Relative Stability of Interest-free Economy

SALIM U. CHISHTI

Associate Professor of Economics and Chairman,
Graduate Studies, Applied Economics Research Centre,
University of Karachi, Pakistan

ABSTRACT. Islamic financial facilities like profit and loss sharing (PLS) are flexible enough to provide built-in stabilizers to the investment process. The amplitude of all phases of the business cycle will be smaller in an Islamic economy compared to advanced capitalist economies where the fixity of the fluctuating short term interest rates account for the unstable and cyclical behaviour of investment. This is demonstrated by emphasising the dependence of investment decisions on financing and capital valuation (following Gordon, Tobin, and Minsky) then using a qualitative model of two differenttial equations to express financing conditions and investment behaviour.

PLS financing makes payment commitments a function of cash flows and strongly discourages the financing of speculative borrowers - thus, eliminating the main sources of volatility in capitalist economies.

I. Introduction

The hypothesis examined here is that the unstable and cyclical behaviour of investment and therefore the inherently unstable behaviour of an advanced capitalist economy can be explained in terms of the fixity of the fluctuating short-term interest rate. Islamic financial facilities like PLS (i.e. Profit-Loss Sharing), which are relatively more flexible may provide built-in stabilizers to the investment process.

It may be mentioned at the outset that only the relative stability of investment under the two systems of fixed and flexible returns to capital is examined. There are other significant differences between the two systems, for instance, in terms of relative efficiency of the financial sector, effectiveness of monetary policies, resource mobilization, etc., which are not considered here.

II. Investment Theories

The neoclassical micro theory of investment is regarded primarily as the adjustment of actual capital stock to the desired capital stock. However, it is now widely recognized that without postulating some adhoc assumptions regarding adjustment costs, the rate of adjustment (i.e., investment) remains indeterminate [Gould. 1968; Haavelmo, 1960]. Furthermore, neoclassical investment theory tends to neglect the financing conditions in investment decisions. This view is clearly reflected in Miller Modigliani Theorem [Modigliani, 1958,1961]. However, attempts have been made to rehabilitate the role of financing conditions in the Miller-Modigliani framework, primarily by relaxing some of their assumptions [Grossman, 1982; Jensen, 1976].

The neoclassical macro theory of investment is simply an aggregation of typical firms. As such, the theory is not quite equipped in explaining either the instability or the cyclical aggregate behaviour of investment.

Kalecki's theory of investment focuses primarily on the explanation of cyclical aspects of the market economy [Kalecki, 1935, 1968, 1971]. His cyclical mechanism is based on: (i) the self-stimulating effect of investment, and, (ii) the retarding effect due to an increase in capital stock. However, he resorts either to external shocks or to specific values of the parameters in his difference-differential equations to generate business cycles. Frisch has demonstrated that the validity of Kalecki's results is highly sensitive to the values of the parameters chosen [Frisch, 1935].

Though financial and capital valuation aspects in investment decisions have been considered in earlier works, yet they have been particularly emphasized recently by Gordon, Tobin and Minsky [Gordon, 1962; Tobin, 1982; Minsky, 1982]. Minsky has specifically identified financial and capital valuation aspects to explain the inherent instability of advanced market economies. Since the model put forth here is closely related to Minsky's approach, a brief description is in order.

Minsky has rejected the neoclassical position that capitalist economies are inherently stable and large business fluctuations are produced either by exogenous shocks or by human errors. He asserts that the financial arrangements in advanced capitalist economies are inherently unstable. Since investment is closely related to financing process, therefore, this instability is transmitted into investment.

According to Minsky the fragility of the financial system depends on the relation between contractual commitments (which are essentially interest and the principal on debts), and the cash flows from regular operations (which are essentially profits). With respect to this relation, he classifies business firms into three groups, namely, hedge, speculative and ponzi.

For hedge units, cash flows are expected to exceed payment commitments on out standing debts in every period. For speculative units, cash commitments on debts exceed cash flows from regular operations for only some periods. For ponzi units, cash payments exceed cash flows for almost all near-term periods.

During a prolonged period of tranquility, prices of capital assets tend to rise, and portfolio preferences shift towards more speculative and ponzi financing. This makes the economy very sensitive to interest rate variations. The cost of short-term debt in financial structure increases and the weight of cash in portfolios declines. Falling profits and rising interest turn some hedge units into speculative units and speculative units into ponzi.

When many speculative and ponzi units find it difficult to meet payment commitments with cash flows, they issue more debt. Where it becomes increasingly more difficult to meet payment commitments by emitting more debt, ponzi/speculative units start selling out their assets. However, when many units resort to generate cash by selling out their assets, it causes a fall in asset prices. If the asset prices fall to the level of their cost of production or even below, new investment virtually stops. But, then this very low level of investment exerts pressure on profits to rise and this merry-go- round starts all over again.

This basic idea of Minsky that "... the relation between cash receipts and payment commitments determines the course of investment and thus employment, output and profits" is retained here [Minsky, 1982, P. XVII]. The only wrinkle added is to interpret the fixity of financing terms, vis-a-vis the uncertainty of profits to be mainly responsible for the gap between cash flows and payment commitments. Under Islamic financing arrangements, payment commitments are made a function of cash-flows. They move together in the same direction. As said above, under traditional financing system, at times, the gap between cash flows and payment commitments becomes so wide that it produces a chaos in the asset market when many units try to sell assets to generate cash in attempts to meet their commitments. This chaos is eased under the relatively more flexible Islamic financing arrangements in which payment commitments are made to move automatically in line with cash-flows and hence provide built-in stability to investment process.

III. The Model

The model presented here consists of two differential equations. One is related to the financing conditions and the other to the investment behaviour. The model is defined in very general terms and studied on the basis of qualitative theory of differential equations. It has close resemblance with the models developed by Albrecht and by TSO [Albercht, 1974; TSO, 1981]. The interaction between cash-flows and cash- commitments is shown to generate unstable cyclical behaviour of investment, which can be dampened by introducing Islamic financial facilities.

(A) Financing Conditions

It is postulated that the proportional change in cash-commitments is a function of the level of investment and the level of existing cash commitments, i.e.,

$$\frac{\dot{C}}{C} = f(I, C) \tag{1}$$

$$\frac{\partial f}{\partial I} > 0; \frac{\partial f}{\partial C} < 0$$

where C is the level of cash-commitments and I is the level of investment.

The first inequality is positive because an increased investment will lead to increased external financing, and hence, increased cash-commitments. The second inequality is negative because increased cash-commitments will lead to stringent financing conditions, and hence, discourage further cash-commitments.

(B) Investment Relation

It is postulated that the pace of investment depends on the changes in the valuation of capital assets, i.e.,

$$\frac{\dot{I}}{I} = g(P_k)$$

where P_k is the valuation of capital assets. It is further assumed that P_k is a function of payment commitments C and gross profits which are proxied by investment, and therefore,

$$\frac{\dot{I}}{I} = g(I,C) \qquad\qquad (2)$$

with $\dfrac{\partial g}{\partial I} > 0, \dfrac{\partial g}{\partial C} < 0$

First inequality is positive because a higher amount of investment will lead to a higher amount of profit, therefore more internal funds will be available for investment. Second inequality is negative because an increase in payment-commitments will lead to a squeeze in the availability of internal funds for investment.

The phase diagram corresponding to equations (1) and (2) is presented below:
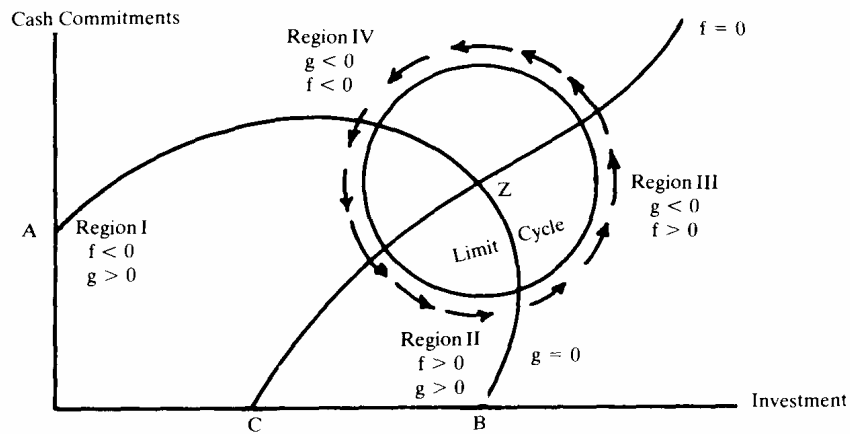
Under quite plausible assumptions about the functions f and g (which are spelled out in the Appendix) it has been shown that the system of these equations generates limit cycles [Minorosky, 1962]. Further, in this system, the oscillations are not generated by exogenous shocks. They are inherently produced by the system itself [Andronov, 1966; Minorosky, 1962]. The force behind the generation of these limit

cycles is the non-linear interaction between the stimulating effect of profits on investment and the retarding effect of the worsening financing conditions. This cycling mechanism can be seen clearly in the phase diagram.

In Region I, the levels of investment and payment-commitments are low. The low levels of investment can be financed by internal funds and the excess of cash flows over investment expenditures may be used to retire some existing debts. At this low level of investment prospective yields are high, which stimulate investment. This scenario corresponds to the upswing of the business cycle.

In Region II, the general optimism continues, which leads to forecast high yields and adopt high capitalization rates. Therefore, valuation of both the existing and new capital goods tends to rise and hence investment continues to rise. Under these optimistic conditions, bankers willingly provide the necessary external finances to meet the investment plans. However, in general long-term assets are acquired by emitting relatively short-term liabilities. And therefore debt payment commitments rise faster than cash flows.

As the economy moves into Region III, which represents the late stages of the boom, the level of investment becomes so high that it dampens the prospective yields. High levels of cash commitments tend to lower the capitalization factor. Therefore, valuation of existing capital as well as new investment starts to fall. This leads to a fall in profits and cash flows. On the other hand, the payment commitments, at terms corresponding to the past optimism, remain the same. For many operating units it becomes difficult to meet their cash commitments with their cash flows. To meet this gap, they emit more debt. The lender's risk goes up, and therefore the terms of refinancing become more stringent. Gradually the system reaches to a limit when it becomes difficult to borrow from one to repay to the other, and entrepreneurs have to sell their assets to generate cash to meet their payment commitments. When many of them attempt to sell assets in a thin market, asset prices fall and sellers have to accept capital losses. The incidents of foreclosures, bankruptcies, selling of subsidiaries etc., become more frequent. Because of significant fall in asset prices, new investment almost stops. This corresponds to Region IV. Once the economy hits the bottom, the merry-go-round starts again.

To sum up, it is the spread between cash-flows (i.e., profits) and payment-commitments (i.e., interest payments) which is the main source of instability in investment. However, it is also obvious that the real source which generates this gap is the fixity of the dated payment commitments versus the uncertainty of cash flows. If somehow, the uncertainty of cash flows may be linked with the payment commitments, in a way that they move together, this gap can be eliminated to a great extent. More specifically, if the terms of financing are linked with the profit rate, the chaotic conditions which make investment as the most unstable component of GNP, may be avoided. The elimination of asymmetry between the fixity of interest rate and the uncertainty of profit rate, is the essential feature of the Islamic financing system which distinguishes it from the traditional financing system. Islamic financing facilities make the payment commitments a function of cash flows because the financing terms have to adjust according to the changing conditions such that the ratio of cash flows to cash

commitments remains relatively stable. This provides a built-in stabilizer to reduce the volatility of investment. In an advanced capitalist economy with a sophisticated financial market, the volatility of investment is largely because of speculation rather than productivity changes. By tieing the financing terms to the performance, Islamic financial facilities strongly discourage the lenders to validate the ponzi financing efforts of the speculative borrowers.

This stabilizing effect of Islamic financing arrangements can be traced more clearly in terms of the above model through the corresponding phase diagram.

Suppose we start in Region I, which characterizes the early stages of the boom, when both C and I are low, $f > 0$, $g < 0$. The low level of investment can be financed by internal funds. Prospective yields are high enough to stimulate further investment.

In Region II, investment continues to rise. Entrepreneurs continue to forecast high prospective yields. Increased investment requires external financing. In an environment when the 'borrowers' know that a part of their risk is shared by the 'lenders,' they will attempt to translate their optimism into accelerated investment, mainly through external financing. However, the 'lenders', knowing that they will have to bear the consequences if the optimism does not materialize, probably will behave more cautiously. Instead of adding fuel to fire, as the lenders do under traditional banking in a euphoric environment of a boom, they will put a safety lid to the animal spirits of the entrepreneurs. Nevertheless both investments and cash commitments will increase, but not as rapidly as in the case when lenders do not share any of the borrower's risk and willingly accept the entrepreneur's optimism.

In Region III, the late stages of the boom, high levels of investment dampen the forecasts of prospective yields as well as actual yields. However, unlike the fixed interest case, where cash payments remain the same, payment commitments under variable return schemes are adjusted to the decline in cash flows.

Therefore, the need for re-financing the maturing 'debts' will not be at the same scale as it was when payment commitments remained fixed at terms corresponding to the past optimism. Moreover, the terms of refinancing will not be as prohibitively stringent as would have been otherwise when borrowers could not pay their maturing debts. Therefore, investments will not fall as fast as under traditional financing facilities.

Finally, Region IV was characterized by a major restructuring of portfolios in order to generate additional cash to meet the payment commitments. These efforts on a large-scale result in a sharp drop in the valuation of capital assets and a chaos in investment. This chaos is generated because the spread between cash flow and cash commitments is so large that it cannot be bridged by refinancing. However, under Islamic financial arrangements the gap is never so wide as to force many operating units to sell out their assets to meet their commitments which creates a panic in the capital asset market and leads to an abrupt fall in asset prices and hence adversely affects new investment. The flexibility in the Islamic financial arrangements automatically monitors this gap and thus provides a built-in stabilizer to the capital asset market and hence to investment.

Conclusion

We conclude that under the Islamic financial system the amplitude of all phases of the cycle will be smaller. Both the euphorism and the pessimism which are inherent characteristics of an advanced capitalist economy are checked by distributing the uncertainty of profits to both the business and financial community. Though, by accepting extra risk, financial institutions partly play the entrepreneural role (for which they are compensated in lieu of the services of capital provided by them) they still continue to play their major role as financial intermediaries.

It may also be mentioned here that according to the above model, the volatility in investment can be reduced by an extended use of the mortgage loan financing with adjustable interest rates, although, the expost adjustability of interest in mortgage loans is significantly different from the flexibility required by the Islamic modes of financing. An adjustable mortgage loan is primarily a loan that permits adjustment of interest rate. This adjustment must be tied to the movement of an agreed-upon interest index which cannot be manipulated at the discretion of either the lender or the borrower. Since the chosen index reflects the general business conditions, therefore, it protects the lender and the borrower from the uncertainties which have an across- the-board effect. But the flexibility required in an Islamic financing instrument protects the borrower from the uncertainty related to the performance of that particular investment of borrowed capital This protection is far more comprehensive than the one provided by adjustable mortgage loans and determines other features of the Islamic economic system.

Appendix

In order to generate limit cycles with differential equations (1) and (2), the following assumptions are made:

(i) There exists a lower limit on investment, I_c such that all of it may be financed internally, i.e.,

$$f(I_c,O) = 0 \text{ for } I_c > 0$$

(ii) The impact on payment-commitments due to an increase in investment is larger than the impact on payment-commitments due to the stricter financing conditions because of the increased level of payment-commitments, i.e.,

$$e_{f,I} > - e_{f,C}$$

(iii) $$g(0,0) > 0$$

This simply means that at very low levels of investment, the rate of profit will be high enough to induce some investment which at very low levels of payment-commitments, may be financed by internal funds available for investment.

(iv) There exists an upper limit C_A on payment-commitments beyond which investment is discouraged, i.e.,

$$g(0 ,C_A) = 0$$

(v) There exists an upper limit I_B on investment beyond which additional investment is not coming, i.e.,

$$g(I_B, 0) = 0$$

(vi) $$e_{g,I} < - e_{g,C}$$

This is a plausible assumption because an increase in payment-commitments is due to financing new equipment and therefore the impact of relatively stringent financing condition will be on new investment. On the other hand, a significant part of the increase in profits due to an increase in investment will be absorbed by the existing stock of capital.

(vii) $$I_c > I_B$$

This is obviously true, because I_c represents that lower limit of investment all of which can be financed internally, whereas I_B is that upper limit of investment beyond which further investment is not coming.

(viii) At z, the intersection of f = 0 and g = 0,

$$I_z \left.\frac{\partial g}{\partial I}\right|_z > -C_z \left.\frac{\partial f}{\partial c}\right|_z$$

This inequality means that the stimulating effect of investment on itself is stronger than the retarding effect of payment commitments on further growth.

Under the above assumptions, and invoking Poincare-Bendixon Theorem, a region can be constructed such that the paths inside the region are limit cycles.

References

Albrecht, F., Gatzke, G., Hddab, A. and **Wax. N**.: The Dynamics of Two Interacting Populations. *Journal of Mathematical Analysis and Applications*, **46**, 1974.

Andronov, A.A., Vitt, A.A. and **Khaikin, S.E**.: *Theory of Oscillators*, Pergamon Press, 1966.

Friedman, M. and Schawartz Anna J.: *A Monetary History of the United States*; 1867-1960, NBER, 1963.

Frisch. R. and **Holme, H.,** "The Characteristic Solutions of the Mixed Difference and Differential Equation Occurring in Economic Dynamics". *Econometrica*, 1935.

Gordon, M.J.: *The Investment Financing and Valuation of the Corporation*, Irwin Homewood, 1962.

Gould, J.P.: "Adjustment Costs in the Theory of Investment of the Firm" *Review of Economic Studies*, 1968.

Grossman, S. and **Hart, O.,** "Corporate Financial Structure and Managerial Incentives", in *The Economics of Information*. McCally (ed.) NBER Conference Report No. **32**, University of Chicago Press, 1982.

Haavelmo, T.: *A Study in the Theory of Investment*, Chicago University Press, 1960.

Jensen, M. and **Mecking, W.** "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure", *Journal of Financial Economics*, October, 1976.

Kalecki, M.: "A Macrodynamic Theory of Business Cycles". *Econometrica*, 1935.

Kalecki, M.: "Trend and the Business Cycle", *Economic Journal*, 1968.

Kalecki, M.: *Selected Essays on the Dynamics of the Capitalist Economy*, Cambridge University Press, 1971.

Minorosky, N.: *Non-linear Oscillations*, Litton, 1962.

Minsky, H.P.: *Can It Happen Again: Essays on Instability and Finance*, Sharpe, M.E., 1982.

Minsky, H.P.: *John Maynard Keynes*, Columbia University Press, 1975.

Minsky, H.P.: *Financial Instability Revisited*, Washington D.C.; Board of Governors, Federal Revenue System, 1970.

Modigliani, F. and **Miller, H.M**.: "Dividend Policy, Growth, and the Valuation of Shares", *Journal of Business*, 1961.

Modigliani, F. and **Miller, H.M**.: "The Cost of Capital, Corporations, Finance, and the Theory of Investment", *American Economic Review*, 1958.

Temin, Peter: *Did Monetary Forces Cause the Great Depression?* W.W. Norton & Co., 1976.

Tobin, J.: *Essays in Economics*; Vol. **1,** (1976), Vol. **2,** (1975), Vol. **3** (1982).

TSO, Ping-Sho: *Theories of Investment and Financing*, Ph.D. Thesis, Washington University, 1981 (Un published).

الاستقرار النسبي في اقتصاد لاربوي

سليم تششتي

أستاذ مشارك – مركز أبحاث الاقتصاد التطبيقي

جامعة كراتشي – باكستان

المستخلص : إن تسهيلات التمويل الإسلامية، كالمشاركة في الأرباح والخسـائر مـثلاً، مرنة إلى قدر يجعلها عوامـل استقرار ذاتـي في عمليـة الاستثمار. وإن سـعة الـدورة (مـدى التقلب) في مختلف أطوار الدورة التجارية ستكون أقل في اقتصـاد إسـلامي منهـا في اقتصاد رأسمالي متقدم. وقد توصلنا إلى هذه النتيجة الأساسـية بـالانطلاق مـن عـدد مـن النظريـات الحديثـة الـتي تؤكـد اعتمـاد قـرارات الاسـتثمار علـى اعتبـارات تمويـل وتقـويم رأس المـال (كنظريات غوردن وتوبن، وبخاصة منسكي)، وباستخدام نموذج رياضي نوعي (غير كمـي) من معادلتين تفاضليتين تمثلان شروط التمويل والسلوك الاستثماري.

ويبدو أن ثبات الالتزامات المالية – في حالة التمويل بالفائدة – مع تقلب الإيرادات، هو سبب للتقلب وعدم الاستقرار في الاستثمار، بينما يربط التمويل الإسلامي الالتزامات الماليـة بما يحققه المشروع فعلاً، كما أنه يُثبِّط كثيراً تمويل المضاربات المغامرة، وبذلك يستبعد مصادر رئيسية لتقلب الاستثمار في الاقتصاد الرأسمالي.