t)$$  \hspace{1cm} (10)

where p stands for a price of gold in a certain month, n is the number of gold being purchased and Mt is either M with the maximum limit of Rp250 million per debtor or Rp150 million per debtor.

3. Analysis of the gold Murabahah financing in Islamic banking

3.1 Historical price of gold

The daily movement of gold prices in the past 12 years has shown an increasing trend and volatility (Figure 1). However, there were three periods where the price of gold was relatively stable, increasing and fluctuating. As such, the paper divides the historical daily prices of gold into three periods, namely:

- (1) the period where prices of gold was relatively stable (January 1999-September 2004);
- (2) the period where prices of gold tended to move up (September 2004-May 2011);
- and
- (3) the period where prices of gold was volatile (May 2011-February 2012).
This division is for analyzing the gold price behavior during stable, increasing and volatile periods.

The first period is noted by the average price of gold below USD400/ounce and the low volatility of gold prices in the past 6 years. The second period occurs in the case when the price of gold moved up from the lowest price of USD402/ounce (10 September 2004) to USD1563/ounce (29 April 2011), and the last period is noted when the price of gold kept rising up to USD1900/ounce followed by a very high volatility. Besides identifying the behavior of gold prices, these three periods can be a benchmark for decision-making, especially during periods of stable, increasing and volatile gold prices.

### 3.2 Probability of occurrence and expected price

The output of applying the equations (1)-(5), above to the three periods of gold prices (stable, increasing and volatile), can be seen in Table I. Interestingly, in the period when gold prices were stable, the highest probability of occurrence (53 per cent) was found if the gold prices were below USD296/ounce. This means that during a stable period, the gold price tends to go down. However, in the period when the gold price inflated (increasing period), there were two high probability of occurrences. The first one was in the gold price of less than USD693/ounce (the probability of 44 per cent), and the second one was in the gold price between USD693/ounce and USD983/ounce (the probability of 30 per cent). These outputs reveal that when the price of gold

<table>
<thead>
<tr>
<th>Price interval Harga and probability per period</th>
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<tbody>
<tr>
<td>Stable Probability of occurrence</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>$&lt; 296$</td>
</tr>
<tr>
<td>296-339</td>
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<tr>
<td>339-383</td>
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<td>$&gt; 383$</td>
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![Figure 1. Historical pattern of gold prices](image)
increased, it did not automatically keep increasing or it might moderately move up or down.

Then, in the period when the price of gold was very volatile, the highest probability of occurrences occurred in three cases. Those cases were if the price of gold was:

1. between USD1591/ounce and USD1694/ounce (the probability of 34 per cent);
2. between USD1694/ounce and USD1797/ounce (the probability of 32 per cent); and
3. less than USD1591/ounce (the probability of 25 per cent).

These facts inform that when the price of gold fluctuated, they could be equally up or down with relatively equal opportunities.

In general, the analysis of the gold price behavior in the three periods above delivers some important messages with regard to the probability of occurrence of future prices, which are:

- When the price of gold is stable, the next price tends to decrease or stand in the lower position than the existing one. Hence, from the investors (the gold Murabahah investors) point of view, investing funds in gold, when the price is stable, will not be really profitable.

- When the price of gold is increasing, the next price will go up (maximally 10.78 per cent) or will moderately go down.

- Finally, when the price of gold is volatile in the high position, the next price will inflate modestly with the maximum inflation of 3.35 per cent.

Based on the analysis of the probability of occurrence, the expected price of gold of those three price intervals can be estimated. By applying the previous equations (2)-(5), the expected price of gold in the stable, increasing and volatile periods is explained in Figures 2, 3 and, 4 below:

Figures 2–5 identify important findings confirming the previous one, which are:

- When the price of gold is stable and suddenly goes up unexpectedly (not persistently), the expected price of gold is low. It is because the investors are not sure if the next price will increase or decrease as it happens unintentionally (Figure 2).

- When the price of gold go up persistently, the expected price of gold also rises because the investors have been assured and have adjusted their (short-term) price expectation from the low level into the higher one. However, in a certain level when the price of gold (are believed) has reached its highest level, such a high expectation of gold price will then rebound. It is because the investors believe that the increasing trend of gold price will not always increase persistently in a very long time (Figure 3).

- Finally, when the price of gold is volatile in its high level, the expected price of gold tends to be stable (moderately). It is because investors wait and see the next pattern of the gold price (Figure 4).

3.3 The risk of gold price fluctuation

Continuing the previous exercises of historical prices, probability of occurrence and expected price of gold, this sub section counts the risk of gold price movement for three
periods (stable, increasing, volatile). By using equation (6), the assessment on risk is figured in Figures 5–7 in the following. Besides confirming the previous finding, the figures inform some interesting facts as a result of combining both the actual and expected price of gold, which are:

- When the price of gold is stable, the risk of price fluctuation remains very low. Even, the increase of the gold price in the modest magnitude will not automatically increase the risk of price fluctuation (Figure 5).
Figure 4. Expected price (volatile period)

Figure 5. Risk of gold price (stable period)
However, when the price of gold inflates persistently, the risk of price fluctuation goes along with such an inflation. Nevertheless, the risk of price fluctuation will then go down when such a persistent increase of gold prices has been maximized (top of the threshold) (Figure 6).

There is same finding in the increasing trend of gold price, when the price is volatile in the high level, the risk of price fluctuation tends to be moderately stable (Figure 7).

3.4 Termination of the gold Murabahah
After exercising and knowing the behavior of gold prices, four simulations are conducted to assess the possibility of investors’ termination of the gold *Murabahah* contract prior to its maturity date. Applying equations (7) and (8), the four simulations are determined for the cases if:

1. *Murabahah* margin of 20 per cent, down payment 20 per cent and installment period of 1 year (12 months).
2. *Murabahah* margin of 30 per cent, down payment 20 per cent and installment period of 1 year (12 months).
3. *Murabahah* margin of 20 per cent, down payment 20 per cent and installment period of 2 years (24 months).
4. *Murabahah* margin of 40 per cent, down payment 20 per cent and installment period of 2 years (24 months).

![Figure 6. Risk of gold price (increasing period)](image-url)
Simulation (1) is based on the Murabahah practices in the Indonesian Islamic banks in which the Murabahah margin is 20 per cent and the same as the down payment. This contract applies for one year (12 months). The second one (Simulation 2) attempts to assess the possibility if the Murabahah margin is raised to 30 per cent with the same down payment and installment period as in Simulation (1). The results of the Simulations (1) and (2) are drafted in Figure 8.

However, Simulation (3) is still based on the Murabahah practices in the Indonesian Islamic banks with the Murabahah margin of 20 per cent and the same as down payment but with the installment period of two years (24 months). Finally, the last one (Simulation 4) attempts to assess the possibility if the Murabahah margin is raised to 40 per cent with the same down payment and installment period as Simulation (3). The results of Simulations (3) and (4) are drafted in Figure 9.

Further, the period in Figures 8 and 9 is divided by stable, increasing and volatile periods to recognize the period where the termination occurs frequently or not frequently. The four simulations (Figures 8 and 9) explain that:

- Down payment determines the share of investors’ funds to be invested in the gold Murabahah. If the gold Murabahah transactions need to be restricted, down payment should be raised and vice versa. As such, down payment is one of the tools for the banking regulator to manage the gold Murabahah transactions in Islamic banks.

- The high Murabahah margin (for example, 30 or 40 per cent) could lower the probability of investors to terminate their gold Murabahah contract prior to its maturity date than the low Murabahah margin, for example, 20 per cent. It is
because the frequency of termination in the high Murabahah margin is lower than the one in the lower Murabahah margin (Figures 8 and 9). Hence, this finding can be used by Islamic banks to mitigate such an early termination and banking regulators to limit the gold Murabahah activities.

- The possibility of having a higher gold price than the current price is higher in the increasing period of gold prices, as indicated previously and in this gold Murabahah termination assessment. This fact can lead investors of the gold Murabahah to end their contract unilaterally (Figures 8 and 9). For the banking regulation, the most effective time to maintain and restrict the gold Murabahah activities is during the increasing period of gold prices.

- The longer the tenor of the gold Murabahah contract (for example, 2 years), the higher the possibility for gold Murabahah investors to unilaterally end the contract, especially when the price of gold is the increasing trend (Figure 9).

- When the price of gold tends to go up, the banking regulator raises the margin of the gold Murabahah or at least set it at an appropriate level followed by shortening the tenor of the gold Murabahah contract. Such strategy may mitigate the frequency of the gold Murabahah termination because the possibility of the new gold price to exceed its initial price is controlled by the Murabahah margin. In addition, the advantage of terminating is minimized by the short-term tenor of the gold Murabahah.
3.5 Maximum amount of the gold Murabahah per investors

The final assessment is to determine the maximum amount of the gold Murabahah per investor. As stated previously, two possible scenarios of maximum amount of gold Murabahah financing are set, which are maximally Rp250 million and Rp150 million per investor. By applying equations (9) and (10), Figures 10 and 11 deliver the result of the simulations.

The assessment informs that the lesser the maximum amount of the gold Murabahah transaction per investor, the lesser the frequency of the gold Murabahah termination prior to its maturity date. This fact supports and reconfirms the previous finding, especially related to the tenor of the gold Murabahah, margin of Murabahah, etc. Further, the combination of minimizing the limit of the maximum amount of gold Murabahah per investor and the short tenor of the gold Murabahah contract may limit the frequency of early termination compared to a higher limit of maximum amount of the gold Murabahah with a long tenor.

4. Regulating the gold Murabahah

Finally, referring to the outputs of all assessments, particularly the behavior of gold prices and investors of the gold Murabahah, scenarios of early termination and maximum amounts of gold Murabahah transactions per investors, the paper recommends some points below:

1. The regulation for gold the Murabahah transaction should not be fixed (permanent), but it needs to be reviewed regularly based on the trend (pattern) of...
the gold prices. The regulation for the gold Murabahah contract might be different in the cases of stable, increasing and volatile periods of gold prices.

2. The key variables to manage the gold Murabahah transactions and mitigate risk of early termination are:
   - margin of the gold Murabahah contract, as it determines the possibility and frequency of terminating the gold Murabahah contract prior to its maturity date;
   - tenor of the gold Murabahah contract, as it controls the intention of investors to short the gold; and
   - down payment as it can manage the amount of the gold Murabahah, frequency of transactions and unilateral termination of the gold Murabahah contract.

5. Conclusion
The gold Murabahah is a new trend in Indonesian Islamic banking transactions. It has become very interesting since the price of gold has increased since 2006 and Islamic banks offer the gold Murabahah contract to investors. However, such a contract needs to be analyzed and managed, particularly as it depends on the movement of gold price. The paper conducts a comprehensive analysis on the behavior of gold price, investors and proposes regulations to mitigate and manage gold Murabahah transactions. Among all, arranging appropriate tenor, down payment, the Murabahah margin and maximum amount of gold Murabahah are proposed as key indicators to manage the gold Murabahah transactions in the Islamic banking industry.
Glossary of Arabic words

**Ijarah:** A mode of financing, by way of hire-purchase, adopted by Islamic banks. It is a contract under which the Islamic bank finances equipment, building or other facilities for the client against an agreed rental together with a unilateral undertaking by the bank or the client that at the end of the lease period, the ownership in the asset would be transferred to the lessee. The undertaking or the promise does not become an integral part of the lease contract to make it conditional. The rental and the purchase price are fixed in such a manner that the bank gets back its principal sum along with some profit, which is usually determined in advance.

**Mudarabah:** This is an agreement between two parties, one provides 100 per cent of the capital for a venture and the other, known as the *Mudarib*, manages the venture using his/her skills. Profits from the project are distributed according to a pre-agreed ratio. Losses are borne only by the provider of the capital while the *Mudarib* looses his/her time, effort, and the chance for a reward. Management is provided by the *Mudarib* only. The *Mudarib* does not share the loss for the simple reason being in Islam, one cannot loose what they did not contribute. This is one of the most common modes of Islamic financing.

**Murabahah:** A contract of sale between the bank and its client for the sale of goods at a price plus an agreed profit margin for the bank. The contract
involves the purchase of goods by the bank which then sells them to the client at an agreed mark-up. Repayment is usually in installments.

*Musharakah:* It is a mutual consent business contract to share profits and losses in the joint business. Islamic bank (central bank) and enterprise (investors) provides funds together. Any profit will be distributed among partners in pre-agreed ratios and loss will be borne by every partner in proportion to respective capital contributions.

*Sharia:* The term Sharia refers to divine guidance as given by the Holy Qur’an and the *Sunnah* of the Prophet Muhammad and embodies all aspects of the Islamic faith, including beliefs and practice.

**References**


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