Comments on Mohsin S. Khan and Abbas Mirakhor, The Financial System and Monetary Policy in an Islamic Economy

Hasan, Zubair

International Islamic University of Malaysia

1991

JKAU: Islamic Econ., **Vol. 3**, pp. 83-91 (1411 A.H./1991 A.D.)

Mohsin S. Khan and Abbas Mirakhor
The Financial System and Monetary Policy in an Islamic Economy, Journal of King Abdulaziz University: Islamic Economics, Vol. **1**, No. **1**, Jeddah (1409/1989)

Comments: Zubair Hasan
Associate Professor
Kulliyah of Economics
International Islamic University
Kuala Lumpur, Malaysia

I. Introduction

'Financial system and monetary policy' is a vast and intricate terrain. Normally, a discussion on the subject is expected to delimitate the financial field, clarify the main policy issues. indicate the various instruments available for use, outline the institutional arrangements. and investigate the linkages of the system with other variables of the economy.(1) Clearly, one could not reasonably hope Mohsin S. Khan and Abbas Mirakhor to attempt such a wide coverage within the time and space confines of an article. However, even in the sub-area of Islamic banking the authors use concepts and employ methods which could only lead them to conclusions of suspect validity. The paper of Khan and Mirakhor is spread over three main sections in addition to the one at the end which contains some broad conclusions of the analysis. In the first two sections, the authors state some of the main features and implications of an interest free banking system. The material they present here is largely a summary(2) of what is already available on the subject in the literature and need not detain us here.

The main argument of Khan and Mirakhor is contained in the third section of their work. Here the authors attempt to present a *theoretical* model in the standard IS-LM tradition. The effects of *monetary* policy(3) on the macro variables of an Islamic economy are explained with the help of the model and the authors arrive at the following conclusions:

i. Whether the monetary authority manipulates the money supply or the *mudarabah* flow of financing as an intermediate policy objective, the impact on the level of national income is the same in each case (p.53).

ii. An expansionary monetary policy would reduce the financial rates of return and increase output in the short run (p.54).

The authors explicitly hold that there is virtually no difference in the way the monetary policy would affect economic variables whether the banking system operates through predetermined interest rates or works through the profit sharing ratios (p. 53).

We may touch upon the appropriateness of these claims later. Presently we shall demonstrate that the source of these claims is a model which suffers from formulative blemishes and structural infirmities.

2. Equality of Rates - Proposition

Following the tradition, Khan and Mirakhor have structured their model on a two-tier *mudarabah* arrangement.(4) First, there is a contract between the banks and the public which ultimately gives the latter a rate of return (r_b) on their investment deposits (D_b). Second, there is a contract between the banks and the entrepreneurs who borrow from the banks. Here the banks eventually get a rate of return (r) on the loans (F_b) they provide to the entrepreneurs.

True, the rate of return (r) the banks receive on loans must in some way be related, as Khan and Mirakhor hold, to the rate (r_b) the banks pay on their liabilities. But here the authors have unwittingly run into some confusion. They assume that the bankers' operating and other costs are zero, and believe that the assumption would make the two rates identical (p.48, also, No. 31). Their exercise largely hinges on this equality of rates presumption. They fail to see that such equality is just not possible under a two-tier *mudarabah* arrangement. We shall show that the inequality $r_b < r$ must invariably hold despite a zero cost assumption.

Unlike Khan and Mirakhor, let us start with a statement for the determination of r. For r_b is a direct function of r, other things remaining the same.

In *mudarabah* the banks assign their resources consisting mostly of investment deposits, to the productive sector by advancing loans to the entrepreneurs In exchange. the banks get from them an agreed proportion (γ) of profits (π) allocable from the total business profit (P) to their contribution (F_b) to the aggregate capital (K) employed in the firm Thus we have:

$$r = \frac{\gamma\pi}{F_b}, \quad 0 < r < 1, \quad \text{and} \quad \pi = P \,.\, F_b / K \geq 0$$

On the other hand, the banks will always share with the borrowers their losses ($\dot{P}$) in the F_b/K proportion Khan and Mirakhor innocuously put $\pi > < 0$ implying that the negative rate of return (r') on (F_b) is also determined by the same formula that determines the positive (r). Obviously this is not the case. It can easily be shown that while (r) is always less than the overall profit rate (P/K) the rate of loss r' on F_b equals the overall rate (P/K) under *mudarabah* arrangements.(5) Thus unlike the position in secular economics, here profit is not in a sense an equal counterpart of loss. We cannot use the same formula to determine the two as the learned authors seem to maintain in line with the secular tradition.

Again, suppose that the depositors are entitled to λ fraction of the profits earned by the banks through the investment of their deposits (D_b) as stated above. Let us also retain the assumptions that the operating and other costs of the banks are zero, that all the investment deposits are fully loaned out i.e. $D_b=F_b$, and that the banks have no other funds to finance their lending operations. The transactions with the central bank are ignored. Given these postulates, the volume of profit banks will share with the depositors will be the same as they received from the entrepreneurs i.e. $\gamma\pi$. This would give us the rate of return banks would pay to the depositors:

$$r_b = \frac{\lambda\gamma\pi}{D_b}, 0 < \lambda < 1, \pi \geq 0,$$

The fraction of losses, if any, the depositors have to bear would be $D_b/D_0 + K_D$) where K_0 represents the net assets of the banks at the beginning of the period.

Since $D_b=F_b$, the two rates (r_b) and (r) may be compared in terms of their numerators only. Obviously,

$$\lambda\gamma\pi < \gamma\pi \quad \text{as} \quad 0 < \lambda < 1$$

and therefore:

$$r_b < r$$

If we relax our assumptions to allow for the operating and other costs and include banks' own resources in addition to (D_b) in the funds banks in fact use for lending, things may become somewhat complicated, but the gap between r_b and r would only tend to widen.(6)

Khan and Mirakhor have treated the bank as a 'no loss on the way' transmission line between the depositors on the one hand, and the entrepreneurs on the other; the former supplying the funds just like the equity holders to the firms. This led them to the belief that r_b=r, and in turn prompted them to erecting their model the way they did. (7) But the misconception the exercise is based on, makes the conclusions deduced there from dubious.

Of course, one may allow for the gap between r_b, and r in the model. But that would need a revision of the whole exercise. One more variable r has to be added to the system requiring some additional equations for its completion.(8) The given set of relationships, even if suitably modified to accommodate the gap. is inadequate and the model must face the problem of indeterminacy.

Furthermore. no less serious is the fact that even if one grants, as a heroic assumption, the equality of the rates i.e. r_b,=r, one may not find it possible to defend the model in its present form. This brings us to the following section.

3. Structural Problems

Khan and Mirakhor follow the comparative static equilibrium technique for purposes of analysis. They specify the relevant sectors of the economy, present a flow of funds accounts table, and spell out some behavioural relationships. Using these building blocks, they design a model which essentially is an extension, with some modifications, of a simple macro economic secular frame. This frame rests on two markets. First, there is a commodity (including services) market where in equilibrium, the savings (S) and investment (I) must equate. Investment is assumed to be an exogenous factor and savings are taken as a function of aggregate income (Y) and the rate of interest ($\dot{r}$).

Second is the money market, where the equilibrium condition is that the exogenously given money supply (M) is equal to the demand for money. The demand for money is a function $\phi(\cdot)$ of money income, ($P \cdot Y$ where P is the price level) and ($\dot{r}$) the rate of interest. To simplify matters further, it is assumed that $P \equiv 1$.

Thus, we have a system of two equations:

$$f^1(Y,\dot{r};I) \equiv S(Y,\dot{r}) - I = 0 \qquad \text{(i)}$$

$$f^2(Y,\dot{r};M) \equiv \phi(Y,\dot{r}) - M = 0 \qquad \text{(ii)}$$

where (Y) and ($\dot{r}$) are the endogenous variables and I and M are exogenous as indicated above. Khan and Mirakhor replace the rate of interest by the rate of return on investment (r_b=r). They add two more markets, one in the reserves (Rb) of the banks and the other in their equity shares. They eliminate the latter while solving the model using the Walrasian law (p.51).

We may observe that one can get the same results as the authors ultimately obtain (pp.52-53) from merely the first four equations of the model given the equilibrium conditions they specify in (9), (10) and (11), and the equality between ΔM and ΔD_p (p.52).[9] The remaining part of their structure is therefore, redundant. However, let us meet Khan and Mirakhor on their on ground.

The sort of comparative static model conceived by Khan and Mirakhor is better solved by using the total derivative tool.[10] The authors have however, chosen to employ linear first order difference equations. There is hardly any objection to that, but the difficulty is that their formulations suffer from some serious inaccuracies.

Suppose we have a simple two variables system:

$$a_0 Y = a_1 X_1 + a_2 X_2 \qquad \text{(iii)}$$

where, Y, X_1 and X_2 are some variables and a_0, a_1 and a_2 are respectively their parameters. If X_1 changes by ΔX_1 and X_2 by ΔX_2 during a given period, then it is easy to find that ΔY, the change in Y over the period, is given as:

$$\Delta Y = \frac{a_1 \Delta X_1 + a_2 \Delta X_2}{a_0} \qquad \text{(iv)}$$

And if Y' were the beginning period value and Y" the end period value of the variable, we have:

$$Y'' = Y' + \frac{a_1 \Delta X_1 + a_2 \Delta X_2}{a_0} \qquad \text{(v)}$$

Thus, if one wishes to operate a system in terms of difference equations, as Khan and Mirakhor do, all variables in a relationship must assume the form of differences as in (iv) above. Evidently, the authors have missed the point. Their system gives incongruous results if one verifies the equations by assigning appropriate numerical values to the variables and parameters of the model.[11] The equations, with modifications where needed, are given hereunder. We have used the same number for each equation as in their paper to facilitate comparisons.

1. $\Delta I - \Delta S = -a_1 \Delta r_b - a_2 \Delta Y + a_3 \Delta W_{-1}$
2. $\Delta F_p = -f_1 \Delta r_b + f_2 \Delta W_{-1}$
3. $\Delta F_b = s_1 \Delta r_b - s_2 \Delta r_c$
4. $\Delta D_P = \Delta F_p - (\Delta I - \Delta S)$
5. $\Delta D_P = -(f_1 - a_1)\Delta r_b + a_2 \Delta Y + (f_2 - a_3)\Delta W_{-1}$
7. $(\Delta I - \Delta S) + (\Delta F_b - \Delta F_p) + (\Delta R_b - \Delta R_c) + (\Delta E_c - \Delta E_b) \equiv 0$
11. $\Delta I = \Delta S$
12. $-(f_1 + s_1)\Delta r_b + s_2 \Delta r_c = f_2 \Delta W_{-1}$
13. $-k(f_1 - a_1)\Delta r_b + k a_2 \Delta Y - \Delta R_c = -k(f_2 - a_3)\Delta W_{-1}$
14. $a_1 \Delta r_b + a_2 \Delta Y = a_3 \Delta W_{-1}$
15. $-(f_1 + a_1)\Delta r_b + a_2 \Delta Y = \Delta M - (f_2 - a_3)\Delta W_{-1}$
16. $r''b = r'b + \frac{f_2}{f_1}\Delta W_{-1} \frac{-1}{f_1}\Delta M$
17. $rc'' = r'c + \frac{s_1 f_2}{s_2 f_1}\Delta W_1 - \frac{(f_1 + s_1)}{s_2 f_1}\Delta M$
18. $Y'' = Y' + \frac{a_3 f_1 a_1 f_2}{a_2 f_1}\Delta W_{-1} + \frac{a_1}{a_2 f_1}\Delta M$

One can readily notice that the last three equations are exactly of the same form as equation (v) given earlier. Also, the revised versions of equations (20), (21) and (22) in the paper may be obtained by replacing ΔM by ΔF_b in (16), (17) and (18) above. It may be mentioned that in the flow of funds accounts table (p.49) as also in note 28 (p. 56) I and S must be replaced by ΔI and ΔS to attain compatibility. Our numerical exercise gives consistent results for the revised system.(12)

A constraint of the model clearly is:

$$\Delta M < f_1 r'b - f_2 \Delta W_{-1}$$

This follows from equation (16) if r"b > o as we have maintained in Section 2. Again, if $\Delta M = \Delta W_{-1}$ as assumed in our numerical illustration, the constraint would become:

$$\Delta M < \frac{f_1 r'b}{1 - f_2}$$

4. The Inferences

Clearly one cannot accept at face value the inferences drawn in Khan and Mirakhor based as they are on an untenable equality of rates (rb=r) proposition. Of greater consequence is, however, their replacing of the rate of interest in the secular model by a rate of profit for its Islamization. Indeed, not a few Islamic economists have been attracted to adopt this course either directly or via the sharing of profit ratio, presumably because it makes things (look) so easy. The demand and supply apparatus remains intact in the money market and its linkage with the commodity (and services) market is not disturbed. Simplicity is a virtue, but must be avoided if it tends to become misleading.

In secular economics interest is essentially viewed as a price for parting with liquidity. In contrast, profit is thought of as a reward linked with investment. Unlike the rate of interest, the rate of profit may be negative. The outside limit for the liquidity trap is the zero rate of interest. What this limit will be in the case of a profit rate? "The importance of the liquidity trap stems from its presenting a circumstance under which monetary policy has no effect on the interest rate and thus, on the level of real income" (Dornbusch and Fischer 1987, p.146). Can we erect a parallel proposition for the rate of profit? Is it possible to visualize a situation in which a profit rate could, for such a reason, fail to have any effect on the level of real income? How will the replacement influence the position and shift of the LM curve? Such questions require a more careful investigation than has so far been carried out.

We may specify an investment spending function as:

$$I = \bar{I} - bi, \qquad b > 0$$

where i is the rate of interest and b measures the interest response of investment, I denoting the autonomous investment expenditure. In this relationship rate of interest has presumably a little *direct* influence on the aggregate investment spending decisions. The equation states that the lower rate of interest, the higher is planned in vestment. The

negative relationship signifies that a reduction in the rate of interest increases the profitability of additions to the capital stock, and therefore, leads to a larger rate of planned investment. Profitability in this case tends to increase via the enhanced *leverage* effect (Hasan 1985, pp. 23-24).

The following figure may help clarify the argument further.

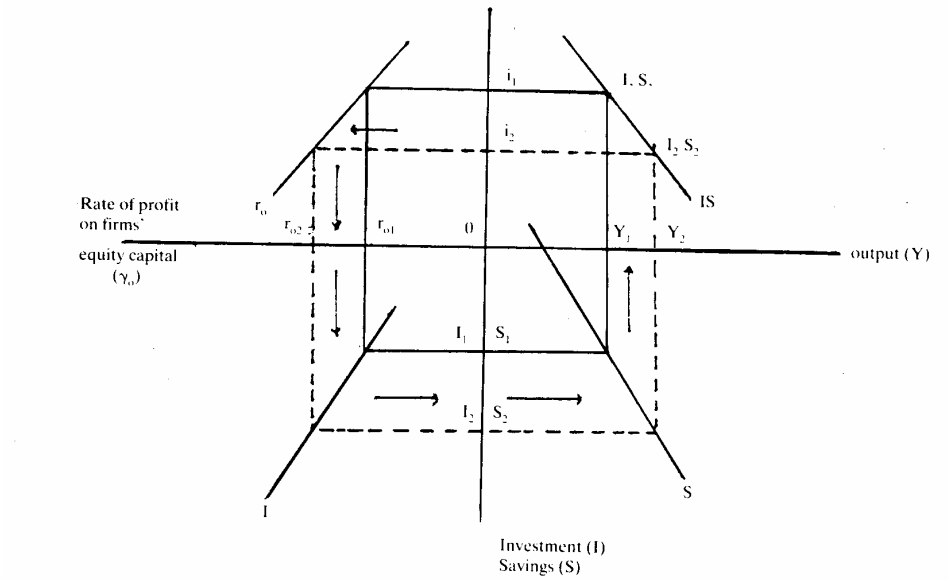

FIG. Showing positive relationship between profit (r_o) and investment (I) via interest (i) in comparative static analysis

Now, Khan and Mirakhor imply to replace in the above diagram the interest rate (i) by the rate of return (r) the banks earn on the loans they give to the firms. But r is, unlike i, an uncertain return, varying directly with the risk estimates. What has the monetary expansion to do with it, unless risk can be shown to vary inversely with such expansion?

Even if one momentarily grants that increase in liquidity would somehow tend to lower r, one cannot presumably be as confident about the extent of the fall as in the case of interest rate. Again, for the firms, interest rate is a *given* cost parameter, which helps in evaluating the effect of varying degrees of leverage on the return of equity, i.e.ro. This role can rarely be performed by an uncertain r. The linkage between r and r_0 θ is not straight, perhaps here we have a case of mutual causation. To overcome the difficulty, Khan and Mirakhor make a crucial assumption that expectations of all the economic agents are realized (p.50). For their model, this may be a necessary but is not a sufficient condition. One must further assume that the expectations of the banks and the entrepreneurs concerning the overall profit rate (P/K) on total investment are *identical* (Hasan 1985, p.17). Without this, the model may defy solution. For, here r_0 θ and r are both *ex ante* concepts locked in a circular relationship (Hasan, No. 3).

5. Conclusions

Khan and Mirakhor have imposed on their model a structure and constraints which lend a tautological character to their exercise.[13] The indiscreet replacement of the rate of interest in the secular model by a profit rate makes their conclusions tentative and questionable. Formulation infirmities have further weakened their position. Still, their work is laudable for it opens up some new areas of investigation in Islamic banking.

Notes

1. For a detailed discussion of these requirements see K.E. Boulding. 1963. pp. 209-213.

2. Indeed, it is a faithful summary avoiding comments or modifications and hardly missing or adding anything of significance.

3. Some find the nomenclature confusing, "for it is the fiscal policy that is primarily concerned, in its quantitative aspects, with the money stock, whereas the so-called monetary policy is mainly concerned with the regulation of certain financial instruments, such as bank loans which are not usually regarded as money" (Boulding 1963, p. 211). It is all the more necessary to clarify the term when Islamic norms are also brought in.

4. One of the first candid explanations is found in M.N. Siddiqi (l978).

5. Since $\bar{h} = P.F_b / K, \gamma\bar{h} / F_b = \gamma P / K$ or $\gamma\hat{r}$ where $\hat{r} = P / K.$ Given o < Y <1 we must have the profit rate available to the banks on loans r < P/K the overall rate of return in business.

   In the case of loss ($\dot{P}$) we have the banks' share of loss $\pi = \dot{P}.F_b / K.$ It gives $\bar{h} / F_b = P / K,$ or $r' = \dot{P} / K$ i.e. the same as in business on the whole. In fact the authors do note the asymmetry in the determination of r and r' (p. 44) but they ignore its implications.

6. The gap between the earned and distributable profits of the banks would increase because the latter will be calculated, to quote the authors, "by setting off administrative expenses, provision for taxes and reserves, and payments due to the central and other banks in respect of the financing provided by them, from total profits" (p.42).

7. Khan and Mirakhor vividly maintain the distinction between equity and investment deposits in the Islamic banking, emphasizing even some of the crucial differences between the two (p.43). Even so, they are swayed by the similarities of the variable returns and non-guarantee of the nominal value in both cases, and set up r_b=r for their model. This allows them to merge the savings of banks and depositors into S for the economy in equation (1) of their model and fix them both.

8. For example, two crucial modifications are
   (l-S) = $-aa_0r_b - a_1r - a_2Y + a_3W_{-1}$ (equation 1, p.50)
   $\Delta D_p = a_0\Delta r_b + a_1r\Delta Y - (f_1 - a_1)\Delta r + (f_2 - a_3)\Delta W_{-1}$ (equation 5, p.51).

9. From our different equations, (or the original ones) multiply (1) by f_1, (2) by a_1 and take their difference to find ΔY. Likewise, multiply (1) by s_l and (3) by f_1 add to get Δrc. Last, add (1) and (2) and solve by substituting the value of ΔY (already obtained) to get Δr_b. Notice that in the structure de signed by Khan and Mirakhor, we must eventually have, in passing from one state of equilibrium to another:

$$\Delta F_b = \Delta F_p = \Delta D_b = \Delta D_p = \Delta M$$

Combining equations (4), (9) and (11) of the model (see appendix) one can easily show:

$$\Delta M = \Delta F_b$$

This must, of necessity lead to identical results whether the Central Bank manipulates M or F_b. It follows, as the authors put it themselves, from the balance sheet equation of the financial system in a closed economy (p.53).

10. As an illustration, one may see the solution of the above type, two equations system in Mukharji and Pandit, 1982. pp. 213-217.

11. We may take the following arbitrary values at the beginning of the period, the system being in equilibrium.

$Y = 8000$	$W_{-1} = 2500$	$f_1 = 1250$
$D_p = D_b = M = 1000$	$r_b = r = 0.20$	$f_2 = 0.5$
$F_p = F_b = 1000$	$r_c = 0.25$	$s_1 = 10{,}000$
$E_b = E_c = 200$	$a_1 = 2000$	$s_2 = 4000$
$R_b = R_c = 100$	$a_2 = 0.15$	$k = 0.10$
$I = S = 850$	$a_3 = 0.64$	

12. The verifications are done by assuming that:

$I = - a_1 r_b + B_1 W_{-1}$ $(B_1 = 0.5)$
$S = a_2 Y - B_1 W_{-1}$ $(B_2 = 0.14)$
$s_3 = B_1 + B_2$ and and $\Delta W_{-1} = \Delta M$

Now assuming that the monetary authority increases the money supply by 100 i.e. $\Delta M = 100$ we find in equilibrium:
$\Delta r_b = -04$, $\Delta r_c = -0.125$, $\Delta = 960$, $\Delta I = \Delta S = 130$
$\Delta R_c = 10$

In the new equilibrium the values of the variables become:

$Y = 8960$	$W_{-1} = 2600$
$D_p = D_b = M = 1100$	$r_b = r = 0.16$
$F_p = F_b = 1100$	$r_c = 0.125$
$E_b = E_c = 300$	
$R_b = R_c = 110$	
$I = S = 980$	

13. The last para in Khan and Mirakhor emphasizes the limitations of the model arising out of their stringent assumption.

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