Banks, Development Financial Institutions and Credit Markets in India: A Simple Model of Financial Intermediation

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Abstract
The paper examines the interaction between a bank and a development financial institution (DFIs) in a macroeconomic set-up, both of whom can lend for working capital and investment finance purposes. Our analysis reveals that the reduction in the interest rate premium on bonds over the deposit rate is an important pre-requisite for the DFI to raise its market share in both investment finance and working capital lending. Also, greater corporate access to bond financing raises investment, output and the bond rate of interest. The policy implications of the analysis are examined.

Key Words Universal banking, investment finance, working capital lending, bond financing, interest premium.

Introduction

Restructuring of financial intermediaries and development of financial markets are two important elements in the process of financial sector reforms. India, in its era of economic reforms during the 1990s has been no different. Nationalised banks, which had been the most important financial intermediaries are increasingly facing competition from securities markets and other financial intermediaries like non-banking financial companies and mutual funds. The nature of this competition and its impact on the economy could be fruitfully addressed only in reference to the specific institutional arrangements prevailing in India. In this article, we examine the interaction between banks and the development financial institutions (DFIs) and their macroeconomic consequences.

Post-nationalisation, commercial banks expanded their branch network very rapidly and provided the bedrock of financial resource mobilisation and credit deployment for the economy as a whole. The number of bank offices in India expanded nearly eight-fold from 8,262 in June 1969 to

64,939 in March 1999. Deposits as percentage of National Income expanded from 15.5 per cent in June 1969 to 48.1 in March 1991 and thereafter to 48.7 per cent in March 1999. The deposit base, accounting for nearly 48 per cent of financial savings of the household during 1998-99, has been instrumental in providing finance to both the corporate sector and the Government to meet its expenditure. Since securities markets were relatively underdeveloped and unable to meet the increasing resource requirement of the process of industrialization, the deposit base of commercial banks were also used to finance publicly owned DFIs for their investment financing.

In India and elsewhere, development financial institutions (DFIs) were established to resolve a typical market inadequacy: the shortage of long-term investments and the perceived socially unjustifiable risk aversion of savers and creditors. In view of the inadequate provision of long-term credit through banks or markets, many of these institutions were sponsored by national governments. The emergence of DFIs was expected to resolve the long-term credit shortages as well as acquire and disseminate skills necessary to assess investment projects and borrowers' creditworthiness. Although the oldest such government sponsored institution began in the Netherlands with the establishment of the *Societe Generale pour favoriser I'Industrie National* in 1822, it was well over twenty years later that development banking came into its own with the establishment of the *Credit Mobiliser* in France in 1848 for financing of Continental European railway expansion (Aghion, 1998). Even in the 20th century, the need for rapid post-war reconstruction of Continental Europe led to the emergence of many new development financial institutions. In Asia too, such institutions served as models; an important example in this context being the *Industrial Bank of Japan* (IBJ) founded in 1900. The IBJ assisted not only in the development of the domestic capital markets, but it also performed the role of obtaining portfolio capital for the industrial firms in Japan[1].

The endorsement of planned industrialization at the national level provided critical inducements for establishment of DFIs in India. The first development financial institution, the *Industrial Finance Corporation of India* (IFCI) was established in 1948. Thereafter, a series of such institutions, both at the state-level as well as at the all-India level, including among others, the *Industrial Credit and Investment Corporation of India* (1955) and *Industrial Development Bank of India* (1964) were established. Subsequently, specialized development banks to take care of rural financing requirements, export finance, housing finance and small scale sector have also been established. As it stands at present, apart from banks, mutual funds, insurance and non-banking financial institutions, a wide array of development banks catering to the needs of various segments of industry and agriculture constitute a vital element of the financial system in India (Bhatt, 1993).

DFIs in India have for long been dependent on the soft window of Long-Term Operations (LTO) funds from the Reserve Bank at concessional rates for meeting their long-term financing requirements. Besides, they had access to cheap funds from bilateral/multilateral agencies, which were guaranteed by the government and carried low coupon rates. Moreover, the institutions were allowed to issue bonds with sovereign guarantee, which qualified as investments by banks for maintaining statutory liquidity ratio (SLR). On the asset side of the balance sheet, DFIs have traditionally been engaged in investment financing, with banks mainly catering to working capital finance. Since 1992, however, there has been a gradual movement towards convergence of activities of banks and DFIs. Partly because of the problems of the Budget and partly on account of financial reforms, the traditional sources of long-term funds have dried up. Also, the reluctance of foreign agencies and international financial institutions to provide long-term loans (under IDA, for example) has meant that DFIs will have to compete with banks for resources. DFIs had to therefore raise medium-term/long-term resources, as well as issue long-term bonds at market rates of interest[2]. Banks too, under the new prudential regulations have begun to access the debt and stock markets to shore up their capital levels. Again, banks have been making a foray into investment financing while financial institutions have been entering the domain of short-term financing, with the result that the competition for supply of funds has also intensified. As a consequence of the erosion of the hitherto conventional divide between banks and financial institutions, the *raison de tour* of DFIs has increasingly been called into question. Elsewhere in the world, the demise of the Glass-Steagall Act of 1933 in the US, which hitherto segregated commercial and investment banking and with amendments in the Securities and Exchange Act in Japan that prevented banking and insurance activities under one umbrella, the tremors of universal banking are being increasingly felt in India in recent years[3].

While various aspects of this transformation and the future policy options have been extensively discussed with reference to the financial viability of banks and DFIs, there has been limited discussion about their macroeconomic impact. Limited studies on the analysis of development banks elsewhere have focused on the Development Bank of the Philippines, development banking in Tanzania and nearer home, the Asian Development Bank (ADB). These papers are essentially descriptive in nature and analyze questions like the financial viability of development banks (Manzano, 1990), need for more refined methods of managing long-term lending (Rwegasira, 1992) and the performance of the ADB (Sender, 1993). The article which comes closest to the spirit of this paper is the one by Holmstrom and Tirole (1994). In particular, the focus of the paper is the effects that reductions in different types of capital have on aggregate and sectoral

investments, interest rates and the relative roles of direct (market) and indirect (intermediated) finance. However, in their analysis, the borrowing capacity of both firms and intermediaries is limited, so that a redistribution of wealth across firms and intermediaries impacts investment and interest rates. The present paper, in contrast, develops a micro-theoretic model of interaction between a bank and a financial institution in the credit market within a standard framework of industrial organization with no constraint on borrowing capacity of intermediaries from external sources. The model is linked to a simplified macroeconomic structure to examine the implications of policy changes on both the real and financial sector variables. Although our model is couched in a static setup, it is able to highlight certain long-term trends with respect to behaviour of banks and DFIs in the credit market. It is however possible to construct a much richer model that allows for interaction among an array of banks and DFIs in a multi-period setting; but this is not considered for the present purpose essentially to keep the model simple and meaningful. The basic framework of the model is developed in Section II. Section III examines the process of interest rate determination whereas section IV traces the impact of changes in policies and of market structure. The main contribution and the area of future research direction are addressed in Section V.

Our analysis reveals that the reduction in the interest rate premium on bonds over the deposit rate is an important pre-requisite for the market share of the DFI to increase both in investment and working capital lending. From a macroeconomic perspective, however, it has little effect on output. The analysis also reveals that greater corporate access to bond financing raises investment, output and the bond rate of interest. Finally, a declining interest rate policy helps to improve the market share of the DFI in the working capital segment, whereas its effect on the market share in the investment finance segment is ambiguous.

II. The Model

We assume a closed economy, single-period set-up where there are two financial intermediaries: a bank and a development financial institution (DFI). Both of them can serve the credit market in which two segments are distinguished - one for working capital finance and the other for investment finance. While investment financing and working capital lending generally differ in terms of their maturity pattern, this is of no consequence in the present model and the maturities of loans in both cases are assumed to be identical. The distinction between these two types of credit, in the present context, is based on two premises.

The first one is based on the asymmetry of transactions costs of financial intermediation between investment financing and working capital financing. Before undertaking investment finance, the lender has to incur a cost for evaluating the viability of the project. With the advent of liberalization, the principles of planned economic development have progressively been discarded in the favour of a competition-based entrepreneurship, so that evaluation of long-term viability of new projects has emerged as a specialised activity. On this count, the cost of project evaluation for investment purposes is relatively higher *vis-à-vis* cost of evaluating projects for working capital finance. In other words, while working capital lending does not involve any (or insignificant) transactions costs, investment financing involves a positive transactions cost.

In the Indian context, major DFIs have historically been associated with investment financing requirements and have, therefore, over time, built up specialized skills in project appraisal[4]. Banks' foray in the investment financing is, however, a recent phenomenon in India. This leads to our first assumption:

Assumption 1: The bank incurs a transactions cost of c per unit of lending in order to undertake investment financing, which the DFI does not. Working capital financing does not involve any transaction cost.

The second distinction is based on the interdependence between the demand for investment credit and that for working capital. Such interdependence arises if we consider an economy where output to be demand-driven. Since demand for working capital depends on demand for output, investment finance drives the working capital requirement. Finally, we assume that the bank and the DFI have effective means of monitoring the end-use of funds, so that producers do not take advantage of the possible interest rate differential between the two segments of the credit market.

The relationship between output (Y) and demand for working capital (W^d) is summarised in assumption 2.

Assumption 2: Each unit of output requires a fixed amount, a, of working capital, i.e., $W^d=aY$. [5]

It is assumed that internal source of funding by corporates' is of minor importance (and set at zero) and therefore, the entire funding is from external sources. For simplicity, three possible external sources of funds for the corporates are considered: credit from bank, credit from DFI and financing through direct issuance of bonds.

The relative advantage of the bank in the process of financial intermediation emanates from its ability to access deposits at a relatively low cost *vis-a-vis* the cost of funds for the DFI. The volume

of this deposit base is exogenous, given the stock of money (fixed by the Central Bank), currency deposit ratio and the cash reserve ratio (CRR). While the DFI finances its on-lending by issuing bonds at the prevailing interest rate *r*, the bank finances its lending primarily through its deposit base. There is, however, no restriction on the bank to either invest in or borrow from the bond market at the prevailing rate, *r*. Therefore, the prevailing bond rate, *r* becomes a floor to the lending rates - both for working capital and investment finance.

Assumption 3: *The bank has an assured deposit base. While the DFI finances its entire on-lending by issuing bonds at the bond rate r, the interest rate on bank deposit equals (r-*θ*), where* θ *(>0) represents the premium of bond rate over the deposit rate.*

Further, we assume that,

Assumption 4: *The bank's deposit base is sufficient to serve the entire demand for working capital.*

The bond market as considered here is far from perfect. In particular, the bond market is assumed to discriminate between issuers in a stark way. It permits financial intermediaries (i.e., the bank and the DFI) to raise unlimited amount at the prevailing rate of interest, whereas individual corporate houses are rationed in terms of quantity they can raise at the prevailing rate. This rule of thumb is hardly surprising in view of the limited infrastructure in the bond market to efficiently process detailed information about corporates. Since the ability of the bond market to assess the long-term viability of projects is limited, the ability of the issuer to access finance from institutional sources (i.e., through credit) provides crucial information to the bond market about corporate credibility. In other words, in a world of informational asymmetry, institutional finance acts as a screening device: it separates the better corporates from the not-so-better ones. Therefore, the quantum of funds raised by corporates directly from the bond market depends, to a large extent, on the quantum of credit obtained from institutional sources. Since, more often than not, bonds are issued with the primary aim of financing investments, the relation between quantum raised through bonds and investment demand is summarised by assumption 5 [6].

Assumption 5: *Corporates resource mobilisation from the bond market is proportional to investment credit raised from institutional sources. The amount raised thus is used for financing investment.*

Producers, as a rule of thumb, apply a constant mark-up, α over the cost of working capital, including interest cost. Fixed requirement of working capital for every unit of output renders the demand for working capital insensitive to interest rate charged on working capital (r_w) up to a limit.

This limit, beyond which there would be no demand for working capital, is naturally given by the condition that entire excess profit of the producer, over and above his fixed mark-up, α, is eaten up by interest cost on working capital. Normalising the price of output to unity, this condition is given by the relation

$$1 - a(1 + r_w)(1 + \alpha) = 0$$

so that,

$$r_w^* = [\{a(1+\alpha)\}^{-1} - 1] \quad \textbf{(1)}$$

It may be checked that, r_w^* is the ceiling for not only r_w but for r_T as well. Should $r_T > r_w^*$, then neither the bank nor the DFI would lend for working capital purposes and output drops to zero. Only when $r_T \leq r_w^*$ will the positive working capital lending be ensured. Assuming that demand for investment credit is inversely related to interest rate charged, every increase in term lending reduces r_T. On the other hand, financial intermediaries can always increase working capital at r_w^* until the entire demand for the same is satisfied. To summarize, the following relationship between the three sets of interest rates would always be satisfied.

$$r < r_T \leq r_w^* \quad \textbf{(2)}$$

This inequality, combined with the assumption that financial intermediaries can always borrow at the prevailing rate from the bond market, ensures that the demand for working capital would always be fully met by the financial intermediaries.

Output, Y in standard text-book fashion, is given by the relation

$$Y = (I + G)/s \quad \textbf{(3)}$$

where *s* is the marginal propensity to save, G is government expenditure, financed entirely through issue of government bonds[7] and *I* is investment demand, financed entirely through term lending.

Combining our earlier assumption that corporates directly issue bonds to part-finance investment demand and that the amount of bond issue by corporates is proportional to total investment credit received from the bank and DFI, we can write total investment credit as

$$I = (1+\gamma)I_C, \quad \textbf{(4)}$$

where I_C is the total investment credit received from the bank and the DFI and γ is the constant proportion between direct bond issue by corporates and I_C.

The demand for investment finance is inversely related to the interest rate according as:

$$I_C = I_o - r_T \quad \textbf{(5)}$$

where I_o is the exogenous investment demand and r_T is the interest rate.

Both the bank and financial institution are permitted to lend in the two credit markets. In the working capital market, both intermediaries charge r_w^* while sharing the market between them.
Total attainable surplus from working capital lending is given by the relation:

$$\Pi_w = (r_w^* - r)\, W \qquad \textbf{(6)}$$

We employ a symmetric Nash-bargaining solution to determine the market share of the bank, λ and of the DFI, (1-λ) over the total surplus, Π_W. As Binmore *et.al.* (1986) have demonstrated, the Nash bargaining solution can be proxied to be the limiting case of an extensive form 'offer-counter-offer' bargaining game.

An important feature of the Nash bargaining programme is the specification of the threat points: what the parties would obtain in the event of a disagreement in bargaining. In the light of assumption 4, it is possible for the bank, in case of disagreement, to drive out the DFI by charging the bond rate of interest, *r*, on working capital lending. In such situation, the bank can still enjoy a surplus of θW, while the DFI gets zero. Therefore, the Nash bargaining solution dictates that λ is determined from the following problem:

$$\underset{\lambda}{Max}\ [\lambda(r_w^* - r) - \theta][(1-\lambda)(r_w^* - r)]$$

Carrying out the necessary maximization exercise, we obtain λ to be

$$\lambda^* = [1 + \{\vartheta/(r_w^* - r)\}]/2 \qquad \textbf{(7)}$$

Not surprisingly, a decline in the cost of bank deposit (i.e., an increase in θ) improves the bank's market share in working capital. Similarly, an increase in the interest spread [i.e., an increase in $(r_w^* - r)$] would improve DFI's profit share. This is because consequent upon an increase in the spread, a 'beggar-thy-neighbour' policy would be less gainful for the bank, so that accommodating the DFI would be preferred.

Having obtained the respective shares of the bank and the DFI in working capital, the optimum term-lending by FI and the bank can be determined. Towards this end, we employ a Cournot-Nash solution in which each player determines his lending decision, taking that of the other player as independent of his own.
In other words, the maximisation problems of the bank and the DFI can be written as

$$\underset{I_{CB}}{Max}\ I_{CB}(r_T - r - c) + \lambda\, W(r_w^* - r) \qquad \textbf{(8)}$$

and

$$\underset{I_{CB}}{Max}\ I_{CF}(r_T - r) + (1-\lambda)\, W(r_w^* - r) \qquad \textbf{(9)}$$

with ($I=I_{CB}+ I_{CF}$), where I_{CB} and I_{CF} denote investment lending by the bank and the DFI, respectively and c denotes the transaction cost of the bank per unit of investment lending.

Carrying out the necessary substitutions and maximising expressions (8) and (9) with respect to the given arguments yields the expressions

$$I_{CF}(r) = [(I_o - r + c) + (a/2s)(r_w^* - r - 3\theta)]/3 \qquad \textbf{(10)}$$

and

$$I_{CB}(r) = [(I_o - r - 2c) + (a/2s)(r_w^* - r + 3\theta)]/3 \qquad \textbf{(11)}$$

Therefore, the total quantum of credit for investment purpose, I_C is given by

$$I_C(r) = [2(I_o - r) - c + (a/s)(r_w^* - r)]/3 \qquad \textbf{(12)}$$

Consequently, the rate of interest on investment credit r_T is given by

$$r_T = \frac{1}{3}\left[I_0 + c - \frac{a}{s} r_w^* + r(2 + \frac{a}{s}) \right] \qquad \textbf{(13)}$$

The total demand for working capital loans, using (3), (5) and (12) is given by

$$W(r) = a[G + ((1+\gamma)/3))(2(I_o - r) - c + (a/s)(r_w^* - r)]/s \qquad \textbf{(14)}$$

Finally, the total supply of credit in the system, L is given by the expression

$$L(r) = I_C(r) + W(r) = [(aG/s) + \{(1 + a(1+\gamma)/s))[2(I_o - r) - c + (a/s)(r_w^* - r)\}/3] \qquad \textbf{(15)}$$

An inspection of equation of (10) through (15) reveals some interesting aspects of credit market intermediation by the bank and DFI. The disadvantage of banks in project evaluation *vis-à-vis* the DFI, as reflected in the transactions cost, c, imposes a burden not only on the total quantum of term lending advanced by the financial system, but also on the overall quantum of the working capital and total credit. In particular, while a reduction in the transaction cost would result in a decline in the investment credit by the financial institution, the corresponding increase in investment credit by the bank would more than offset it.

How are the market shares of the bank (and the DFI) in working capital and investment finance affected by the development of the bond market? While the process of bond market development has many aspects, one indicator of importance is the interest rate premium on bonds *vis-à-vis* the bank deposit rate, θ. Development of the secondary bond market would reduce this premium over time. It is important to note that the parameter θ, does not have any effect either on the aggregate amount of term lending or on working capital lending. A change in θ only reallocates the market

share in term-lending and working capital lending between the two intermediaries. A decline in θ, for instance, reflecting the development of the bond market, would reduce the investment credit by the bank in the favour of the DFI. It would, using (7), increase the market share of DFI in the market for working capital lending. This lends credence to the oft-quoted belief that the development of the bond market, therefore, is an important pre-requisite for the financial institution to improve their market share.

Proposition 1: A reduction in the interest rate premium on bonds over the bank deposit would not change aggregate investment credit or working capital credit. A decline in the premium would, however, improve the market share of the DFI in both the working capital and investment finance segments at the expense of the bank

Another question of interest is how is the market share of the bank (resp., the DFI) in the working capital market altered, consequent upon a change in the bond rate of interest? Simple calculations reveal that

$$\frac{\partial \lambda}{\partial r} = \theta / 2(r_w^* - r)^2 > 0 \qquad \textbf{(16)}$$

In other words, a rise in the bond rate of interest improves the market share of banks in the working capital market. As every rise in the bond rate of interest reduces the profit per unit of working capital lending, the co-operative outcome involving sharing the market with the financial institution by charging a uniform rate of interest, r_W^* becomes relatively less attractive to the bank *vis-a-vis* its outside opportunity 'going it alone': serving the entire market by itself at a rate of interest r, and thereby, making a profit of θ per unit of lending, while driving the DFI out of the market. Therefore, a co-operative outcome following an increase in r would necessarily improve bank's share, λ in the working capital market.

In respect of the market share in the investment credit, we find that,

$$\frac{\partial (I_{CB} / I_{CF})}{\partial r} = [\frac{-\{3(a+2s)/2s)\}(cs - a\theta)}{[(I_o - r + c) + (a/6s)(r_w^* - r - 3\theta)]^2}] \qquad \textbf{(17)}$$

Since the denominator is always positive, the sign of the derivative would depend on the sign of the numerator. An increase in interest rate on bonds would improve the share of the bank in the term lending market provided its transaction cost in project-appraisal is below a critical threshold as given by $a\theta/s$. Put alternately, when $c<a\theta/s$, a policy of low interest rate (say, by expansion of money supply) would improve the share of the financial institution in the market for investment credit. If, however, in the initial phase of the bank's foray in the investment financing, it faces a high

transactions cost, then a low interest rate enables it to improve its market share as compared with the DFI.

Proposition 2: An increase in the bond rate would raise, keep unaltered or reduce the relative share of the bank vis-à-vis the DFI in the market for investment credit according as $c <=> a\theta / s$.

III. Determination of Interest Rate on Bonds

All variables in the credit market, as can be seen from equation (10) through (15) are functions of the bond rate of interest. We have also noticed in the inequality (2) that the interest rate structure is significantly influenced by the interest rate on working capital r_W. As both intermediaries would set $r_w = r_w^* = \{a(1+\alpha)\}^{-1} - 1$ and share the surplus, it is essentially product market parameters that set the upper limit on the interest rates in the economy. An increase in producers' mark up (α) or an increase in working capital requirement per Rupee of output would bring down the ceiling of bond rate of interest. While the ceiling of bond interest rate is given by the product market conditions, its level is determined in the bond market. In this section, we examine the bond market and the process of interest rate determination.

It is assumed that bonds, loans and deposits are of equal maturity. This renders the distinction between stocks and flows irrelevant for the present purpose. Further, we make the following simplifying assumption:

Assumption 5: *The bonds issued by various entities (viz., government, DFI, banks and corporate sector) are homogenous in all respects.*

Assume that households have a well-defined bond demand function of the form:

$$B_D = l\, r + v\, Y; \qquad l, v > 0 \tag{18}$$

where l and v are the sensitivity of bond demand with respect to interest and income, respectively. Since bonds are unlikely to be used for the purpose of financing consumption, its additional demand would form only a part of new savings. Accordingly, $v < s$.

The supply of bonds, B_S, on the other hand, is the total of supply by four issuers, *viz.*, government, DFI, bank and corporates. In other words,

$$\begin{aligned} B_S &= G + [(1-\lambda)W(r)) + I_{CF}(r)] + [\lambda W(r) + I_{CB}(r) - \frac{M(1-e)}{1+d}] + \gamma\, I_C(r) \\ &= G + W(r) + (1+\gamma) I_C(r) - \frac{M(1-e)}{1+d} \end{aligned} \tag{19}$$

where M is the stock of money fixed by the central bank, *e* is the cash reserve ratio (CRR) and *d* is the currency-deposit ratio. Equating demand and supply of bonds yields the following condition:

$$vY + r[l + \frac{(1+\gamma)(a^2 + 3a\,s + 2s^2)}{3s^2}] = G[\frac{(a+s)}{s}] - \frac{c(1+\gamma)(a+s)}{3s} - \frac{M(1-e)}{1+d} + \frac{2(1+\gamma)(a+s)}{3s} I_o + \frac{a(1+\gamma)(a+s)}{3s^2} r_w^* \quad \textbf{(20)}$$

This relation is labelled as the *bond market equilibrium*. It describes the locus of (Y,r) combinations that maintain equilibrium in the bond market. As evident from (20), $\partial r/\partial Y<0$. Intuitively, a rise in income implies higher demand for bonds, implying a rise in the price of bonds and a consequent fall in interest rates. This is plotted as the BM locus in Figure 1. Any (Y, r) combination to the right of BM would imply a situation of excess demand in the bond market and r would tend to fall. Similarly, a situation of excess supply prevails in the bond market to the left of BM.

In a similar fashion, using equations (5) and (14) and making the relevant substitutions, we obtain,

$$Y + \{[(1+\gamma)(2s+a)]/3s^2\}r = [G + \{(1+\gamma)(2I_o - c + (a\,r_w^*/s))\}/3]/s \quad \textbf{(21)}$$

We term this equation as the *product market equilibrium*: it traces the locus of (Y,r) combinations that maintain equilibrium in the product market. From the above equation it is clear that $\partial r/\partial Y<0$. Intuitively, a decline in the bond rate of interest, through its effect on the interest rate on investment credit, stimulates investment. This, *via* the demand multiplier, ensures a higher level of income. In Figure 1, this is represented as the PM locus. Any (Y, r) combination to the right of PM would involve a situation where the supply of working capital would not be adequate to generate output, Y. Accordingly, Y would tend to decline. Reverse would be the case to the left of the PM locus. Combining the above information, it is clear that both the BM and the PM loci are negatively sloped in the (Y,r) plane.

IV. Implications of Policy Changes

Totally differentiating equations (20) and (21) and rearranging, we obtain,

$$\begin{bmatrix} v & J \\ 1 & [(a+2s)(1+\gamma)/3s^2] \end{bmatrix} \begin{bmatrix} dY \\ dr \end{bmatrix} = \begin{bmatrix} \{(a+s)/s\} & X & \{-(1-e)/(1+d)\} & a(a+s)(1+\gamma)/3s^2 \\ 1/s & Z & 0 & a(1+\gamma)/3s^2 \end{bmatrix} \begin{bmatrix} dG \\ d\gamma \\ dM \\ dr_w^* \end{bmatrix}$$

(22)

where $J = [l+\{(1+\gamma)(a^2+3as+2s^2)\}/3s^2]$

$X = \{[(a+s)/3s][2I_0 - c + (a/s)\, r_W^*] - [(1/3s^2)(a^2+3as+2s^2)r]\}$

and $Z = \{[(1/3s)(2I_0 - c + (a/s)\, r_W^*)] - [(1/3s^2)(a+2s)r]\}$.

The determinant of the above matrix is given by the expression[7]

$$|D| = [\frac{v(a+2s)(1+\gamma)}{3s^2} - J] = \frac{(a+2s)(1+\gamma)}{3s^2}(v-a-s) - l < 0$$

We are now in a position to conduct certain comparative static exercises.

First, we examine the effect of fiscal policy. Clearly,

$$\frac{\partial Y}{\partial G} = \frac{1}{|D|}[\frac{(a+s)(a+2s)}{3s^3} - \frac{J}{s}] > 0 \qquad \textbf{(23)}$$

and,

$$\frac{\partial r}{\partial G} = \frac{1}{|D|}[\frac{v}{s} - \frac{(a+s)}{s}] > 0 \qquad \textbf{(24)}$$

Clearly, a rise in government expenditure raises output but also raises the interest rate on bonds. From the bond market condition, a rise in government expenses (through increased supply of bonds) leads to a rise in interest rates for a given income level. However, in the product market a rise in government expenditure leads to an expansion of income, which in turn increases the demand for bond and puts a downward pressure on the bond rate of interest. As the marginal propensity to invest in bonds out of additional income (v) is relatively small, this would mean (v-a-s)<0, so that, increased government expenditure would raise interest rate in the bond market. In the new equilibrium, therefore, increased output comes at the cost of private investment, which would be lower on account of higher rate of interest charged on investment credit following the hike in the bond rate (equation 13).

Proposition 3: An increase in government expenses unambiguously raises output and bond rate of interest, but reduces private investment

On the monetary policy front, it is clear that

$$\frac{\partial Y}{\partial M} = -\frac{1}{|D|}\left(\frac{a+2s}{3s^2}\right).\left(\frac{1-e}{1+d}\right) > 0 \quad \textbf{(25)}$$

$$\frac{\partial r}{\partial M} = \frac{1}{|D|}\left(\frac{1-e}{1+d}\right) < 0 \quad \textbf{(26)}$$

Not surprisingly, the effects of monetary policy on output and interest rates are found to be usual in direction. In particular, an increase in money supply raises output and depresses interest rate. Economically speaking, a rise in money supply would imply that agents are more willing to hold bonds, so that bond prices rise and bond rates fall. A fall in interest rates would imply greater credit for investment financing, and via the multiplier effect, greater output.

Proposition 4: An expansionary monetary policy raises output and lowers interest rates.

Of greater interest from the point of view of the present exercise is the effect of changes in direct access of corporates to the bond market, as reflected in a change in the parameter γ. An increase in γ would mean greater direct access by corporates to the bond market. Such a possibility might arise from several policy developments, e.g., liberalization of norms for bond issuance by corporates, strengthening the credit rating systems, to mention a few.

$$\frac{\partial Y}{\partial \gamma} = -\frac{1}{|D|}\left(\frac{l}{3s}\right)I_C > 0 \quad \textbf{(27)}$$

$$\frac{\partial r}{\partial \gamma} = \frac{1}{|D|}\frac{(v-a-s)}{3s}I_C > 0 \quad \textbf{(28)}$$

Increased corporate access to the bond market has important macroeconomic consequences. Increased corporate access to the bond market reduces their dependence on the institutional intermediaries for undertaking investment. Increased issuance of bonds by corporates, however, raises bond rate of interest, as the offsetting effect through increased bond demand resulting from higher income would be relatively low. Higher bond interest by increasing r_T would obviously reduce the investment credit from the bank and the DFI, but the effect would be of second order so that total investment and output would rise. The bank and the DFI, however gain from increased demand for working capital.

Proposition 5: An increase in corporate access to bond market raises output and the bond rate of interest. It reduces the investment financed through credit by the bank and the DFI, although total investment increases.

Finally, we also examine the effect of a change in the producers' mark-up. Due to equation (1) this would change the ceiling rate of interest, r_w*. For example, a reduction in producers' mark-up would increase r_w*. Using (22) we find that

$$\frac{dY}{dr_w^*} = -\frac{al(1+\gamma)}{3s^2 \mid D \mid} > 0 \qquad \textbf{(29)}$$

$$\frac{dr}{dr_w^*} = \frac{a(1+\gamma)}{3s^2 . \mid D \mid}[v - a - s] > 0 \qquad \textbf{(30)}$$

Interestingly, a reduction in producers' mark-up by increasing the ceiling rate of interest also increases the bond rate of interest and output. To understand the underlying dynamics, which originate in the product market, let us note that due to equation (13),

$$\frac{dr_T}{dr_w^*} = \frac{1}{3}\left[-\frac{a}{s} + (2 + \frac{a}{s})\frac{dr}{dr_w^*}\right] \qquad \textbf{(31)}$$

Using equation (30) and after simplification we find that

$$\frac{dr_T}{dr_w^*} = \frac{al}{3s. \mid D \mid} < 0$$

We may note that an increase in r_W* renders provision of working capital lending more profitable for the financial intermediaries. The demand for working capital depends on the demand for output, which, in turn, depends on investment demand. An increase in r_w*, as may be seen from equation (31), has two opposing effects on the rate of interest on investment credit and thereby on the volume of investment credit. Firstly, in order to expand working capital lending, intermediaries charge a lower rate of interest on investment credit to boost its demand. This, through the multiplier effect, generates greater demand for working capital. Greater credit off-take, however, also increases the net supply of bonds and increases bond rate of interest (the possible counter-effect through income channel being insufficient). The second term in the right hand side of (31) reflects the upward pressure on r_T due to increase in the bond rate. This second effect of increase in r_W* on r_T, however, is found to be insufficient so that r_T falls in the equilibrium as a result of an increase in r_w*. Accordingly, investment credit and total output also rise.

Proposition 6: A reduction in producers' mark-up would expand investment, total credit and output despite an increase in the bond rate of interest.

V. Concluding Observations

Banks and DFIs, two of the important financial intermediaries in India, are increasingly competing each other with regard to both mobilisation as well as deployment of funds. The development of the bond market is shaping the nature of this competition in several crucial ways. In this article, we have made an attempt to identify some of the elements of the intermediation process which are expected to play important role on the outcome. Within an industrial organisation framework, we examined the behaviour of these two types of intermediaries in the two segments of the credit market *viz*., working capital and investment finance.

Whereas the relative advantage of banks lies in their ability to mobilise low-cost deposits, the DFIs are advantageously placed in extending investment credit at minimal transactions cost (assumed to be zero in the present setup) *vis-à-vis* banks. Their relative advantages, however, impact their market share and macro-economic variables differently. While development of the bond market (in terms of reduction in interest rate premium on bonds over deposits) improves the market shares of the DFI, it has no effect whatsoever on the quantum of credit, investment, output or the interest rate of the economy. Thus banks end up as 'second-best' in such a situation. On the other hand, a gradual decline in the transaction cost of extending investment credit by banks not only improves their market share in investment financing, but it also raises the quantum of credit extended to the system along with the level of output. Banks tend to be better placed in such situations.

Secondly, as the interest rate in the bond market declines, the market share of banks in the working capital market *vis-à-vis* DFIs falls as well. However, the effect of an increase in the bond rate of interest on banks' share in the investment credit is less than certain and depends on the costs of transactions as compared with the relative cheapness of deposits. It is found that when banks' transactions cost for extending investment credit is relatively high, then a policy of low interest rate helps banks to improve their market share. A high interest regime, on the other hand improves banks' share in the investment finance as against DFIs, if its transaction cost is relatively low.

Thirdly, increased corporate access to the bond market significantly impacts the macroeconomic aggregates. Increased direct recourse to bond market reduces corporates' reliance on institutional credit, so that the investment credit from institutional sources decline. However, total credit, output and the rate of interest on bonds increase due to expansion in working capital. Accordingly, from a macroeconomic perspective, policy initiatives to enhance information-processing capacity of bond markets through strengthening credit rating structure and through better disclosure/accounting standards would be conducive to the development of the real sector. A

somewhat similar expansionary effect occurs along with an increase in the bond rate of interest when producers reduce their mark-up.

In the present framework, product market influences the interest rate structure of the economy by imposing a ceiling. This is an immediate outcome of the fixed mark-up rule adopted by the producers. While a more realistic model would have to endogenise this mark-up by allowing for working capital financing through internal and other market sources, the present assumption conveys a simple, yet important message: any policy that makes working capital dearer would have drastic impact on the demand for working capital and the level of output as well.

The restructuring of the financial sector is often aimed at encouraging competition among financial intermediaries. The present article has demonstrated that the outcome of this competition crucially depends on the development of other financial markets ('the financial infrastructure') and the policy stance of the monetary authority.

The present analysis imposed several restrictions on the pattern of corporate financing. A richer model must allow for the possibility of financing from internal sources and from equity markets as well. At another level, there is also a need to examine the dynamic aspects of the competition between banks and DFIs in a multi-period set-up. One can also examine the effect of competition by allowing more than one bank and DFI. These should form part of the future research agenda.

Endnotes

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1. A detailed discussion of development banks is provided in Diamond (1957).

2. In India, DFIs are generally debarred from accepting chequeable deposits.

3. The Reserve Bank of India appointed a Working Group to examine the possibilities for Harmonization of the Role and Operations of DFIs and Banks. The Working Group, in its Report suggested, among others, a gradual move towards universal banking practices. In the light of the above, the Reserve Bank prepared a 'Discussion Paper' for wider public debate on the issue of universalisation of banking and eliminating the function-specific role of DFIs. It suggested that, while universal banking is a desirable goal, in the present scenario, DFIs remain an important conduit for bridging the demand-supply mismatch for long-term funds, owing to the inadequate development of debt markets. On the basis of feedback received on the Discussion Paper, in the Monetary and Credit Policy of April 2000, the Reserve Bank delineated a broad approach focusing on the status of financial sector reforms, the state of preparedness of the concerned

institutions, the evolution of regulatory-regime and above all, a viable transition path, for institutions desirous of moving in the direction of universal banking.

4. In the present setup, banks have to incur a transactions cost for investment finance, whereas DFIs do not have to incur any cost for advancing working capital finance. This can be justified on the ground that DFIs, more often than not, provide working capital loans to corporates to whom they have already advanced investment finance. As a consequence, their cost of appraisal for working capital loans is relatively lower (assumed to be zero, in this case).

5. As we shall subsequently see, within the present framework, the demand for working capital would be fully met, so that, $W^d=W$.

6. In India, corporates have to meet a number of criteria to directly raise resource from the bond market. Besides their track record, these companies have also to disclose in their prospectus, the purpose, the lead manager, the quantum of resource to be raised, the pattern of shareholding, the credit rating status, *etc.* The end-use of the resources so raised as also the repayment performances are monitored by an independent body of trustees.

7. Government bonds are assumed to be retired by monetisation by the Central Bank.

8. The negativity of the determinant, which is a necessary condition for stability, is provided in Appendix 1.

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Appendix 1

It is demonstrated that a stable equilibrium requires the product market schedule, PM to be steeper than the bond market schedule, BM. Suppose a stable equilibrium is represented by (Y*, r*). Then a marginal disturbance in r* would be self-restoring. Suppose there is a small decline in r from r*. In the bond market this would lead to an increase in the supply of bonds (to finance a increased supply of credit) as well as a reduction in bond demand at the prevailing Y*. The combined effect would be an excess supply of bonds to the tune of *J* leading to an increase in r at the prevailing Y*. This could be seen from equation (18).

But Y would also deviate from Y*, as there would be greater demand for investment demand leading to greater supply of working capital. The initial decline in the rate of interest would lead to an increase in investment demand to the tune of (a+2s)/3s, an increase in output to the tune of (a+2s)/3s^2. This would in turn lead to increase in the demand for bonds by v(a+2s)/3s^2 and a down ward pressure on the bond rate of interest. Stability requires that the additional demand for bonds should not over compensate excess supply of bonds, so that there would be a net increase in the bond rate of interest enabling it to return to its original position. In other words,

$$(\frac{v(a+2s)}{3s^2} - J) = |D| < 0$$

Note from the bond market equilibrium that

$$\frac{\partial r}{\partial Y}|_{BM} = -\frac{v}{J}$$

and from the product market equilibrium condition, that

$$\frac{\partial r}{\partial Y}|_{PM} = -\frac{1}{(a+2s)/3s^2}$$

Then the stability condition requires that the PM locus must be steeper than the BM locus, or, in other words,

$$\left| \frac{\partial r}{\partial Y}|_{PM} \right| > \left| \frac{\partial r}{\partial Y}|_{BM} \right| .$$

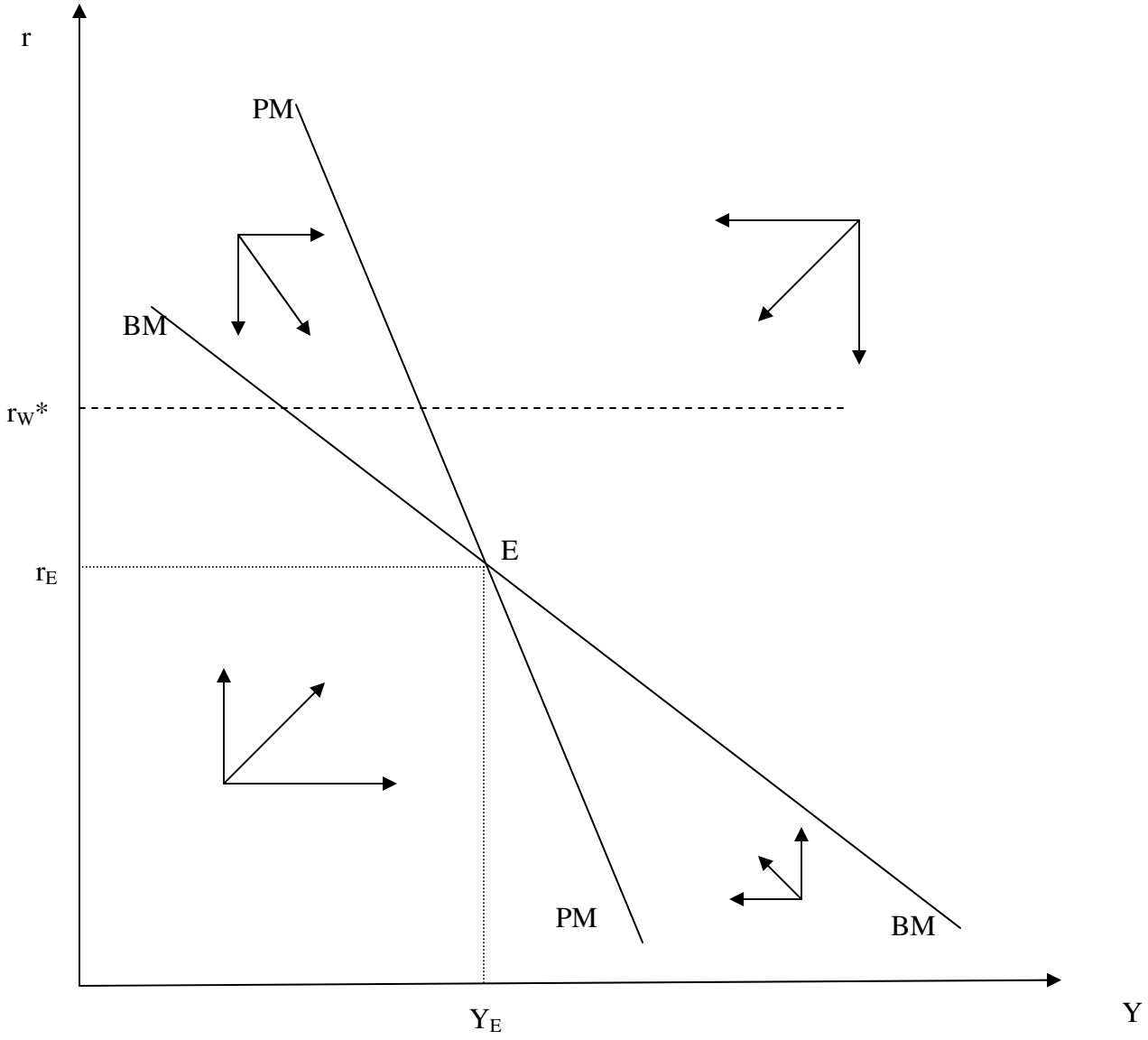

Figure 1.