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Aspects of Financial Reforms In the Presence of Product Market Imperfection

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Abstract

In this paper we construct a dynamic general equilibrium model to analyse different aspects of financial reforms in a two sector closed economy. Market structure in one of the sectors is perfectly competitive, while the other sector is monopolistically competitive. The perfectly competitive firms do not have access to the equity markets, whereas the imperfectly competitive firms finance their fixed cost needs through the equity market and operate under increasing returns to scale. Both types of firms depend on the banks for working capital finance. Financial reform is modeled as a one shot process of either increasing the efficiency of the equity market or decreasing the cash-reserve ratio of the banks. We analyse a steady state solution of the dynamic structure. Simulation exercises with alternative plausible parametric specifications regarding capital and labour intensities in the production process throw light on the issues of brand proliferation (emergence of new firms) and relative impact on the two sectors, following the initiation of a financial reform programme.

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1. Introduction

Financial intermediaries have traditionally played a pivotal role in the growth of the real sector in the development experience of the developed and newly industrialized countries (Goldsmith 1969, Patrick 1966). The magnitude and dimensions of this finance-growth nexus have been the focus of a number of empirical studies. The level of financial intermediation acts as a good predictor of long run rates of economic growth, capital accumulation and productivity improvement in King and Levine (1993); whereas, De Gregorio and Guidotti (1995), Demetriades and Hussein (1996), Odedokun (1996, 1998), Arestis and Demetriades (1997), Wang (2000) among others, attempt to answer the vexed question of which sector, financial or real, leads in the dynamic process of economic development. It has been widely agreed that financial development is crucial for successful economic growth. In the policy front, the literature arising out of the McKinnon and Shaw hypothesis (McKinnon 1973, Shaw 1973) and its critique (Wijnbergen 1983, Buffie 1986, Stiglitz and Weiss 1981, Cho 1986) points to the importance of financial reforms as an integral part of the stabilization and structural reforms programme for the developing countries.

Financial intermediaries provide the link between the financial and the real sector and they have been central to both forms of literature cited above. Fama (1980) has pointed out that a perfectly competitive financial intermediary has no role to play in a world without frictions. To justify the emergence of financial intermediaries frictions in the form of asset indivisibility and imperfect risk sharing arising out of informational asymmetries, have been stressed in the literature. Financial intermediaries perform the roles of resource mobilization and allocation, risk diversification and liquidity management to foster development of the real sector. In a complete information deterministic world also, financial intermediaries can have the important role of a temporary resource provider when there is a time lag between the firms' factor payments and receipts from sale proceeds (Edwards and Vegh 1998, Buffie 1986, Wijnbergen 1983). This role assumes greater significance when the firms do not have enough internal resources to cover its factor payments and the financial intermediaries come in with working capital finance.

In the process of financial development equity markets across the world have become another important source of resource mobilization and allocation. Equity markets are fast catching up with traditional financial intermediaries in terms of volume and transactions (Boyd and Smith 1998). Atje and Jovanovic (1993), Harris (1994) and Levine and Zervos (1998) present cross-country studies of equity market development and economic growth to show that they are highly correlated. Generally financing through the equity market has been observed to be relatively long term in nature as compared to the traditional intermediaries. The penchant for intermediaries towards short-term loans can be interpreted as a preference towards financing the variable cost needs of the firms. On the other hand firms tend to approach the equity markets to finance their fixed cost needs. Differentiation along these lines is consistent with the conclusion of Levine and Zervos that "both stock markets and banks arise and develop simultaneously while providing different bundles of financial services to the economy."

Although it seems that in a general equilibrium set up with multiple assets, the returns from different assets will have to be equalized for their coexistence, in the theoretical literature coexistence and endogenous development of intermediated finance and equity finance have been modeled in several ways, even when they offer different rates of returns. In the presence of moral hazard, firms without enough assets are prevented from obtaining funds in the equity market. These assets can either be monetary (Holmstrom and Tirole,1993) or reputational (Diamond,1991). When some firms do not have access to the equity market, they have to fall back upon traditional intermediaries and the coexistence of banks and stock market arise as an endogenous outcome of the models. In a different vein, Boyd and Smith (1998) justify the coexistence of debt and equity markets in the presence of liquid and illiquid technologies. Endogenous financial development is also modeled in Greenwood and Jovanovic (1990) by introducing a "once-and-for-all" lump sum cost of development.
Contrary to this endogenous development view, some economists take the development of the financial market as exogenous to the model arguing that "differences in the extent of financial markets across countries seem to depend primarily on legislation and government regulation." (Bencivenga and Smith 1991) On a similar vein, we do not explicitly model endogenous development of financial markets. Coexistence is guaranteed by exogenous classification of different forms of

financing for different types of costs - fixed costs are financed through the equity market and variable costs are financed by the intermediaries. This kind of classification also helps us in generating a role for financial intermediaries even in a deterministic production structure. There is a definite shift of emphasis from analyzing the dynamics of the credit channel to the equity market.

The treatment of the product market structure has remained mostly rudimentary in the financial reform literature. Most of the models look into the financing problems of a perfectly competitive firm. We have already seen that the distinction between fixed and variable costs is crucial in terms of debt and equity financing, but standard models of perfectly competitive firms are incapable of accommodating fixed costs. Presence of fixed costs leads to increasing returns in the production structure. Profit maximization under increasing returns to scale leads to the classic problem of indeterminacy of optimal output for a perfectly competitive firm.

So, in modeling an economy where firms access the equity market to finance their fixed cost needs, we have to move out of the realm of perfect competition. A monopolistically competitive market structure in the lines of Dixit and Stiglitz (1977) is one of the ways to accommodate fixed costs and yet get rid of the indeterminacy problem.

From a very different viewpoint, Krugman (1998), Diaz-Alexandro (1985) and others have written extensively on the possible complications that might arise if a financial reform programme is initiated in an imperfectly competitive product market environment. Their emphasis is on the collusive behaviour of the firms and possible firm-bank tacit understandings. Obviously the sequencing of the liberalization process should take this into account. The general consensus is that product market liberalization should preceed or go hand-in-hand with a full-fledged financial liberalization process. In our model we consider an economy where some reforms in the product market has already taken place and there are no barriers to entry in the product market but the market structure still remains monopolistically competitive because of the presence of fixed costs.

Only very recently there has been some theoretical work on financing behaviour of monopolistically competitive firms. (Bernanke, Gertler and Gilchrist 1998, Becsi, Wang and Wynne 1998, Bernanke and Gertler 2000) These models are not primarily aimed at analyzing financial reforms but look into the dynamics of simultaneous development of the financial and real sectors. Here, following Bekaert, Harvey and Lundblad (2001), we make an important distinction between modeling financial development and financial liberalization. They argue in their empirical study that financial liberalization has a temporal dimension and the liberalization effect is distinct from the impact of financial development.

The financial sector, in these models, consists of only traditional financial intermediaries and firms depend only on debt financing. Also the structure allows for monopolistic competition in the intermediate goods (inputs in the production process) market but not in the final goods market.

Our paper tries to provide a dynamic general equilibrium framework where the monopolistically competitive sector produces one of the final goods. The inputs in the production process are land, labour and capital. So, we are not looking into produced inputs but rely on primary inputs. Also, we present a choice in front of the firm regarding modes of financing. In our view, incorporating a source of direct finance enhances the possibility of analyzing financial reforms at an advanced stage of reforms process.

Generally, the financial reform programmes undertaken by developing countries have followed a particular pattern. Initially the stress is more on moving from an administered interest rate regime to market determined interest rates. This has been accompanied by policies to ensure a competitive environment in the banking sector - a move away from nationalized banks towards free entry and exit. On the other hand, development of the equity market has generally lagged the development of financial intermediaries in the reforms process. At a theoretical level, attempts to capture the real effects of a financial reform programme have mostly concentrated on the interest rate and banking sector reforms (Kapur 1976, 1980 ; Matheison 1980 and more recently Edwards and Vegh 1998). In this paper we conceive of a situation where interest rates are already market determined and there is perfect competition in the banking industry. We concentrate on a general policy induced efficiency increase in the functioning of the equity market. In general we are abstracting from policies which engineer a switch of savings from traditional financial intermediaries to the equity market, rather our focus will be on policies which increase the efficiency of transformation of financial savings into productive capital through the equity market. A typical developing country feature is that not all firms have access to the equity market. Our assumption of fixed cost financing through the equity market and a fixed cost component in the cost structure of the monopolistically competitive firm would imply that these firms will have access to the equity market. On the other hand, The perfectly competitive firms, having only to satisfy their variable cost needs will depend only on bank finance. We can think of the perfectly competitive firms as the smaller ones operating at the fringe of the economy. The smaller firms are generally the ones which are excluded from the equity market either through government fiat or market forces and are unable to reap the benefits of economies of scale. Later on we provide a detailed discussion on the kind of market scenario that we have in mind. Introducing monopolistic competition opens up the interesting question of optimal product diversity (Dixit and Stiglitz 1977). Rajan and Zingales (1998) from a cross-country study of firms conclude that "financial development has almost twice the economic effect on the growth of the number of establishments as it has on the growth of the average size of establishments." Their argument is based on the fact that the external finance requirement of the new firms will be relatively more pronounced but the idea has not been formally modeled. In our model we try to provide a framework which can explain observed brand proliferation in the process of financial development. In short, policy induced efficiency increase in the equity market makes the fixed cost component easier to obtain and it becomes profitable to venture into new brands at the margin. This explanation does not rely on the traditional methods of relaxing barriers to entry in the product market. As we have noted, we are modeling an economy where all the barriers to entry have already been dismantled. In the course of the paper we also look at some preliminary simulation exercises based on this structure where alternative parametric specifications are made broadly keeping in mind some developing country features. More specifically, we look at some proxy experiments for financial reforms in the above setup. These include an exogenous policy induced efficiency increase in the equity market and a possible reduction in the reserve requirement. The capital and labour intensities in the production process along with a host of other parameters influence the simulation results. The details given in the paper point to a rich structure which can be exploited to generate many interesting results.

Section 1 of this paper builds up the structure of the model. Section 1A deals with the household optimization problem whereas the next section presents the timing of the decisions and actions of different agents in the system. Profit maximization exercises of the firms in the two sectors are detailed in Section 1C. A rudimentary structure of the banks are presented in Section 1D. The last Subsection under Section 1 depicts the different market clearing conditions. The steady state characterization of this dynamic structure is done in Section 2 to prepare the model for a comparative static analysis. While Section 3 discusses alternative plausible parametric specifications, Section 4 brings out the basic results of the simulation exercises. Detailed results of the simulations are provided in Appendix I - VI. Section 5 concludes.

Section 1 : The Model

Section 1A : Agent Characterization - Households

We consider a two period overlapping generation structure for the households. The mass of the households is normalized to one and we do not consider population growth. We denote the first period of the household as "young" and the second period as "old".

Households are endowed with one unit of labour which they supply inelastically when young at the market wage rate. We assume that old people do not work. Young households consume a part of the wage and save the rest for consumption when old.

Household optimal consumption decision is modeled as a multistage process. In the first stage they decide on how much to consume when young and how much to save. In the second period they consume the saving from the first period plus the return on these savings. The consumption decision is taken by a representative household born at t by maximizing the intertemporal utility function

$$U = \log C_t^1 + \frac{1}{1+\delta} \log C_t^2 \qquad (1)$$

subject to the lifetime budget constraint

$$V_t = P_t C_t^1 + \frac{P_{t+1}}{d_{t+1}} C_t^2 \qquad (2)$$

where δ is the subjective discount rate, V_t denotes wage rate and d_{t+1} denotes the gross return on saving between t and t +1. Also C_t is a composite index of different consumption goods and P_t is an index of the prices of different goods. For any variable a subscript denotes the time when the concerned cohort was born and superscripts of 1 and 2 denote young and old, respectively.
Optimal choice of C_t^1 and C_t^2 in the first stage yields that,

$$C_t^1 = \frac{1+\delta}{2+\delta} \frac{V_t}{P_t} \qquad (3)$$

$$C_t^2 = \frac{d_{t+1}(P_t/P_{t+1})}{2+\delta} \frac{V_t}{P_t} \qquad (4)$$

In the second stage the household consumer has to allocate each period's consumption expenditure between a single homogeneous good and a set of differentiated goods. X_t is the quantity index associated with the differentiated good and the consumption of the homogeneous good is given by Y_t.

The homogeneous good is treated as the numeraire and the price index associated with the differentiated good is p_t. So, in effect P_t is the composite index of price of the homogeneous good (normalized to unity) and price of the differentiated good (indexed by p_t).

In the second stage optimization the instantaneous utility function is taken as a Cobb-Douglas one

$$U_t = X_t^{\alpha} Y_t^{1-\alpha} \tag{5}$$

Consumers maximize (5) subject to the intra period budget constraints

$$P_t C_t^1 = p_t X_t^1 + Y_t^1 \text{ when young} \tag{6}$$

and $$P_{t+1} C_t^2 = p_{t+1} X_t^2 + Y_t^2 \text{ when old.} \tag{7}$$

Given C_t^1 and C_t^2, optimal consumption of X and Y is implicitly given by

$$p_t X_t^1 = \alpha P_t C_t^1$$

and $$Y_t^1 = (1-\alpha) P_t C_t^1 \text{ when young} \tag{8}$$

$$p_{t+1} X_t^2 = \alpha P_{t+1} C_t^2$$

and $$Y_t^2 = (1-\alpha) P_{t+1} C_t^2 \text{ when old.} \tag{9}$$

The consumers will allocate a constant fraction of the total consumption expenditure on the differentiated good, where the fraction will be determined by the marginal utility of the differentiated good.

In the final stage the consumer will decide on the allocation between different brands of the differentiated good. We construct the price index p_t and the quantity index X_t associated with the differentiated good in the Dixit-Stiglitz form.

$$p_t = \text{price index associated with the branded good} = \frac{1}{n_t}\left[\sum_{j=1}^{n_t} \left(p_{jt}\right)^{1-\sigma}\right]^{\frac{1}{1-\sigma}} \tag{10}$$

X_t = quantity index associated with the branded good $= n_t^{\frac{1}{1-\sigma}} \left[\sum_{j=1}^{n_t} \left(x_{jt} \right)^{\frac{\sigma}{\sigma-1}} \right]^{\frac{\sigma-1}{\sigma}}$ (11)

where n_t is the number of brands at period t.

The construction of the quantity index additionally captures the feature that there is no "love of variety" - the number of brands offered to the consumers does not have any bearing on his overall utility.

The consumer will try to maximize the value of the quantity index by choosing his allocation over the different brands, subject to the constraint imposed by the price index.

Demand function for a particular brand will be

$$x_{jt} = \left(\frac{p_{jt}}{p_t} \right)^{-\sigma} \left(\frac{x_t^i}{n_t} \right) \qquad (12)$$

Here, σ is the elasticity of demand for a particular brand. For horizontally differentiated goods value of σ should be close to one but not equal to one.

Under the assumption of symmetry between differentiated goods firms (12) reduces to

$$X_t = n_t x_t \qquad (13)$$

because $x_{jt} = x_t \quad \forall\ j = 1, ...n_t$

Also $p_t = p_{jt} \quad \forall\ j = 1, ...n_t$

Total demand for the differentiated good at any point in time (say t) will be the demand arising out of the young people born at t plus the demand of the old people born in t-1. So total demand X_t is given by

$$X_t = X_t^1 + X_{t-1}^2 = \frac{\alpha}{2+\delta}\left[(1+\delta)\frac{V_t}{p_t} + d_t \frac{V_{t-1}}{p_t}\right] \quad (14)$$

Similarly, the total demand for the homogeneous good will be

$$Y_t = Y_t^1 + Y_{t-1}^2 = \frac{1-\alpha}{2+\delta}\left[(1+\delta)V_t + d_t V_{t-1}\right] \quad (15)$$

On the other hand the household also has to make a portfolio allocation decision. Given the logarithmic form of the intertemporal utility function a constant proportion of the labour income will be saved in the young age.

$$S_t = \frac{1}{2+\delta} V_t \quad (16)$$

The young household has the option of saving in the form of bank deposits, or they can invest in the equity market or they can buy land from the old. Banks offer a riskless gross rate of return r_t on deposits. We consider a very primitive kind of an equity market where secondary market in equity is not developed as yet. So, the return from equity does not have a capital gains component. The firms simply pay back the amount invested in the equity market along with a dividend, the gross rate or return on equity being d_t. Return from land has two components - land earns a rent q_t from the firms who use it for their production and there might be capital gains arising out of sale of land when the households are old - $p_{rt+1} - p_{rt}$. (p_{rt} denotes the price of land at period t).

In a general equilibrium if the household wants to save a non trivial amount in all the assets available to it, then an arbitrage condition should ensure that the return to all the assets must be equal in equilibrium.

$$\frac{q_t + (p_{rt} - p_{rt-1})}{p_{rt-1}} = d_t = r_t \quad (17)$$

The equilibrium in each of the asset markets will be determined by the movement of asset prices to achieve the arbitrage condition.

Also, in equilibrium the total amount of saving should be completely invested in either of the 3 assets.

$$S_t = E_t + R_t + B_t \qquad (18)$$

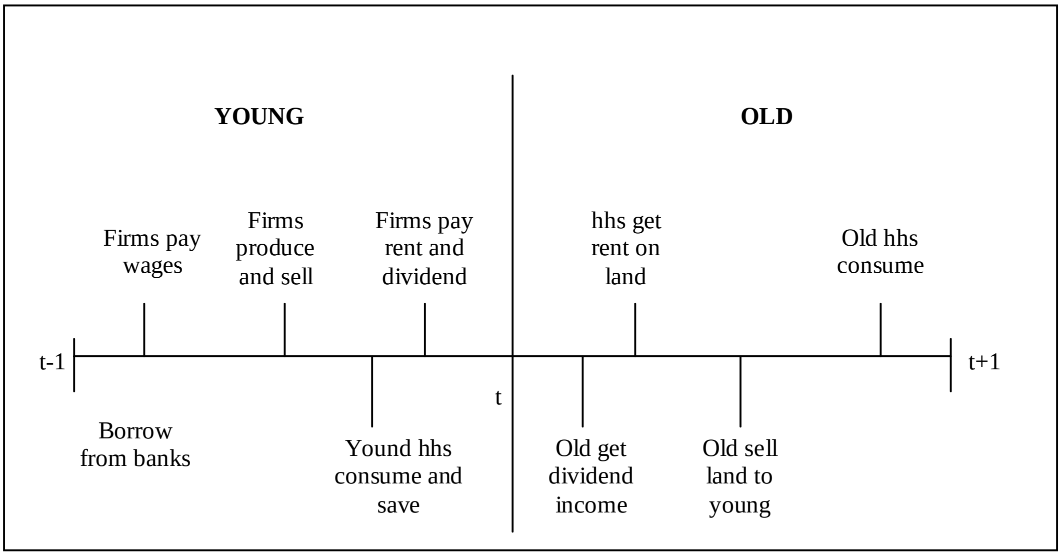
where, E_t = saving in the equity market

R_t = saving in land

B_t = saving in bank deposits

Section 1B : Timing structure of the model

Before looking at the specifics of the production side of the model, let us briefly look at timing of different decisions taken by the households and firms. On the production side we have firms in the homogeneous goods industry and in the differentiated goods industry. Although households live for two periods, we assume that firms are infinitely lived and the production structure replicates every period. At the beginning of period t firms hire labour and rent land from the old to start the production process. The differentiated goods firms also convert last period's saving in the equity market into productive physical capital. The young households receive wages before the final product is produced and sold in the market. This payment in advance constraint forces the firms to borrow from banks their entire wage bill. When the final output reaches the market, the young households spend a part of their wage earnings in consuming it. The proceeds from sales are used by the firms to pay rent and dividend to the old at t and also to meet their contractual commitment with the banks. The unconsumed part of the wages of the young households is used either to buy land from the old, or saved in the form of bank deposits and equity market capital. When young households turn old, their income consists of rent from land (which they have given on rent when old), dividends on the saving done through equity market when they were young, interest income from their saving deposits and also earnings from selling land to the young. They spend their entire income on the final output before they die.



Section 1C : Production

Now, we can look at the production side of the economy in greater detail. The particular kind of market structure we are modeling can be justified in the following ways - the homogeneous goods producing sector can be thought of as a generalization of the "agricultural" sector whereas the differentiated goods sector can be the image of the overall "industrial" sector. Otherwise, the homogeneous goods producing sector can be the fringe (small) firms in a particular industry, whereas the differentiated goods sector can be the core (large) firms in the same industry. In either situation our assumption of lack of access to equity market for the homogeneous goods sector (and consequently the absence of increasing returns to scale technology in this sector) seems to be a plausible one.

The homogeneous good is produced under conditions of constant returns to scale with a Cobb-Douglas technology. Labour (L) and land (R) are the only two inputs used in the production of the homogeneous good. Perfectly competitive market structure in this sector ensures marginal cost pricing at the optimum.

$$a_{ly}W_t + a_{ry}q_t = 1 \tag{19}$$

where, $$W_t = V_t l_t \quad (20)$$

a_{ij} is the requirement of the ith input (i = L , R) in the j^{th} line of production (j = X, Y). a_{ij}'s in principle can be functions of the wage rental ratio. W_t denotes the marginal labour cost taking into account the rate of interest that has to be paid on the loans taken to finance the wage bill. l_t is the gross lending rate of the banks. The marginal cost associated with land is only the rent that has to be paid to the old people. Note that marginal cost of the homogeneous good is equated to the price of the homogeneous good, which is set to unity by suitable normalization.

Each brand of the differentiated good requires a variable cost and a quasi-fixed cost component in its production structure. Except for the quasi-fixed cost, output is produced through a Cobb-Douglas technology. The introduction of fixed cost paves the way for increasing returns to scale in this sector. The variable cost component is produced using labour and land, whereas the quasi-fixed cost component requires the usage of labour and physical capital. The important point to note here is that fixed costs are generally more capital intensive. Here quasi-fixed cost is a recurring cost which has to be incurred every period and it is not in the nature of a sunk cost. We assume that level of quasi-fixed cost is insensitive to the level of output but will vary with the level of input prices. This kind of a production structure with quasi-fixed costs has been used by Konishi et al (1990) and Chao and Yu (2001). The capital that is part of the quasi-fixed cost is obtained from the equity market. The differentiated goods firms have access to a simple linear technology through which saving in equity market at period t-1 is converted into productive physical capital at period t.

$$K_t = kE_{t-1} \quad (21)$$

where, K_t is the amount of productive capital at period t.

The lack of access to this technology may be thought of as the reason for homogeneous goods firms not accessing the equity market. The coefficient k in this technology tries to capture the fact that in a not so well developed equity market a large part of the funds invested in the market might not get converted into productive capital. Along with financial reforms and strengthening of the equity market, we assume that a higher proportion of savings will be converted into productive capital. An increase in k might also be a proxy for lower capital market imperfection and hence lower external finance premium. In principle k can be thought of as any function and need not be a linear one. Although, savings and physical capital are both measured in terms of the numeraire good, we are making a conceptual difference between the two in terms of their applicability in the production process. We also assume that capital depreciates completely in the production process and the firms have to go to the equity market again next period to raise funds for physical capital formation.

In a monopolistically competitive market structure, free entry within a period will drive down profits to zero. The price in the differentiated goods sector will be set at a markup over the variable cost and the mark up will be a function of the elasticity of demand for that particular brand. To ensure zero profits in the long run, the rest of the revenue (a fraction $\frac{1}{\rho}$) will go towards covering fixed costs.

$$\left(\frac{\sigma}{\sigma-1}\right)\left(a_{lx}W_t + a_{rx}q_t\right) = p_t \tag{22}$$

$$\sigma\left(a_{lf}W_t + a_{kf}\,\frac{d_t}{k}\right) = p_t x_t \tag{23}$$

Here the labour coefficient associated with per firm fixed cost is a_{lf} and the capital coefficient associated with it is a_{kf}. a_{lx} and a_{rx} are the labour and land coefficients associated with production of the marginal cost for the branded goods firm. The cost of the physical capital will be more than the per unit dividend payment on saving in equity market because by assumption of linear technology in capital goods production, not all the savings acquired from the capital market is used in the production process.

Section 1D : Banks

The problems associated with asymmetric information, agency costs and optimal contracts have always been in the center-stage of the literature on financial reforms. So, the stress has been on the role of banks in the credit disbursement process. In this model we abstract from the important role of the banks by assuming a deterministic production structure. There is no uncertainty in the production or consumption process. Also we have in mind a complete information setup.

Due to the above assumptions banks become passive conduits of channelising savings from households to firms. Banks take deposits from households and finance the wage bill of the firms by lending them the required amount. While passing through the banks a part of the savings (μ) is kept aside by the banks. This can be thought of as a proxy for CRR. It is exogenous to the model and is thought to be part of a regulatory practice which does not arise out of the incentive structure of the model.

We assume perfect competition in the banking industry which forces the profits of the banks down to zero. For a zero profit intermediary the lending rate will simply be a mark up over the deposit rate when there is a reserve requirement. A higher reserve requirement will force the banks to charge a higher lending rate to the firms.

$$d_t = (1-\mu)l_t \tag{24}$$

The deposit and lending rate will be determined by the supply of deposits by the households and the demand for credit by the firms.

Section 1E : Market Clearing

Now, we will look into clearing of different markets in a general equilibrium setup. First, we look at the labour market where the demand for labour from homogeneous goods producers and differentiated goods producers must be equal to the fixed supply of labour 1 (endowment to the households).

$$a_{ly}Y_t + a_{lx}n_t x_t + a_{lf} n_t = 1 \tag{25}$$

In the market for land, total demand for land arises out of the demand from homogeneous good producers and from the variable cost of the differentiated goods sector. This should be equal to the fixed total supply of land (normalized to one).

$$a_{ry}Y_t + a_{rx}n_t x_t = 1 \tag{26}$$

In the market for capital the total supply is not fixed. It depends on the saving in the equity market which is an endogenous variable in the model. The demand for capital arises only from the fixed cost component of the differentiated goods producers. In equilibrium,

$$a_{kf} n_t = kE_{t-1} \tag{27}$$

The equilibrium in the productive capital market highlights the fact that the supply of funds in this market depends on the equity market efficiency parameter k.

The total demand for funds for working capital financing comes from both the homogeneous goods producers and the differentiated goods producers because both of them use labour and face the payment in advance constraint. This demand for funds is constrained by the supply of deposits from households and the reserve requirement of the banks.

$$(1-\mu)B_t = a_{ly}Y_t V_t + a_{lx}n_t x_t V_t + a_{lf} n_t V_t \tag{28}$$

In the market for land, the total saving in land should be equal to its value, i.e., market price multiplied by the fixed supply (normalized to be unity).

$$R_t = p_{rt}.1 \tag{29}$$

In the differentiated goods market total supply at period t in terms of the numeraire good should be $n_t p_t x_t$ if we invoke the assumption of symmetric firms. This should be equated to the total demand for the differentiated good given by equation (14).

$$n_t p_t x_t = \frac{\alpha}{2+\delta}\left[(1+\delta)V_t + d_t V_{t-1}\right] \tag{30}$$

The use of Walras law allows us to get rid of the market clearing condition in the homogeneous goods market.

Section 2 : Steady State Characterization

Equations (16) - (30) are 15 dynamic equations of the model and represent a complete dynamic general equilibrium set up. In this paper we do not look at the dynamic properties of the system and concentrate only on steady state characteristics of the dynamic structure.

The steady state versions of the dynamic equations, without time subscripts represent a complete general equilibrium system. We claim that a set of positive values of the variables $(S, V, W, E, R, B, Y, x, n, K, p, p_r, l, d, q)$ which solves equations (16) - (30) is a general equilibrium of the model. For further analysis, we simplify the above system by getting rid of some of the variables by suitable substitutions. The reduced set of equations in the steady state looks like

$$\frac{q}{p_r} = (1-\mu)l \tag{31}$$

$$\frac{1}{2+\delta}V = \frac{a_{kf}n}{k} + B + p_r \tag{32}$$

$$a_{ly}Vl + a_{ry}q = 1 \tag{33}$$

$$\frac{\sigma}{\sigma-1}\left(a_{lx}Vl + a_{rx}q\right) = p \tag{34}$$

$$\text{ó}\,[a_{lf}Vl + a_{kf}\,\frac{(1-\text{ì})}{k}] = px \tag{35}$$

$$npx = \frac{\alpha}{2+\delta}\left[(1+\delta)+(1-\mu)l\right]V \tag{36}$$

$$a_{ry}Y + a_{rx}nX = 1 \tag{37}$$

$$a_{ly}Y + a_{lx}nX + a_{lf}\,n = \overline{L} \tag{38}$$

$$(1-\mu)B = a_{ly}YV + a_{lx}nXV + a_{lf}\,nV \tag{39}$$

Now, the reduced system of equations comprises of equations (31) - (39). These are 9 equations in 9 variables $\{V, n, p, x, Y, l, q, B$ and $p_r\}$. It is in principle possible to find the values of the variables which solve this system of equations but for a non-linear system of equations finding out the steady state will be very difficult. So we will be more interested in doing some comparative static exercise around the steady state assuming that for suitable parameter values one such steady state exists. For the comparative static exercise,we linearize the equations around that steady state and get the following set of linear equations.

$$\hat{q} - \hat{p}_r = -\varphi\hat{\mu} + \hat{l} \quad (40)$$

$$\hat{V} = \lambda_1(\hat{n} - \hat{k}) + \lambda_2\hat{B} + (1 - \lambda_1 - \lambda_2)\hat{p}_r \quad (41)$$

$$\theta_{ly}(\hat{V} + \hat{l}) + (1 - \theta_{ly})\hat{q} = 0 \quad (42)$$

$$\theta_{lx}(\hat{V} + \hat{l}) + (1 - \theta_{lx})\hat{q} = \hat{p} \quad (43)$$

$$(1 - \theta_{kf})(\hat{V} + \hat{l}) + \theta_{kf}(-\varphi\hat{\mu} + \hat{l} - \hat{k}) = \hat{p} + \hat{x} \quad (44)$$

$$\delta_{ly}\hat{Y} + (1 - \delta_{ly})\hat{n} + (1 - \delta_{ly})\hat{x} = (\hat{V} + \hat{l} - \hat{q})(\delta_{ly}\theta_{ry}\varepsilon_y + \delta_{lx}\theta_{rx}\varepsilon_x) \quad (45)$$

$$\delta_{ry}\hat{Y} + (1 - \delta_{ry})\hat{n} + (1 - \delta_{ry})\hat{x} = -(\hat{V} + \hat{l} - \hat{q})(\delta_{ry}\theta_{ly}\varepsilon_y + \delta_{rx}\theta_{lx}\varepsilon_x) \quad (46)$$

$$\hat{n} + \hat{x} + \hat{p} = \hat{V} + \gamma(-\varphi\hat{\mu} + \hat{l}) \quad (47)$$

$$-\varphi\hat{\mu} + \hat{B} = \pi_1(\hat{V} + \hat{Y}) + \pi_2(\hat{V} + \hat{n} + \hat{x}) + (1 - \pi_1 - \pi_2)(\hat{V} + \hat{n}) \quad (48)$$

where, θ_{ly} and θ_{lx} are the cost shares of labour in the homogeneous and differentiated goods sectors respectively.

θ_{kf} is the cost share of capital in the quasi-fixed cost.

δ_{ly} and δ_{ry} are the physical shares of labour and land in the production of the homogeneous good.

ε_x and ε_y are the elasticities of substitution in the branded and the homogeneous goods sectors respectively.

λ represents a fraction of the total demand for the differentiated good coming from the old generation.

λ_1 and λ_2 are the proportions of savings in equity market and banks respectively.

π_1 and π_2 are the proportions of bank credit given towards the homogeneous goods industry and towards financing the variable costs in the differentiated goods industry, respectively.

$\varphi = \dfrac{\mu}{1-\mu}$ is a variable which gives us some idea about the initial level of CRR in the economy.

Let "^" over a particular variable denote the percentage change in that variable.

From the linearized system our object of interest is to study the effect on the different variables of changes in the parameters of the system. We specifically focus on the changes in the policy induced parameters k and ℓ, given the values of structural parameters $\theta_{lx}, \theta_{ly}, \theta_{kf}\, \delta_{ry}, \delta_{ly}, \varepsilon_x, \varepsilon_y, \lambda_1, \lambda_2, \pi_1, \pi_2, \varphi$ and γ.

Section 3 : Parametric specification

To find any numerical solution of a comparative static exercise with this system of equations we will require specific values for the different structural parameters. We formulate our parametric specification keeping in mind some of the developing country features. For some of the structural parameters we chose alternative values to look at how the system behaves under different initial conditions. We assume a very simple constant returns to scale Cobb-Douglas technology structure in both homogeneous and differentiated goods sectors $-\varepsilon_X = \varepsilon_Y = 1$. The fixed cost production structure is generally more capital intensive than the other sectors. θ_{kf} is assumed to be equal to 0.8. Proportion of saving in land and equity market will be less than saving in banks for a developing country. So we set λ_1 = 0.2 and λ_2= 0.5 respectively. In a developing country context, proportion of bank credit given to the homogeneous goods industry and for variable cost financing of the differentiated goods industry will be much higher than what is going towards the fixed cost of the differentiated goods industry. We assume $\pi_1 = 0.3$ and $\pi_2 = 0.5$ respectively. We also assume that physical share of labour in the production of the homogeneous good is higher than the physical share of land - $\delta_{ly} > \delta_{ry}$. We will see that this assumption will be helpful in signing the different effects of policy changes and seems to be a plausible assumption. We do not specify any particular value for the cost shares of labour in homogeneous and differentiated goods industry, but θ_{ly} and θ_{lx} are likely to take high values. In our simulation exercise we work with some particular combinations of θ_{ly} and θ_{lx}. The initial level of CRR is taken to be 10% before financial liberalization. This can be justified from most developing country experiences. A 10% level of CRR gives a φ value of 0.1. Finally we assume that the old people consume more and the young people save more, so that γ is taken to be equal to 0.8.

Section 4 : Simulation Results

We should note that we have not specified any particular values for the parameters $\theta_{lx}, \theta_{ly}, \delta_{ry}$ and δ_{ly}. So, in principle the effects of changes in policy induced parameters will be functions of these structural parameters.

First, we do the comparative static exercise with changes in the efficiency of the equity market parameter *k*. For that we set $\hat{\mu}$ to be equal to zero. Here we will present results for only 5 important variables - number of brands in the steady state n, per brand output in the steady state X, level of homogeneous good in the steady state Y, relative price of the differentiated good p and the rent on land q. Detailed results on other variables are given in the appendix.

$$\hat{n} = \frac{\left\lfloor -0.05 + (0.04\delta_{ry} + 0.07\delta_{ly}) + (\delta_{ly} - \delta_{ry})(0.03\theta_{lx} + 0.05\theta_{ly}) \right\rfloor}{-0.06 + (0.07\delta_{ry} + 0.15\delta_{ly}) + (\delta_{ly} - \delta_{ry})(0.04\theta_{lx} + 0.07\theta_{ly})}\hat{k}$$

$$\hat{x} = \frac{\left\lfloor 0.24 - (0.28\delta_{ry} + 0.36\delta_{ly}) + (\delta_{ly} - \delta_{ry})(0.2\theta_{lx} + 0.24\theta_{ly}) \right\rfloor}{-0.06 + (0.07\delta_{ry} + 0.15\delta_{ly}) + (\delta_{ly} - \delta_{ry})(0.04\theta_{lx} + 0.07\theta_{ly})}(0.2\hat{k})$$

$$\hat{Y} = \frac{\left\lfloor (1 - \delta_{ry}) - (\delta_{ly} - \delta_{ry})\theta_{ly} \right\rfloor}{-0.06 + (0.07\delta_{ry} + 0.15\delta_{ly}) + (\delta_{ly} - \delta_{ry})(0.04\theta_{lx} + 0.07\theta_{ly})}(0.11\hat{k})$$

$$\hat{p} = \frac{(\delta_{ly} - \delta_{ry})(\theta_{lx} - \theta_{ly})}{-0.06 + (0.07\delta_{ry} + 0.15\delta_{ly}) + (\delta_{ly} - \delta_{ry})(0.04\theta_{lx} + 0.07\theta_{ly})}(0.11\hat{k})$$

$$\hat{q} = \frac{(\delta_{ly} - \delta_{ry})\theta_{ly}}{-0.06 + (0.07\delta_{ry} + 0.15\delta_{ly}) + (\delta_{ly} - \delta_{ry})(0.04\theta_{lx} + 0.07\theta_{ly})}(0.11\hat{k})$$

The above solutions have the general form

$$\hat{u} = b\hat{k}$$

where $\hat{u}$ is the percentage change in the steady state value of the relevant endogenous variable measured by multiplying the impact effect b with the percentage change in the policy instrument *k*. At this stage we will be more interested in the sign of b (impact effect) for different variables and see how these impact effects are related to $\theta_{lx}, \theta_{ly}, \delta_{ry}$ and δ_{ly}. The important features of the solutions are

As long as $\delta_{ly} > \delta_{ry}$ (one of our parametric specifications) and δ_{ly} is large ($\delta_{ly} > 0.5$ is a sufficient condition), the denominator of b (same for all the variables) is going to be positive. Since δ_{ly} measures the share of labour force engaged in the traditional primary sector, this seems to be a plausible assumption for developing countries.

The numerator of the impact effect on the number of brands (n) will also be positive under the above parametric specifications. The impact effect can be positive even when $\delta_{ly} < \delta_{ry}$, if δ_{ly} and δ_{ry} are both large. So for most plausible values of $\theta_{lx}, \theta_{ly}, \delta_{ry}$ and δ_{ly}, an increase in the efficiency of the equity market will lead to an increase in the number of brands.

On similar lines the numerator of the impact effect on the per brand output (x) is likely to be negative given $\delta_{ly} > \delta_{ry}$ and δ_{ly} and δ_{ry} are large. An increase in the efficiency of the equity market will lead to a fall in the per brand output.

The numerator of the impact effect on the output of the homogeneous good (Y) cannot be signed unambiguously. $\delta_{ly} > \delta_{ry}$ is not a sufficient condition for this to be either positive or negative. So the impact effect of an efficiency increase in the equity market on the homogeneous good output can go either way, in principle.

The numerator of the impact effect on the relative price of the differentiated good (p) will depend on both the difference in physical shares $(\delta_{ly} - \delta_{ry})$ and the difference in cost shares $(\theta_{lx} - \theta_{ly})$. So relative price can move in either direction following an efficiency increase depending on the structural parameters.

The numerator of the impact effect on the rent on land will be positive given $\delta_{ly} > \delta_{ry}$. So rent on land is likely to go up after an increase in efficiency of the equity market.

Now, we do the same kind of exercise with the CRR parameter ℓ. The analysis assumes $\hat{k}$ to be equal to zero. Unfortunately we cannot make general remarks about the results of a decrease in CRR, as we have done in case of increase in the efficiency of the equity market. The results depend on $\theta_{lx}, \theta_{ly}, \delta_{ry}$ and δ_{ly} in a much more complicated manner. (start from here)We derive the impact effects for some plausible alternative values of $\theta_{lx}, \theta_{ly}, \delta_{ry}$ and δ_{ly} and present the detailed results in a tabular form in Appendix IV - VI.

Some general reflections are in order -

A decrease in CRR generally leads to an increase in the number of brands.
Per brand output in the differentiated goods industry generally falls following a decrease in CRR.
The impact effect of a decrease in CRR on homogeneous good output is generally negative.
The effect on the relative price of the homogeneous and the differentiated good depend on the difference between the labour cost shares $(\theta_{lx} - \theta_{ly})$ assuming $\delta_{ly} > \delta_{ry}$. Relative prices can move in either direction.
A decrease in CRR will generally be followed by an increase in the rent on land under the assumption that $\delta_{ly} > \delta_{ry}$.

Since financial liberalization is characterized by a fall in the CRR and an increase in the efficiency of the equity market, it is clear from the simulation results that the endogenous variables - number of firms, per brand output and the output of the homogeneous good - will move in the same direction following the initiation of a complete reforms package. So the two components of financial liberalization will reinforce each other.

Finally we put some plausible values for $\theta_{lx}, \theta_{ly}, \delta_{ry}$ and δ_{ly} and try to quantify the actual effect of a one percent change in the efficiency of the equity market parameter k and the CRR parameter ℓ. The exact percent changes in the different variables are reported in the tables in Appendix I - VI. In the Appendix we also we also present the impact effects by changing the share of savings in equity market (λ_1) and the capital cost share (θ_{kf}). Although the exact numerical results are only indicative in nature, we can put forward some general remarks about the quantitative aspects of the model.

The impact effects of the emergence of new firms and fall in per brand output is significantly large under all possible scenarios.

Effect on the homogeneous good production is always small. When we reduce the capital cost share (θ_{kf}), the two types of financial reforms might have different impact on the homogeneous good production. (Appendix - III & VI)

Relative prices and rent on land are not responding significantly to any financial reforms in this set up.

After the reforms wage rates and lending rates are moving in the opposite directions. Although in most cases wage rates go down, it might go up following an increase in the efficiency of the equity market when the capital cost share (θ_{kf}) is low. (Appendix -III)

The effect of a change in CRR on per brand output and number of firms is similar when we allow for an increase in the share of savings in the equity market. The effect of an increase in the efficiency of the equity market on these variables do differ significantly under alternative specifications of initial share of savings in equity market. (Appendix -II & V)

A change in the capital cost share changes the impact effect on steady state per brand output and number of firms significantly for both types of reforms measures.(Appendix -III & VI)

Section 5 : Conclusion

This paper tries to address the problems of carrying on a financial reform package from a developing country perspective, which has already undergone some amount of interest rate liberalization. In the general equilibrium structure we model the savings behaviour of a continuum of overlapping generations of households. They are the sole provider of finance to the firms, but the financing operates either through perfectly competitive financial intermediaries or through a primitive equity market. We have constructed a market structure where we can take into account differences in production technologies and access to finance for different sectors. There is a homogeneous good which is produced through a constant returns to scale production technology, whereas, the other one is a differentiated good produced via an increasing returns to scale technology. Equity market access is limited to the differentiated goods firms.

Financial reforms package in our model consists of an increase in the efficiency of the equity market in converting savings into productive capital and a lowering of the cash reserve ratio of the financial intermediaries. The complex structure of our model does not allow for unambiguous analytical solutions to these comparative static exercises. The effects of these changes generally depends on a host of parameter values. We try to characterize the effects for some plausible alternative parametric specifications.

Although the exact numerical values of the effects on different endogenous variables are always questionable because of the simplistic structure of the financial intermediaries and the equity market and uncertainty about the correct parametric specification, we get a clear idea of the direction of change. Our results lend theoretical support to the findings of Rajan and Zingales (1998) that emergence of new firms and financial development are closely related. We also find that the size of the firms tend to get reduced following financial reforms. This seems to project a picture of brand proliferation and reduction in concentration in the differentiated goods industry as a consequence of financial liberalization and not as a consequence of lifting of barriers to entry.

We are yet to look at the welfare consequences of this exercise formally, but because of the sensitivity of our results to alternative parametric specifications, we can say that financial liberalization will not be an unmixed blessing under all circumstances. We intend to carry forward this analysis in an open economy context, where liberalization of capital flows can act as another possible reform measure.

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Appendix - I

$\lambda_1 = 0.2, \quad \lambda_2 = 0.5$

The effect of 1% increase in *k* on the different variables under alternative parametric specifications		*n*	*X*	*Y*	*V*	*p*	*q*	*L*
$\theta_{1y} = 0.5$ $\theta_{1x} = 0.7$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	0.53	-0.58	0.03	-0.27	0.003	-0.008	0.28
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	0.56	-0.6	0.02	-0.24	0.004	-0.01	0.25
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	0.54	-0.59	0.01	-0.26	0.002	-0.006	0.26
$\theta_{1y} = 0.7$ $\theta_{1x} = 0.5$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	0.52	-0.57	0.03	-0.27	-0.003	-0.01	0.28
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	0.55	-0.59	0.01	-0.25	-0.004	-0.01	0.25
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	0.54	-0.59	0.009	-0.26	-0.002	-0.008	0.26
$\theta_{1y} = 0.7$ $\theta_{1x} = 0.9$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	0.54	-0.59	0.03	-0.26	0.003	-0.01	0.27
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	0.56	-0.61	0.01	-0.23	0.004	-0.01	0.24
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	0.55	-0.60	0.009	-0.25	0.002	-0.008	0.25
$\theta_{1y} = 0.9$ $\theta_{1x} = 0.7$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	0.53	-0.58	0.02	-0.27	-0.003	-0.01	0.27
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	0.56	-0.60	0.007	-0.24	-0.004	-0.02	0.24
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	0.54	-0.59	0.007	-0.25	-0.002	-0.01	0.26

Appendix – II

$\lambda_1 = 0.3, \quad \lambda_2 = 0.5$

Effect of increase in *k* by 1 % on the different variables under alternative parametric specifications		*n*	*X*	*Y*	*V*	*p*	*Q*	*L*
$\theta_{1y} = 0.5$ $\theta_{1x} = 0.7$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	0.66	-0.69	0.02	-0.14	0.002	-0.004	0.14
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	0.67	-0.69	0.009	-0.13	0.002	-0.006	0.13
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	0.67	-0.69	0.006	-0.13	0.001	-0.003	0.13
$\theta_{1y} = 0.7$ $\theta_{1x} = 0.5$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	0.66	0.68	0.01	-0.14	-0.002	-0.006	0.14
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	0.67	-0.69	0.006	-0.13	-0.002	-0.008	0.13
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	0.67	-0.69	0.005	-0.13	-0.001	-0.004	0.13
$\theta_{1y} = 0.7$ $\theta_{1x} = 0.9$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	0.66	-0.69	0.01	-0.14	0.001	-0.005	0.14
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	0.67	-0.70	0.006	-0.12	0.002	-0.008	0.13
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	0.67	-0.69	0.005	-0.13	0.001	-0.004	0.13
$\theta_{1y} = 0.9$ $\theta_{1x} = 0.7$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	0.66	-0.69	0.01	-0.14	-0.001	-0.007	0.14
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	0.67	-0.69	0.004	-0.13	-0.002	-0.01	0.13
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	0.67	-0.69	0.003	-0.13	-0.001	-0.005	0.13

Appendix – III

$\lambda_1 = 0.2, \quad \lambda_2 = 0.5, \quad \theta_{kf} = 0.6$

The effect of 1% increase in *k* on the different variables under alternative parametric specifications.		*n*	*X*	*Y*	*V*	*p*	*q*	*L*
$\theta_{1y} = 0.5$ $\theta_{1x} = 0.7$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	0.78	-0.74	-0.03	0.22	-0.003	0.007	-0.23
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	0.75	-0.72	-0.01	0.22	-0.003	0.007	-0.23
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	0.77	-0.73	-0.009	0.21	-0.002	0.005	-0.21
$\theta_{1y} = 0.7$ $\theta_{1x} = 0.5$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	0.79	-0.74	-0.02	0.23	0.003	0.009	-0.23
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	0.76	-0.73	-0.01	0.20	0.004	0.01	-0.20
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	0.77	-0.73	-0.008	0.21	0.002	0.007	-0.21
$\theta_{1y} = 0.7$ $\theta_{1x} = 0.9$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	0.77	-0.73	-0.02	0.22	-0.002	0.009	-0.22
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	0.74	-0.71	-0.009	0.18	-0.003	0.01	-0.18
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	0.76	-0.72	-0.007	0.20	-0.001	0.006	-0.20
$\theta_{1y} = 0.9$ $\theta_{1x} = 0.7$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	0.78	-0.74	-0.02	0.22	0.002	0.01	-0.22
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	0.75	-0.72	-0.006	0.19	0.003	0.01	-0.19
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	0.77	-0.72	-0.005	0.21	0.002	0.008	-0.21

Appendix – IV

$\lambda_1 = 0.2, \quad \lambda_2 = 0.5$

Effect of increase in CRR by 1% on the different variables under alternative parametric specifications.		n	X	Y	V	p	q	L
$\theta_{1y} = 0.5$ $\theta_{1x} = 0.7$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	-0.62	0.49	0.08	-0.70	0.008	-0.02	0.72
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	-0.55	0.44	0.04	-0.63	0.01	-0.03	0.66
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	-0.59	0.46	0.03	-0.67	0.006	-0.01	0.68
$\theta_{1y} = 0.7$ $\theta_{1x} = 0.5$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	-0.63	0.51	0.07	-0.71	-0.008	-0.03	0.72
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	-0.57	0.46	0.03	-0.64	-0.01	-0.04	0.66
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	-0.60	0.47	0.02	-0.67	-0.006	-0.02	0.68
$\theta_{1y} = 0.7$ $\theta_{1x} = 0.9$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	-0.60	0.47	0.07	-0.68	0.008	-0.03	0.69
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	-0.53	0.41	0.03	-0.61	0.01	-0.04	0.63
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	-0.58	0.45	0.02	-0.66	0.006	-0.02	0.66
$\theta_{1y} = 0.9$ $\theta_{1x} = 0.7$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	-0.61	0.49	0.06	-0.69	-0.008	-0.03	0.70
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	-0.54	0.44	0.02	-0.62	-0.01	-0.05	0.63
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	-0.58	0.46	0.02	-0.66	-0.006	-0.03	0.67

Appendix – V

$\lambda_1 = 0.3, \quad \lambda_2 = 0.5$

The effect of 1% increase in CRR on the different variables under alternative parametric specifications.		n	X	Y	V	p	Q	l
$\theta_{1y} = 0.5$ $\theta_{1x} = 0.7$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	-0.63	0.50	0.08	-0.71	0.008	0.02	0.73
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	-0.57	0.46	0.04	-0.65	0.01	-0.03	0.68
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	-0.59	0.47	0.03	-0.67	0.006	-0.01	0.69
$\theta_{1y} = 0.7$ $\theta_{1x} = 0.5$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	-0.65	0.52	0.07	-0.72	-0.008	-0.03	0.74
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	-0.59	0.48	0.03	-0.67	-0.01	-0.04	0.68
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	-0.60	0.48	0.02	-0.68	-0.006	-0.02	0.69
$\theta_{1y} = 0.7$ $\theta_{1x} = 0.9$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	-0.62	0.48	0.07	-0.69	0.008	-0.03	0.71
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	-0.55	0.43	0.03	-0.63	0.01	-0.04	0.65
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	-0.58	0.45	0.02	-0.66	0.006	-0.02	0.67
$\theta_{1y} = 0.9$ $\theta_{1x} = 0.7$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	-0.63	0.50	0.06	-0.71	-0.008	-0.04	0.71
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	-0.57	0.45	0.02	-0.65	-0.01	-0.05	0.65
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	-0.59	0.46	0.02	-0.67	-0.006	-0.03	0.67

Appendix - VI

$\lambda_1 = 0.2, \quad \lambda_2 = 0.5, \quad \theta_{kf} = 0.6$

Effect of 1% increase in CRR on the different variables under alternative parametric specifications		n	x	Y	V	P	q	L
$\theta_{1y} = 0.5$ $\theta_{1x} = 0.7$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	-0.83	0.62	0.13	-1.10	0.01	-0.03	1.13
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	-0.69	0.52	0.06	-0.93	0.02	-0.04	0.97
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	-0.76	0.57	0.05	-1.02	0.009	-0.02	1.04
$\theta_{1y} = 0.7$ $\theta_{1x} = 0.5$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	-0.85	0.65	0.12	-1.13	-0.01	-0.05	1.15
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	-0.72	0.56	0.05	-0.96	-0.02	-0.06	0.99
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	-0.78	0.59	0.04	-1.04	-0.009	-0.03	1.06
$\theta_{1y} = 0.7$ $\theta_{1x} = 0.9$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	-0.79	0.58	0.11	-1.06	0.01	-0.04	1.08
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	-0.65	0.48	0.04	-0.89	0.02	-0.06	0.91
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	-0.74	0.54	0.03	-0.99	0.009	-0.03	1.01
$\theta_{1y} = 0.9$ $\theta_{1x} = 0.7$	$\delta_{1y} = 0.7$ $\delta_{ry} = 0.5$	-0.81	0.61	0.10	-1.09	-0.01	-0.06	1.10
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.5$	-0.68	0.52	0.03	-0.92	-0.02	-0.07	0.93
	$\delta_{1y} = 0.9$ $\delta_{ry} = 0.7$	-0.75	0.56	0.03	-1.01	-0.009	-0.04	1.02