

Profit-Sharing in a Model of Bank Behaviour

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ABSTRACT

The establishment of Islamic banks has brought forward three basic issues. First, there are questions concerning the operation of a banking system which is prohibited from paying and receiving interest rates. Second, there are issues arising from the coexistence of Islamic banks with conventional banks. Third, there is the question of how monetary policy can be expected to operate in an interest-free banking system. These issues have been integrated into a model of bank behaviour which incorporates outputs, inputs, profit-sharing and monetary policy. The results shows competitive interactions between assets and liabilities, and between Islamic banks and conventional banks, so the impact of profit-sharing can be explicitly and directly assessed.

ABSTRAK

Penubuhan bank Islam menghasilkan dua isu asas. Pertama, persoalan berkenaan operasi sistem bank yang tidak dibenarkan membayar dan menerima kadar bunga. Kedua, isu yang timbul daripada kewujudan bersama bank Islam dan bank konvensional. Ketiga, persoalan bagaimana dasar kewangan dijangkakan beroperasi dalam sistem bank tanpa faedah. Isu ini telah digabungkan dalam model kelakuan bank yang mengambil kira output, input, perkongsian untung dan dasar kewangan. Keputusan menunjukkan interaksi yang kompetitif antara aset dan tanggungan, dan antara bank Islam dan bank konvensional. Oleh itu kesan perkongsian untung boleh dinilai secara tersirat dan secara langsung.

INTRODUCTION

The growing establishment of Islamic banks in several Muslim countries and non-Muslim countries, as mentioned by Abdul-Ghafar (1993a), has brought forward two basic issues. First, there are questions concerning the operation of a banking system which

is prohibited from paying and receiving interest rates. Second, how would monetary policy be expected to operate in an interest-free banking system? The first and second issues have been addressed by Mohsin (1982) and Khan and Mirakhor (1987b), respectively. However, a model of bank behaviour which incorporates outputs, inputs, profit-sharing and monetary policy has not been formulated. Therefore, this paper is directed towards that issue.

The discussion will be organised in the following way. Section 2 will deal with a brief discussion on the concept of profit-sharing. Two issues concerning Islamic banks will be discussed in section 3. A simple model of workable Islamic banks will be developed in section 4. The model that will be developed here is a simple one that is able to highlight the principal questions of concern.

THE CONCEPT OF PROFIT-SHARING

In general the operations of an Islamic banking would have the following features. Besides its own shareholder funds, the main sources of funds would be two forms of deposits, that is, demand deposits and investment deposits. Demand deposits are directly related to payment. Although Islamic banks would guarantee the nominal value of the deposits, they would pay no return on these deposits. Investment deposits constitute the main sources of funds for Islamic banks. These deposits enable depositors to participate in Islamic banks' investment rather than fixed and saving deposits. Therefore, depositors would be treated as shareholders and entitled to a share of the profits or losses made by the bank. The distribution of profits or losses has to be agreed on in advance of the transaction between the bank and the depositors and cannot be changed during the life of the contract.

The Islamic banks usually use the profit-sharing method as the main principle in acquiring assets. Two principal methods of financing in profit-sharing are *Mudharabah* (commenda) and *Musyarakah* (partnership). Under the provisions of *mudharabah* excess funds are made available to the borrower to be invested in a productive enterprise in return for a predetermined distribution of the profits earned. Financial losses are borne exclusively by the lender, and the borrower loses only the time and effort invested in the venture.

Under *musyarakah* (partnership), there is more than one contributor of funds. All contributors invest in varying proportions, and the profits (or losses) are shared strictly in relation to their respective capital contribution.

In transactions where profit-sharing is not applicable, other methods of financing can be employed, which include the following. First, *Qard al-Hasanah* (benevolent loans) where these are zero-return loans that make available to those who need them. Commercial banks that provide these loans are permitted to charge the borrower a service charge to cover the administrative costs of handling the loans. This cost should not be related to the amount or the time period of the loans.

Second, *Bai' Bithaman Ajil* (deferred payment sales). This method allows the sale of a good on the basis of deferred payment in instalments or in a lump sum payment. The price of the goods is agreed on between the buyer and the seller at the time of the sale and cannot include any charges for deferring payments.

Third, *Bai' Salam* or *Bai' Salaf* (purchase with deferred delivery). In this method the buyer pays the seller the full negotiated price of goods that the seller promises to deliver at a future date. This method is limited to goods whose quality and quantity can be fully specified at the time the contract is made, such as agricultural and manufactured goods.

Fourth, *Ijarah* (leasing). In this method, a person leases a particular good for a specific sum and a specific period of time. They can also negotiate for lease-purchase of the good, where each payment includes a portion that goes towards the final purchase and transfer of ownership of the goods.

Fifth, *Jo'alah* (service charge). This is a method in which one party undertakes to pay another a specified sum of money as a fee for rendering a specific service in accordance with the terms of the contract negotiated between two parties. This method facilitates activities, such as consultation, fund placements, and trust activities.

In summary, first, the contract between depositors and bank, and bank and borrowers are not limited by the above methods, because under Islamic law the freedom of contracts provides both parties with a flexibility that allows a variety of forms of financial transactions. The law does not constrain the Islamic bank from creating any contractual form as long as it does not include

interest, and both parties are fully informed of the details of the contract. Second, the interaction between assets and liabilities is mainly devoted to profit-sharing.

TWO ISSUES CONCERNING ISLAMIC BANKS

The growing establishment of Islamic banks in the 1980s has brought two broad issues. First, there are questions concerning the operation of a banking system which is prohibited from paying and receiving interest. This issue includes the coexistence of Islamic banks with the conventional banks, except in Pakistan and Iran. Second, there are issues concerning the instruments of monetary policy and how these instruments work in the Islamic banks.

The prohibition of interest means that an Islamic banking system has to develop alternative financial transactions that do not bear predetermined interest rates. This question has been examined by several authors. Mohsin (1982) suggests a clear way out of the interest rate system. The depositors, the shareholders, the borrowers and the banks share the risks and rewards in proportion to the contribution made by each agent. Furthermore, as part of its business activity, the bank may charge commission and fees for the banking and non-banking activities.

In an attempt to structure its assets and liabilities, the bank is subject to the monetary policy imposed by the Central Bank. Given this setting, what should be the instruments of monetary policy? How would monetary policy be expected to operate in an interest-free banking system?

The issues concerning suitable instruments of monetary policy have been addressed recently in a number of papers. For example, Khan and Mirakhor (1987b) examine the implications of introducing a central bank in an Islamic financial system. They suggest that the conventional instruments of monetary policy that would still be available to the Central Bank would be the required reserve requirement, credit control (the maximum limit for the amount that banks can allocate to profit-sharing activities), moral suasion, and the regulation of profit-sharing ratios between banks and depositors and between banks and borrowers.¹ Other conventional instruments, such as open market operations and discounting policy, as pointed out by Akhram Khan (1982) and Siddiqui (1982) are also applicable if they do not bear a fixed rate of return.

Khan and Mirakhor (1987b) also argue that the banking operations will undoubtedly be more varied and complex, as compared to the conventional banking system. The viability and profitability of specific projects being proposed are emphasised, rather than the creditworthiness of the borrower that underlies the conventional banking system. In addition, banks have to consider a different rate of return for each economic project. On the liabilities side, the rate of return on deposits is determined as a proportion of profit. Therefore, the rate of return on deposits should be competitive with the interest rate offered by the conventional banks if the Islamic banks have to coexist with the former.

THE MODEL

The discussion in section 3 shows that the operations of Islamic banks are entirely worked on the basis of profit- and loss-sharing and have to compete with the conventional banks. In addition, Islamic banks are still subject to the same monetary policy. This means that Islamic banks have to adjust their portfolio according to the changes in monetary policy. The purpose of this section is to integrate all the liabilities, assets, profit-sharing and monetary policy constraint aspects of bank behaviour into a unified framework.

JOINTNESS OF PRODUCTION AND PROFITS

Islamic banks are assumed to obtain inputs from n types of liabilities, LI_n : borrowed funds secured through the issuance of i types of deposits, DI_i (demand deposits (CA) and investment deposits (IA)), capital from shareholders (KI) and other liabilities (OLI). The demand deposits are interest free as in the conventional banking system, while for investment deposits, depositors participate in the outcomes of the banks' investment at a rate which is predetermined as a profit- or loss-sharing ratio. The same basis will be used to calculate the return to the equity holders. Then, the liability constraint can be written as

$$\sum_n LI_n = KI + \sum_i DI_i + OLI \quad (1)$$

Funds secured from capital, the issuance of deposits and other liabilities are used to produce four classes of assets: required reserves (*RRI*), *j* types of liquid assets (*LAI_j*), loans (*PIB*) and other assets (*OAI*). The holding of liquid assets and loans includes the holding of excess reserves and provisions of interest-free loans, respectively. Therefore, the equation for the total assets is given by

$$\sum_m AI_m = RRI + \sum_j LAI_j + PIB + OAI \quad (2)$$

Let ρ and τ denote the proportion of the total eligible liabilities (*ELI_k*) allocated to required reserves and liquid assets, respectively. The banks are presumed to have a behaviour pattern such that $PIB + OAI = (1 - \rho - \tau) \sum ELI_k$, where $(1 - \rho - \tau)$ is the marginal propensity to acquire additional loans. Hence, the constraints for each asset can be shown as:

$$RRI = \rho \sum_k ELI_k \quad (3)$$

$$\sum_j LAI_j \geq \tau \sum_k ELI_k \quad (4)$$

$$PIB + OAI = (1 - \rho - \tau) \sum_k ELI_k \quad (5)$$

Equations (1) to (5) can be combined to represent the balance sheet constraint:

$$RRI + \rho \sum_j LAI_j + PIB + OAI = KI + \sum_k ELI_k + OLI \quad (6)$$

In equation (6) *LAI* and *ELI* are defined, respectively as

$$\sum_j LAI_j = VCI + BICB + SCI + GIC + OII \quad (7)$$

and

$$\sum_k ELI_k = \sum_i DI_i + NPI \quad (8)$$

where *VCI* is vault cash, *BICB* is the balance with the Central Bank, *SCI* is stock of commodities, *GIC* is government investment certificates, *OII* is other investments and *NPI* is the total net

payable (the difference between payable amount and receivable amount).

Following Sealey and Lindley (1977), Baltensperger (1980) and Elyasiani (1983) it is assumed that the production of all liabilities and assets can be represented as

$$Q = Q(AI_m, LI_n, I_{m,h}, I_{n,h}) \quad (9)$$

where $I_{m,h}$ and $I_{n,h}$ denote the quantity of input type h employed with asset type m and liability type n , respectively.

From equation (9), product integration becomes an important element when deposits or a combination of deposits and capital are used to produce more than one product. However, banks acquire the right to use their deposits only for as long as owners of deposits allow.

In the banking system, profits and losses are to be shared between bank and depositors, and bank and borrowers according to certain predefined rules. Furthermore, the small-denomination deposits will be invested economically in the large-denomination investment that facilitate under Islamic law. It allows depositors to participate indirectly in large diversified investment in which the return will be shared between bank and depositors. Therefore, the costs of funds depend on the rate of return on banks' loans and investments. From here, the profits function can be written as²

$$\pi = [e_j\tau + e_1(1 - \rho - \tau)]IA - [e_iIA + C(I_{m,h}, I_{n,h})] \quad (10)$$

subject to the technical constraint (9), and the balance sheet constraint (6) and the rate of return from investment (e_j), rate of return from loan (e_l), rate of return on deposits (e_i) which are related as

$$e_i = p_0 e_l \quad (11)$$

$$e_i = p_1 e_j \quad (12)$$

where p_0 and p_1 depend on the percentage ratio that has been determined during the signing of contract.

A MODEL OF ISLAMIC BANK BEHAVIOUR

The aim to be achieved by the equation (10) is to determine the combination of the rate of return on investment/loans and deposits,

and the composition of portfolio that will maximise the return to equity holder. This requires the construction of a model for each component of asset and liability which is the main purpose of this section.

Loan Demand Assume an economy consisting of two classes of agents - entrepreneurs and banks. Entrepreneurs have limited initial endowments and must finance the project by borrowing. For simplicity, suppose there are two types of projects - low-risk (J_1) and high-risk (J_2). There are J_b projects of type b . For any investment $I \in [0, \infty)$, a borrower receives a return of $R(I_b) \equiv Y$ with probability $\delta \equiv (0, 1)$ and a return of zero with probability $1 - \delta_b$, where $\delta_2 > \delta_1$.

The bank is assumed to have no access to monitor the project. This is based on the assumption that a loan is given on the basis of the viability and profitability of a project, (see Khan and Mirakhor (1987b)). The bank offers a contract by specifying a proportion of profits δ_b and a borrowed amount I_b . Thus, the return on loans is given by

$$e_{b,1} = \frac{\delta_b R(I_b)}{I_b} \quad (13)$$

We assume the bank can distinguish among borrowers on the basis of the quality of projects, so each type b borrower receives a distinct loan contract (δ_b, I_b) . When a borrower's project is successful, the bank collects the return $Y(I_b)$. When a borrower's project is unsuccessful, the bank suffers losses which depend on the proportion of loans.

To develop the demand for loans, we assume that borrowers choose the contract which yields the highest expected utility. This expected utility for type b is given by

$$EU_b(R(I_b), I_b) - e_{b,1} I_b \equiv \delta_b [R(I_b) + e_{b,1}] \quad (14)$$

If we assume that the conventional banks offer a loan contract $(P_b, r_{b,1})$, a borrower will choose the Islamic banks if and only if

$$EU_b(R(I_b), I_b) - e_{b,1} I_b \geq EU_b(R(P_b), P_b) - r_{b,1} P_b \quad (15)$$

The number of type- b borrowers who choose the Islamic banks is

$$B_b(I_b, e_{b,1}, P_b, r_{b,1}) \equiv N_b [EU_b(R(I_b), I_b) - EU_b(R(P_b), P_b)] \quad (16)$$

From equations (15) and (16), it can be derived that $\partial B_b/\partial e_{b,1} < 0$, $\partial B_b/\partial I_b > 0$, $\partial B_b/\partial Y > 0$, $\partial B_b/\partial r_{b,1} > 0$, $\partial B_b/\partial P_b < 0$ and $\partial B_b/\partial Y > 0$. Thus, as an Islamic bank makes its loan contract more favourable (lower $e_{b,1}$, and higher I_b) or as a conventional bank makes its loan contract less favourable, the Islamic bank attracts more borrowers. Furthermore, as the income of borrower increases, the demand for loans will increase.

Reserves and Liquid Assets Demands In the basic model, as discussed in Abdul-Ghafar (1993b), the bank's demand for reserves and liquid assets is viewed as part of monetary policy requirements. The bank is assumed to be a price taker in these markets. The bank then maximises the expected utility of profits from this portfolio, subject to the balance sheet constraint. The optimal composition of these portfolio then depends on the own return, substitute return and an exogenous variable.

Formally, let y and x denote the $M \times 1$ and $N \times 1$ vectors of endogenous and exogenous variables, and e_j and e_s denote the own return and substitute return. The system of asset demand equations is

$$y = \alpha_0 + \alpha_1 x + \alpha_2 e_j + \alpha_3 e_s + u \quad (17)$$

where α_i ($i=0, \dots, 3$) are the vector of coefficients. The coefficients of α_1 and α_3 , and α_2 are expected to have positive and negative signs, respectively, and u represents the error terms.

Given the constrained involvement of Islamic bank in the money market and investment avenues for liquid assets, the general thesis of a structural change in the liquid assets/eligible liabilities relationship is certainly limited. This implies a small change in the composition of reserves and liquid assets. It can also be argued that changes in the liquid assets/eligible liabilities relationship will occur marginally, as monetary policy instruments change.

Deposit Supply A two-step decision problem faces the depositor. First, the depositor must choose which bank to use. The relative return of these deposits will be evaluated by the depositor in order to decide where to invest. Second, the depositor must decide how much to invest. Suppose a bank offers a contract specifying the proportion of profits to be allocated to the depositor as p_i and receives an amount of deposit DI_i . The depositor will choose the

deposit amount $DI(p_i)$ to maximise the sum of liquidity benefit $LB(DI_i)$ and the net income of deposits $(e_i - 1)DI_i$, that is

$$DI_i(e_i) = \max_{DI_i} [LB(DI_i) + (e_i - 1)DI_i] \quad (18)$$

Since the liquidity benefit is assumed to be increasing and concave, therefore $LB' > 0$ and $LB'' < 0$, it follows that $DI'(e_i) > 0$.

The maximal utility a depositor obtains when facing a deposit rate e_i can also be represented as

$$EU(e_i) \equiv [LB(DI_i(e_i)) + (e_i - 1)DI_i(e_i)] \quad (19)$$

From equation (19) and the assumption of liquidity benefit, the following condition can be obtained, i.e. $EU'(e_i) = DI'(e_i) > 0$ and $EU''(e_i) = DI''(e_i) > 0$. A depositor chooses the bank that makes $EU(e_i)$ as large as possible. Therefore, the deposit supply function $DI(e_i, r_i)$ for an Islamic bank offering deposit return e_i , when conventional banks are offering deposit rate r_i , is given by

$$DI(e_i, r_i) = DI(e_i)[EU(e_i) - EU(r_i)] \quad (20)$$

From equations (19) and (20), a bank's deposit supply is expected to increase in the own rate e_i and decrease in the rival's rate r_i , and as income increases, the deposit supply will also increase.

Profit and Cost of Funds The deposit return is reflected in the bank's profit from loans and investment. This is based on the contention that the cost of funds is determined by the proportion of profits from investment and loans that will be shared between bank and depositor. This model simply postulates that the deposit return is influenced by the bank's profit. Thus,

$$e_i = f_1(e_1) \quad (21)$$

$$e_i = f_2(e_j) \quad (22)$$

where f_1 and f_2 are determined by the ratio of profit that will be divided between bank and depositors.

In summary, equations (21) and (22) show that any changes in the rate of return on investment and loans will influence the rate of return on deposits.

CONCLUSION

The establishment of Islamic banks has been a dominant theme in Muslim countries and among Islamic economists over the last decade. It is reflected in the increasing number of banks as well as more works published in the literature. As a result, several issues have been raised concerning the credibility of a banking system without interest and the coexistence of Islamic banks with conventional banks. In this paper, the effect of profit-sharing in banking has been examined. Our analyses show: first, competitive interactions between assets and liabilities, and between Islamic banks and conventional banks. Second, the rate of return on investment is determined by market forces, a rise in this return unambiguously raises the depositor's return; while the most likely effect is an increase in the amount of deposits. This result indicates that the higher return on investment is more prone to an expansion in bank credit.

ACKNOWLEDGEMENT

The author gives special thanks to Peter Smith, George McKenzie, Robin Wells, Victor Hung, Roland Craigwell and Yosif Basodan for helpful comments and suggestions. Financial support from the Universiti Kebangsaan Malaysia under grant PCB/93 is fully appreciated.

NOTES

1. The issue of changing the pre-determined profit-sharing ratio is still controversial. Some scholars believe that it would be inappropriate to change a contractually determined ratio while, some scholars argue in favour of regulating the ratio, provided such actions affect only new deposits and loans, see Khan and Mirakhor (1987): 165).
2. Other objectives might exist, such as to achieve social justice and a specific pattern of income and wealth distribution; perhaps this objective is the most easy to identify and other objectives can be identified through the allocation of assets.

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