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Islamic Interest-Free Banking: A Theoretical Analysis*

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Summary

This paper begins by describing the basic concepts of Islamic banking, focusing in particular on the issue of elimination of the rate of interest from the system. Islam expressly prohibits a fixed or predetermined return on financial transactions, but not uncertain rates of return deriving from risk-taking activities. Consequently, a banking structure in which the return for the use of money fluctuates according to actual profits made from it would be consistent with the precepts of Islam. The view that profits are legitimate, even though interest rates are not, has provided the basic foundation for the development and implementation of Islamic banking. In such a system profits and losses are expected to be shared between banks and economic agents according to certain predefined rules. The depositor is treated as if he were a shareholder of the bank and is entitled to a share of the profits made by the bank. He is not, however, guaranteed the nominal value of his deposit, nor a predetermined rate of return on the deposit. The system is symmetric so that if the bank incurs losses, the depositor is expected to share in these as well and the nominal value of his deposit would be reduced. On the other side of the balance sheet the bank is also not permitted to charge a fixed rate of interest on loans, but has to engage in some type of a profit/loss sharing arrangement with borrowers. Broadly speaking, therefore, the Islamic banking system can be regarded as an equity-based, rather than an interest-based, system.

Utilizing this concept of equity participation, a relatively simple theoretical model is developed in this paper to examine the workings of the Islamic banking system. It is shown that the Islamic system may well turn out to be better suited than the interest-based, or traditional,

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banking system in adjusting to shocks that can lead to banking crises. This is because in an equity-based system, shocks to asset positions are immediately absorbed by changes in the nominal values of shares (deposits) held by the public in the bank. Therefore, the real values of assets and liabilities of banks would be equal at all points in time. In the traditional banking system, since the nominal value of deposits is guaranteed, such shocks can cause a divergence between real assets and real liabilities and it is not clear how this disequilibrium would be corrected and how long the process of adjustment would take. The paper concludes that from an economic standpoint the principal difference between the Islamic and the traditional banking systems is not that one allows interest payments and the other does not. The more relevant distinction is that the Islamic system treats deposits as shares and accordingly does not guarantee their nominal value, while in the traditional system such deposits are guaranteed either by the banks or by the government.

I. Introduction

The general resurgence of fundamental Islamic values in many parts of the world has manifested itself on the economic front as well, with a number of countries moving towards the transformation of their economic systems to accord more closely with the precepts and conditions of Islam. The most far-reaching attempts in that direction have taken place in Iran and Pakistan, although this phenomenon can be observed in varying degrees in most Islamic countries; more significantly, the process of Islamization of the economic systems appears to be gaining momentum over time.

This shift towards the institution of an Islamic economic system has generated widespread interest, not only on the part of economists in the countries directly involved, but also in the economics profession at large. The recent outpouring of papers dealing with a variety of aspects of the structure and operation of the Islamic economy attests to the importance being attached to the subject. Whereas until the mid- to late 1970s, writings on the Islamic economic system were relatively scarce, 1/ the picture has changed quite dramatically in the 1980s. In the past four or five years there has been a remarkable increase in the number of papers and books, 2/ conferences and seminars, and even the production of a journal devoted solely to Islamic economics--the "Journal of Research in Islamic Economics".

1/ The most oft-quoted source on the subject is Ahmad (1952). For surveys of the earlier literature see Siddiqi (1980) and Mirakhor (1983).

2/ See, for example, Ahmad (1980) and the papers contained in Ariff (1982), and Ahmad *et al*. (1983).

As this material is still relatively new, considerable misunderstandings still exist as to what Islamic economics is, and how an economic system based on Islamic criteria differs from other types of systems. The popular perception is that it is the concept of an interest-free financial structure that basically characterizes the Islamic economic system, and discussions of the subject often tend to treat Islamic economics and interest-free banking as one and the same thing. Since the elimination of interest is perhaps the most controversial of the policy proposals contained in Islamic economics, and furthermore has typically been the first step in the Islamization of the economy, it is perhaps only natural that this particular issue of an interest-free economy has received most attention. While the elimination of interest is certainly a central tenet of the Islamic economic system, it should be stressed that it is by no means an adequate description of the system as a whole, or for that matter even of Islamic banking.

Broadly speaking, the term "Islamic economics" defines a complete system that prescribes specific patterns of social and economic behavior for all individuals. It deals with a wide-ranging set of issues, such as property rights, the incentive system, allocation of resources, types of economic freedom, the system of economic decision making, and the proper role of the government. 1/ The overriding objective of the system is social justice and specific patterns of income and wealth distribution, and consequently economic policies are to be designed to achieve these ends. Aside from the interest rate issue, Islamic economics also offers fairly precise guidelines on, for example, tax policy, and the orientation of government expenditures. Islamic banking is expected to actively participate in achieving the goals and objectives of an Islamic economy, and consequently is to be conducted "in consonance with the ethos of the value system of Islam," (Ahmad (1984), page 1). Even though the terms Islamic banking and interest-free banking have been used interchangeably, it has been stressed by several writers that the former is a more normative concept while the latter is the actual practice or mode of banking. 2/

Despite the fact that the theory and practice of Islamic banking have been increasingly studied and discussed, the subject still presents a number of puzzles for academics and policymakers alike. Whether a system that forbids the payment or receipt of interest can be viable in a modern-day economy is a question that is often raised by economists, especially those trained in the Western tradition of economics. 3/

1/ See Ahmad (1980) and Naqvi *et al*. (1984). The Islamic system has also been examined in a recent comprehensive paper by Pryor (1985).

2/ Islamic banking is discussed in detail in Qureshi (1967), and Ahmad (1984), as well as in the papers in Ahmad *et al*. (1983) and Ariff (1982). A useful survey is also provided in Karstens (1982).

3/ Pryor (1985), for example, is one who is quite sceptical of the feasibility of such a system.

The writings of Muslim scholars have helped somewhat towards a broader understanding, but there still exists substantial confusion on the main issues. In this paper an attempt is made to answer some of the basic questions that arise by providing a formal analysis of the main features of Islamic banking, using the tools and concepts of modern economics. By doing so it is hoped that the gap between Muslim scholars and the profession at large will be narrowed.

In more specific terms, the paper presents a theoretical model of an interest-free banking system that is considered to be broadly consistent with the principles of Islam. The purpose of the exercise is fourfold: first, to show that the Islamic banking system can be rationalized even in a neoclassical framework. Second, to demonstrate that when cast in this formal way the model underlying Islamic banking is not totally alien to Western economic thinking; indeed it is pointed out that variants of such a system have appeared in the writings of a number of eminent economists, such as Fisher (1945), Simons (1948), and Friedman (1969). Third, to argue that there may be circumstances in which an Islamic banking system would be relatively more stable than the traditional, or interest-based, banking system in the face of certain types of shocks. 1/ Finally, to propose how the Islamic banking system should be implemented in order to maximize its' inherent benefits.

In order to define the scope of the study it is necessary to point out the limitations that have been placed on the analysis. First, we do not attempt to provide a complete and detailed description of Islamic banking, or how it is expected to work in the countries that have adopted such a system. Rather, this paper focuses exclusively on the analytical features of Islamic banking. Second, and following from this, the model developed here is a very simple one that incorporates only those elements of Islamic-type banking that are considered essential to the argument. While it is not intended to be a fully realistic representation of the complete Islamic banking system, the model nevertheless is able to highlight the principal issues of concern. Last, the paper does not try to imply that the Islamic system is always more stable, or that the traditional banking systems are necessarily unstable; all it suggests is that there may be situations when an Islamic system can adjust relatively faster to shocks than would the traditional system.

The remainder of the paper proceeds as follows: in Section II we briefly describe the background for the policy of elimination of interest in an Islamic economy, and how such an economy is expected to operate. This discussion sets the stage for the formulation of the model in Section III. In this section the dynamic properties of the model are examined

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1/ Stability here is defined in the strict mathematical sense, rather than as a general description of the state of the world. The latter interpretation is adopted, for example, by Zarqa (1983).

under the assumptions of both fixed and flexible prices. It is shown here that the results do not depend on what is assumed about prices, or more generally, turn out to be equally applicable whether one has a Keynesian or a classical view of how the economy works. The concluding section brings together the main findings of the exercise and attempts to draw some policy implications.

II. General Aspects of an Islamic Interest-Free Financial System

It is useful to begin examining the Islamic banking system by first defining some basic terminology. Riba is the Arabic word for the predetermined return on the use of money. While in the past there has been dispute as to whether Riba refers to interest or usury, there is now a consensus among Muslim scholars that the term covers all forms of interest, and not only "excessive" interest. 1/ Thus, in the ensuing discussion the terms Riba and interest will be used interchangeably, and an Islamic banking system will be one in which the payment or receipt of interest is forbidden. We define an interest-based, or traditional, banking system symmetrically, where interest is paid and charged for use of funds.

The Islamic restriction against interest is very explicit and has to be taken as axiomatic. Transactions based on Riba are strictly prohibited in the Quran, as the following verse forcefully states:

> "Those who devour Riba will not stand except as stands one whom the devil hath driven to madness by (his) touch." [II:275-276].

That there can be no doubt of the condemnation of the system of interest, and the penalties that would be imposed if the rule were not observed, consider the following verse:

> "O Ye who believe, observe your duty to Allah and give up what remains (due to you) from Riba, if ye are (in truth) believers. And if ye do not, then be warned of war (against you) from Allah and His messenger. And if ye repent then ye have your principal. Wrong not, and ye shall not be wronged." [II:278-279].

1/ There is still debate on whether Riba is defined as the nominal or real rate of interest; in the latter interpretation indexing of the principal would presumably be allowed. Here we do not address this distinction.

While there have been discussions among Muslim scholars on the reasons for this prohibition against interest, it is obvious from the above quotations that there is no real room for differences in interpretation of whether interest can or cannot be paid in an Islamic economy. It is generally the view that it is considerations of equity and protection of the poor that lies behind the strong condemnation of interest-based transactions. 1/ In any case, the Islamic economic system, and of course the corresponding banking system, has to operate within the proscribed framework which does not permit interest.

The concept of an economy in which interest is not allowed appears quite counter-intuitive to many observers. Arguments that such a system is unlikely to work efficiently in the short run, and in the long run will result in an eventual drying-up of savings and investment have frequently been made in this connection. 2/ This view, however, tends to reflect a basic confusion between the terms of "rate of interest" and "rate of return." While Islam clearly forbids the former, it not only permits, but rather encourages trade and, therefore, profits. For example:

> "That is, because they say: Trade is just like Riba; whereas Allah permitteth trading and forbiddeth Riba." [II:275-276].

Intangible rewards are also permitted, and using the Arabic term Sadaqat for charity or alms, the same verse from the Quran goes on to say:

> "Allah has blighteth Riba and made Sadaqat fruitful." [II: 275-276].

In essense, what is forbidden in Islam is the fixed or predetermined return on financial transactions and not an uncertain rate of return, as for example represented by profits. From this it follows that if a banking structure could be evolved in which the return for the use of money would fluctuate according to actual profits made from it, the resulting system would be consistent with the guidelines of Islam.

1/ The Quran itself provides no detailed rationale for the prohibition of interest. For a discussion of some of the possible reasons for this restriction, see Ahmad (1984).

2/ Pryor (1985), for example, states quite categorically that:

> "The simple story is that if there is no interest rate, aggregate savings would fall." (page 208).

and later,

> "... the elimination of a nominal interest rate would lead to a reduction in savings in an Islamic economic system, other things being equal." (page 209).

The view that profits are perfectly legitimate has provided the basic foundation for the development and implementation of Islamic banking. In this system profits and losses are to be shared between banks and economic agents according to certain predefined rules. 1/ Specifically, the depositor would not be guaranteed a predetermined return on the nominal value of his deposit by the bank, but would be treated as if he were a shareholder of the bank and thus be entitled to a share of the profits made by the bank. The system is symmetric so that if the bank incurs losses, the depositor would share in these as well and the nominal value of his deposit would be reduced. On the other side of the balance sheet the bank could also not charge a fixed rate of interest on its loans, but would have to engage in some type of a profit/loss sharing arrangement. At the very simplest level the Islamic system can be considered as an equity-based, rather than an interest-based, system. The depositor essentially purchases equity in the bank, and the bank in turn has an equity position in whatever activity the borrower uses the funds for. 2/ This distinction between equity-based and interest-based systems is very crucial and will be utilized in the remainder of the analysis in the paper.

The earliest modern example of a bank established along the principles of profit and loss sharing was the Myt Gamt Saving Bank in Egypt in the early 1960s. The 1970s saw the emergence of a number of similar banks in Kuwait, the United Arab Emirates, Jordan, Sudan, and Pakistan. 3/ Two such banks were also established in Luxembourg and Switzerland, and with the active encouragement of the Kingdom of Saudi Arabia, an international development bank--The Islamic Development Bank-was set up in Jeddah in 1975. In most Muslim countries Islamic banks operate side-by-side with traditional banks, but certain governments have taken steps to eliminate the latter over time. For example, the Government of Pakistan started in 1978 a gradual process to eliminate interest-based transactions entirely from banking. As of July 1, 1985, all transactions by banks are required by law to be conducted solely on an equity-participation basis. 4/ Similar steps have been announced by the government authorities of Iran, 5/ and Sudan.

1/ Generally these are based on the concept of Mudarabah, or Qirad, which refers to transactions in which profits and losses are shared by the borrower and lender in some mutually agreed proportions.

2/ This does raise some interesting issues regarding consumption loans which have still to be resolved.

3/ For a detailed discussion see Khan (1983).

4/ See State Bank of Pakistan (1984).

5/ See Bank Markazi Jamhouri Islami Iran (1983).

The fact that the process of establishing Islamic banking appears to be well-entrenched, at least in Pakistan and Iran, raises two related questions. One, does such a system make theoretical sense, and two, can it work in a modern setting? The first of these questions has been examined in a number of papers that show that it is indeed possible to rationalize the profit and loss sharing system through the use of risk and uncertainty analysis. 1/ Basically these papers replace a certain, or predetermined, rate of interest with an expected rate of return and go through the usual procedures to show that this change does not affect the conclusions of standard banking and macroeconomic behavior in any fundamental sense. On the other hand with respect to the second question, as the experience with an economy-wide profit and loss sharing system is relatively recent, it is not possible to state with confidence that such a system will function as well, or better, than the traditional banking system. There are, of course, those who argue on mostly a priori grounds that it will, 2/ but clearly in the absence of empirical analysis the issue is far from settled.

Once one gets past the terminology and the interest-free and interest-based distinction, and recognizes that the Islamic banking is really a particular variant of equity-participation systems, it can be seen that proposals for reform of the traditional banking system along similar lines have been made at various times in the United States. These times have generally corresponded with episodes of banking crisis, and the most ardent proponent of an equity-based financial system was Henry Simons (1948). 3/ Arguing in the context of bank collapses in the 1930s that the fractional-reserve banking system was "inherently unstable," Simons proposed that traditional banks should be replaced by two separate financial institutions. In his words,

> "First, there would be deposit banks which, maintaining 100 percent reserves, simply could not fail, so far as depositors were concerned, and could not create or destroy effective money. These institutions would accept deposits just as a warehouse accepts goods... A second type of institution, substantially in the form of an investment trust, would perform the lending functions of existing banks. Such companies would obtain funds for lending by sale of their own stock, and their ability to make loans would be limited by the amount of funds so obtained." (Simons (1948), pp. 64-65).

1/ For example, Naqvi (1982), and Khan (1984).

2/ See Ahmad (1984).

3/ Arguments for a profit and loss based system have also been made in the wake of bank failures in Latin America, particularly in Argentina. See Fernandez (1984).

While Simons' call for a sharp distinction between the payments and portfolio functions of banks, and a 100 percent reserve requirement on the former, were rejected in favor of official deposit insurance at that time, 1/ interest in Simon's ideas has remained. 2/ Friedman (1969) agreed with Simons on the 100 percent reserve requirement idea, but more on the grounds that such a system would reduce government interference with the lending and borrowing operations of banks, and thus increase economic freedom. More recently, in connection with bank failures in the United States during the 1980s, there has been a revival of proposals for the equity-based system that Simons advocated. Papers by Kindleberger (1985), Kareken (1985), and Golembe and Mingo (1985), presented at a conference organized by the Federal Reserve Bank of San Francisco, 3/ again raise the issue of the potential financial instability of a fractional reserve banking system combined with official deposit insurance. Kareken (1985) and Golembe and Mingo (1985) argue that the reasons why bank failures are special is because, unlike bankruptcies of firms in general, they affect the payments mechanism of the economy. Consequently, what must be protected is the efficient functioning of the payments mechanism and not necessarily the overall lending and borrowing operations of banks. These authors would, therefore, have the government separate the provision of payments services from lending services, and in effect create the two types of banks that Simons (1948) had in mind. 4/ The payments side of banking, that is transactions balances, would be backed 100 percent by some safe security, say U.S. Treasury bills, while the portfolio activities would be effectively unregulated. Neither these schemes, nor the one proposed by Simons, are significantly different from the Islamic systems being implemented in a number of countries, at least on the deposit side. 5/ At the same time, however, it should be stressed that the Islamic banking system goes further and requires that loans and advances made by banks also be based on equity-participation.

1/ Irving Fisher was also an early supporter of 100 percent (cash) reserve requirement on banks. His view too was that the institution of this scheme would stop bank runs and thus banking failures. See Fisher (1945).

2/ Some Muslim writers also have suggested a 100 percent reserve requirement for the same reasons as Simons; see Kahf (1978) and Al-Jarhi (1983).

3/ "The Search for Financial Stability: The Past 50 Years," San Francisco.

4/ Alternatively each bank would simply have its activities separated in this manner. The issue of "corporate separateness" naturally involves legal and regulatory questions that are discussed at length by Golembe and Mingo (1985).

5/ However, the 100 percent reserve requirment has not been considered seriously in these systems. This issue will be discussed later in this paper.

There are many reasons advanced in the literature as to why the traditional banking system could be unstable. In Simons view the basic flaw in the traditional system was that as a crisis developed and earnings fell, banks would seek to contract loans to increase reserves. However, each bank could do so only at the expense of other banks and in the process a number of banks would become insolvent and be forced to close. Alternatively, Mayer (1974) contends that banks tend to switch from techniques of "asset management" to "liability management" in the face of a crisis, and that this practice has increased in the U.S. banking system. In other words, if banks raise interest rates to attract or retain deposits in problem situations, and if the total stock of deposits is fixed in the short run, this would clearly be an unstable process and eventually result in bankruptcies. In such circumstances any system which guaranteed the transactions balances component of deposits and eliminated the need or incentives for liability management would likely stabilize the process.

In the following section we show formally how an equity-based banking system of the Islamic type would operate and how it would be stable in the context of real shocks.

III. A Formal Model of Islamic Banking

The framework utilized here to represent the Islamic banking system is based on an aggregate macroeconomic model developed by Metzler (1951), and extended by Fernandez (1984). This model is quite simple, and although it incorporates some fairly restrictive assumptions, it turns out to be a very useful device for the purpose at hand. In this section two versions of the basic model are considered. The first takes prices as fixed, or predetermined, and real output as endogenous; in the second version the price level is assumed to be flexible and output in turn is assumed exogenous. These two versions can also be interpreted as the Keynesian or classical representations of the basic model.

1. The basic model with fixed prices

The macroeconomic model contains a capital market, a money market, and a market for goods. We assume here for simplicity that all real income goes to capital rather than being divided between capital and labor, as is more customary. Metzler (1951), for example, assumes that capital receives a constant proportion of national income, and we could easily follow his approach without affecting the analysis. 1/ We proceed by describing the three markets in the model.

1/ If y is national income then one only has to assume that capital receives ωy, where ω is a constant, and the remainder $(1-\omega)y$ goes to labor.

a. Capital market

Consider an economy in which banks are the only intermediaries that connect saving and investment. These banks are treated as if they were simply firms that issue shares (deposits) and derive their earnings from investments. Economic agents hold their savings in the form of deposits whose nominal value is not guaranteed, and the rate of return they receive from these deposits, i.e., the yield on shares, is also not predetermined and can vary. Indeed there is no restriction preventing the rate of return from becoming negative, since this would only imply that the value of shares falls. All investments in the economy are also assumed to be undertaken by borrowing from banks.

Since the price level is given, we can use the simple discounting formula suggested by Metzler (1951) to relate the real value of the banks' shares to the capitalized value of its future real earnings: 1/

$$(1) \quad \frac{S}{P} = s = \frac{y}{r}$$

where,

S = nominal value of shares;

P = price level;

s = real value of shares;

y = real income; and

r = real yield on shares (or the real interest rate). 2/

If banks are assumed not to hold any reserves and have zero net worth then (1) essentially defines the balance sheet of the banking system. The assumption that banks cannot absorb losses through reserves or net capital is also not crucial since what we are concerned with is the issue of bankruptcies. Basically, ignoring reserves or net capital of banks is tantamount to assuming that the potential losses that would occur in the event of a failure far exceed the provisions that a bank can reasonably be expected to make against them.

1/ While this discounting formula is not exact, it is nevertheless convenient to use and helps to clarify the analysis that follows. The proper discounting formula would be an integral that took into account continuous changes in y and r. Such a formula converges in the steady state to the one used here.

2/ The term "real interest rate" will be used in the analysis only for convenience. In all cases, however, we will interpret r to mean the real yield on shares.

The balance sheet of the aggregate banking system in real terms would therefore be:

Banking System	
Assets	Liabilities
$\frac{y}{r}$	$\frac{S}{P}$

b. Money market

Money is the other asset in the model and is considered to consist solely of currency, assumed to be exogenously supplied by the government. In other words, all money in the model is "outside" money. Total real wealth (w) is defined as $w = m+s$, where m is the stock of real money balances ($m = \frac{M}{P}$) and M is the exogenously given nominal stock of money. Equilibrium in the money market is determined by the following:

$$(2) \quad \frac{m}{s} = g(r) \qquad g_r < 0$$

where the proportion of wealth held in the form of money depends negatively on the real rate of interest. Since from (1) we know that $s = \frac{y}{r}$ we can rewrite the equilibrium condition in the money market as:

$$(3) \quad m = g(r) \cdot \frac{y}{r}$$

c. Goods market

We assume that the goods market is characterized by slow adjustment and that output responds to variations in excess aggregate demand. This formulation is not difficult to justify in the case when prices are fixed. 1/ Specifically the relationship between real income, or output, and excess aggregate demand can be derived using a standard Keynesian framework. Real aggregate demand (y^d) is defined as: 2/

$$(4) \quad y^d = C(r,w) + I(r) \qquad C_r < 0;\ C_w > 0;\ I_r < 0.$$

1/ The alternative case when prices are flexible is taken up later.
2/ Note that we are assuming that the economy is closed and there is no explicit government sector.

where $C(r,w)$ is a standard consumption function with wealth as the relevant scale variable, and $I(r)$ is the investment function. Using (1) total wealth can be written as:

$$(5) \quad w = m + \frac{y}{r}$$

The assumption of slow adjustment in the goods markets can be represented by the following differential equation for output:

$$(6) \quad \frac{dy}{dt} = \dot{y} = \beta[C(r,m + \frac{y}{r}) + I(r) - y] \qquad \beta > 0.$$

where the expression inside the square brackets is excess aggregate demand. This can be written as a reduced form equation: 1/

$$(7) \quad \dot{y} = f(r,y;m) \qquad f_r < 0;\ f_y < 0;\ f_m > 0.$$

Equation (7) can be viewed as a dynamic form of the IS curve in which real income responds positively to excess aggregate demand, which in turn is a negative function of the real rate of interest and real income, and a positive function of (exogenous) real money balances.

This is the basic structure of the model that can be used to describe the Islamic banking system. It will be noted that the model is a dynamic variant of the standard IS-LM model, and no special factors have had to be introduced up to now. To analyze the Islamic banking system the crucial point to remember is that the nominal value of shares (S) is not guaranteed to the depositor, and thus can be treated as perfectly flexible. In the model here equation (3) ensures that the capital and money markets are continuously in equilibrium, while from equation (7) we have real income adjusting slowly to any shocks to excess aggregate demand. Using the equation for the money market (3), and output (7), we can derive a standard IS-LM diagram to determine the equilibrium values of the real interest (r^*) and real income (y^*). Given r^* and y^* it is straightforward matter to obtain the equilibrium real value of shares ($s^* = y^*/r^*$). The basic system is depicted in Figure 1. 2/

To examine the dynamics of the system consider the case of an exogenous fall in real income (real earnings) of banks from y^* to y_1 in Figure 1. At point B there is an excess supply of money that results in an instantaneous

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1/ It is assumed that the marginal propensity to consume, $\partial C/\partial y$, is less than unity.

2/ While Figure 1 is drawn for positive values of r, this is not necessary and r could in fact be negative without affecting the argument.

decline in the real interest rate from r^* to r_1 (to point C). 1/ However, at C, with real income at y_1 and the real interest rate at r_1, there is excess aggregate demand. This will move real income slowly back towards y^* to eliminate the disequilibrium in the goods market, and as real income grows the real interest rate will rise as well towards r^*. Equilibrium will once again be reached at the original steady state, that is at A with $r = r^*$ and $y = y^*$.

From equation (1) we can trace out what happens to the real value of shares during the process of adjustment. As the real interest rate declines, the real value of shares falls immediately from $s^* = y^*/r^*$ to $s_1 = y_1/r_1$ to maintain continuous equilibrium in the capital market. This result follows because the nominal value of shares is flexible and can thus adjust immediately to clear any disequilibrium in the capital market. Basically this feature ensures that the system is dynamically stable.

By contrast, in the traditional banking system the nominal value of shares (deposits) is guaranteed to the depositor by the bank, 2/ and it is this guarantee that distinguishes the two systems. In standard banking systems the individual is assured of the nominal value of his deposit, and if the bank pays interest on these deposits, the rate of return that he will receive is also predetermined. In most countries there exists some form of official insurance scheme that backs the guarantee provided by banks, and even if there is not, it is normally assumed that the government would step in should the need arise.

In the context of the analysis developed here the introduction of a guarantee for the nominal value of the shares simply means that the balance sheet of the banking system is now written as:

$$\text{(1a)} \quad \frac{\bar{S}}{P} = \frac{y}{r}$$

where $\bar{S}$ is the predetermined, or guaranteed, value of shares. While it is possible to show that the introduction of a deposit guarantee, in other words using equation (1a) in place of equation (1) in the model, does not change anything insofar as equilibrium behavior is concerned, important

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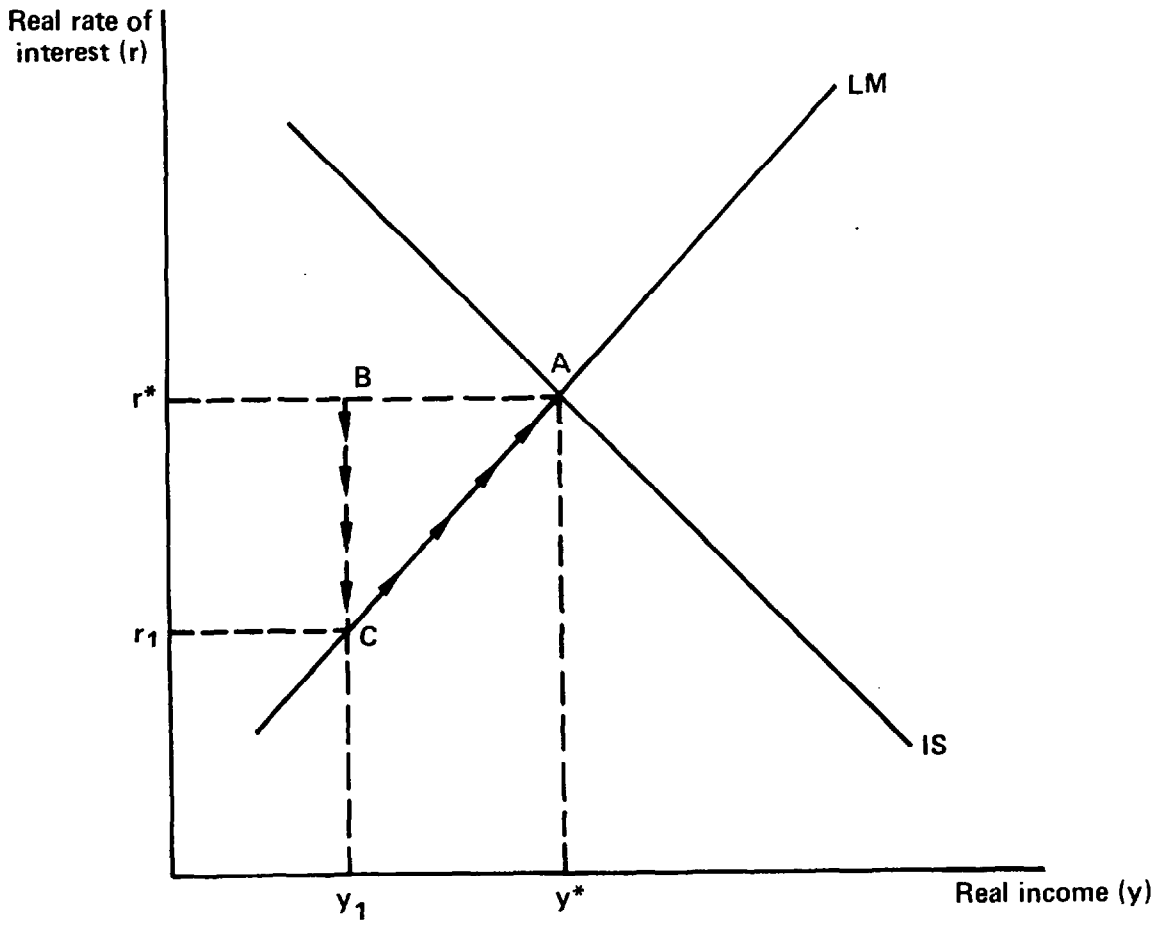
1/ One can see from this that Pryor's (1985) conclusion that adjustment of the money market would be slower and more complicated stems from his confusion between the real rate of interest and the real yield on shares. While the commonly-defined interest rate may be fixed at zero, as was pointed out in Section II, there is nothing in Islamic economics that requires the real yield on shares to be zero or constant.

2/ If the price level is given, then the real value is obviously also guaranteed.

Figure 1
ISLAMIC BANKING SYSTEM WITH FIXED PRICES



differences can emerge in the transition process. As was discussed above, in the Islamic banking model any divergence between the real value of assets and liabilities would be immediately reflected in a corresponding adjustment in the nominal value of shares. However, in the traditional banking system, as the nominal value of shares is guaranteed and the interest rate is predetermined, changes in y will not necessarily result in immediate variations in the real value of shares. This means that in the short run one could have (y/r) not equal to (S/P), and the fundamental question is how the system can be expected to adjust to this disequilibrium.

One way, of course, would be for banks to cover the discrepancy between assets and liabilities through a drawdown of reserves or a reduction in net capital. However, if losses greatly exceed available reserves, as has been assumed here, banks would presumably face the possibility of runs on deposits and bankruptcy as net worth became negative. 1/ Generally, in such circumstances the government would enter into the picture and assume the liabilities of the banks, either in its capacity as the ultimate guarantor of deposits, or more importantly, to protect the payments mechanism. In any case, the depositors would be repaid by the government using resources obtained through taxes or borrowing. 2/ Ignoring distributional complications, what the government has done is to reduce wealth by a capital levy on shareholders, either imposed now or in the future, that would be equal to the loss of assets of the banks. The end-result of such an operation would be equivalent to that observed in the case of the Islamic banking model, namely the fall in real earnings of banks would be matched by a decline in real wealth, with the government intervening to ensure such an outcome.

Short-run differences between the two systems can, however, arise for a variety of reasons. For example, the public may not see through the "veil" and believe that despite the government's actions real wealth has not been reduced, and thus not alter its behavior. Also the behavior of banks may also create short-run problems. Even though the liabilities of the banks may be insured directly or indirectly by the government, it has been argued by Mayer (1974) and Fernandez (1984), among others, that banks may try to postpone bankruptcy by resorting to liability management techniques and raise interest rates to bid for deposits. Such actions, which basically reflects myopic behavior on the part of bankers, can easily lead to instability, since attempts to increase interest rates

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1/ Recall that we are assuming that net worth of banks is zero to start with.

2/ One can argue that the choice between taxation and borrowing really represents a choice between present and future taxation, since any government debt created to pay depositors has to be retired at some point in the future.

would reduce (y/r) even further. 1/ In the Islamic banking model the market immediately writes down the real value of shares and these types of short-run phenomena cannot arise.

2. The basic model with flexible prices

We can extend the analysis to consider the alternative case where output is exogenously given and prices adjust to excess aggregate demand. This model, therefore, corresponds more to the classical system, in constrast to the Keynesian-type model of the previous sub-section. In terms of real money balances this adjustment function can be specified as: 2/

$$(8)\quad \dot{m} = -f(r,m;y^*) \qquad\qquad f_r < 0;\ f_m > 0;\ \ f_{y^*} < 0.$$

where $\dot{m}$ is the change in real money balances and $f(r,m;y^*)$ is the excess demand function for an exogenously given level of (long-run) real income (y^*). We now use equation (8) in place of the output adjustment equation (7) that was specified in the case of rigid prices. Slow adjustment in the goods market has been maintained to highlight the dynamic properties of the system, although one could easily assume that prices adjusted instantaneously to clear the market. 3/

In this system equations (1), (3), and (8) can be combined to determine the endogenous variables r, m, and s. The model is described by Figure 2 where $\dot{m}_{y^*} = 0$ represents the locus of points that clear the goods market and $\dot{r}_{y^*} = 0$ is the corresponding locus of points that clear the money market, $m = g(r) \cdot \frac{y^*}{r}$. As before, once we have determined m^* and r^*, we can derive the value of the real value of shares, $s^*(= m^*/g(r^*))$.

In Figure 2 the point A represents the steady-state equilibrium, yielding the values of m^* and r^*. Suppose that real income falls from y^* to y_1. The economy will now have to adjust to this lower level of (exogenously given) real income, and thus the $\dot{r}_{y^*}=0$ schedule will shift downwards to $\dot{r}_{y1}=0$, and the $\dot{m}_{y^*}=0$ schedule to $\dot{m}_{y1}=0$. A new steady state equilibrium will be reached at point C, with $r = r_2$ and $m = m_1$. The

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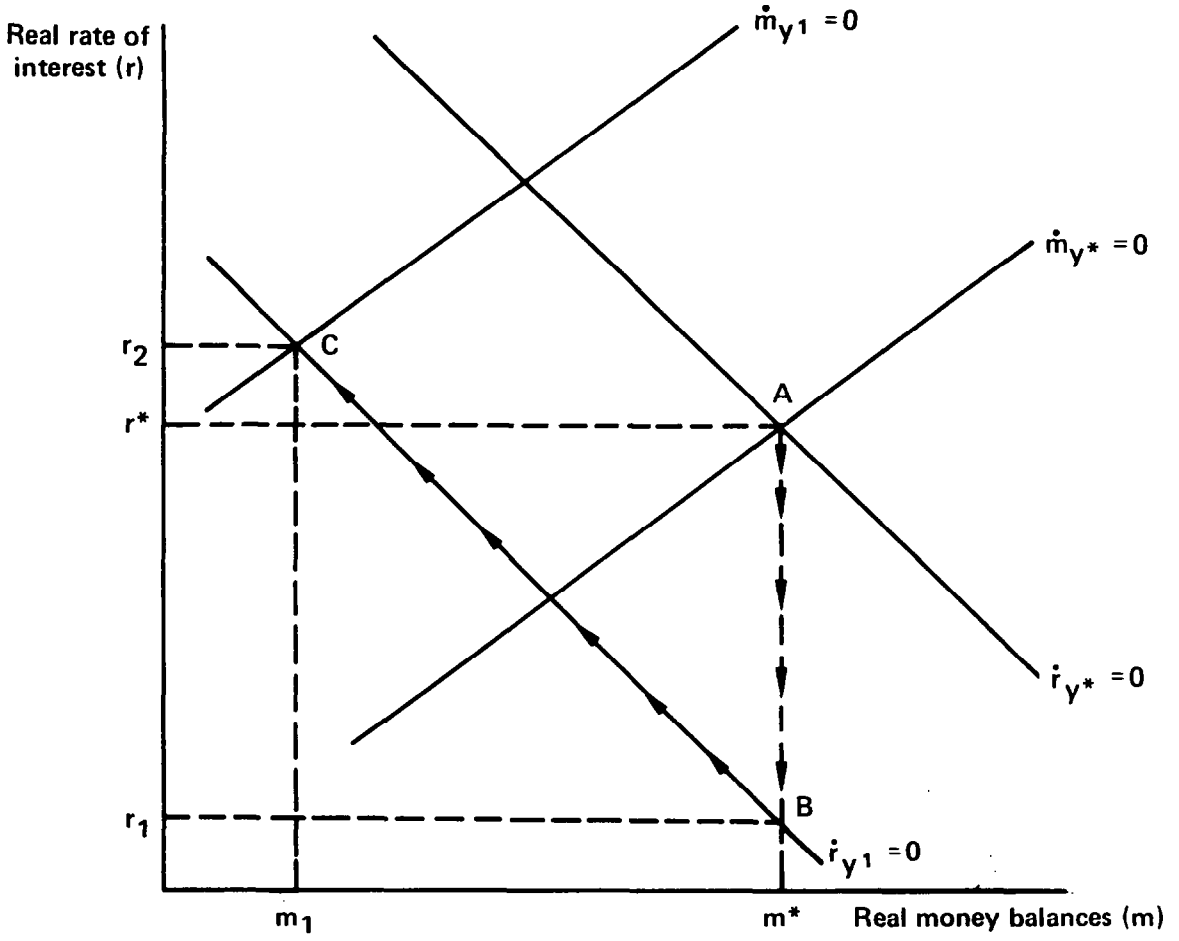
1/ It is formally demonstrated in the Appendix that the addition of a liability management process into the basic model yields a saddle point solution.

2/ This follows directly from equation (7). The adjustment equation (6) is now specified as $\dot{m} = -\beta[y^d - y^*]$, and with the relevant substitutions yields equation (8).

3/ This would simply amount to specifying $f(r,m;y^*) = 0$ in equation (8).

Figure 2
ISLAMIC BANKING SYSTEM WITH FLEXIBLE PRICES



instantaneous short-run equilibrium obtains at point B as the real interest rate moves immediately from r^* to r_1 to preserve equilibrium in the assets market at r_1 and m^*. At B the real money supply remains constant at m^* since prices, which are allowed to change only gradually, cannot jump to the new steady state. However, at this point B there is an excess demand for goods which increases prices and lowers real money balances. As real money balances decline the real interest rate starts to rise to maintain equilibrium in the money market and this reduces excess aggregate demand. The process would continue until the new steady state (point C) where $r = r_2$ and $m = m_1$ was reached.

The real value of shares does not behave exactly the same way as it did in the case where prices were fixed. Initially the real value of shares declines sharply, since at B

$$\frac{m^*}{g(r_1)} < \frac{m^*}{g(r^*)}$$

and then continues to fall as the system approaches the steady state at C. The path followed by the real value of shares is a consequence of the assumption of slow adjustment of prices, and if instantaneous adjustment of the goods market was allowed we would observe the economy moving directly from A to C and the real value of shares would, as in the fixed price case, move immediately from $s^* = y^*/r^*$ to $s_1 = y_1/r_2$.

Again the process can be replicated by the traditional banking model if both the public and bankers behave rationally in the short run, and the government moves rapidly to correct the disequilibrium between assets and liabilities that result from the fall in real income from y^* to y_1. If not, the traditional banking system would adjust slowly to the real income shock, and could very easily become unstable. 1/

IV. Conclusions

While the number of studies on Islamic economics and Islamic banking has grown enormously in recent years, there is still a dearth of analytical work on the subject. In many ways the lack of understanding and confusion that exists about Islamic economics can be attributed to the virtual absence of formal descriptions of the theory underlying the proposed system. In this paper an attempt is made to provide a theoretical description of the Islamic banking system by formulating a relatively simple model that explicitly incorporates the constraints imposed by religion on the conduct of financial transactions. As was shown in the paper, this model does provide a reasonable portrayal of the types of systems of Islamic banking that have been put into practice in certain countries. The exercise further demonstrated that standard economic concepts and methods can be fruitfully employed to analyze issues in Islamic economics.

1/ As before, a liability management equation in place of equations (1) and (3) would yield a saddle point solution; see Appendix.

The model that is developed in this paper also turns out to have a lot of similarities with standard models used to analyze the behavior of banks at an aggregate level. Indeed, it is readily apparent that the Islamic model of banking, being based on principles of equity participation, bears a striking resemblance to proposals made in the literature on the reform of the banking systems in many countries, and particular in the United States. The paper demonstrates that the Islamic system may well turn out to be better suited to adjusting to shocks that result in banking crises and disruption of the payments mechanism of the country. This is because in an equity-based system that excludes predetermined interest rates and does not guarantee the nominal value of deposits, shocks to asset positions are immediately absorbed by changes in the values of shares (deposits) held by the public in the bank. Therefore, the real values of assets and liabilities of banks in such a system would be equal at all points in time. In the more traditional banking system, since the nominal value of deposits is fixed, such shocks can cause a divergence between real assets and real liabilities and it is not clear a priori how this disequilibrium would be corrected and how long the process would take. In other words, there is a rigidity in the traditional banking system that prevents instantaneous adjustment, and this rigidity can lead to possible instability.

Thus, as argued in this paper, the principal difference between the Islamic and the traditional banking system is not that one allows interest payments and the other does not. The difference stems from the fact that an Islamic system treats deposits as shares and accordingly does not guarantee their nominal value. In the traditional banking system such deposits are guaranteed either by the banks or the government. This distinction has apparently not been generally appreciated in the literature. Basically, the interest rate issue is shown not to be central from an economic or analytical point of view, and one can argue that the debate in many ways has been misdirected.

It should be acknowledged, of course, that the scope of this paper was fairly limited, and a number of interesting questions associated with Islamic banking remain as yet unanswered. The model specified was a fairly stylized one and certain restrictive assumptions were imposed to highlight the essential features of the Islamic financial system. Obvious generalizations of the approach here would have to examine in greater detail how both deposit and loan behavior can be theoretically modeled within an equity-based system. Also the analysis here was restricted to the operation and practice of banking under the Islamic system, rather than the effects that the adoption of this system would have on savings, investment, the level of financial development, and so forth, and furthermore, how monetary, fiscal, and exchange rate policies can be expected to operate in such an environment. At this stage it is not possible to say very much about the effects that the introduction of uncertainty created by the elimination of a predetermined rate of interest on financial transactions would have on basic economic behavior and on the efficiency of

the financial system. Perhaps even more important is the question of whether the profit and loss sharing practice meets the fundamental objectives of Islamic economics relating to income and wealth distribution. Clearly addressing these various issues will require concerted efforts at both the theoretical and empirical levels.

Despite these caveats, it is still possible to draw certain policy implications from this study that relate to the practice of Islamic banking. In our judgment the equity-based system being implemented in Muslim countries has considerable merit from a purely economic standpoint, independent of its consistency with the strictures of Islam. From a policy perspective, one can go from the analysis in the paper and argue that banks should operate two windows for deposit transactions. One window would cover only transaction balances and would pay no interest on deposits. In other words, all deposits made through this window would be akin to existing demand deposits, with one important difference. Such deposits would have a 100 percent reserve requirement placed on them and there would be no possibility of using these as a basis for multiple credit creation. The backing for these deposits could be in the form of currency, foreign exchange, or suitable government securities. The reason for adopting a 100 percent reserve requirement is that these deposits would be made completely safe and thus simultaneously satisfy the desires of risk-averse individuals and prevent the dangers of runs from interfering with the payments mechanism. If such deposits did not yield any return to the banks, then presumably a service charge could be levied on depositors that would correspond to the costs of administering this window.

The other window would be the profit and loss, or equity, account in which a depositor would be treated exactly as if he were a shareholder in the bank. There would be no guarantee provided of the rate of return or the nominal value of the share. No official reserve requirement would be necessary for these investment deposits, although presumably for prudential reasons banks would maintain some minimum level of reserves. Since deposits through the profit and loss window are to be treated as investments, as for example in a mutual fund or investment trust, there is no obvious reason for the government to impose legal reserve requirements. Regulations similar to those applying to public companies, such as equity to capital ratios, could of course still be imposed.

In conclusion, while the two-window scheme is in fact being implemented in Islamic countries, there has been no basic change in the reserve requirements on different types of deposits. To maximize the safety benefits that are inherent in the system such a change seems obvious. Differential reserve requirements on deposits that are based on their terms to maturity are commonplace already, and a 100 percent reserve requirement on one particular subset of deposits is not that radical a proposal, and furthermore, would not be too difficult to implement within existing financial structures. If a clear distinction is to be made between the equity-related operations of banks and the payments process, then such a step is necessary.

Dynamic Properties of the Traditional Banking System with Liability Management

The Islamic banking model developed in the text can with suitable alterations be used to represent the traditional banking system as well. However, once the hypothesis of liability management is introduced, the dynamic properties of the two systems turn out to be quite different. This Appendix analyzes the dynamics of the traditional banking model in the presence of liability management for both the fixed price and flexible price cases.

1. Fixed price model

The fact that in a traditional banking system there is an explicit guarantee provided for the nominal value of shares does not affect the long-run properties of the model. Thus, the following identity which ensures equilibrium in the capital market will continue to hold:

$$(1) \quad \frac{\overline{S}}{P} = \frac{y}{r}$$

where $\overline{S}$ is the exogenously determined nominal value of shares.

Equilibrium in the money market is given by: 1/

$$(2) \quad \gamma(r) \cdot m = \frac{y}{r}$$

where $\gamma(r) = 1/g(r)$. This equation implies that the demand for shares relative to real money balances in the long run is a positive function of the real interest rate.

In the goods market real aggregate demand (y^d) is defined as:

$$(3) \quad y^d = C(r,w^*) + I(r) \qquad C_r < 0;\ C_{w^*} > 0;\ I_r < 0.$$

where $C(r,w^*)$ is the consumption function and $I(r)$ is the investment function. The variable w^* is long-run wealth, i.e.:

$$(4) \quad w^* = m + \frac{y}{r}$$

1/ We continue to use the same long-run demand for money function discussed in the text.

which can differ from measured real wealth, $w = m + \overline{S}/P$, if (y/r) does not equal $(\overline{S}/P)$.

The adjustment function for the goods market is:

$$(5) \quad \frac{dy}{dt} = \dot{y} = \beta[C(r, m + \frac{y}{r}) + I(r) - y] \qquad \beta > 0.$$

where the expression in square brackets is excess aggregate demand. This can be written as a reduced-form equation:

$$(6) \quad \dot{y} = f(r,y;m) \qquad f_r < 0;\ f_y < 0;\ f_m > 0.$$

where m is exogenous. Equations (1), (2), and (6) define the model for traditional banking system, and as can be seen, it is virtually the same as the Islamic banking model.

Suppose, for some reason, there is a fall in earnings of banks. In the Islamic banking system the liabilities of the banks would be immediately written down to ensure continuous financial market equilibrium. In the traditional banking system, however, the nominal value of deposits is predetermined in the short run so that changes in y are not necessarily reflected in the real value of shares unless there is a corresponding change in r. If banks try to prevent bankruptcy by resorting to liability management, i.e., they raise interest rates to retain deposits, this can set in motion an unstable process. This process of liability management can be approximated by a simple adjustment function suggested by Fernandez (1984), which says that if the amount banks are willing to pay depositors for any reason exceeds the income of banks (y), then the banks would try to increase the public demand for shares by increasing the real return to depositors, i.e.,: 1/

$$(7) \quad \frac{d}{dt}[\gamma(r) \cdot m] = \alpha[(\gamma(r) \cdot m \cdot r) - y] \qquad \alpha > 0$$

This equation can also be written as:

$$(8) \quad \dot{r} = \frac{\alpha\gamma(r)}{\gamma_r} \cdot r - \frac{\alpha\, y}{m\gamma_r}$$

1/ An alternative adjustment function that directly related the change in the interest rate to the difference between real assets and liabilities, i.e.:

$$\dot{r} = \alpha[(\overline{S}/P).r - y]$$

yields the same qualitative results shown below.

The second equation in the system is the adjustment function for the goods market:

$$(9) \quad \dot{y} = f(r,y;m)$$

The steady-state solutions of equations (8) and (9), i.e., when $\dot{r} = \dot{y} = 0$, are:

$$(8a) \quad m = g(r) \cdot \frac{y}{r}$$

$$(9a) \quad f(r,y;m) = 0$$

which are exactly the same as the steady-state solutions obtained in the Islamic banking version of the model. In other words, the two systems are identical in long-run equilibrium.

The short-run dynamics, however, turn out to be quite different. 1/ While the Islamic system has a stable solution, this is not true in the traditional model represented by equations (8) and (9). The characteristic matrix of the system (K) is defined as: 2/

$$(10) \quad K = \begin{bmatrix} \frac{\alpha\gamma(r)}{\gamma_r} + \alpha r & -\frac{\alpha}{m\gamma_r} \\ f_r & f_y \end{bmatrix}$$

and since $|K| < 0$ the two eigenvalues are real, with one positive and the other negative. This implies that the solution of the model is a saddle point.

2. Flexible price model

The basic change in this case is in the adjustment equation for the goods market, which in terms of real money balances is written as:

$$(11) \quad \dot{m} = -f(r,m;y^*) \qquad f_r < 0;\ f_m > 0;\ f_{y^*} < 0.$$

where $\dot{m}$ is the change in real money balances and $f(r,m;y^*)$ is the excess demand function for an exogenously given level of (long-run) real income--y^*. Equation (11) replaces equation (6) for the flexible price model, so that the system now becomes:

1/ For the dynamic analysis we work with the linearized versions of equations (8) and (9), and further assume that $\gamma_{rr} = 0$ in equation (8).
2/ The characteristic equation is $\lambda^2 - tr(K)\lambda + |K| = 0$.

$$(11) \quad \dot{m} = -f(r,m;y^*)$$

$$(12) \quad \dot{r} = \frac{\alpha\gamma(r)}{\gamma_r} \cdot r - \frac{\iota\, y^*}{m\gamma_r}$$

For the traditional banking system with flexible prices we once again obtain a saddle point as a solution to equations (11) and (12). The characteristic matrix is given by

$$(13) \quad K = \begin{bmatrix} -f_m & -f_r \\ \dfrac{\alpha\, y^*}{m_2\gamma_r} & \dfrac{\alpha\gamma(r)}{\gamma_r} + \alpha r \end{bmatrix}$$

As $f_r < 0$, $f_m > 0$, we can see that $|K| < 0$, and the roots of the characteristic equation are real and of opposite sign.

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