Central bank Islamic monetary instruments: a theoretical approach

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Abstract

Purpose – The purpose of this paper is to propose the Islamic monetary instruments as an Islamic approach for the central banking monetary operation. It is assumed that the central bank may not deal with the uncertain return of the project (asset) and its ultimate monetary policy target is to stabilize the economy by utilizing the excess (idle) liquidity in the economy. This theoretical study benefits the central bank from the assessment of the usage of every proposed Islamic monetary instrument with respected to the monetary operation purposes.

Design/methodology/approach – The paper exercises four feasible Islamic monetary instruments based on the characteristics of Sharia contract which suit the nature of the current central banking monetary operation. Every instrument is elaborated mathematically to analyze its monetary impact and the possible reaction of depositors. Finally, the paper suggests the deterministic factors to successfully offer such Islamic instruments.

Findings – The exercises find the unique operation of every Islamic monetary instrument. Based on the monetary impact of each instrument, the central bank can now have an alternative monetary policy based on the Sharia principles and operation.

Research limitations/implications – The paper has so far found the feasibility of four Islamic monetary instruments. There might be other Islamic monetary instruments which can be viable to be exercised.

Originality/value – To the best of the author’s knowledge, this is the first paper trying to exercise the alternative of the Islamic instruments for monetary operation.

Keywords Net present value, Islam, Securities, Financial instruments, Central banks

Paper type Conceptual paper

1. Background

Islamic economics as a new field in the modern economic science recognizes not only the principles and operations of Islamic commercial banks but also central bank as the monetary and economic authority. Amongst all, the main functions of a central bank in Islam are to maintain price stability and prosperity of the whole people (Chapra, 1985). Although it seems indifferent with the conventional concept of central bank, the Islamic central bank conducts its monetary operation by using Islamic monetary instruments which are free from interest, links with the business sector activities and gives value added into the economy (Mills and Presley, 1999).

In the Sharia point of view, there are a number of Islamic contracts that are feasible to be exercised as the Islamic monetary instruments. But, their operations must link with the real project(s)/asset(s) in the real sector. However, the conventional economic view of monetary operation stipulates that monetary contraction/expansion may not directly link with the real projects or business activities (Rabin, 2004). Liquidity contraction, for instance, is done by selling central bank monetary instruments (securities) under money market mechanism which do not represent any project or asset in the real sector.
This contradiction is one of the main constrains of applying the Islamic contracts in the institution namely central bank.

Nevertheless, the progressive development of the Islamic banking industry demands the appropriate Islamic monetary instruments to control the industry and economy in general. In fact, some countries like Malaysia, Pakistan and Sudan, which lead the implementation of Islamic banking, have launched some Islamic monetary instruments to manage the liquidity. For example, there are Government Investment Issues (Rosly, 2005), Bank Negara Malaysia (BNM) sukuk murabahah/tawarruq short-term securities and BNM commodity murabahah acceptance (Aziz, 2007). However, those instruments are operated under bay al-innah and tawarruq contracts which are debatable contracts among Islamic scholars and the majority of them declare such contract as prohibited (Mansoori, 2010).

Actually, the central bank can use interest-free statutory reserve requirement (SRR) to control liquidity which is acceptable in Sharia. Nonetheless, concerning that Islamic monetary instruments should ideally deal with specific projects/assets in the real sector while liquidity in SRR is idle (unutilized), SRR is not considered as an ideal Islamic monetary instrument.

As such, this paper tries to find more feasible Islamic monetary instruments concerning the current operation and limitation of the interest-based central bank. First of all, assuming that the major motivations of depositors are earning profits or owning profitable projects (assets), the central bank has to offer and design the instruments which match such depositors’ intensions. Second, the assessment considers the flow of incomes (returns) to the depositors, maturity date, depositors’ valuation, etc. The most important one is the effectiveness of the instruments to conduct the monetary operation. Finally, the paper figures out the usages (benefits) of every Islamic contract to be occupied as the Islamic monetary instrument. Hence, the central bank can now have an alternative monetary policy based on the Sharia principles and operations.

2. General assumptions

The paper sets some assumptions with respect to the central banking operation, intentions of depositors to invest monies in the monetary instruments and tenor of the Islamic contracts. First, the international practices of central bank require that it may not deal with the pure investment activities rather it may only hold the excess liquidity until the end period of conventional monetary instruments. On the other hand, the Islamic concept allows the central bank to actively utilize the idle liquidity either in investment contracts or debt contracts (Chapra, 1985). Hence, taking into account that a central bank is not a commercial institution, functions as monetary authority to control the economy and can use its power to make use of the idle liquidity, the most possible underlying Islamic contracts are Wakalah (agency), Musharakah and Islamic securitization followed by Ijarah contract that can provide a continuous, positive and predetermined payment of returns to depositors.

The second assumption relates to the depositors’ intention of depositing monies in the financial institution. The 100 years’ implementation of the capitalist system has created a profit/return-oriented investment in the public perception. Indeed, central bank may not ignore this fact by paying investment return in line with managing liquidity in the economy. But, such return should be really coming from the real output of economic activities. There are two intentions of depositors employed in this paper:
(1) the intention to receive a routine payment of the returns (cash flow preference) and the reversal of the principal at the end of the investment period; and
(2) the intention to own the prospective/profitable projects (assets preference).

Hence, the study particularly proposes four Islamic monetary instruments under combinations of *Wakalah wa Ijarah* (agency and leasing) contracts, *Musharakah mutanaqisah wa Ijarah* (diminishing partnership and leasing) contracts and Islamic securitization *wa Ijarah* contracts. Every contract in the combination works independently (do not depend on each other) as it is considered as *gharar* (uncertain) in *Sharia* (Bakar and Ali, 2008).

The proposed instruments work as monetary policy tools to absorb/expand liquidity from/to the economy without totally breaking the international central banking practices and at the same time match the investors’ intention of investment in the Islamic monetary instruments. However, unlike the conventional monetary tools, the ultimate mission of the Islamic ones is to activate the economic activities with the idle funds as stated above. In the operation of Islamic monetary instruments, there is no monetary compensation (fiat money creation) unless it is coming from the output (returns/incomes) of the real business activities (Chapra, 1985).

The third assumption is the short-term tenor of the Islamic monetary instruments. It is because the nature of monetary policy is for a short-term target. Moreover, it realized that it might not be possible for the central bank to issue a long-term Islamic monetary instrument (such as long-term investment certificate) while currently the monetary operation is usually arranged for a short-term basis (monthly, quarterly, etc.). Hence, the assumption of a short-term placement of the funds seems very reasonable to reflect the stance of the present monetary policy.

The final assumption is that the central bank operates in a dual banking system and the main monetary policy is still determined by interest system. Therefore, there is a possibility for some depositors, who position investment return from Islamic and conventional instruments indifferently, to compare the return of Islamic monetary instruments with the one from interest-based instruments. Moreover, because the operation of Islamic monetary instruments is to complement the existing conventional monetary instruments, such depositors’ behavior is sensible and should be anticipated by the central bank.

### 3. Islamic monetary instruments

#### 3.1 Instruments with a routine payment of returns

The instruments are offered to depositors who prefer cash flow profit to owning prospective project (physical asset preference). For this purpose, the central bank issues Islamic monetary certificates of:

- *Wakalah wa Ijarah* (agency and leasing); and
- *Wakalah wa Ijarah Muntahia Bitamlik* (agency and leasing – sale).

As of the definition of *Wakalah*, the central bank will receive fixed and predetermined fees from depositors (the employer). And, based on *Ijarah* concept, the central bank in these two certificates will receive the funds from depositors (monetary contraction) and buy a leasable asset for them in order to be leased to the third party with a certain rental rate in an agreed period (Mirakhor and Iqbal, 2007).
The holders of certificates, on the other hand, will get a regular payment of returns which come from the returns of a leasing asset. Finally, at the end of the period, the holders of *Wakalah wa Ijarah* certificate will get the principal of certificate based on the end (market) value of the asset when it is sold by the bank. Meanwhile, the holders of *Wakalah wa Ijarah Muntahia Bitamlik* certificate will receive the regular installment of the principal from the beginning until the end of the contract together with the payment of the regular returns of a leasing asset.

In fact, in order to be more effective and efficient, central bank can cooperate with the government when utilizing the funds. For example, the provider (seller) of a leasable asset is government. With this, the funds can be used by the government to finance state projects. Another alternative, the leasable asset is the one needed by state projects so that government is the lessee (third party) of the asset. These strategies would optimize the operation of Islamic monetary policy.

Central bank *Wakalah wa Ijarah* certificate. Initially, the issuance of certificate by the central bank subtracts $X$ amount of funds from the investors for certain years to buy a leasable asset which will pay them a monthly return ($R_d$). To make it more attractive to investors, variable rental rates can be applied:

- the initial rental rate ($R_i$); and
- the adjusted rental rate ($R_a$).

It is because *Ijarah* rate (leasing rate) in *Sharia* can be changed during the leasing period if both parties (lessee and lessor) agree for it. The former ($R_i$) refers to the current market rental rate and the latter ($R_a$) refers to the future market rental rate, thus $R_a$ can be less or more than $R_i$ ($R_a < R_i$ or $R_a > R_i$). This strategy would benefit both parties (lessee and lessor) but the evaluation date of rental rate is stated in the date of the lease agreement to avoid any dispute or uncertainty.

Investors on the other hand also have to pay fixed agency fees of $C_t$ per month to the central bank. Assuming that the costs of issuance and acquiring the leasable asset (administration cost, agency cost, etc.) are insignificant and being borne by the issuer, $X$ is fully used to buy an asset with the same value. Investors also cannot add more (new) funds in their investment ($X$) until the end of the certificate period because $X$ has been transformed into a leasable asset.

Central bank in the next stage leases the asset under operating lease agreement with the third party for a period of $t$ months (short-term periods). And, the variable rental rates are ($R_a$ and $R_i$) decided based on the value of asset or $R_iX$ and $R_aX$ where $R$ is in percentage. Hence, assuming that the asset works well and does not cause any significant maintenance cost, the holders of certificate receive the monthly payment ($y_{it}$) of:

$$y_{it} = \left(\frac{R_iX}{t_i}\right) - C_t \quad \text{and} \quad y_{at} = \left(\frac{R_aX}{t_a}\right) - C_t$$

$t_i$ is the period of $R_i$ and $t_a$ is the period of $R_a$. By using the symbols of:

- $X_e$ as the end value of $X$ at the end of rental period where $X_e < X$;
- $k = 1$ until $t_i$ as the accumulation of rental payments with initial rental rate;
- $m = 1$ until $t_a$ as the accumulation of rental payments with adjusted rental rate; and
- $n$ as the accumulation of costs, the future values of investment ($Y_t$) at the end of investment period is:
\[ Y_t = X_e + \left[ \left( \frac{R_i X}{t_i} \right)_{k=1}^t + \left( \frac{R_a X}{t_a} \right)_{m=1}^t \right] - C_1 - \cdots - C_n \] 

or:

\[ Y_t = X_e + \left[ \sum_{k=1}^t \frac{R_i X}{t_i} + \sum_{m=1}^t \frac{R_a X}{t_a} \right] - \sum_{n=1}^t C_t \] 

The formulas highlight that the productivity of this instrument to manage the unused public liquidity is determined by:

- \( X \) as how much excess liquidity needs to be absorbed from the economy.
- \( R \) as how attractive is (in terms of rate and amount) the rental rate in the view of investors and lessee.
- \( C \) as how much fixed fees charges by the central bank.
- \( t \) as how long is the short-term period of Islamic monetary instrument.

Meanwhile, as mentioned before, the depositors may evaluate the performance of such Islamic instrument by comparing it with the interest rate returns. Equation (3) as the final output of Islamic investment needs to be adjusted with the interest rate to find its present values (PV). If the PV exceed the initial investment, the depositors will accept the offer and vice versa. However, if the net present values (NPV) are the same as the initial investment (called internal rate of return (IRR)) investors are indifferent with it[1].

Assuming that the interest rate of deposit is \( r \) (fixed) and equals with the tenor of the Islamic contract, the PV of this Islamic investment is computed as:

\[ PV = \frac{X_e}{(1 + r)} + \sum_{k=1}^t \frac{R_i X}{t_i} \cdot \left( 1 + \frac{r}{t_i} \right)^k + \sum_{m=1}^t \frac{R_a X}{t_a} \cdot \left( 1 + \frac{r}{t_a} \right)^m - \sum_{n=1}^t C_t \cdot \left( 1 + \frac{r}{t} \right)^n \]  

Equation (4) composes of:

- the PV of the repayment of principal;
- the PV of total monthly incomes during the initial and adjustment period; and
- the PV of the total fixed fees.

Hence, the NPV occur if:

\[ NPV = PV - X \]  

The minimum performance of the instrument is if the NPV = 0 or \( X = PV \) or called IRR (Benninga, 2000). As such, to make it marketable, NPV should be more than 0 or \( NPV \geq 0 \). Assuming[2]:

\[ \sum_{k=1}^t \frac{1}{t_i(1 + (r/t_i))^k} = PVF_i; \quad \sum_{m=1}^t \frac{1}{t_a(1 + (r/t_a))^m} = PVF_a \quad \text{and} \]

\[ \sum_{n=1}^t \frac{1}{(1 + (r/t))^n} = PVF_c, \]
One of the keys for the central bank to have a positive NPV is by \( R_i \) and \( R_a \) to be:

\[
R_i(PVF_i) + R_a(PVF_a) > \frac{C_t(PVF_c)}{X} + \frac{X_e}{X(1+r)} + 1
\]

(see Appendix 1 for the derivation) \( (6) \)

Whilst, for the purpose of monetary policy, the value of \( X \) should be decided as:

\[
X > \frac{C_t(PVF_c) - (X_e/(1+r))}{[R_i(PVF_i) + R_a(PVF_a) - 1]} \tag{7}
\]

Equations (6) and (7) suggest that interest rate, agency fees and total initial and end values of investment stand as the deterministic factors of the attractive variable rental rates of an \( Ijarah \) asset. With regard to monetary operation under dual economic system, when the central bank cut the interest rate, it will help the operation of this Islamic monetary instrument because the variable returns are higher than before.

To give a simple illustration, let us assume that the contract is valid for one year and both initial and adjusted periods apply for six months subsequently. When, annual interest rate is 10 percent, the total future values and PV of the depositors become:

\[
Y = X_e + \left[ \sum_{k=1}^{l_i} \left( \frac{R_i X}{2} \right) + \sum_{m=1}^{l_a} \left( \frac{R_a X}{2} \right) \right] - \sum_{n=1}^{f=12} C_t
\]

\[
PV = \left( \frac{X_e}{(1 + 0.1)} \right) + \left[ \sum_{k=1}^{l_i} \left( \frac{(R_i X)/2}{(1 + 0.05)^k} \right) + \sum_{m=1}^{l_a} \left( \frac{(R_a X)/2}{(1 + 0.05)^m} \right) \right] - \left[ \sum_{n=1}^{f=12} \left( \frac{C_t}{(1 + 0.008)^n} \right) \right]
\]

By netting the PV with the initial investment (NPV) and following assumptions of \( PVF_i, PVF_a \) and \( PVF_c \), the marketable certificate applies if:

\[
R_i(PVF_i) + R_a(PVF_a) > \frac{C_t(PVF_c)}{X} + \frac{X_e}{1.1X} + 1
\]

And, how much \( X \) is to be absorbed based on:

\[
X > \frac{C_t(PVF_c) - (X_e(1.1))}{[R_i(PVF_i) + R_a(PVF_a) - 1]}
\]

Central bank Wakalah wa Ijarah muntahia bitamlik certificate. The construction of the formula in this certificate is almost similar with the former one. The issuance of the \( Wakalah wa ijarah muntahia bitamlik \) contracts \( X \) amount of the public funds for certain years and promises to remunerate a monthly return (\( R_d \)). The variable rental rates are offered: the initial rental rate (\( R_i \)) and; the adjusted rental rate (\( R_a \)) with the same scenarios and purposes as the previous certificate. Next, investors compensate fixed agency fees of \( C_t \) per month to the central bank and the costs of issuance and acquiring the leasable asset are borne by the issuer. There is no additional fund except the initial one stated in the certificate.
However, the different mechanism with the former certificate is that the leasing agreement with the third party uses financing lease for a period of $t$ months (short-term periods). Besides the payments of variable rental rates ($R_a$ and $R_i$) based on the value of asset ($R_iX$ and $R_aX$), there is periodical payments of the initial value of investment ($X$) along the period of the contract. Hence, with the same assumptions of the performance of a leasable asset as above, the depositors receive the monthly payment ($y_i$) of:

$$y_{it} = \left( \frac{X}{t} \right) + \left( \frac{R_iX}{t_i} \right) - C_t \quad \text{and} \quad y_{at} = \left( \frac{X}{t} \right) + \left( \frac{R_aX}{t_a} \right) - C_t$$  \hspace{1cm} (12)

At the end of investment period, the future values of investment ($Y_t$) are ($h$ is the accumulation of periodical payments of initial value of investment):

$$Y_t = \left[ \frac{X}{t} + \cdots + \frac{X}{t_h} \right] + \left[ \frac{R_iX}{t_i} + \cdots + \frac{R_iX}{t_i} \right]$$

$$+ \left[ \frac{R_aX}{t_a} + \cdots + \frac{R_aX}{t_a} \right] - C_1 - \cdots - C_n$$  \hspace{1cm} (13)

$$Y_t = \sum_{h=1}^{t} \left( \frac{X}{t} \right) + \sum_{k=1}^{t_i} \left( \frac{R_iX}{t_i} \right) + \sum_{m=1}^{t_a} \left( \frac{R_aX}{t_a} \right) - \sum_{n=1}^{t} C_t$$  \hspace{1cm} (14)

The equation (14) stresses that the productivity of this instrument as the second alternative of Islamic monetary instrument is determined by:

- $X$ as how much excess liquidity needs to be absorb from the economy.
- $R$ as how attractive is (in terms of rate and amount) the rental rate in the view of investors and lessee.
- $C$ as how much fixed fees charges by the central bank.
- $t$ as how long is the short-term period.
- How often is the installment of $X$ (initial investment).

Like the former instrument, the investors judge it against the interest rate returns. Thus, with the same circumstances of interest rate as the first instrument, the NPV of this second exercise are:

$$PV = \sum_{h=1}^{t} \frac{X/t}{(1 + (r/t))^h} + \sum_{k=1}^{t_i} \left( \frac{(R_iX)/t_i}{(1 + (r/t_i))^h} \right) + \sum_{m=1}^{t_a} \left( \frac{(R_aX)/t_a}{(1 + (r/t_a))^m} \right) - \sum_{n=1}^{t} \frac{C_t}{(1 + (r/t))^n}$$  \hspace{1cm} (15)

Equation (15) presents:

- the PV of the installments of principal;
- the PV of total monthly incomes during initial and adjustment periods; and
- the PV of the total fixed fees.
Further, by using the same assumptions of PVF above, the positive NPV occurs if:

\[ R_i(PVF_i) + R_a(PVF_a) > \frac{C_t(PVF_c)}{X} - (PVF_c) + 1 \]

(see Appendix 2 for the derivation)

Whilst, for the purpose of monetary policy, the value of \( X \) should be decided as:

\[ X > \frac{C_t(PVF_c)}{[(PVF_c) + R_i(PVF_i) + R_a(PVF_a) - 1]} \]

(see Appendix 2 for the derivation)

Unlike equations (6) and (7), the roles of agency costs and the installments of investment are very important besides interest rate in this instrument. Whilst the cutting interest rate will make the instrument more attractive and Islamic monetary operation works well, the issuer is also expected to lower the agency cost otherwise it would be difficult to bid a positive NPV.

Let us make the same example as before, the validity of contract is one year and six months subsequent application of the initial and adjustment periods. With 10 percent interest rate, the total future values and PV of the depositors become:

\[ Y = \left[ \sum_{h=1}^{t=12} \left( \frac{X}{12} \right)^h \right] + \left[ \sum_{k=1}^{t=6} \left( \frac{R_iX}{2} \right)^k + \sum_{m=1}^{t=6} \left( \frac{R_aX}{2} \right)^m \right] - \sum_{n=1}^{t=12} C_t \]

\[ PV = \left[ \sum_{h=1}^{12} \left( \frac{X/12}{(1 + 0.008)^h} \right) \right] + \left[ \sum_{k=1}^{t=6} \left( \frac{(R_iX)/2}{(1 + 0.05)^k} \right) + \sum_{m=1}^{t=6} \left( \frac{(R_aX)/2}{(1 + 0.05)^m} \right) \right] \]

\[ - \left[ \sum_{n=1}^{t=12} \left( \frac{C_t}{(1 + 0.008)^n} \right) \right] \]

Then, the attractive variable rental rates (\( R_i \) and \( R_a \)) for investors and how much \( X \) is to be contracted are referred to equations (16) and (17). However, the installments of the principle (besides the other variables identified in equations (10) and (11)) determine the variable rental rates and the initial monetary contraction.

### 3.2 Instruments to possess/securitize a project (asset)

The instruments relate to owning or securitizing a prospective project (asset), namely:

- *Musharakah mutanaqisah wa Ijarah* certificate; and
- *Islamic securitization wa Ijarah* certificate.

For the former, based on definition of *Musharakah*, the central bank and depositors contribute some funds to share the ownership of a project (Mirakhor and Iqbal, 2007). Then *Ijarah* concept states that the project is leased to the third party with a certain rental rate in an agreed period. Referring to the contribution of each party, both parties will divide up the *Ijarah* incomes. Nonetheless, this contract permits one party (the investor) to own the project by giving their *Ijarah* incomes to the central bank to capture the full possession of the project.
Meanwhile, in the latter, the central bank has a prospective asset and sells part of its full ownership of to the investors. The third party will then lease the asset and the rental incomes are shared between investors and central bank based on the portion of ownership. However, unlike the former one, the central bank will release its share of rental incomes to the investors in order to repossess the asset at the end of certificate.

And, like the first two certificates, government can engage in the process. For example, the Musharakah project is the public (state) project or it is the government who hires the project for a certain period. The securitized asset can also be rented by the government or the central bank may purchase the government’s asset before securitizing it to the investors. With these strategies, all parties cooperatively entail in the real business while doing monetary operation.

Central bank Musharakah mutanaqisah wa Ijarah certificate. In this case, the central bank prepares some funds and issues the certificate to get the rest of the funds from investors. The Musharakah contract is then being signed for a project with the value of X available for certain years and the possession of central bank and investors are \((\alpha X)\) and \((1 - \alpha)X\), respectively. \(\alpha\) is a fraction with the value of \(0 < \alpha < 1\). Later, the third party rents the project and pays two kinds of rental charges: the initial rental rate \((R_i)\) and the adjusted rental rate \((R_a)\) in \(t\) periods akin to the previous exercises of two Islamic instruments.

After the project goes on, the central bank and investors receive a regular sharing of rental incomes as \((R_{ct} \text{ and } R_{dt})\) are regular incomes of central bank and investors, respectively:

\[
R_{ct} = \left( \frac{\alpha R_i X}{t_i} \right) \quad \text{and} \quad R_{ct} = \left( \frac{\alpha R_a X}{t_a} \right) \quad \text{(central bank)} \tag{20}
\]

\[
R_{dt} = \left[ \frac{(1 - \alpha)R_i X}{t_i} \right] \quad \text{and} \quad R_{dt} = \left[ \frac{(1 - \alpha)R_a X}{t_a} \right] \quad \text{(depositors)} \tag{21}
\]

Next, instead of taking their sharing, investors give it to the central bank to acquire its Musharakah share (diminishing musharakah). As such, central bank obtains future returns of:

\[
Y_{ct} = \left[ \frac{(1 - \alpha)R_i X}{t_i} \right]_1 + \cdots + \left[ \frac{(1 - \alpha)R_i X}{t_i} \right]_k + \left[ \frac{(1 - \alpha)R_a X}{t_a} \right]_1 + \cdots + \left[ \frac{(1 - \alpha)R_a X}{t_a} \right]_m
\]

or:

\[
Y_{ct} = \sum_{k=1}^{l_i} \left[ \frac{(1 - \alpha)R_i X}{t_i} \right]_k + \sum_{m=1}^{l_a} \left[ \frac{(1 - \alpha)R_a X}{t_a} \right]_m = \alpha X \tag{22}
\]

At the end of \(t\) period, the project belongs to the investors and the central bank receives full amount of the depositors’ regular incomes which equals to its ownership \((\alpha X)\). This process represents the monetary contraction. Then, to successfully market and sale this Islamic monetary instrument, the Ijarah rental rate \((R_i \text{ and } R_a)\) should be determined based on the formula of:

\[
(R_i + R_a) = \frac{\alpha}{(1 - \alpha)} \quad \text{(see Appendix 3 for the derivation)} \tag{24}
\]
For a simple example, let us assume in $t = 1$ year, the portion of central bank’s ownership in a *Musharakah* project is $1/3X$ and depositors is $2/3X$ and $R_i$ and $R_a$ are relevant for six months subsequently. Then, both parties receive a regular sharing of rental incomes as:

$$R_{ct} = \left(\frac{0.33(R_iX)}{2}\right) \quad \text{and} \quad R_{ct} = \left(\frac{0.33R_aX}{2}\right) \quad \text{(central bank)} \quad (25)$$

$$R_{dt} = \left[\frac{0.67R_iX}{2}\right] \quad \text{and} \quad R_{dt} = \left[\frac{0.67R_aX}{2}\right] \quad \text{(depositors)} \quad (26)$$

However, since investors give their regular incomes to the central bank, the future returns of central bank become:

$$Y_{ct} = \sum_{k=1}^{t_i} \left[\left(\frac{0.67R_iX}{2}\right)\right]_k + \sum_{m=1}^{t_a} \left[\left(\frac{0.67R_aX}{2}\right)\right]_m = 0.33X \quad (27)$$

And potential depositors will be interested in buying this certificate if:

$$(R_i + R_a) = \frac{1}{2} \quad (28)$$

*Central bank Islamic securitization wa Ijarah certificate.* This instrument a little bit similar with the *Musharakah mutanaqisah wa Ijarah*, except in this case the central has an asset and wants to share its possession with potential investors. The bank does not prepare some funds instead it collects the depositors’ funds. For example, central bank offers ownership of the asset to potential investors as $\alpha X$ and the rest of them or $(1 - \alpha)X$ still belongs to them ($\alpha$ is a fraction with the value of $0 < \alpha < 1$). After that, both of them agree to let it to the third party with two kinds of rental charges as above: the initial rental rate ($R_i$) and the adjusted rental rate ($R_a$), with $t$ periods of rental.

As initiated above, the central bank will repossess the asset by releasing its regular incomes to investors in order to take up their possession. This process represents the monetary expansion. Hence, first of all, the regular incomes of investors ($R_d$) and central bank ($R_c$) which comes from the *Ijarah* rental payment are:

$$R_{dt} = \left(\frac{\alpha R_iX}{t_i}\right) \quad \text{and} \quad R_{dt} = \left(\frac{\alpha R_aX}{t_a}\right) \quad \text{(depositors)} \quad (29)$$

$$R_{ct} = \left[\frac{(1 - \alpha)R_iX}{t_i}\right] \quad \text{and} \quad R_{ct} = \left[\frac{(1 - \alpha)R_aX}{t_a}\right] \quad \text{(central bank)} \quad (30)$$

Then, the central bank keeps forwarding its regular incomes to the holders of the certificate such that:

$$Y_{dt} = \left[\left(\frac{(1 - \alpha)R_iX}{t_i}\right)\right]_1 + \cdots + \left(\frac{(1 - \alpha)R_iX}{t_i}\right)_k$$

$$+ \left[\left(\frac{(1 - \alpha)R_aX}{t_a}\right)\right]_1 + \cdots + \left(\frac{(1 - \alpha)R_aX}{t_a}\right)_m \quad (31)$$
or:

\[
Y_{dt} = \sum_{k=1}^{t_i} \left[ \frac{(1 - \alpha) R_i X}{t_i} \right]_k + \sum_{m=1}^{t_a} \left[ \frac{(1 - \alpha) R_a X}{t_a} \right]_m = \alpha X \quad (32)
\]

Later on, the central bank will fully rehold the asset whilst the investors receive full amount of the central bank’s regular incomes which equals to its ownership (\(\alpha X\)). This is actually the opposite of the \textit{Musharakah Mutanaqisah wa Ijarah} certificate. The \textit{Ijarah} rental rate (\(R_i\) and \(R_a\)) are then decided in the same way as \textit{Musharakah wa Ijarah}, based on the formula of:

\[
(R_i + R_a) = \frac{\alpha}{(1 - \alpha)} \quad \text{(see Appendix 3 for the derivation)} \quad (33)
\]

Nevertheless, unlike the \textit{Musharakah Mutanaqisah wa Ijarah}, investors in this case may compare their total returns with the conventional returns by discounting them as in the cases of the earliest two instrument. Because of that, the PV of their total incomes become:

\[
PV = \left(\frac{(1 - \alpha) R_i X}{1 - (r/t_i)}\right)_1 + \sum_{k=1}^{t_i} \left(\frac{(1 - \alpha) R_i X}{1 - (r/t_i)^k}\right)_k \quad (34)
\]

\[
PV = \sum_{k=1}^{t_i} \left(\frac{(1 - \alpha) R_i X}{1 - (r/t_i)^k}\right)_k + \sum_{m=1}^{t_a} \left(\frac{(1 - \alpha) R_a X}{1 - (r/t_a)^m}\right)_m \quad (35)
\]

The decision of potential investors to accept/refuse the offer depends on the NPV which are equation (35) minus the initial investment or \(\alpha X\) as in the formula below:

\[
R_i(PVF_i) + R_a(PVF_a) > \frac{\alpha}{(1 - \alpha)} \quad \text{(see Appendix 4 for the derivation)} \quad (36)
\]

The instance can refer to the former case (equations (25)–(27)) where the ownership of the central bank and depositors in an asset is 1/3X and 2/3X, respectively; \(R_i\) and \(R_a\) are relevant for six months. Then, regular incomes of the central bank (\(R_c\)) are:

\[
R_{ct} = \left(\frac{0.33 R_i X}{2}\right) \quad \text{and} \quad R_{ct} = \left(\frac{0.33 R_a X}{2}\right) \quad \text{(central bank)} \quad (37)
\]

Because central bank releases such regular incomes to the depositors, the future returns of depositors (\(Y_d\)) become:

\[
Y_{dt} = \sum_{k=1}^{t_i} \left[ \frac{0.33 R_i X}{2} \right]_k + \sum_{m=1}^{t_a} \left[ \frac{0.33 R_a X}{2} \right]_m = 0.67 X \quad (38)
\]

As being considered in equations (34) and (35), the rational investors’ drag the PV of equation (38) based on annual interest rate of 10 percent, such that:
And the attractive returns \((R_i + R_a)\) for depositors are the condition when:

\[
R_i(PVF_i) + R_a(PVF_a) > \frac{1}{2}
\]  

Equation (40) reveals the important role of the ratio of ownership of an asset and the level of conventional interest rate for depositors to evaluate this Islamic monetary instrument. If central bank reduces the interest rate, the incomes from variable rental rates turn into bigger than before and make the central bank easy to accomplish the contract.

4. Utility of every Islamic monetary instrument

This part comprises the utility of every proposed Islamic monetary instrument from the perspective of monetary operation (Table I). First of all is *Wakalah wa Ijarah* certificate. The principal of the certificate represent the monetary contraction, the purchasing of an asset, payment of the returns and repayment of the principal to investors at the end of the contract period are the monetary expansion. Nonetheless, the payment date of every commitment is different and such gap is the benefit for the bank to handle a short-term liquidity spike (a sudden excess liquidity) in the economy. Indeed, the main purpose of this Islamic monetary instrument is to utilize the idle funds (preventing money hoarding) rather than rejecting/injecting the liquidity in a certain period of time. This is the different way of Islamic monetary policy approach compared with the conventional approach.

Second, is *Wakalah wa Ijarah Muntahia Bitamlik* certificate. Almost the same as the first one, the absorption of the principal value of the certificate is the monetary contraction, whilst the purchasing of the asset, payment of the returns as well as repayment of the principal to depositors in the on going period of the certificate contract are the monetary expansion. Compared with the first certificate, despite its function to utilize idle liquidity, this instrument leave a bigger expansionary impact since the regular payment to depositors include payment of regular incomes and the installment of principal. Nevertheless, this instrument causes a relocation of the ownership of the asset from depositors into the third party (lessee). As mentioned earlier, if the government is the lessee of such asset which supports the economic development, such transfer is essential and beneficial in the fiscal/monetary operation.

The third one is *Musharakah Mutanaqisah wa Ijarah* certificate. The share of the investors in a project is the monetary contraction while the spending to set up a project is the expansion one. One of the advantages of this instrument is that the central bank can set the level of alpha \((\alpha)\) as the level of how much liquidity is to be taken from the economy. Compared with the first two Islamic certificates, this instrument truly can functions optimally as liquidity absorber because the holders of certificate do not take their regular incomes from the central bank. Even, the government gets benefit of becoming the lessee of the project.

The last one is Islamic securitization *wa Ijarah* certificate. Like the *Musharakah Mutanaqisah wa Ijarah*, the share of investors in an asset is the monetary contraction but there is an initial expansionary impact when the central bank buys the asset. The other expansionary impact is when the central bank releases its regular incomes from *Ijarah*. 

---

\[
PV = \sum_{k=1}^{t_i=6} \left[ \frac{(0.33R_iX)/2}{(1 - 0.05)^k} \right] + \sum_{m=1}^{t_a=6} \left[ \frac{(0.33R_aX)/2}{(1 - 0.05)^m} \right] = 0.67X 
\]

(39)
<table>
<thead>
<tr>
<th>Islamic monetary instruments</th>
<th>Monetary expansion</th>
<th>Monetary contraction</th>
<th>End owner of asset/project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wakalah wa Ijarah</strong></td>
<td>$X_t + \left[ \sum_{k=1}^{t} (R_t X_t / t_k) + \sum_{m=1}^{t} (R_m X_t / t_m) \right]$</td>
<td>$X; \sum_{t=1}^{T} C_t$</td>
<td>Buyer of the used leasing asset</td>
</tr>
<tr>
<td><strong>Wakalah wa Ijarah</strong></td>
<td>$\sum_{k=1}^{t} (X_t / t_k)$</td>
<td>$X; \sum_{t=1}^{T} C_t$</td>
<td>Lessee</td>
</tr>
<tr>
<td><strong>Muntahia Bitamlik</strong></td>
<td>$\sum_{l=1}^{t} (R_l X_l / t_l) k + \sum_{m=1}^{t} (R_m X / t_m) m$</td>
<td>$(1 - \alpha) X; \sum_{t=1}^{T} [((1 - \alpha) R_t X_t / t_k)] + \sum_{m=1}^{t} [((1 - \alpha) R_m X / t_m)]$</td>
<td>Depositors</td>
</tr>
<tr>
<td><strong>Musharakah</strong></td>
<td>$\alpha X$</td>
<td>$\alpha X$</td>
<td>Central bank</td>
</tr>
<tr>
<td><strong>mutanaqisah wa Ijarah</strong></td>
<td>$\sum_{l=1}^{t} [((1 - \alpha) R_l X_l / t_l) k] + \sum_{m=1}^{t} [((1 - \alpha) R_m X / t_m) m]$</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Islamic securitization</strong></td>
<td>$R_o X / t_n m$</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>wa Ijarah</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table I. Monetary impact of the Islamic monetary instruments
to depositors in order to repossess the asset. The accurate time management between the contraction and expansion of this instrument benefits the central bank to control the impact of a short-term excess liquidity. Another benefit is that the central bank uses its belonging to control the liquidity and does not lose it at the end of certificate period.

5. Conclusion

Based on the Islamic values, the Islamic monetary instruments can contribute to stabilize the economy. Rather than reserving the excess liquidity, the Islamic monetary instruments employ and use it in the real business activities and share the outputs (incomes) based the contribution of every party. In this paper, the central bank has four different options of Islamic monetary instruments depending on the target of the Islamic monetary operation. However, unlike the conventional monetary operation, the Islamic monetary operation does not create extra liquidity (fiat money creation) rather it activates the economic activities by utilizing the unused (excess liquidity) in the economy.

In its implementation, every Islamic monetary instrument has the monetary expansion and monetary contraction impacts as its purposes are to utilize the idle funds (activate the economy), generate the return on investment and manage the liquidity in a certain period of time. To choose the suitable Islamic monetary instrument, the central bank has to have the accurate time management between the monetary contraction and monetary expansion in the specific economic condition of excess liquidity or liquidity shortage.

Finally, as mentioned in the earlier part of the paper, the main challenge/constrain of applying these proposed Islamic monetary instruments is the conventional monetary operation which does not require central bank to use the project/asset-based monetary instrument. On the other hand, Sharia stipulates that every Islamic financial contract should link with the real business activities including these proposed Islamic monetary instruments.

Notes
1. The investors are rational and position the Islamic and non-Islamic investment indifferently.
2. PVF is a PV factor.

References


**Appendix 1**
Starting from the PV or equation (4), where:

\[ PV = \frac{X_e}{(1 + r)} + \left[ \sum_{k=1}^{t} \frac{(R_eX)/t_i}{(1 + (r/t_i))^{k}} + \sum_{m=1}^{t_a} \frac{(R_aX)/t_a}{(1 + (r/t_a))^m} \right] - \sum_{n=1}^{t} \frac{C_t}{(1 + (r/t))^n}, \]

if NPV > 0,

then:

\[ \frac{X_e}{(1 + r)} + \left[ \sum_{k=1}^{t} \frac{(R_eX)(1)}{t_i(1 + (r/t_i))^{k}} + \sum_{m=1}^{t_a} \frac{(R_aX)(1)}{t_a(1 + (r/t_a))^m} \right] - \sum_{n=1}^{t} \frac{1}{(1 + (r/t))^n} > X, \]

then:

\[ \frac{X_e}{(1 + r)} + (R_eX)(PVF_e) + (R_aX)(PVF_a) - C_t(PVF_c) > X, \]

finally we find:

\[ R_e(PVF_e) + R_a(PVF_a) > \frac{C_t(PVF_c)}{X} + \frac{X_e}{X(1 + r)} + 1 \]

and

\[ X > \frac{C_t(PVF_c) - (X_e/(1 + r))}{[R_e(PVF_e) + R_a(PVF_a) - 1]} \]

**Appendix 2**
The NPV of equation (15) is extended to be:

\[ X\sum_{h=1}^{t} \frac{1}{t_i(1 + (r/t_i))^{h}} + (R_eX)\sum_{k=1}^{t} \left( \frac{1}{t_i(1 + (r/t_i))^{k}} \right) + (R_aX)\sum_{m=1}^{t_a} \left( \frac{1}{t_a(1 + (r/t_a))^m} \right) - C_t\sum_{n=1}^{t} \left( \frac{1}{(1 + (r/t))^n} \right) > X, \]

hence:

\[ X(PVF_e) + (R_eX)(PVF_e) + (R_aX)(PVF_a) - C_t(PVF_c) > X, \]
finally we get:

\[ R_t(PVF_i) + R_d(PVF_a) > \frac{C_t(PVF_e)}{X} - (PVF_s) + 1 \quad \text{and} \]
\[ X > \frac{C_t(PVF_e)}{[(PVF_s) + R_t(PVF_i) + R_d(PVF_a) - 1]} \]

**Appendix 3**

Equations (23) and (32) can be modified to become:

\[ Y_{ct} = t_i \left( \frac{(1 - \alpha)R_s X}{t_i} \right) + t_a \left( \frac{(1 - \alpha)R_a X}{t_a} \right) = \alpha X \]

then:

\[ (1 - \alpha)R_s X + (1 - \alpha)R_a X = \alpha X \]

finally, \( X(1 - \alpha)(R_t + R_a) = \alpha X \) and \( (R_t + R_a) = \alpha/(1 - \alpha) \)

**Appendix 4**

Equation (35) is extended to become:

\[ \sum_{k=1}^{t_i} \left( \frac{(1 - \alpha)R_s X}{t_i} \right) \left( \frac{1}{1 - (r/t_i)^k} \right) + \sum_{m=1}^{t_a} \left( \frac{(1 - \alpha)R_a X}{t_a} \right) \left( \frac{1}{1 - (r/t_a)^m} \right) > \alpha X, \]

then:

\[ (1 - \alpha)R_s X \sum_{k=1}^{t_i} \left( \frac{1}{t_i(1 - (r/t_i)^k)} \right) + (1 - \alpha)R_a X \sum_{m=1}^{t_a} \left( \frac{1}{t_a(1 - (r/t_a)^m)} \right) > \alpha X, \]

then by using the same assumptions of PVF, we modify this to be:

\[ (1 - \alpha)R_s X(PVF_i) + (1 - \alpha)R_a X(PVF_a) > \alpha X, \]

finally:

\[ R_t(PVF_i) + R_d(PVF_a) > \frac{\alpha}{(1 - \alpha)}. \]

**Glossary of Arabic words**

**Bay al-innah.** An agreement between two parties (seller and buyer) to sell an item by installment and buy it back on the spot basis with different princes. Some contemporary scholars deem this practice as an interest back door especially if the item is removed from the transaction then the contract becomes a debt/loan contract with the payment of interest and principal.

**Commodity Murabahah/Tawarruq.** This is the same as bay al-innah except it involves the third party besides the buyer and the seller. As in the case of bay al-innah, some contemporary scholars deem this practice as an interest back door especially if the item is removed from the transaction then the contract becomes a debt/loan contract with the payment of interest and principal.

**Gharar.** Any element of absolute or excessive uncertainty in any business or a contract about the subject of contract or its price, or mere speculative risk. It has the potential to lead to undue
loss to a party and unjustified enrichment of the other, which is prohibited. There are several types of gharar for examples:

- selling goods that the seller cannot deliver;
- selling known or unknown goods against an unknown price;
- selling goods without proper description;
- selling goods without specifying the price;
- making a contract conditional on an unknown event;
- selling goods on the basis of false description;
- selling goods without allowing the buyer the properly examine the goods; and
- combining (depending/interconnecting) two or more contracts in one contract.

**Ijarah.** Sale of a definite usufruct of any asset in exchange of definite reward. It refers to a contract of land leased at a fixed rent payable in cash and also to a mode of financing adopted by Islamic banks.

**Ijara Muntahia Bitamlik.** 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.

**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.

**Musharakah Mutanaqisah.** A type of Musharakah equity participation or investment in an asset where one partner releases his possession of such asset to the Musharakah partner through one time payment or periodical installments based on pre-agreement. At the end one partner does not have ownership in an asset and the other partner fully acquires it.

**Shariah.** The term Shariah 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.

**Wakalah.** A contract of agency in which one person appoints someone else to perform a certain task on his behalf and under specific conditions, usually against a certain fee. Under this concept, agent (for example the central bank) acts as the agent of the investors in completing a particular financial transaction. As such, the central bank will be paid a certain amount of fee for the services it provides.

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