TIME VALUE OF MONEY AND DISCOUNTING
IN ISLAMIC PERSPECTIVE

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Contemporary research on investment behaviour in Islamic perspect-
ive, most of the time, finds it expedient to assume zero rate of time
preference in an Islamic economy. The author argues that there is no
justification for that. According to him, there is nothing against positive
time preference or against realizing a time value of money in an Islamic
framework, as long as time value of money is not claimed as a
predetermined value. The paper also identifies possible discount rate to
be used in evaluating projects, particularly in the public sector. The rates
of return paid by Islamic banks on deposits of different maturities, have
been suggested as close proxies for discount rates for the evaluation of
projects of different maturities.

1. Introduction

There are several issues in the conventional techniques of project evaluation that
need to be reconsidered when reviewed from an Islamic perspective. Several of these
issues have not been settled even in the conventional framework. Discounting for time
value is one such issue. This issue assumes special importance in the Islamic
perspective because of the prohibition of interest, which can be considered as sort of a
denial of time value of money. On the other hand *bay' mu'ajjal*[1] and *bay' salam*[2] are
permitted in Islam. In these contracts of sale, price of a commodity is allowed to be
different from its spot price, if time element is involved in the process of exchange.
This can be considered as sort of a recognition of time value of money. Rents and
wages also include a fixed reward for the time element. Rent of a house, for example,
includes a part which is beyond depreciation. This part of rent can be regarded as time
value of money. Thus, while *Bay' mu'ajjal*, rent and wages include a fixed and
predetermined element as compensation for time, prohibition of interest specifically
denies any recognition for time value of money. Therefore, a legitimate question
arises as to what is the correct position of Islam on the issue of time value of money.
The answer to this question is of primary importance in the context of project
evaluation where cost of capital must be defined clearly, keeping in view the time

value of capital. If Islam does not recognize time value of money, then there would be no need for discounting or compounding for time value of money in project evaluation and feasibility studies. But if Islam recognizes time value of money, then we need to know the principles under which such a value is to be determined, the rationale for discounting and the discount rate to be used in project evaluation.

Though several good attempts have been made in this area, the issue is far from settled. First attempt was made by Anas Zarqa (1983) who concluded that discounting is permissible in Islam and the rate of return in the projects of comparable riskiness already in operation should be used as the rate of discount. However, he did not discuss the Islamic position on the time value of money and also questioned the relevance of time preference in determining the discount rate. Rafiq al-Masri (1986) discussed the question of the time value of money in detail and argued that Islam allows time value of money. However, he did not discuss a number of important issues; such as, why the time value of money is denied in case of interest and what would be the appropriate determinant of the time value of money (and hence of the discount rate) in an Islamic economy. Rauf Azhar (1986) discussed the consumer's time preference as well as productivity of investment and concluded that the rate of profit, and not the rate of interest, would be the appropriate rate of discount in an Islamic economy. But since, he kept the conventional assumption of perfect foresight and lack of uncertainty, his conclusion loses Islamic perspective. Also, issues like, the concept and nature of time value of money and the principles under which time value of money is to be distinguished in a loan contract from an investment contract were not discussed by him. Furthermore, his conclusion that money will have no time value or is not entitled to a rate of return if it is in putty form and will be entitled to a profit if it is molded into a productive asset, does not, in my view, reflect the correct Islamic position about return on money capital. A certain amount of money invested in a business enterprise is entitled to a share in profit irrespective of whether it remains with the entrepreneur in the form of putty or is converted into clay. On the other hand, a certain amount of money loaned to a business enterprise with principal amount guaranteed is not entitled to any return even if the money is converted by the borrower into clay. The whole issue of time value of money and hence of discounting in Islamic framework, therefore, still remains unsettled. This note is another attempt to resolve some of the relevant questions.

2. Islamic Perspective on Time Value of Money

The conventional concept of discounting regards two similar values at two different points of time as two different values because of the time element involved. Since it is assumed that present consumption is always preferred to future consumption, future values need to be discounted to make them comparable with present values. The rate of interest serves as the rate of discount. Keeping the question of suitability of the rate of interest as a measure of time preference aside for a while, let us first consider whether time value is justified in Islam whenever time element is involved in comparing two values.

Some Islamic economists have answered this question in the affirmative[3]. They start by arguing that *bay' mu'ajjal* and *bay' salam* are permissible modes of trade in Islam. In these types of sale, the price of a commodity sold on credit basis or advance payment basis respectively, can be different from its spot price. This, according to them proves that Islam recognizes difference in value due to time-element. In other words, it means that Islam does have a concept of time preference.

Islamic jurists have, no doubt, allowed a difference between the price of a commodity if it is delivered now and the price if it is delivered sometime in future or between the cash and credit price of a commodity. But this does not necessarily mean that they have allowed getting a predetermined time value for money. The difference in the present and future values of the same commodity cannot be considered to have been allowed just because of the pure time element involved. The jurists could have allowed this difference because they recognized that supply and demand forces are different at different points of time. Perhaps, this is why they allowed the future price in *bay' mu'ajjal* contract to be higher, lower or equal to the present price. As far as I know, they never say that the price in *bay' mu'ajjal* should always be higher than the present price as a rule. Same is the case of *bay' salam*. The permission for the difference in the price of a commodity to be delivered in future is likely to be simply a recognition of the forces of supply and demand that may cause prices to differ at different points of time.

It is quite possible that the actual market price when the good is delivered may turn out to be less than the price that the buyer paid at the time of the contract. It is, in fact, this risk that justifies the profit that he may earn if actual market price at the time of delivery turns out to be higher than the price he paid. Hence, it is not correct to argue that the permission for *bay' mu'ajjal* and *bay' salam* is an unqualified recognition of the concept of pure time value. There may be recognition of some time value but the nature of this time value needs to be clearly understood. It is also argued that rents on physical assets are permitted in Islam and the aggregate rental value is allowed to be higher than the present value of an asset. It can, therefore, be concluded that Islam recognizes time value of money and allows it to be cashed in the market. This argument has some weight. Rent can be interpreted as a time value of money in the following sense.

Suppose a person has $10,000. He may buy a machine and rent it for $1000 per year. He would be earning return at a rate of 10 percent per annum on his money. However, this is only a gross value. This is not the net return that the owner of the machine gets. He, as the owner of the machine, is responsible for the depreciation of the machine. He is also responsible that the machine remains in working order throughout the contract. If the machine goes out of order for no fault of the user, the owner will be responsible to get it repaired or replaced. The net return to the capital would be calculated as follows:

$$r = \frac{(R \times t + C) - M}{M} \qquad (1)$$

where   r = Net time value of money.

          R = Rent of the asset per annum.

          t = Number of years the asset has been used under the rent contract.

          C = Nominal value of the asset at the time of termination of the rent contract.

          M = Money being invested.

It can be seen that both t and C are uncertain and can be determined only after the rent contract terminates. Hence if rent is considered to involve time-value, this value cannot be predetermined. In order to further clarify the point that Islam does not permit a *predetermined* time value of money, the example of financial lease can be presented. In a financial lease, a physical asset is rented out on the following conditions:

a) The user of the asset is responsible for all maintenance of the asset to keep it in working order.

b) The user of the asset undertakes to purchase the asset at the expiry of the contract at a predetermined fixed price irrespective of the condition of the asset and irrespective of whether or not the asset actually exists at the time of expiry of the contract.

c) The contract is irrevocable before the date of its expiry.

In this case all values; R, t, C and M in equation (1); are predetermined and hence r is also predetermined and fixed. There is no element of uncertainty in 'r'. Financial lease, as specified above, is not permitted in Islam.

The prohibition of such a contract suggests that Islam does not permit a fixed, predetermined time value of money. The prohibition of a predetermined time value of money is also evident from another *fiqh* principle which states, "no compensation for time (alone)". For example, if a person owes somebody a loan of say $1000 to be repaid after one year and if either of them wants to negotiate (say after six months) that $500 be paid immediately and $500 be exempted in lieu of the early payment then such negotiation is not permitted.

From the above discussion, we have tried to establish that if there is a concept of time value of money in Islam, it can only be an ex-post one. But what about the case of *bay' mu'ajjal* in which a person is permitted to charge a predetermined higher price if the payment is to be deferred for certain period? For example, a person is authorized to sell his goods at say $100 if the payment is made now and to sell at $120 if the payment is to be made after a year. Does this not imply a fixed and predetermined time value of money?

To understand the correct Islamic position in this case, let us identify the possible sources of difference in prices to be quoted for two different points of time. The possible sources can be:

i) **Time Preference**. One may not be indifferent between the same value at two different points of time, i.e. $100 now may not be same as $100 after a year because of the time element involved.

ii) **Supply-Demand Conditions**
One may assume that the supply-demand conditions and hence price in future may be different than the present conditions and price.

A higher price in case of deferred payment in *bay' mu'ajjal* contract cannot be attributed only to time preference. It has been allowed taking into account both the factors i.e. time preference and supply-demand conditions. Therefore, we can say that there may be time value involved in *bay' mu'ajjal* contract but this time value is definitely not predetermined.

From the above discussion, we can conclude that Islam does not have anything against realizing time value of money but it cannot be claimed as a predetermined value.

3. Rate of Return on Capital as a Measure of Time Preference

Having outlined the Islamic position about the time value of money, we now turn to the question as to how this approach can be integrated with the investment decision making. This requires a review of the following two concepts from Islamic point of view: (a) Time preference and (b) Rate of return on capital as a measure of time preference.

3.1 Concept of Time Preference

Once we admit the existence of interest in the society, it is easy to develop a theory of time preference. People can be assumed to have a certain rate of time preference which is predetermined. Taking interest rate as a parameter, a utility maximizing consumer will make a choice between present and future consumption such that his rate of time preference is equal to the interest rate at the margin. Similarly, in investment decision making, an individual will discount future cash flows (or compound present values) at the given interest rate in order to make the present and future values comparable. But if we deny the existence of interest rate in the society, the above treatment of time preference in the context of investment decisions loses its validity. It has already been argued that time value of money in Islamic perspective cannot be predetermined. In the presence of an uncertain time value of money, how can we justify use of a predetermined rate of time preference?

One approach could be to use the average rate of return on capital in the economy as a proxy for the *expected* time value of money . We may use, as suggested by Zarqa (1983), the rate of return in alternative uses of comparable riskiness, assuming that this rate of return represents the expected time value of money. One problem in this approach would be that the expected rate of return on capital in the economy may

elements other than time value of money, e.g. reward for bearing the risk not associated with time. Furthermore, it has been observed that projects of longer duration have expected profits higher than the projects of shorter duration. Thus, the expected rate of profit on capital may change with respect to time. In other words, the expected rate of profit may be a function of time. If the expected rate of return on capital is to represent the time value of money, then we will have to think of the rate of time preference as a function of time as well. Therefore, the whole concept of time preference needs to be reviewed, a task to which we now turn.

The rate of time preference can be determined by confronting a consumer with the choice between present and future consumption and finding out his point of indifference. If a consumer is indifferent between $100 now and $110 a year later, then his rate of time preference is 10 percent. This is how the rate of time preference is defined. In the conventional framework, this rate is assumed to be fixed. However, if this rate is to reflect uncertainties associated with time, then this rate cannot be assumed to be fixed over time. It should vary as uncertainties associated with time vary. In other words, the rate of time preference of an individual will depend on the time-frame for which he is taking the decision. In a 3-year framework, the rate of time preference is expected to be different from that relevant for a 2-year framework or a 4-year framework. The reason is that time preference depends on time-related uncertainties which are compounded by the length of the time involved.

In the light of the above discussion, the present value of a future cash flow would be worked out as follows:

$$PVF_t = F_t(1+d_t)^{-t} \tag{2}$$

Where $\quad F_t$ = flow accruing in period t.

$\qquad PVF_t$ = Present Value of F_t.

$\qquad d_t$ = Rate of time preference relevant for the period t.

$$d_{t+i} > d_t > d_{t-i} \text{ for any positive value of i.}$$

As an example, suppose a person is indifferent between $1000 now and $1210 two years later. The rate of time preference in this case will be $d_2 = 10\%$ because $1000 = 1210 (1 + 10/100)^{-2}$. In the above framework this rate cannot be taken to imply that this individual will also be indifferent between $1000 now and $1331 three years later since $1331 (1 + 10/100)^{-3} = 1000$. The rate in a 3-year framework should be higher than that in the 2-year framework. Therefore, the individual is expected to be indifferent between $1000 now and a figure higher than $1331 after 3 years. In this framework, it would be justifiable to equate the rate of time preference with the expected rate of return, both being functions of time.

3.2 Rate of Return and Investment Decision Making in Islamic Perspective

In making investment decisions, it is mostly money capital that is under considera-
tion. The rent on this capital is called the rate of interest. This rate serves as a measure
of time preference. Since it is prohibited in Islam to award any rent to such capital, the
investment decision making will have to be based on expected rate of return on capit-
al. However, it is to be noted that though an investment decision will have to be made
on the basis of some expectation about the actual rate of return on capital, the capital
will not be rewarded on the basis of this expectation. It will be rewarded on the basis of
the actual return on capital after it has been realized. Therefore, while making an
investment decision, the decision maker, will have to consider expected rate of return
with all the uncertainties attached to it.

The uncertainties associated with a rate of return are of two types: (a) Uncertainties
(risks) related to time; and (b) Uncertainties (risks) unrelated to time. If we want to
account for the time value of money, it will be captured by that expected rate of return
which reflects a reward for time related uncertainties only.

Islam allows earning a profit through risk-bearing. If someone is willing to bear the
loss arising out of the uncertainties of time, then he is also allowed to gain from the
uncertainties of time. And if one is permitted to claim a reward for facing the uncer-
tainties of future, the future cash flows can be discounted for the time element
involved. Since longer time means, higher uncertainty, it is only reasonable to dis-
count distant future at a higher rate for making intertemporal comparisons.

4. Determination of Discount Rate in Islamic Perspective

The discount rate or the rate of time preference, even in conventional framework is
not directly observable. Since a rational consumer is assumed to equate his rate of
time preference with the time-value of his money at the margin, the time-value of
money can represent the rate of time preference and hence the discount rate. But as has
been explained earlier, the time-value of money can be determined only ex-post,
whereas discount rate must be known ex-ante in order to make investment decisions.
Conventional economics has an easy solution to this problem. If we assume away any
uncertainty, then the marginal productivity of capital, the time-value of money and the
interest rate all coincide. Hence interest rate which is fixed and predetermined can
serve as the discount rate. In Islamic framework, interest is not permitted, and there is
no ex-ante measure of the time-value of money. What measure, then, should we use to
represent the discount rate in Islamic perspective?

Before answering this question, it is instructive to note that even the rate of interest
may fail to represent discount rate in several practical instances. For example, if there
is disequilibrium in the market, which is a real situation in most of the economies, the
interest rate does not represent discount rate. Consider the following situation.

SS is a supply curve of investable funds. It results from consumer's choice i.e. from
equality of his discount rate (d) with the time value of his money (r). All points on this
curve, therefore, represent discount rates. The values on the X-axis corresponding to

each point on this curve are the levels of savings if the time value of money is equal to the discount rate at that point.

Supply and Demand of Investible Funds
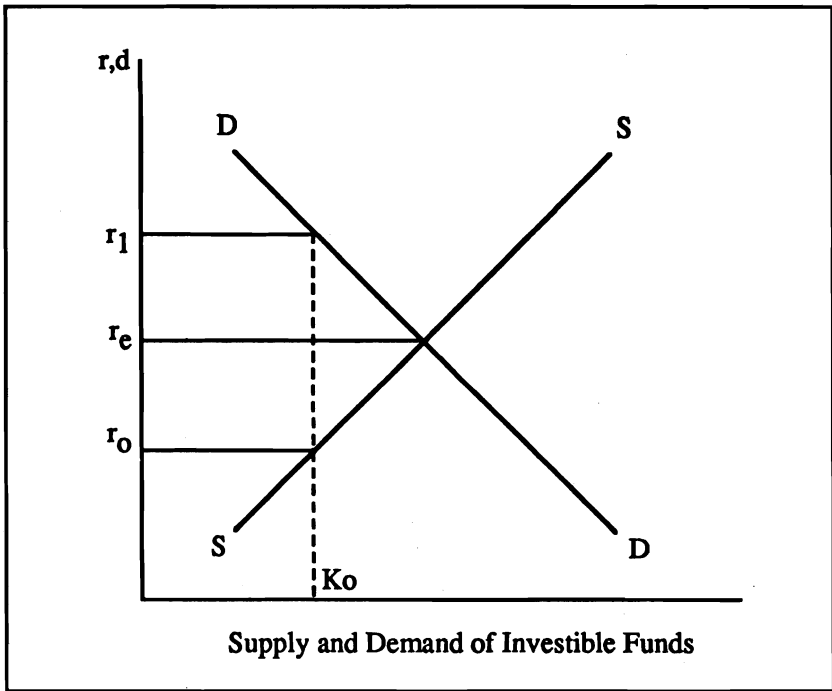
DD is a demand curve for investable funds. It is determined by the equality of marginal productivity of capital and the time-value of investable funds. At equilibrium, marginal productivity and discount rate are equal to the time-value of money which is called the interest rate (r).

Now suppose an economy chooses to have an artificially low rate of interest r_0. This will yield K_0 saving. But these savings do not have r_0 as their time value of money. The time value of money for these resources is r_1. However, r_1 is not observable ex-ante in the market. Hence, even in the conventional framework, practical situations may not justify use of the interest rate as the discount rate. The point is that, a rational consumer equates his discount rate with the time value of his money. On the other hand, a rational investor or the user of funds equates the rate of return with the cost of funds. The cost of funds is the time value of money that the supplier of investable funds will charge him.

Since in Islamic framework, the time value of money cannot be determined ex-ante, some proxy for the expected time-value of money will have to be used to make investment decisions. Time value of money can be approximated by the existing rate of return on capital. But the existing rate of return on capital will be different in different projects. These rates of return have two components: (a) rate of return due to bearing risks which are not related to time, and (b) rate of return due to bearing the

risks associated with time. It is the latter component that reflects time-value and is required to be used for time discounting in investment decision making. But it is difficult to separate the former component from the latter for any existing project to determine the pure time value of money.

To approximate the pure time value of money we need to look for portfolios in which all risks are almost non-existent or negligible except purely time-related risks. The rate of return on such portfolios could represent the discount rate. It is commonly believed that portfolio diversification reduces risks. Therefore, the rate of return on capital which has been distributed over large number of projects can provide a proxy for the time value of money since this rate of return will more closely reflect the reward for bearing the risks related to time related uncertainties alone. The rate of return on deposits of Islamic banks can be considered to be such a rate. The bank distributes the collected deposits to different projects and pays the depositors a return out of the collective profits of all funds. Hence the rate of return of Islamic banks on deposits of different maturities will give time value of money for different periods of time. The Islamic banks do offer different rates of return on deposits of different maturities which is consistent with the hypothesis developed earlier that rate of time preference is expected to be different for different time-frames. An alternative way of finding out the discount rate for time value may be to take projects of different duration already in operation and establish relationship between profit and risk for the projects of same duration in different groups based on the extent of riskiness. This will give us a function of the following type:

$$\pi_i = F(R_i^d) \tag{3}$$

Where π_i = Rate of return in projects of ith group. (Each group representing different level of riskiness).

$(R_i^d$ = Risk, measured by standard deviation, for the projects of duration d in the ith group.

The limiting value of this function when $(R_i^d) \longrightarrow o$ will be taken as the time value of money and hence the discount rate for that duration.

Hence, the discount rate = $\lim R_i^d \longrightarrow o \, F(R_i^d)$. $\tag{4}$

This rate of discount is different from that suggested by Zarqa (1983). He proposed that the rate of return in projects of comparable riskiness may be taken as the discount rate. Such a rate of return may be a valid basis for discounting private sector projects but this may not be an appropriate rate in case of public sector projects since the public sector projects are required to be discounted for pure time value of money. Other risks do not have much significance in case of these projects because they get distributed over large number of tax payers. In this way they are minimized and hence are not required to be accounted for.

5. Summary and Conclusions

This note addresses the following questions:

1. What is the concept of time value of money in Islamic perspective where interest is totally prohibited?

2. What implications does this concept have for discounting for time in project evaluation, particularly in the public sector?

The answers to these questions, in brief, are the following:

(a) Islam has nothing against having a positive time preference. However, it is more reasonable to think of the time preference as a function of time rather than treating it as fixed and independent of the time-frame under consideration.

(b) There is also nothing against realizing time value of money as long as it is not claimed as a predetermined value.

(c) Ex-post rate of return on capital is the only source to identify pure time value of money. Since the rate of return is also a function of the time-frame of the project, it is justified to use this rate to approximate the rate of time preference.

(d) Since ex-post rate of return is a result of two types of risk bearing, one related to time element alone and the other unrelated to time element; the pure time value of money and hence pure rate of time preference would be reflected by the rate of return due to time-related risk bearing only.

(e) The expected rates of return on Islamic banks' deposits of different maturities can be treated as close proxies for the rates of time preference and hence are the most appropriate rates to be used for the purpose of discounting projects of different maturities.

To conclude, economic agents in an Islamic economy will have positive time preference and there will be indicators available in the economy to approximate the rates of their time preferences. There is no justification to assume zero rate of time preference in an Islamic economy as is done in many studies on investment behavior in Islamic perspective.

Notes

1.   Sale on deferred payment basis, i.e. the goods are delivered now but the price is to be paid in future. The price in such a contract may be different from the prevailing market price.

2.   Sale on advanced payment basis, i.e. the price is paid now and the goods are to be delivered in future. The price in such a contract is permitted to be different from the spot price.

3.   See for example, Rafiq al-Masri (1986) and Kauthar Abdul Fattah al-Abji (1986).

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القيمة الزمنية للنقود والحسم الزمني
من وجهة نظر إسلامية

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البنك الإسلامي للتنمية – جدة

خلاصة

يطرح هذا البحث السؤالين التاليين :

١ – ماهو مفهوم القيمة الزمنية للنقود من وجهة إسلامية ، حيث الفائدة ممنوعة تماماً ؟

٢ – ما دلالات هذا المفهوم بالنسبة لعملية الحسم الزمني في تقويم المشروعات ، وبخاصة في القطاع العام ؟

ويجيب عنهما كما يلي :

(أ) ليس ثمة مانع إسلامياً من وجود "تفضيل زمني" موجب . لكن من المعقول أكثر النظر الى التفضيل الزمني على أنه تابع (دالة في) للزمن بدل النظر إليه وكأنه شيء ثابت ومستقل عن الإطار الزمني موضع البحث .

(ب) كما أنه لامانع من تحصيل قيمة زمنية للنقود طالما أن تلك القيمة ليست مشروطة سلفاً ولا محددة المقدار .

(ج) إن معدل العائد الفعلي على رأس المال هو المصدر الوحيد لمعرفة القيمة الزمنية الصافية للنقود . لكن ذلك العائد هو أيضا تابع للإطار الزمني للمشروع ، ما يبرر استعماله كقيمة تقريبية لمعدل التفضيل الزمني .

(د) إن معدل العائد الفعلي هو محصلة لتحمل نوعين من المخاطر : أحدهما مرتبط بعنصر الزمن وحده والآخر غير مرتبط بالزمن . لذلك فإن القيمة الزمنية الصافية للنقود ، ومن ثم معدل التفضيل الزمني الصافي ، سيظهر أثرهما فقط في ذلك الجانب من معدل العائد الفعلي الناجم عن تحمل المخاطر المرتبطة بالزمن .

(هـ) إن معدلات العائد المتوقعة على الودائع الاستثمارية المختلفة الآجال في البنوك

الإسلامية يمكن اعتبارها مؤشرات قريبة لمعدلات التفضيل الزمني ، لذلك فإن معدلات العائد المذكورة هي أفضل ما يمكن استخدامه في الحسم الزمني للمشروعات ذات الآجال المختلفة .

ويستنتج الكاتب أن الوحدات الاقتصادية في اقتصاد إسلامي سيكون لديها تفضيل زمني موجب ، وستكون هناك مؤشرات اقتصادية على معدلات ذلك التفضيل . وليس هناك مبرر لافتراض معدل تفضيل زمني يساوي الصفر كما فعلت دراسات عديدة للسلوك الاستثماري في إطار إسلامي .