Financial Development and Economic Growth in India and South Korea*

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In recent years the role of financial development in the growth of developing countries has drawn considerable attention. Most of this attention can be traced to the works of McKinnon and Shaw. Broadly speaking, two different schools of thought with somewhat different policy prescriptions can be identified, namely, the 'structuralists' school (Goldsmith) and the 'financial repressionists' school (McKinnon; Shaw). The first school argues that a widespread network of financial institutions and a diversified array of financial instruments has a beneficial effect on the saving-investment process and hence, on growth. The 'repressionists' school, on the other hand, maintains that low real interest rates, caused by arbitrarily set ceilings on nominal interest rates and high and variable inflation rates, are the major impediment to financial deepening, capital formation and growth. According to this school, thus, the solution lies in freeing up the interest rates to find their equilibrium levels in a free market environment.

In recent studies I have examined these issues extensively (Gupta, 1984a, 1984b). Those works, however, were based on cross-section time series data on Asian and Latin American countries. The aim of this paper is more specific. Using the same model as developed in those studies, I examine the effects of

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financial liberalization on the economic growth of the India and South Korea. Financial liberalization, just as in my earlier studies, is interpreted as an increase in the expected real rates of interest. In order to examine the effects of such a liberalization, a simultaneous equations model was formulated. The technique of simulation is used, as was done before, to calculate both final or the equilibrium multipliers and the interim multipliers. The latter provide some evidence about the speed or the slugishness with which financial liberalization of this type works. The scheme of the paper is as follows. In Section 1, the model is briefly discussed and the data and the estimates are described. Section 2 presents the simulation results. While this paper is not concerned with the effects of government investment in terms of its 'crowding out' effects, our models allows us to discuss this issue. Since this issue has attracted some attention with respect to the two countries under study, Section 3 briefly deals with this topic. The paper is concluded with a brief of the major findings.

I. The Model

The variables (all in real terms) used are as follows:

Endogenous Variables

F1R	:	currency and demand deposits at commercial banks
F2R	:	savings and time deposits at commercial banks
F3R	:	other financial assets held by the non-financial private sector
FSR	:	private savings in financial assets
RS	:	private savings in real assets
GCR	:	government consumption expenditure
GRR	:	government revenue
IPR	:	private gross fixed investment
IMPR	:	imports
SPR	:	total private savings
CPR	:	total private consumption expenditure
GSR	:	government savings
SNR	:	national savings
YDR	:	private disposable income
YR	:	gross national product

Lagged Endogenous Variables

F1LR	:	one period lagged F1R
F2LR	:	one period lagged F2R
F3LR	:	one period lagged F3R
FSLR	:	one period lagged FSR
RSL	:	one period lagged RS
GCLR	:	one period lagged GCR
GRLR	:	one period lagged GRR
IMPLR	:	one period lagged IMPR

Exogenous Variables

NI	:	nominal interest rate
PE	:	rate of expected inflation
PU	:	rate of unanticipated inflation
IGR	:	government gross fixed investment
ISR	:	change in inventories
XR	:	exports

Since the model used is discussed in detail in my earlier studies (Gupta, 1984a, 1984b), to avoid repetition, only a brief outline is given here. The model consists of a total of fifteen equations. It is divided into four blocks. Block 1 consists of three equations which explain the behavior of the financial sector, that is, the behavior of F1R, F2R, and F3R. These equations capture the essence of the relationship between financial repression and financial deepening. The second block consists of two structural equations and four definitions which specify the role of financial liberalization in determining savings and their structure. The third block discusses the relationship between private investment and financial liberalization as well as the hypothesis of 'complementarity' a lá McKinnon. The final block consists of the remaining definitions and identities.

The data used are annual time series from 1960 to 1981 and, except for PE and PU are taken from Fry and from the various issues of *International Financial Statistics,* IMF. PE and PU are not, of course, observable. They were constructed as follows. A model of saving behavior was estimated for both countries (Gupta, 1984a). As part of the estimation procedure, PE was also calcualted and PU was defined as the difference between the actual and the anticipated rate of inflation (PE). Given the small

sample size, equations were estimated by the least-squares method and wherever necessary, correction was made for first-order serial correlation in the residuals. The t-statistics are given in the parentheses.

A great deal of experimentation was involved in the estimation of individual equations. The equations reported below are those where the signs of the coefficients were plausible, where such judgement could be made on *a priori* grounds. The estimates of the model for India and South Korea are given in Tables 1 and 2, respectively. Instead of going through the two tables in detail, summary results of major interest are given in Table 3. It can be seen that the real rate of interest has different effects in the two countries. In addition, the two components of the real interest rate, namely NI and PE, exercise different effects, which justifies treating them as separate varaibles.

II. Effects of Financial Liberalization

In order to evaluate the effects of financial liberalization, we use the technique of dynamic multiplier analysis. Since the technique is well known (Intrilligator), no attempt is made to explain it here. We know that before we can calculate interim and long-term multipliers, we must check for the stability of the model. In our case, since the estimated models for both countries can be reduced to a system of difference equations, the necessary and sufficient conditions for stability is that the values of all moduli be less than unity. In order to determine whether this condition was satisfied in both cases, the eigenvalues of the model were calculated from the endogenous parts of the estimated models. The eigenvalues, the moduli and the damping period are given in Table 4. It can be seen that the condition for stability is satisfied for both countries so that we can proceed with the multiplier analysis.

Using interim multipliers, we examine the time paths of the effects of real interest rates over a period of fifteen years. It is assumed that a given increase in real interest rates which, as explained before, reflects the degree of financial liberalization here, can be achieved in three alternate ways: (i) by manipulating the nominal interest rate alone, which is essentially the approach

Table 1

STRUCTURAL ESTIMATES OF THE MODEL FOR INDIA

1. F1R = 9.829 + 0.117(YDR) - 0.959(VE) + 0.276(F1LR)
   (0.752)*(2.913) (-2.522) (1.769)
   $\bar{R}^2$ = 0.897
   DW = 1.85
   SSE = 1806.38

2. F2R = -86.209 + 0.148(YDR) + 1.602(N1R) + 0.807(F2LR)
   (-1.718) (1.913) (1.388) (5.163)
   + 1.602NI - 1.602PE
   $\bar{R}^2$ = 0.962
   DW = 2.00
   P = -1.01 (-4.04)**

3. F3R = 1.346 - 0.020(YRD) - 2.170(NI) + 0.303(PE)
   (0.491) (2.749) (-2.928) (2.043)
   -0.368(VE) + 0.885(F3LR)
   (-5.035) (6.346)
   $\bar{R}^2$ = 0.974
   DW = 2.45

4. FSR = 0.054(YDR) - 3.107(PE)
   (4.39) (-2.614)
   R^2 = 0.542
   DW = 1.934
   P = 0.111(0.473)

5. RS = 47.058 + 0.838(YDR) - 17.313(NI) + 3.290(PE)
   (1.839) (7.244) (-2.551) (2.022)
   + 0.184(RSL)
   (1.484)
   $\bar{R}^2$ = 0.991
   DW = 2.119
   P = -0.202(-0.797)

Table 1
(continued)

6. GCR = 6.143 + 0.704(GRR) + 0.252(GCLR)
(0.876) (5.782) (1.947)

$\bar{R}^2$ = 0.889
DW = 1.44
P = 0.491(2.356)

7. IPR = -33.633 + 0.164(YR) + 3.669(NI) + 0.144(FSR)
(-2.905) (14.244) (1.855) (2.971)

$\bar{R}^2$ = 0.945
DW = 1.698
P = 0.423(1.724)

8. IMPR = -26.359 + 0.048(YR) + 0.777(IMPR)
(-2.209) (2.404) (5.259)

$\bar{R}^2$ = 0.916
DW = 1.801
P = -0.016(-0.057)

9. GRR = -18.014 + 0.107(YR) + 0.083(GRLR)
(-1.521) (3.692) (0.348)

$\bar{R}^2$ = 0.839
DW = 1.811
P = 0.374(1.654)

* numbers in brackets are t-statistics
** are the asymptotic t-ratios, estimated by the maximum likelihood procedure.

recommended by the financial repressionists; (ii) by controlling inflation alone, as presumably the monetarists would argue; and (iii) a policy which combine elements of both. Following this approach, three different simulations were performed, corresponding to the three different shocks described below:

SHOCK 1: It was assumed that there was a one percent sustained increase in the nominal rate of interest (NI) while the expected rate of inflation (PE) remained constant.

Table 2

STRUCTURAL ESTIMATES OF THE MODEL FOR KOREA

1. F1R = -171.47 + 0.034(YDR) - 0.127(NI) + 8.048(PE) + 0.657(F1LR)
   (-1.026) (2.125) (-2.403) (1.884) (3.545)
   $\bar{R}^2$ = 0.587
   DW = 2.110
   P = -0.223(-0.886)

2. F2R = -7900.82 + 0.883(YDR) + 450.48(PE) - 179.28(VE)
   (-2.035) (3.542) (4.276) (-3.768)
   $\bar{R}^2$ = 0.624
   DW = 1.613
   P = 0.385(1.476)

3. F3R = 0.627(YDR) + 0.042(F3LR)
   (7.043) (0.319)
   $\bar{R}^2$ = 0.803
   DW = 1.729
   P = 0.775(5.383)

4. FSR = -964.49 + 0.309(YDR)
   (-0.473) (1.863)
   $\bar{R}^2$ = 0.127
   DW = 2.105
   P = -0.732(-2.525)

4b. FSR = 0.244(YDR)
   (2.627)
   $\bar{R}^2$ = 0.277
   DW = 2.082
   P = -0.739(-2.612)

5. RS = 957.33 + 0.691(YDR)
   (0.469) (4.162)

Table 2
(continued)

$\bar{R}^2$ = 0.493
DW = 2.106
P = -0.731(-2.525)

5b. IPR = 0.755(YDR)
(8.122)

$\bar{R}^2$ = 0.785
DW = 2.282
P = -0.739(-2.613)

6. GCR = 0.992(GCLR)
(9.042)

$\bar{R}^2$ = 0.819
DW = 1.574
P = 0.270(2.201)

7. IPR = 377.72 + 0.211(YR) + 0.119(NI) - 19.205(PE)
(0.927) (6.936) (1.361) (-3.203)
-1.129(IGR)
(-20.374)

$\bar{R}^2$ = 0.992
DW = 1.843
P = 0.82(5.966)

8. IMPR = -2025.76 + 1.402(YR) + 0.146(IMPLR)
(-0.492) (5.219) (0.974)

$\bar{R}^2$ = 0.641
DW = 1.813
P = 0.690(4.155)

9. GRR = 0.008(YR) + 0.067(GRLR)
(1.043) (4.003)

$\bar{R}^2$ = 0.577
DW = 1.981
P = 0.048(0.205)

Table 3

EFFECTS OF NI AND PE*

	Effect of NI		Effect of PE	
	India	S. Korea	India	S. Korea
F1R	(ns)	-(s)	(ns)	+(ms)
F2R	+(ms)	(ns)	-(ms)	+(s)
F3R	-(s)	(ns)	+(ms)	(ns)
FSR	(ns)	(ns)	-(s)	(ns)
RS	-(s)	(ns)	+(ms)	(ns)
IPR	+(ms)	+(ms)	(ns)	-(s)

* Source: Table 1, 2
s: significant at the 5% level.
ms: coefficient greater than its own standard error.
ns: coefficient smaller than its own standard error.

Table 4

STABILITY CONDITIONS OF THE MODEL

India			South Korea		
Eigenvalues	Modulus	Damping Period (years)	Eigenvalues	Modulus	Damping Period (years)
.73582	.73582	1.3590	.06723	.067233	14.874
-.02298	.02298	44.848	.04063	.04063	24.609
.26441	.26441	3.7819	.98899	.98899	1.0111
.10646	.10646	9.3934	.65700	.65700	1.5221
.37600	.37600	2.6596	.04200	.04200	23.810
.80700	.80700	1.2392			
.88500	.88500	1.1299			

SHOCK 2: The nominal interest rate was assumed to increase at a sustained rate of 0.5 percent while the expected rate of inflation was assumed to decline by 0.5 percent.

SHOCK 3: In this simulation, the expected rate of inflation was assumed to decline at a sustained rate of one percent while keeping the nominal interest rate constant.

The interim effects of these shocks for major variables are given in Figures 1—10 for India and in Figures 11—20 for S. Korea.

We discuss these figures by comparing the outcomes for both countries for one variable at a time.

F1R: The initial effect of all three shocks is different for the two countries, leading to an increase in India and a decrease in S. Korea. For S. Korea, the effects of shocks 2 and 3 are much more pronounced than those of shock 1. On the other hand, shock 1 has the most pronounced effect in India. It should be noted, however, that the effects of all three shocks are concentrated in the first five years or so.

F2R: Somewhat the same pattern can be observed for F2R. But as we would expect from the portfolio theory, the effects are much more pronounced. For India, the effects are spread over a much longer period, suggesting that economic agents act much more slowly to new information in India than in Korea. Shock 1 now dominates.

F3R: The most interesting thing in this case is that the pattern is reversed here for the two countries. A comparison of Figures 1 and 11, Figures 2 and 12 on the one hand and that of Figures 3 and 13 on the other hand, shows that the three shocks affect the demand for F3R just the opposite way compared to that for F1R and F2R in response to the three shocks. While this is not the place to discuss this difference, it would appear to be an area worthy of further exploration.

FSR: Figures 4 and 14 show the effects of three shocks on savings in financial assets. Shock 3 has the most pronounced effect for both counties and further, the effect seems to be of the same order of magnitude and is concentrated in the first two years. Shock 1 is the least effective in both cases.

RS: Comparing Figures 5 for India and 15 for S. Korea, we can

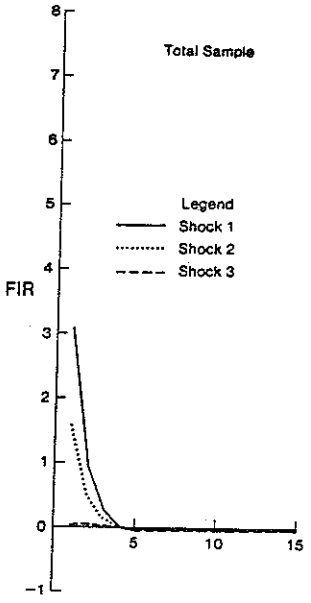
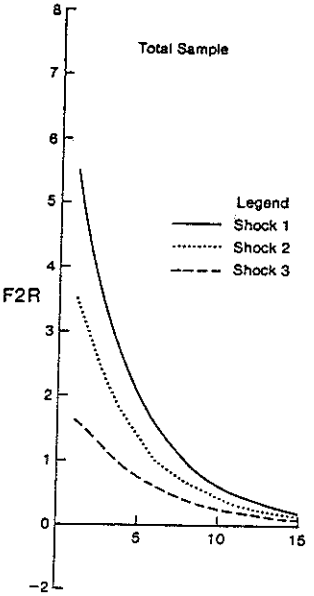


Figure 1



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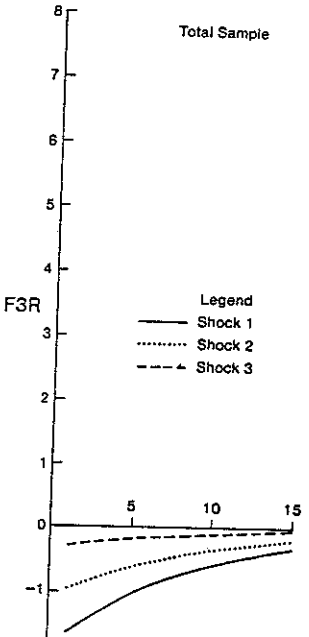

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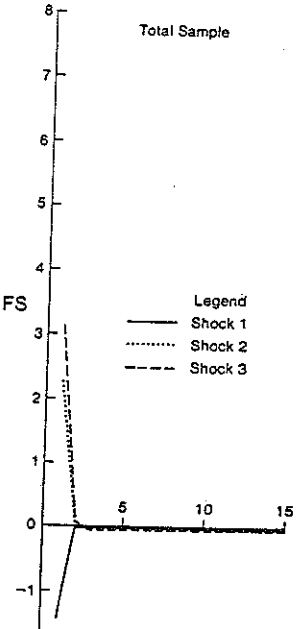

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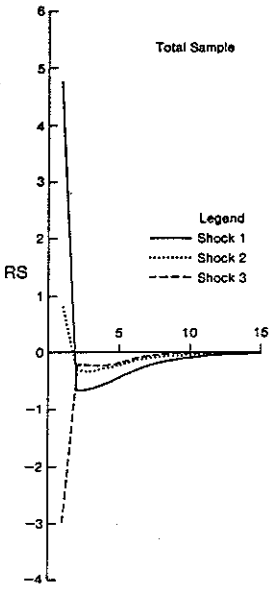

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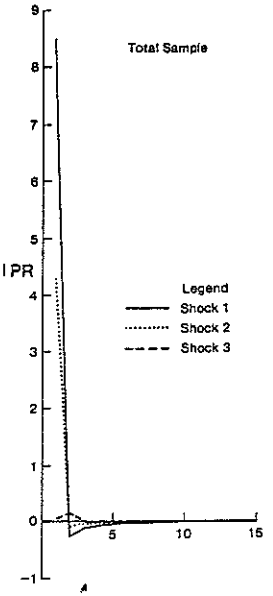

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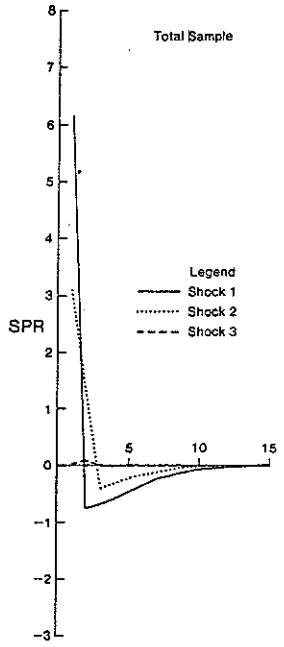

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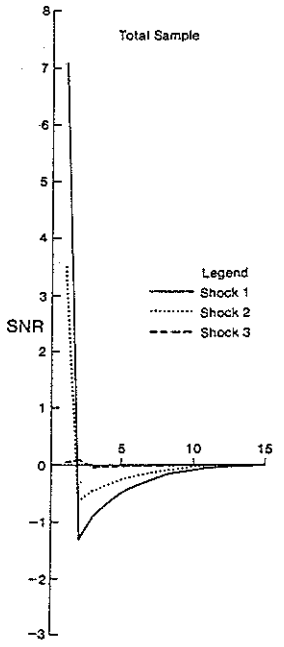

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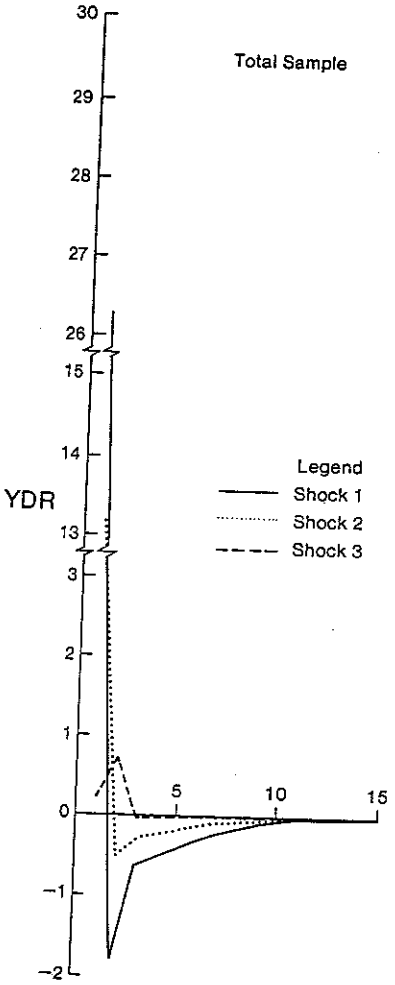

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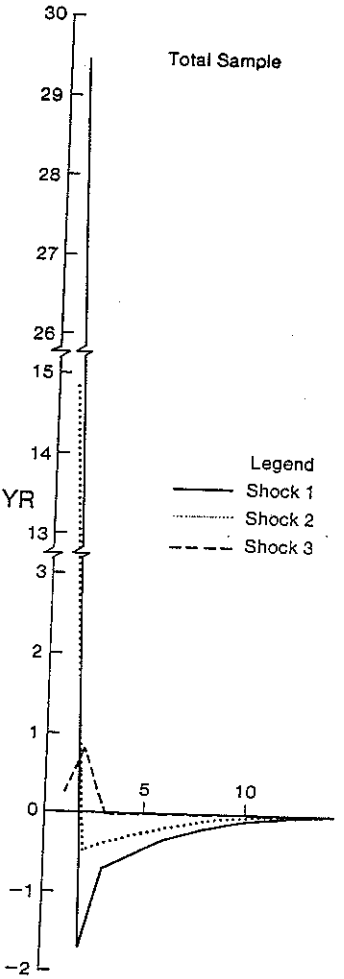

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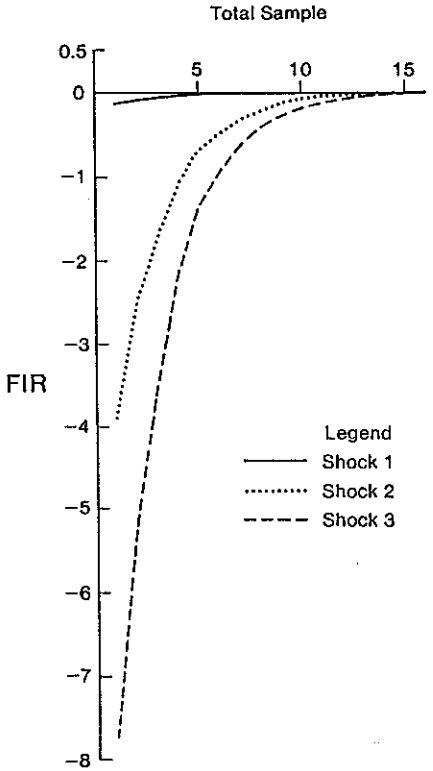

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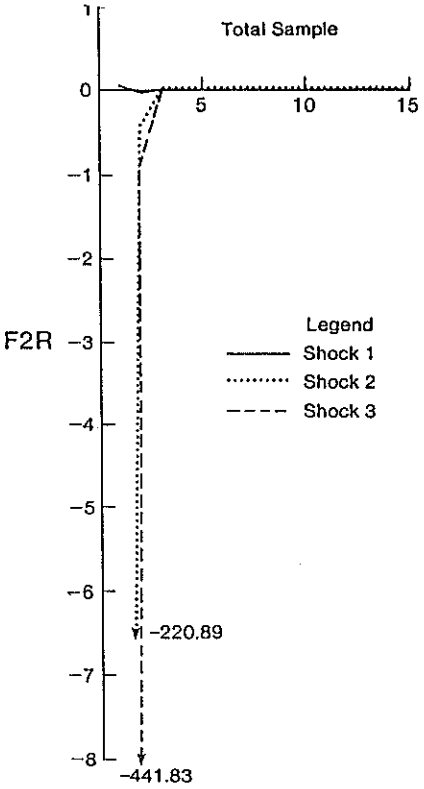

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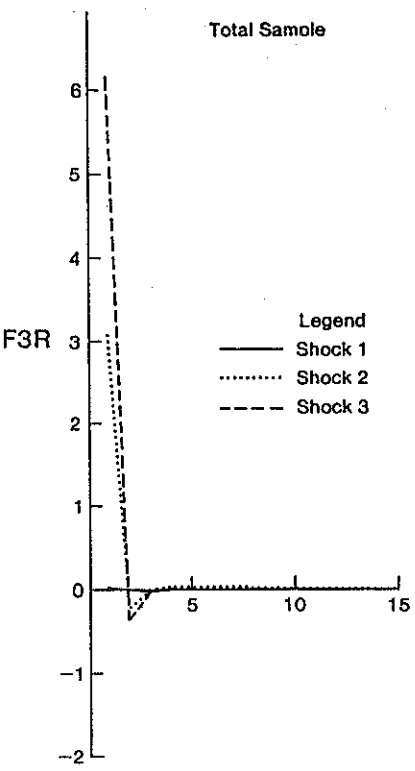

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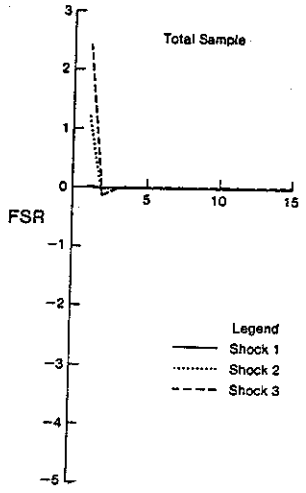

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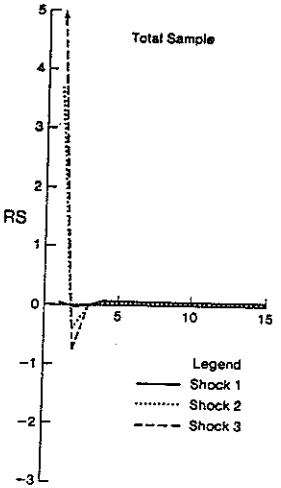

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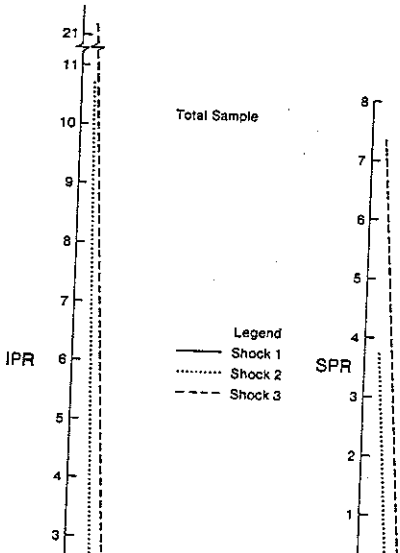

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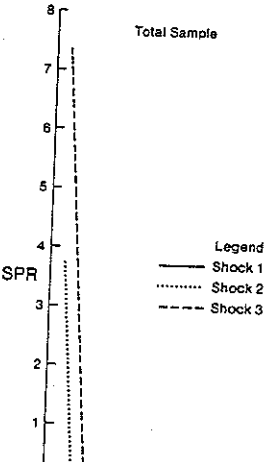

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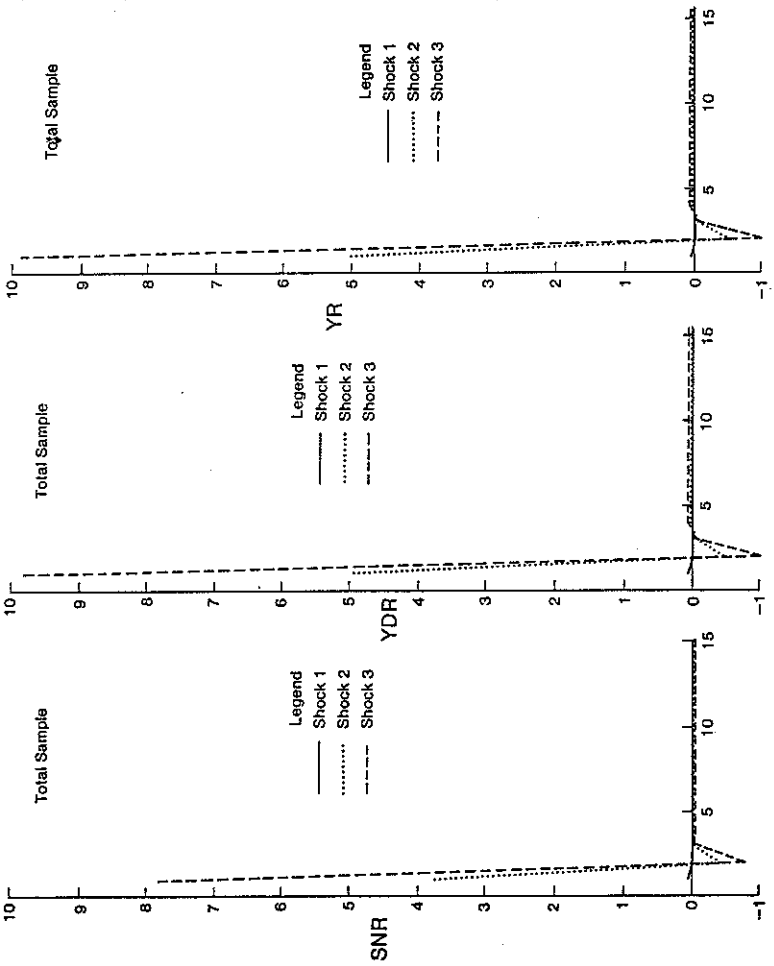

Figure 20

Figure 19

Figure 18

see some sharp differences unlike in the case of FSR. For India, shock 1 now dominates whereas for S. Korea, shock 3 still continues to be the most important one. However, in both cases, most of the effect is concentrated in the first two years.

IPR: The effects on real private investment can be seen from Figures 6 and 16 for India and S. Korea, respectively. The effects are quite large, but concentrated in the first two years or so. However, it is shock 1 for India and shock 3 for S. Korea which

dominates. The positive effect on investment is noteworthy since it would appear to provide some support for the 'complementarity' hypothesis.

SPR: In terms of Figures 7 and 17, we can see that in the first few years, the effect of the three shocks is positive, then becoming negative and finally petering off. However, the negative effect lasts much longer for India than for S. Korea. It should be noted once again that shock 1 dominates the Indian case while shock 3 does for S. Korea.

SNR: Given that government savings do not constitute a major share of SNR, it is dominated by SPR, so that we can see from Figures 8 for India and 18 for S. Korea that the effects of the three shocks on SNR closely parallel those on SPR.

YDR and YR: Finally, we look at the effects on private disposable income and total income. These are given in Figures 9 and 10 for India and 19 and 20 for S. Korea. As would be expected, the two sets of Figures for both countries show parallel movements. Further these movements correspond to those displayed by the effects on gross private investment. The initial effect of the shocks is positive, concentrated in the first two to three years. Shock 1 dominates the Indian case while shock 3 does the S. Korean.

From the above discussion, we can draw a number of conclusions. First, on the whole, shock 1 dominates the effects on the Indian economy while shock 3 the S. Korean. In other words, if financial liberalization is to be used to expedite growth in the two countries, quite different strategies will be needed to achieve a given degree of financial liberalization in the two countries. The prescription recommended by McKinnon and Shaw would appear to be more appropriate for India than for S. Korea which is an interesting finding in view of the fact that originally the McKinnon and Shaw policy was recommended for and applied to, S. Korea. Second, in both cases, the effects of all shocks are concentrated in the few initial years, although there are some differences, as for example, in the case of F3R. Third, for both countries some complementarity is suggested between financial and physical capital, a lá McKinnon, in the initial years of a shock, but then the relationship becomes typically neo-classical. And finally, in both cases, control of inflation as a means of increasing real interest

rates appears to be a useful policy, whereas the same cannot be said about the use of manipulating nominal interest rates.

So far, we have examined the effects of financial liberalization in terms of their interim effects. We now turn to an examination of the long-term equilibrium effects. These long-term effects of the three shocks on all of the endogenous variables are given in Tables 5 and 6. We discuss these effects for the same variables as were examined for the interim effects.

Table 5

IMPACT AND LONG-TERM MULTIPLIERS FOR INDIA

Endogenous Variables	Shock 1		Shock 2		Shock 3	
	Impact (1)	Long-term (2)	Impact (3)	Long-term (4)	Impact (5)	Long-term (6)
F1R	3.078	4.069	1.552	2.110	0.427	0.151
F2R	5.496	24.942	3.566	16.931	1.636	8.919
F3R	-1.644	-15.095	-0.971	-8.795	-0.298	-2.495
FSR	1.421	1.172	2.270	2.161	3.119	3.151
RS	4.733	1.069	0.817	-1.067	-3.098	-3.204
GCR	2.219	2.698	1.119	1.399	0.019	0.100
GRR	3.152	2.867	1.590	1.487	0.027	0.107
IPR	8.500	7.698	4.271	3.924	0.042	0.150
IMPR	1.414	5.288	0.713	2.742	0.012	0.197
SPR	6.153	2.241	3.087	1.094	0.022	-0.053
CPR	20.154	19.460	10.181	10.160	0.208	0.860
GSR	0.933	0.169	0.471	0.087	0.008	0.006
SNR	7.086	2.410	3.558	1.182	0.030	-0.047
YDR	26.308	21.701	13.269	11.254	0.229	0.807
YR	29.460	24.568	14.858	12.741	0.257	0.913

F1R, F2R, and F3R: From columns (2), (4) and (6) we can see that shock 1 has the largest long-term effect and taking all financial assets together, the net long-term effect of all three shocks is to increase the demand for financial assets, suggesting thereby any type of financial liberalization is conducive to financial deepening. The results for S. Korea in columns (8), (10) and (12) of Table 6 are just the opposite. Further, unlike India, shock 3 has

Table 6

IMPACT AND LONG-TERM MULTIPLIERS FOR SOUTH KOREA

Endogenous Variables	Shock 1		Shock 2		Shock 3	
	Impact (7)	Long-term (8)	Impact (9)	Long-term (10)	Impact (11)	Long-term (12)
F1R	-0.125	-0.364	-3.920	-11.404	-7.715	-22.443
F2R	0.054	0.056	-220.886	-220.666	-441.826	-441.389
F3R	0.038	0.042	3.092	3.390	6.145	6.738
FSR	0.015	0.016	1.203	1.264	2.391	2.512
RS	0.046	0.048	3.723	3.911	7.400	7.773
GCR	0.0003	0.022	0.020	1.768	0.041	3.514
GRR	0.0005	0.001	0.040	0.045	0.079	0.089
IPR	0.132	0.133	10.711	10.764	21.290	21.396
IMPR	0.086	0.106	6.969	8.577	13.852	17.048
SPR	0.046	0.048	3.723	3.911	7.400	7.773
CPR	0.015	0.016	1.208	1.269	2.401	2.522
GSR	0.0002	-0.021	0.019	-1.723	0.038	-3.425
SNR	-0.046	0.027	3.742	2.188	7.438	4.348
YDR	0.061	0.064	4.931	5.180	9.801	10.295
YR	0.061	0.064	4.971	5.224	9.880	10.384

the lagest effect.

FSR, RS, SPR and SNR: From Table 5, the long-term effects of shock 2 suggest that savings in financial and real assets are substitutes for India but complements according to the two other shocks. But regardless, shock 3 dominates. For S. Korea, as shown in Table 6, all three shocks suggest a complementary relationship between the two types of savings with shock 3 being the dominant one. The net effect on private and national savings is highest for shock 1 for India and shock 3 for S. Korea. The quantitative impact is greater in case of S. Korea. But it should be noted that in both cases, the effect is stronger on the composition of savings than on aggregate savings.

IPR: The long-term effects support the hypothesis of complementarity for both countries, with shock 1 and shock 3 having the largest effect for India and S. Korea, respectively. It should be recalled that shock 3 had the most pronounced effects on savings

and their structure for both countries. Thus, at least in the case of India, our findings raise an interesting question, namely, whether the same method of achieving a given increase in the real rate of interest can be beneficial, simultaneously, for raising both savings and investment.

YDR and YR: The long-term multipliers suggest a beneficial effect of financial liberalization on growth, with shock 1 being the most effective for India and shock 3 for S. Korea, these being the shocks for the maximum investment effects also. These results are somewhat different from those I reported earlier for a cross-section of developing countries (Gupta, 1984a, 1984b).

We can draw the following conclusions from the discussion based on Tables 5 and 6. First, unlike my earlier findings, it turns out that the same shock is suited for achieving both rapid financial development and rapid growth. Second, as was the case with the interim effects, long-term equilibrium effects of financial liberalization are also sensitive to the particular policy used in achieving a given change in the real rates of interest. And, finally, in terms of the effects on real growth, the benefits of financial liberalization appear to be significant for both countries. To this extent these results support McKinnon's and Shaw's contention that financial repression is a serious impediment to achieving rapid grwoth, at least, in these two countries.

Finally, it is useful to compare the impact multipliers with the long-term multipliers. The former are also given in Tables 5 and 6. We consider the effects of one shock at a time.

Shock 1: For India, the direction of the impact and the long-run multipliers is the same, but there are important qualitative differences. In particular, notice the effect on YDR and YR, where the short-run or the impact effect is greater than the long-run effect, which is in conformity with the finding that the 'complementarity' hypothesis is valid in the short-run but not in the long-run. For S. Korea, the direction is the same except in the cases of GSR and SNR. But the effects on all variables are quite small.

Shock 2: For India, the direction of the two effects is the same except for RS where the effect is positive in the first period but negative in the long-run. There are marginal quantitative differences but not as pronounced as in the case of Shock 1. For

Korea, the direction is the same except for GSR. The quantitative effect is the sdame except that in a few cases the long-run effects are greater than the impact effects, Note particularly the effects on YDR and YR, a finding which is in conformity with the effect on IPR.

Shock 3: For India, the only exceptions are SPR and SNR, otherwise the direction of the effects of the two multipliers is the same. Quantitatively, all multipliers are very small in magnitude. For S. Korea, the only exception is GSR as far as the direction is concerned. The quantitative magnitudes of the two multipliers are very close with the long-run being marginally greater than the impact ones.

It is clear from this brief discussion that in order to analyze the effects of financial liberalization, the relevance of time horizon should be kept in mind. For it may well be the case that in the short run the effects are minimal, but in the long-run they are substantial, as for example, is the case with effects of all three shocks on F2R and F3R for India.

III. 'Crowding Out' Effects of Public Investment

In a recent paper, Sundrarajan and Thakur examined this issue for India and S. Korea and concluded that for India, the immediate (impact) effect of public investment on private investment was sizeable and negative and that it took nearly a decade for the multiplier to become nonnegative. For S. Korea, on the other hand, the multiplier effect was always positive. The relevant results from our estimates are given in Table 7.

It can be seen from this table that our results are just the opposite of those reported by Sundrarajan and Thakur. At, the

Table 7

'CROWDING OUT' EFFECT OF GOVERNMENT INVESTMENT

Type of Effect	India	South Korea
Impact	0.230	-1.143
Long-Term	0.162	-1.144

very least, these results suggest that 'crowding out' effects of public investment may be highly sensitive to model specifications. Given the radical policy implications of such results, it is therefore advisable to test their robustness in terms of alternate models.

IV. Concluding Remarks

In this paper, a simultaneous equations model developed in my earlier works, was used to examine the role of financial liberalization in India and S. Korea. Simulation techniques were used to assess the role of financial liberalization on their real and financial growth. The results show that there are considerable differences in the experiences of the two countries, but on the whole financial liberalization does have a positive effect on their growth. Of particular interest is the finding that different strategies are relevant for achieving the same degree of financial liberalization for the two countries.

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