THE INDUSTRIALIST AS PRODUCER, TRADER, SIDE BANKER AND THE SELECTIVE CREDIT POLICIES*

By P. E. PETRAKIS (Ph. D.)
Assistant Professor

ABSTRACT

This article deals with the problem of the effectiveness and the conditions of the bank rate of interests by the monetary- credit authorities for the influence of the real and monetary variables of industry.

It is found that according to the specific features of the model developend the use of the bank rate of interest of the short-term credits by the monetary-credit authorities is an effective means for the influence of the short-term entrepreneur behaviour. In this article, the relative particular conditions are analyzed.

INTRODUCTION

This article deals with the problem of the effectiveness and the conditions of use of the bank rates of interest by the monetary-credit authorities for the influence of the real and monetary variables of industry.

I wish to extend my.thanks to Professor S. Thomadakis (Baruch: College, City University of New York) for his valuable assistance to the establishment of the basic structures of the entrepreneur model adopted.

Mr. S. Hatjidakis' conribution to the solution of the: mathematical problems has also been decisive.

The subject of this article is treated analysing the short-term micro-equilibrium of the «industrialist» who presents a multiple function; that of the producer, of the trader and of the side-banker. The producer's function is associated with the handling of capitals to the movement of the circuit production-sales. The trader's function is associated with the handling of capitals to the movement of the circuit reserves-sales. Finally, the side-banker's funion is associated with the handling to the movement of the circuit loan-financing of customers-sales. It is then particularly interesting to see how are related the levels of the three fields of activity to the point of optimization of the objective function under various assumptions of rates of interests.

This article could be classified in the works analysing the more general question of the influence of the selective credit policies in the entrepreneur behaviour. Such works are those of D.C. Rao and I. Kaminow (1975), J.H. Wood (1975) and E. Baltensperger (1978) and others.

1. HYPOTHESES CONCERNING THE ENVIRONMENT OF THE ENTREPRENEUR ACTIVITY

The basic characteristics of the more general economic environment incorporated to the model used are the following :

(i) The commercial banks supply the total of the short terms credits in industry. Their interest rate policy is directly controlled by the monetary-credit authorities.

(ii) Economic policy uses the rates of interest on lending as means of a developing policy with various targets. This article does not concerns with the developmental applications of these operations. For the present paper, it suffices to note that as a result of these operations the entrepreneur has to face an exogenously determined rate of interest for the short-term banking credits.

(iii) There is unemployed productive capacity and excess of labour supply in economy.

(iv) A tight monetary policy is exercised and therefore the cost of capital is generally high.

(v) The capital market is extremely weak and therefore it is not taken into consideration.

2. INDUSTRY AS THE CREDITOR OF TRADE

The origin of the phenomenon of the involvement of producers in the granting of credits to the clients purchasers of the products lies to the «developmental» specification of the operation of the credit system. According to these specifications, the financing of the trade is approached with reservation. On the contrary, the credit potential of industry is deliberately increased with a view to its being in a position, in its turn, to provide credits to its clients. This trend has been strengthened by industry itself, since the enlargement of its credit providing potential increases its ability to control the market, by converting the credit potential into a means of sales promotion.

3. THE ENTREPRENEUR BEHAVIOUR MODEL

The entrepreneur behaviour will analysed within the frame of a model in which we distinguish two periods, t and t+1. The entrepreneurial unit wishes to maximise its profits at the end of the t+1 period. So, the t+1 period is character rized by the fact that at the end thereof the entrepreneur «does his accounts» to calculate whether he has succeeded in his targets, without any perspective for the continuation of the productive function for a further period.

Thus, particular attention should be drawn to the t period as it is in this that entrepeneur behaviour reaches its full development.

Some aspects of entrepreneur behaviour are considered as being not activated because of the short-term character of the model. Thus, no mention is made for investments in fixed assets to the entrepreneur divided policy, nor is the prospect financing from equity dealt with. The purchase of the product of the entre. preneurial unit and the purchase of labour are fully competitive.

Included in the entrepreneur function are the

— productive function

— building of inventories

— borrowing and lending function

3.1. Productive function and building of inventories

As an introduction to the productive and building of inventories function of the entrepreneur we shall first stress and subsequently analyse that the entrepreneur, having as a rule the maximization of his profits, can determine the quantity of the product he must produce, provided that he can determine the levels of product he will keep as inventories and those he will sell.

In order to introduce the production activity to the model of the entrepreneurial behaviour, but without any extension to the investment function, we suppose that the industrialist adapts his production in order to maximise his profits, engaging and dismissing personnel. This hypothesis inplies unemployed productive capacity and excess labour potential.These conditions are valid for the circumstance prevailing in industry during the last decade. Thus, is Z is the volume of the product produced and L the volume of work used, then the production function function will have the following linear form : ?

(1) $$Z = Z(L), \ Z' > 0$$

On the purpose of the adoption of a specific form of function of building of inventories first clarified the issue of what incentives for inventories building we shall accept as prevailing in the entrepreneur behaviour. The issue may be put as follows: shall we accept as prevailing incentives of inventories building the purpose of providing against changes in demand for the products and of the ease of trading or shall we accept as the dominat motivation the speculation or finally shall we accept a matching of the above!

In accordance with the model developed here, the business aims in each period to produce as much of the product (Z) as it wishes to sell in the same period (Z^S) and as much it wishes to store for reasons of speculation (I_n^S). That is, $Z = Z^S + I_n^S$. This hypothetical behaviour is particularly valid in periods when money is expensive, thus the financing for inventories is also particularly dear. In such conditions, the business estimates the cost of the damage to its reputation for delays in carrying out orders, as cheaper than the financing of the satisfaction of providential motives in building up inventories.

In addition, the above version adopts the view that the producer is able to sell as much as he wishes to sell. We shall also take as given full total entreprenuerial foresignt in the matter of the developement of prices, so that the expected change in prices coincide with the change in prices observed.

It is obvious that there is complete consistency in the definitions of the model as concers production and sales, given that the model does not allow for leakages in other periods. Thus, the total production in each period is given as follows:

period t : $Z_t \equiv Z_t^S + In_t^S$

period t+1 : $Z_{t+1} \equiv Z_{t+1}^S$

In period t, the industrialist produces a product so that he sells one part during the same period and one part is for storing, for sale in the next period. In period t+1, the idustrialist produces only to sell in the same period, since there is no next period to build inventories for.

On the other hard, sales are defined as follows :

period t : $S_t \equiv Z_t^S$

period t+1 : $S_{t+1} \equiv Z_{t+1}^S + In_t^S$

In period t, the industrialist sells only what he had produced during the same period plus the inventories of the previous period.

Thus, finally, the following holds good. :

$$\sum_t^1 Z \equiv \sum_t^1 S$$

since $Z_t^S + In_t^S + Z_{t+1}^S \equiv Z_t^S + Z_{t+1}^S + In_t^S$

The two functions of production for the periods t and t + 1 will be the following :

$$(2) \qquad Z_t^S + In_t^S = Z(L_t)$$

$$(3) \qquad Z_{t+1}^S = Z(L_{t+1})$$

where $Z' > 0$

As far as the matter of the specific form of the behavioural function of inventories is concerned, we shall adopt the following linear form :

$$(4) \qquad In_t^S = In^S(\dot{p}\ Z_t^S) \text{ with } In^S > 0$$

where $\dot{p}$ represents the rate of changes in prices.

In its specific form, the function of inventories building on one hand suggests the sensitivity of the entrepreneur to the developments in prices, but, on the other hand, it suggests that the strategic variable of the entrepreneur is not the inventories itself but the relation of the inventories to the sales, which fact brings us closer to the philososphy of the accelerator theory in «classical» theoretical views of inventories behaviour. Thus, the introduction of the motives of foresignt and transactions in entrepreneur behaviour is to some degree achieved. In period t+1, the entrepreneur has no reason to build inventories, since, at the end thereof, he is supposed to «sell» his enterprise.

3.2. The borrowing and lending behaviour of the entrepreneur

The borrowing and lending entrepreneur behaviour in the model has two aspects. The first is connected with borrowing from the banking system and the other with lending to the clients.

Concerning the entrepreneur's borrowing from the banking system, here we shall accept that it is only of a shor (t-t) erm character, where C is the credits he is borrowing. The rate of interest atwhich the industrialist borrows from the banking system is specified by the monetary authorities.

In the case of lending to clients, we shall accept that it is only of a short-term nature. The industrialist specifies the rate of interest to debit his clients in order to maximise his profits. The model does not adopt a function between the short-term banking credits and the short-term banking rate of interest. The industrialist does not borrow and does not lend during the t+1 period.

The short-term banking credits are returned to the banking system within the next period together with the interest they have earned. On the contrary with what happens with the banking credits, the industrialist receives the interests of the capital he lends to his clients within the same period these are created although he takes back his capital, in the next period.

In other words, the industrialist has two advantages from his lending to the clients. The first reports to the profits he has from the interests he receives. The second is related to the fact that he receives these interests within the same period these are created. In this way, his liquidity position is considerably improved. Lest us note that, in reality, it is a very common practice during the side-bank lending of the customers, the real sum they receive to be equivalent to the total sum agreed minus the interests created at least for one period.

In this point we should add that, according with the third dimension of the entrepreneurial behaviour of the «industrialist», i.e. the side-banking, capital is involved in the handling of the circuit borrowing-financing the client sales. This fact will be reflected in the model by accepting that the credits to clients are a function of the sales and the rate of interest by which he credits the buyers of the products.

For the credits he borrows to the clients, the linear relation hereinafter applies:

$$(5) \qquad L^C = L^C = (Z^S,\ r^C),\ L^C_{Z'} > 0, \quad L^C r^{c'} > 0$$

where L_t^C is the credits to the clients

r^C is the rate of interest by which are debited the credits to the clients

3.3. The maximisation of the entrepreneur's profits and the inflows - outflows equatinos

In accordance with what has been previously explained, we can now determine the net income of the enrerpreneur in periods t and t+1 as well as the equations of inflows-outflows of capital for the two periods :

Net income of t period

(6) $Z_t^C + r^C L_t^C - L_t$

Net income of t+1 period

(7) $Z_{t+1}^S + (1 + \dot{p})\, In_t^S - L_{t+1} - rC_t$

Equation of inflows - outflows of t period

(8) $Z_t^S + C_t + r^C L_t^C - L_t - In_t^S - L_t^C$

Equation of inflows-outflows of the t+1 period

(9) $Z_{t+1}^S + (1+\dot{p})\, In_t^S + L_t^c - L_{t+1} - (1 + r)\, C_t$

The function of the entrepreneur's profits during the t+1 period will consist of the net profit of the t period in values of period t+1 plus net income of the t + 1 period.

$$(10) \qquad V = Z^{S}_{t+1} + (1 + \dot{p})\ In^{S}_{t} - L_{t+1} - rC_{t} +$$

$$+ (Z^{S}_{t} + r^{C}L^{C}_{t} - L_{t})(1+r)$$

All magnitudes in (10) are expressed in the values of the t+1 period, using r discount rate, which is the same as the short-term banking rate of interest.

So, the problem of the industrialist may be expressed as follors: Max V subject to the limitations represented in Nos (8), (9), (2), (3), (4) and (5).

4. THE FINDINGS

The maximization of the entrepreneur's objective function necessitates the satisfaction of the conditions of the first and second order. Supposing that the conditions of second order are satisfied as to the existence of a point of maximization, we use the conditions of first order in order to calculate the effect from an unexpected alteration of some exogenous variables and particularly of the bank rate of interest on basic entrepreneurial variations. This effect is presented by the first derivatives of the endogenous variations as to the change of the bank rate of interest.

1. From the sign of the derivatives that present the effect of the change of the short - term bank rate of interest of the basic entrepreneurial variations (See Table No 1), we find out that only the rate of interest by which the entrepreneur debits his clients will be altered to the same direction with the bank rate of interest. All other entrepreneurial variations, i.e. the credits to the clients, the production destined to be sold, the reserves, the labour used and the banking credits, will change to the opposite direction, where will move the bank short-term rate of interest.

TABLE 1

The influence after one change of the exogenous variables in the basic entrepreneurial variables

Endogenous variables / Exogenous variable	r^c	L^c	I^s	In^s	L	C^s
r	> 0	< 0	< 0	< 0	< 0	< 0

Note : The values of the derivatives are estimated in the annex

2. Taking advantage of the fact that the derivative $\frac{dr^C}{dr}$ appears in all other derivatives, the expressions of derivatives, as these appear in the annex, may be rewritten as follows :

$$(11) \qquad \frac{dr^C}{dr} = \frac{In^{S'}}{L^{C'}_{Z^C}} \cdot \dot{p} \cdot \frac{1}{r^2}$$

$$(12) \qquad \frac{dL^C}{dr} = \frac{dr^C}{dr} \cdot L^{C'}r^C$$

$$(13) \qquad \frac{dZ^S}{dr} = \frac{dL^C}{dr} \cdot \frac{2}{L^{C'}_{Z^S}}$$

$$(14) \qquad \frac{dIn^S}{dr} = \frac{dZ^S}{dr} \cdot I_n^{S'} \cdot \frac{\dot{p}}{P_t}$$

$$(15) \qquad \frac{dL}{dr} = \frac{1}{Z'} \left(\frac{dz^S}{dr} + \frac{dIn^S}{dr} \right)$$

(16) $\frac{dc}{dr}$ = As this can be seen in the annex, this derivative derives from the solution of equilibrium for the short-term bank credits. As the solution for the short-term banking credits is developed after the evaluation of all the other solutions of equilibrium for the endogenous derivatives is a complicated expression. But it is clear

that the short-term credits receive all direct and indirect influences from the change of all the other endogenous variables.

On the basis of the form we have given to the values of the derivatives, as these appear in Nos (11) to (16) above, we can make the following basic remarks : The process of interaction among the entrepreneurial, after an alteration of the bank rate of interest, short-term credits may be represented in Fig. 1. It is found out that, after one alteration of the bank rate of Internet the process of interaction is transmitted via the alteration of the rate of interest to the credits granted by the industrialist, to the credits granted to the clients. From there, it is transmitted to the real variables, that is production, reserves, labour, in order to end to the credits needed for borrowing from the banking system in order to finance his activities. Thus, an increase (decrease) of the bank rate of interest drives to increase (decrease) of the rate of interest on the creadits to his clients and to decrease (increase) these credits. At the same time, he will decrease (increase) the production for sale as well as his inventories. So less (more) labour and finally less (more) credits from the banking system will be necessary.

3. Due to the primary place in the clain of the interactions, the value of the derivative representing the alteration sustained by the rate of interest of the credits to the clients after a change of the banking interest becomes of a critical importance. The main factors influencing his are (see No 11) :

— the level itself of the banking interest

— the rate of change "in prices

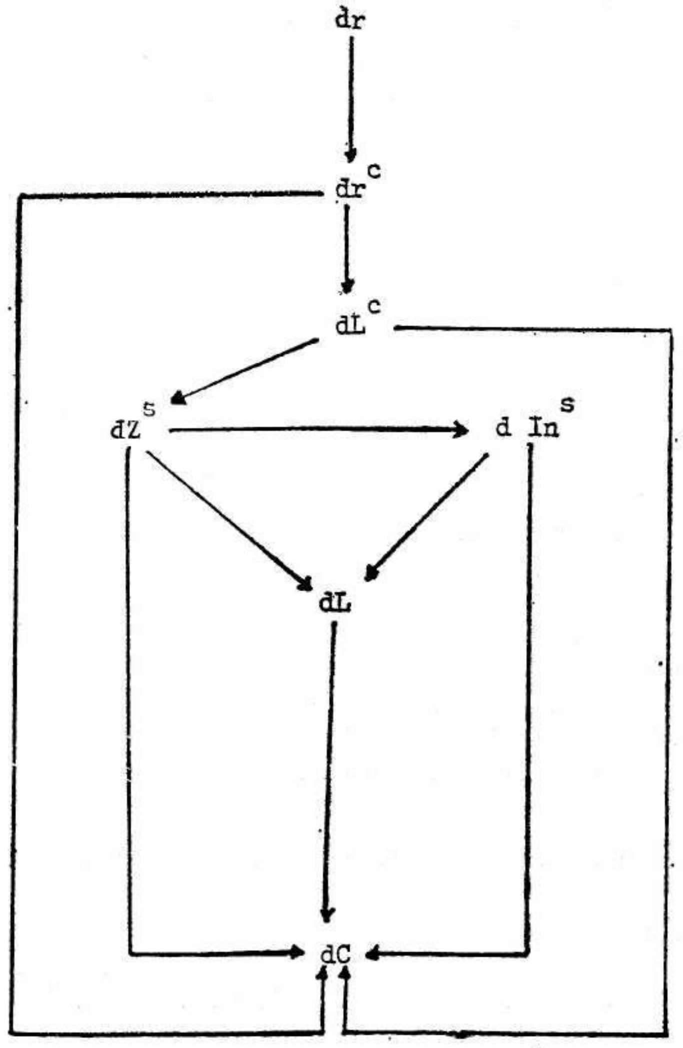
— the inventories speculative behaviour

— the borrowing need of the clients for the sale of the produced product or, in other words, the dependence of the productive from the credit function of the industrialist.

Thus, it is found out that in periods when high (low) inflation is prevailing, the influences from a change in the real short-term bank rates of interest is respectively greater (smaller) in the entrepreneurial behaviour, We could then assert that the prevalence of inflation pressures in economy renders the entrepreneurial behaviour sensible to the changes in the bank rates of interest. Tne knowledge of this ascertainement is particularly usefulto the monetary-credit authorities when

FIGURE 1

The direction of the tnteraction of the entreprcneurial variables after a change in the bank rate of interest



they have to estimate the reactions of the enterpreneurs to the decisions of change m the bank rates of interest.

Also, the stronger becomes the speculation behaviour of the industrialist (which means the more units he stocks in comparison with those he produces) and the more dependant becomes the disposal of the produced product from the granting of credits to the customers, the more intensive are the influences of a change in the bank rate of interest on the rate of interest to the credits granted to the clients, and thus to the rest of the entrepreneurial decisions. Notably, the speculation behaviour reinforces in a proportional way, the relative influences while the dependance of the productivity function from the credit function, in an inversely proportional way.

4. To this last point, concerning the meaning of the dependance of the productive function from the credit function, we can make a more ample analysis.

The degree of dependance of the productive function from the credit function, that is represented by the value of the derivative $\frac{dL^C}{dZ^S}$ expresses the degree that the purchasers of the products of the enterprise, that is the commercial sector, depend from the financing of the entrepreneur for the purchase of his products. Obviously, for the rest of their purchases that are not financed by the entrepreneur, they are financed by the banking system or they are self-financed. But, let use accept that the case of the self-financing is not existing. We could then compare two economies that differ as to the fact that in the first the function of the industrialist as side-banker is enlarged because of the non satisfactory linancing of the trade by the banking system for the purchase of the industrial products while the contrary is in force for the other. To the first of the two economies, the derivative $\frac{dL^C}{dZ^S}$ will have a relatively high value, while to the other, the same derivative has, comparatively to the previous one, a lower value. Therefore, the mo^ in a certain economy, the function of the industrialist as a side-banker, is enlarged, the weaker are the reactions of the entrepreneurial variables in a change of the bank rate of interest. The contrary happens in an economy where the banking system plays an important role to the direct financing of the trade for the purchasing of the industrial products. Thus, in the first case, the effectiveness of the use of the bank rates of interest for the influence of the entrepreneurial behaviour is weaker than in the second case.

5. CONCLUSIONS

In **the** previous analysis we developed a model of short term entrepreneurial behaviour that distinguishes three distinguished operations in the industrialist: That of the producer, that of the side-banker and that of the trader. The basic questions that the analysis is called to answer refer to the characteristics of the influence of a non expected change of the bank rate of interest to the industrialist's behaviour.

First, it was found out that such a change has a direct influence on the industrialist's behaviour and it finally influences all the basic entrepreneurial variables. The more particular elasticities responsible for the shaping of the final size of change of the entrepreneurial variables were identified.

The analysis brought to light three considerable characteristics responsible for the economics of short-term entrepreneur behaviour under interest rate controls. There refer to the meaning of the level of the inflation pressures prevailing in economies, to the role played by the speculative behaviour of the entrepreneur as a trader and finally the importance of the dependence of the productive from the importance of the dependence of the productive from the side-banking operation of the entrepreneur.

Concering the inflation pressures in economy, it was found out that the level thereof sensitizes the entrepreneurial behaviour and to be exact it proportionally influences the extent by which an unexpected change in the bank rates of interest influences the entrepreneurial variables. Also, the stronger is the speculative behaviour of the entrepreneur the strongest is the influence of the manipulations of the bank rate of interest to the entrepreneurial variables. On the contrary, it was found out that the more important is the dependence of the productive function from the credit function of the industrialist, the weaker is the influence of a change in the bank rates of interest to the entrepreneurial variables.

ANNEX

In this Annex is presented the solutiotn of the problems of the industrialust, as this is described in the main text :

The Langrange function that is created by the maximization of the entre preneur's profits subject to the limitations is the following :

$$F = Z^{S}_{t+1} + In^{S}_{t} - \bar{L}_{t+1} - rC_{t} + (Z^{S}_{t} + r^{C} L^{C}_{t} - L_{t})(1 + r) +$$

$$+ \lambda 1 \quad [Z^{S}_{t} + C_{t} + r^{C} L^{C}_{t} - L_{t} - In^{S}_{t} - L^{C}_{t}] +$$

$$+ \lambda 2 \quad [Z^{S}_{t+1} + (1+\dot{p}) In^{S}_{t} + L^{C}_{t} - L_{t+1} - (1 + r) C_{t}] +$$

$$+ \lambda 3 \quad [Z^{S}_{t} + In^{S}_{t} - Z(L_{t})] +$$

$$+ \lambda 4 \quad [Z^{S}_{t+1} - Z(L_{t+1})] +$$

$$+ \lambda 5 \quad [L^{C}_{t} - L^{C} (Z^{S}_{t}, r^{C})] +$$

$$+ \lambda 6 \quad [In^{S}_{t} - In^{S} (\dot{p} \; Z^{S}_{t})$$

The first order conditions issued are the following:

1) $$\frac{\delta F}{\delta \lambda_1} = Z_t^S + C_t + r^C L_t^C - L_t - In_t^S - L_t^C = 0$$

2) $$\frac{\delta F}{\delta \lambda_2} = Z_{t+1}^S + In_t^S + L_t^C - L_{t+1} - (1+r\ ) C_t = 0$$

3) $$\frac{\delta F}{\delta \lambda_3} = Z_t^S + In_t^S - Z(L_t) = 0$$

4) $$\frac{\delta F}{\delta \lambda_4} = Z_{t+1}^S - Z(L_{t+1}) = 0$$

5) $$\frac{\delta F}{\delta \lambda_5} = L_t^C - L_C(Z_t^S, r^C) = 0$$

6) $$\frac{\delta F}{\delta \lambda_6} = In_t^S - In^S(\dot{p}\ Z_t^S) = 0$$

7) $$\frac{\delta F}{\delta Z_t^S} = (1 + r) + \lambda_1 + \lambda_3 - L_Z^C \lambda_5 - In^{S\prime} \dot{p}\ \lambda_6 = 0$$

8) $$\frac{\delta F}{\delta Z^{S}_{t+1}} = 1 + \lambda_2 + \lambda_4 = 0$$

9) $$\frac{\delta F}{\delta L_t} = - (1 + r) - \lambda_1 - Z'\lambda_3 = 0$$

10) $$\frac{\delta F}{\delta L_{t+1}} = -1 - \lambda_2 - Z'\lambda_4 = 0$$

11) $$\frac{\delta F}{\delta \ln_t} = 1 - \lambda_1 + (1 + \dot{p}) \lambda_2 + \lambda_3 + \lambda_6 = 0$$

12) $$\frac{\delta F}{\delta L^{C}_{t}} = (1 + r) r^{C} + \lambda_1 r^{C} - \lambda_1 + \lambda_2 + \lambda_5 = 0$$

13) $$\frac{\delta F}{\delta r^{C}_{t}} = (1 + r) L^{C}_{t} + \lambda_1 L^{C}_{t} - L^{C'}_{r} \lambda_5 = 0$$

14) $$\frac{\delta F}{\delta C_t} = - r + \lambda_1 - (1+r) \lambda_2 = 0$$

The first order conditions create a system of 14 equations with 14 unknowns. The solution thereof will give the values of equilibrium of the endogenous variables.

In order to make the supervision of the system solution easier, we can substitute the variables Z', $L_Z^{C'}$, $L_r^{C'}$, and $I_n^{S'}$ by the symbols a, b, v and e respectively.

We also consider that (3), (4), (5) and 6 have the following linear forms :

$$3) \quad Z_t^S + In_t^S = \alpha\, L_t$$

$$4) \quad Z_{t+1}^S = \alpha\, L_{t+1}$$

$$5) \quad L_t^C = \beta\, Z_t^S + v\, r^C$$

$$6) \quad In_t^S = \varepsilon\, \dot{p}\, Z_t^S$$

From (8) and (10) it is found out that $\lambda_2 = -1$ and $\lambda_4 = 0$. By the substitution of the value of $\lambda_2 = -1$ in (14) we have $\lambda_1 = -1$. By the substitution of the value of $\lambda_1 = -1$ in (9), we obtain $\lambda_3 = -\frac{r}{a}$

Subsequently, by the substitution of the values of λ_1, λ_2 and λ_3 in (11) we evaluate the $\lambda_6 = \dot{p} + \frac{r}{a} - 1$.

By the substitution of the values of λ_1, λ_2 and λ_6 in (7) we calculate the value of λ_5 :

$$\lambda_5 = \frac{\varepsilon p\ (1-\dot{p})}{\beta} + r \left[\frac{1}{\beta} - \frac{1}{\alpha\beta} - \frac{\varepsilon \dot{p}}{\alpha\beta} \right]$$

In 13), when susbstituting the values of λ_1 and λ_5 we have the value of equilibrium of the endogenous L_t^C :

$$(13) \iff (1 + r + \lambda_1)\, L_t^C = \lambda_5\ V \iff$$

$$rL_t^C = \lambda_5\ V \iff$$

$$L_t^C = \lambda_5\ V \frac{1}{r} \iff$$

$$L_t^C = V \left[\frac{1}{\beta} - \frac{1}{\alpha\beta} - \frac{\varepsilon \dot{p}}{\alpha\beta} \right] + \frac{\varepsilon \dot{p}\,(1-\dot{p})}{\beta}\ V\ \frac{1}{r}$$

In (12), when we substitute the values of λ_1, λ_2, λ_5 we obtain the value of equliibrium of the endogenous r^C :

$$12) \iff (1+r+\lambda_1)\, r^C = -\lambda_5 \iff$$

$$r^C = \frac{\lambda 5}{r} \iff$$

$$r^C = -\left[\frac{1}{\beta} - \frac{1}{\alpha\beta} - \frac{\varepsilon\dot{p}}{\alpha\beta}\right] - \frac{e\dot{p}\,(1-\dot{p})}{\beta}\;\frac{1}{r}$$

By the substitution of the values of L_t^C and r^C in (5)′, we obtain the value of the endogenous Z_t^S :

$$Z_t^S = \frac{2V}{\beta}\left[\frac{1}{\beta} - \frac{1}{\alpha\beta} - \frac{\varepsilon\dot{p}}{\alpha\beta}\right] + \frac{2e\dot{p}\,(1-\dot{p})\,V}{\beta^2}\;\frac{1}{r}$$

By the substitution of the value of Z_t^S in (6)′ we obtain the value of the endogenous I_{nt}^S :

$$In_t^S = \frac{2\,\varepsilon\dot{p}\;V}{\beta}\left[\frac{1}{\beta} - \frac{1}{\alpha\beta} - \frac{\varepsilon\dot{p}}{\alpha\beta}\right] + \frac{2\in^2\dot{p}^2(1-\dot{p})\;V}{\beta^2}\;\frac{1}{r}$$

By the substitution of the value of Z_t^S and $I_{n_t}^S$ in (3)′ we obtain the value of the endo enous L_t :

$$L_t = \frac{2V}{\alpha\beta}\left[\frac{1}{\beta} - \frac{1}{\alpha\beta} - \frac{\varepsilon p}{\alpha\beta}\right] + \frac{2\,\varepsilon\dot{p}(1-\dot{p})\;V)}{\alpha\beta^2}\cdot\frac{1}{r} +$$

$$+\frac{2\varepsilon\dot{p}V}{\alpha\beta}\left[\frac{1}{\beta}-\frac{1}{\alpha\beta}-\frac{\varepsilon\dot{p}}{\alpha\beta}\right]+\frac{2\varepsilon^2\dot{p}^2(1-\dot{p})V}{\alpha\beta^2}-\frac{1}{r}$$

By the substitution of the values of Z_t^S, L_t^C, $I_{n_t}^S$, L_t in (1) we obtain the v lue of the endogenous C_t^S:

$$Ct=V\left[\frac{1}{\beta}-\frac{1}{\alpha\beta}-\frac{\varepsilon\dot{p}}{\alpha\beta}\right]+\frac{\varepsilon\dot{p}(1-\dot{p})V}{\beta}\frac{1}{r}+$$

$$+V\left(\left[\frac{1}{\beta}-\frac{1}{\alpha\beta}-\frac{\varepsilon\dot{p}}{\alpha\beta}\right]+\frac{\varepsilon\dot{p}}{\beta}\frac{1}{r}\right)\left(\left[\frac{1}{\beta}-\frac{1}{\alpha\beta}-\frac{\varepsilon\dot{p}}{\alpha\beta}\right]+\right.$$

$$\left.+\frac{\varepsilon\dot{p}}{\beta}\frac{1}{r}\right)+\frac{2V}{\alpha\beta}\left[\frac{1}{\beta}-\frac{1}{\alpha\beta}-\frac{\varepsilon\dot{p}}{\alpha\beta_1}\right]+\frac{2\varepsilon\dot{p}(1-\dot{p})V}{\alpha\beta^2}\frac{1}{r}-$$

$$-\frac{2V}{\beta}\left[\frac{1}{\beta}-\frac{1}{\alpha\beta}-\frac{\varepsilon\dot{p}}{\alpha\beta}\right]-\frac{2\varepsilon\dot{p}(1-\dot{p})V}{\beta^2}\frac{1}{r}+$$

$$+P_t\cdot\frac{2\dot{p}V}{\beta}\left[\frac{1}{\beta}-\frac{1}{\alpha\beta}-\frac{\varepsilon\dot{p}}{\alpha\beta}\right]+\frac{2^2.\dot{p}^2(1-\dot{p})V)}{\beta^2}\frac{1}{r}P_t$$

The influence on the endogenous variables after the alteration of the bank rate of interest r :

$$(15)\quad \frac{\delta r^{C}}{\delta r} = \frac{e\dot{p}\,(1+\dot{p})V}{\beta}\,\frac{1}{r^{2}} > 0$$

$$(16)\quad \frac{\delta L_{t}^{C}}{\delta r} = -\frac{e\dot{p}(1-\dot{p})V}{\beta}\,\frac{1}{r^{2}} < 0$$

$$(17)\quad \frac{\delta Z_{t}^{S}}{\delta r} = -\frac{2e\dot{p}(1-\dot{p})V}{\beta^{2}}\,\frac{1}{r^{2}} < 0$$

$$(18)\quad \frac{\delta I_{t}^{S}}{\delta r} = -\frac{2\,\varepsilon^{2}.\dot{p}^{2}\,(1-\dot{p})V}{\alpha\beta^{2}}\,\frac{1}{r^{2}} < 0$$

$$(19)\quad \frac{\delta L_{t}}{\delta r} = -\frac{2\,ep(1-\dot{p})V}{\alpha\beta^{2}}\,\frac{1}{r^{2}} - \frac{2\,e^{2}\dot{p}^{2}\,(1-\dot{p})V}{\alpha\beta^{2}}\,\frac{1}{r^{2}} < 0$$

$$(20)\quad \frac{\theta\,C_{t}}{\partial r} = -\frac{\varepsilon\,\dot{p}(1-p)\,V}{\beta}\,\frac{1}{r^{2}}$$

$$-\frac{2\,e\dot{p}\,(1-p)V}{\alpha\beta^{2}}\,\frac{1}{r^{2}}$$

$$- \frac{2\varepsilon^2\dot{p}^2(1-p)V}{\beta^2}\frac{1}{r^2}$$

$$+ \frac{2\,e\dot{p}(1-p)V}{\beta^2}\frac{1}{r^2}$$

$$- \frac{\varepsilon\,\dot{p}V}{\beta}\frac{1}{r^2}\left(\left[\frac{1}{\beta}-\frac{1}{\alpha\beta}-\frac{\varepsilon\dot{p}}{\alpha\beta}\right]+\frac{e\dot{p}\,(1-\dot{p})}{\beta}\frac{1}{r}\right)$$

$$- \frac{\varepsilon p}{\beta}\frac{1}{r^2}\left(V\left[\frac{1}{\beta}-\frac{1}{\alpha\beta}-\frac{\varepsilon\dot{p}}{\alpha\beta}\right]+\frac{\varepsilon\dot{p}\,(1-\dot{p})\,V}{\beta}\frac{1}{r}\right)<0$$

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