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Externality from China's Non-State Sector's Growth to its State-Sector's Growth: An Empirical Assessment

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Abstract

Applying a modified modelling framework of Feder (1983) and of Ram (1986) to macroeconomic data from China, this paper assesses the direct and indirect (externality) contributions of the non-state sector growth to China's economic growth, particularly to state-sector growth during the initial period of economic reform. The results from the empirical analysis show that the growth of the non-state sector has induced pressure on the state enterprises through intensified market competition to improve their efficiency, and has thus contributed to economic growth as an externality.

Introduction

Before China's economic reform, the state-owned enterprises (SOEs) dominated the industrial and other non-agricultural sectors. These enterprises basically were run under the direction of either the uniform central plan or, less importantly, provincial government plans. The market had virtually no impact on the economy. The economic reform, which began in 1978, gradually transformed the central planning economy into a market economy. In this period, the economic growth rate was significantly higher than that during the central planning period. The annual gross output growth rate during 1953–78 was 7.9 per cent, whereas between 1979 and 1994 it was 11.5 per cent,[1] increased by 3.6 percentage points. In the reform period, the market-oriented non-state sector grew much faster than the state sector,[2] and therefore the acceleration of economic growth can be attributed entirely to the growth of non-state sector (see Table 1). This growth divergence reflects a difference in productivity changes between the two sectors, and a new tendency of changing resource allocation through the market mechanism.

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Table 1: Growth Rate of the State and the Non-State Sector (%)

	Overall	State Sector	Non-State Sector	TVEs[c]
Economic growth[a]				
1953-78	7.9			-
1979-94	11.5			20.1
Industrial growth[b]				
1953-78	11.4	14.2	7.4	-
1979-94	14.8	7.8	21.9	20.0

Notes: a - measured by TOVS (see End Notes)
b - measured by Gross Industrial Output
c - stands for Township and Village Enterprises.

Sources: Data were calculated from SSB(a) 1993: 52, 412–14; 1995: 32, 365–79; BTV 1990: 5, 91: 8–9, 92: 8–9. TVE output is deflated by using Industrial Products Producer Price Indices (SSB(a) 1995: 249) as the deflator.

As a result of the fast growth of non-state sector, the ownership structure of the economy changed significantly from that of the central planning period. Table 2 shows that the share of the SOEs in the gross industrial output dropped dramatically from 78 per cent in 1978 to 34 per cent in 1994 and the non-state enterprises replaced SOEs' dominating status in the industrial sector. Tables 1 and 2 suggest that in the reform period, Township and Village Enterprises (TVEs) became the main component not only of the non-state sector, but also of the entire economy.

Owing to demonstration effects of the successful performance of the non-state sectors, market-orientation was also practised in the state sector, which was formerly under central planning control. Price control for most products was either abolished or much weakened after a long course of transition, *via* the 'double track price system.'[3] It was estimated that price control on SOEs' output dropped from 80 per cent in 1980 to a range of 20–30 per cent in 1991 (Zou 1992). Correspondingly, the government plan on SOEs' production was also reduced to a small proportion. An early survey[4] found that in 1984, 53 per cent of the output (by value) was under some sort of government planning control, either at the central, provincial or municipal level. However, only 12 per cent of the products were under direct central planning control[5] (CIESR 1986). Since then, the economy was further decentralised, particularly after 1992 when the central government announced it would bring the economy into the orbit of the market economy. The government plan, either at the central or at the local level, now plays only a trivial role in the state sector.

Table 2: Shares of the State and the Non-State Sector in Industrial Output (%[a])

Year	State	Non-State[b]	Collective	Private	Joint[c]	TVE[d]
1978	78	22	22	-	-	9
1985	65	35	32	2	1	19
1992	48	52	38	7	7	37
1994	34	66	41	12	13	44

Notes: a - Total industrial output as 100.

b - Column (2) = Column (2.1) + Column (2.2) + Column (2.3).

c - Jointly owned by state, collective and/or private owners.

d - TVEs are the major components of the non-state sector. Its share may be underestimated since joint ventures of TVEs with others are excluded.

Source: SSB(a) 1993:396, 412, 414; 1995: 365, 379.

Although the state sector has been decentralised greatly, its performance has differed greatly from that of the non-state sector. Despite the fact that many SOEs were making progress in market competition, a third of them incurred financial losses in 1994. This proportion increased dramatically to about two-thirds in 1996[6] when the financial situation was being tightened. On the other hand, most non-state enterprises were still making profit. Facing sharp competition, SOEs' traditional markets were squeezed by products of non-state domestic enterprises, joint ventures and foreign exporters. Several studies have argued that the disadvantage of SOEs stems from their institutional arrangements, either in management or in ownership structure (see, for example, OECD 2003).

Two different effects from decentralisation and market competition on SOEs can be observed. First, SOEs are losing policy favours and monopolistic status, and are facing sharp competition from the non-state enterprises. This situation, together with their institutional disadvantages (weaker incentive and weaker or improper monitoring from the owners than the private enterprises), have made many of them worse. Second, the pressure of market competition, emanating greatly from the non-state enterprises, is pushing SOEs to increase their efficiency in order to survive the competition. A number of studies have found positive growth of total factor productivity in SOEs since reform (see next section for references), though smaller than that found in the non-state enterprises.

In this context, there are three important questions: (1) how significant has the improvement in productivity in the non-state sector been over time? (2) has the non-state sector productivity growth created any externalities to induce productivity growth in the state sector? and (3) if so, is the productivity change in the state sector comparable with that in the non-state sector? Applying the analytical

frameworks suggested by Feder (1983) and Ram (1986) with modifications relevant to macro-level data from China, the above questions are examined in this paper.

Productivity in State and Non-State Sectors: A Review

There have been a number of studies on the issues of China's economic growth in the post-reform period. However, the results are diversified. For example, in a World Bank report (World Bank 1985), it was speculated that China's total factor productivity (TFP) declined during 1978–82 by about seven or eight percentage points. The achievement in 1982 was even slightly lower than that in 1957. This result was obtained by simply assuming that the weights of labour and capital contributions were 60 per cent and 40 per cent, respectively (Table 3).[7]

Table 3: Index of TFP in State-Owned Industry

	1957	1978	1982
1. Net output	100	673.3	798.4
2. Labour input	100	406.6	468.3
3. Capital input	100	948.7	1299.8
4. TFI (L40%, K60%)	100	751.8	967.2
5. TFI (L60%, K40%)	100	623.5	800.9
6. TFP (1)/(4)	100	89.6	82.5
7. TFP (1)/(5)	100	108.0	99.7

Notes: TFI = total factor inputs,
TFP = total factor productivity,
L = labour,
K = capital.

Source: World Bank (1985).

The World Bank study used data from 1978 to 1982. The year 1978 was a year of fast growth in China, the growth rate [measured by total product of society (TPS)] in that year was 13 per cent, 4.7 percentage points higher than the 1976–80 average, and was the highest since 1970 until 1983. Later, the economy experienced a short-run recession. In 1981, the growth rate reached the bottom, 4.4 per cent, 8.6 percentage points lower than in 1978. Although the economy recovered in 1982, the growth rate was still lower than the average for the period 1981–85. Though this short-run fluctuation naturally leads to a conclusion of decreasing productivity, it does not necessarily mean a decreasing tendency in a longer period.

Later, Chen *et al* (1988), using reconstructed data and improved analytical methods (Cobb-Douglas and translog production functions with time trend), found a slow increase in annual multifactor productivity between 0.4 per cent and 1.1 per cent in the state-owned industrial sector between 1957 and 1978. During the economic

reform period of 1979–85, productivity growth accelerated in that sector by 1.9–2.7 per cent per annum.

Distinguishing the growth performance by ownership, Jefferson (1989) compared productivity growth between the state and the collective sectors. He used a Cobb-Douglas production function with an industrial efficiency variable to measure productivity in both state and collective-owned industrial sectors in China. Cross-section data for 293 cities and counties were used. His results show that the marginal revenue product of capital (VMPK) in the collective sector was about 4 times that in the state sector. On the contrary, the marginal revenue product of labour (VMPL) in the collective sector was much lower than in the state sector (about 1/4 of the latter). These results are not surprising since the state sector is much more capital intensive than the collective sector. However, total factor productivity (TFP) in the state sector was about 2.6 times greater than that in the collective sector. He thus concludes 'measures of multi-factor productivity within the state and collective sectors show that the state sector enjoys a considerable advantage in overall efficiency.' (Jefferson 1989: 56)

Jefferson explains the low TFP in the collective sector as the consequence of insignificant technological progress. According to his model specification, technology was embodied in both scale economies of enterprises and agglomerative economies. These two were the explanatory variables representing sectoral efficiency in the model. Additional evidence was provided to support the argument. During the period 1980–85, nearly one-third of the equipment installed by large and medium-sized enterprises in the state sector was imported from abroad; but virtually all of the equipment in the collective sector was domestically produced and of pre-1980s vintage. He, therefore, argues that China could increase its economic efficiency significantly by simply transferring techniques from the state sector to the collective sector.

However, besides technological differences, there have been three other factors that contributed to the differences in TFP between the two sectors. First, in the early period of economic reform, the state-owned enterprises still enjoyed centrally distributed material inputs at much lower prices than the market ones, under the 'double track price system.' Although output prices could also be controlled, it was found that the degree of planning control on basic materials was much higher than that on the processed manufactured goods (Wang *et al* 1986). Thus, the state-owned enterprises had the advantage of lower cost. This could have resulted in an overestimation of TFP in the state sector.

Second, there were still various discriminatory regulations on resource allocation against the non-state enterprises, particularly private ones. An important one was the selective distribution of low interest bank loans. Non-state enterprises also faced a higher cost and difficulties in getting skilled labour and technicians in

the earlier stage of the reform because of their inability to provide permanent jobs as the state enterprises did. Further, anti-market regulation in the aspect of labour mobility was a constraining factor for the non-state enterprises. These regulations resulted in the much lower proportion of skilled labour and technicians in total employment in the non-state sector than in the state sector. Third, most studies gave equal weightage to the different kinds of labour used owing to lack of data. This would certainly over-estimate the state sector's productivity.

Within these limitations, a comparison of the level of productivity between the state and the non-state sectors does not mean much. Instead, estimating the relative change of productivity in the two sectors would be more valuable. Jefferson, Rawski and Zheng (1992) developed a 'quasi-frontier' estimation procedure to estimate total productivity in the state and the collective industrial sectors. They found that productivity in both sectors rose substantially during the reform period (1978–1988) after more than two decades of stagnation. Although the estimated productivity of the collective sector is still lower than that of the state sector, the former was found to grow more rapidly than the latter. Thus, the two sectors' productivity tends to converge.

In another paper, Jefferson, Rawski and Zheng (1992) also examine the relative capacity of three types of industrial enterprises — the state-owned enterprises (SOE), township-village enterprises (TVE), and urban collectives (UCOE) — to undertake new product innovation. Their analysis shows that the market-oriented non-state enterprises had fewer technicians but stronger incentives and better achievement in innovations. An interesting question in this context is whether government sector growth would induce productivity growth in the non-government sector or *vice-versa*.

In another cross-country analysis, Ram (1986) has used Feder's export and non-export model (1983) to estimate relative productivity between the government and the non-government sector and the impact of the government sector on economic growth. This model was originally established by Feder to estimate relative productivity and externalities between the export and the non-export sectors. Different from Landau and Edwards, Ram found that the government sector had a higher productivity than the non-government sector, and also had a positive external effect on growth of the non-government sector.

Ram's model includes two production functions for the government and the non-government sector, respectively:

$$C=C(L_c, K_c, G) \quad (1)$$

$$G=G(L_g, K_g) \quad (2)$$

where C and G refer to the output of private and government sectors, respectively; L_i and K_i (i = c, g) are capital and labour inputs in the two sectors, respectively. The private sector production function includes the government output G, in order to

estimate the externality of the government sector on the private sector.

To allow for the estimation of sectoral marginal productivity using aggregate data, it is assumed that the ratio of the two sectors' marginal product of capital is equal to the ratio of their marginal product of labour:

$$(G_K/C_K) = (G_L/C_L) = 1+\delta \qquad (3)$$

where G_K and C_K are the government and the private sector's marginal productivity of capital, respectively, G_L and C_L are that of labour. δ is the relative productivity difference between the two sectors. $\delta>0$ indicates that productivity in the government sector is greater than that in the private sector, and $\delta<0$ otherwise.

By differentiation of the production functions, the following reduced form equation is derived:

$$Y = \alpha(I/Y)+ßl+[(\delta/(1+\delta))-\theta]g(G/Y)+\theta g \qquad (4)$$

where $y = dY/Y$, $g = dG/G$, $l = dL/L$, they are growth rates of Y, G, and L respectively. $Y = C + G$, is the aggregated output of the economy. L is the total labour in the economy. $I = dK$ is the investment in the economy. $\theta = C_G(G/C)$ is the elasticity of C with respect to G. $\theta>0$ would suggest a positive externality from the government sector on the private sector. The coefficient α is the marginal product of capital for the private sector, and ß is labour elasticity of output for the private sector.

From both cross-section (115 countries) and time-series estimation of Equation 5, Ram obtained both positive δ and θ. He then concluded that the government sector had a higher productivity than the private sector; the former also had a positive external effect on the latter. In aggregation, the government sector had a positive impact on economic growth. He believed that this was true particularly in less developed countries.

About the above result, Carr (1989) argues that Ram's positive δ, which was the relative productivity difference between the two sectors, probably resulted from a data problem, since government output could be overestimated. Carr claims that since most government goods did not pass through the market, they were usually evaluated at their cost of production, even though they might have zero *ex post* value to citizens of the country. However, Carr does not provide any evidence to support his argument.

Rao (1989) points out that Ram's method might have some specification problems, since certain assumptions were without justification. For example:

- The marginal product of each factor input in the government sector is assumed to have the same proportional relationship to its counterpart in the private sector, and without this assumption the main equation cannot be obtained.
- The elasticity θ, which is the elasticity of the private sector output with respect to the output of the government sector, is assumed to be a constant, but this is not clear across countries and over time.

Rao also argues that Ram's model did not include a number of variables such as human capital endowments, economic structure, political orientation, etc., and that this could lead to bias in the parameter estimates of the included variables. In his re-estimation by using Ram's model, with similar results, Rao finds a specification bias in cross-section regressions, suggested by RESET test and some insignificant coefficients in time-series regressions.

Though Ram provides convincing answers to some of the above criticisms, there has not been any consensus on the contribution of the government and non-government sectors to economic growth. This necessitates more empirical work in this direction. It is in this context that this paper examines the relative productivity and externality between the state and the non-state sectors in China.

China's Non-State Sector Growth: Externalities and Relative Productivity

The market-oriented non-state sector generates positive externalities on the growth of the state sector, by bringing pressure of market competition on state enterprises, pushing them to increase their efficiency. This hypothesis is tested by applying a modified Ram's model to the Chinese data.

First, unlike in Ram's model, externalities are allowed in both sectors. However, if the symmetry effect does exist, e.g. if C has a positive effect on G, the exclusion of C in Equation (2) of Ram's model would cause an overestimation of factor productivities G_L and G_k in the government sector. Thus, the productivity differential δ could also be overestimated. To avoid this problem and to test the hypothesis raised above in this paper, the model can be modified by simply adding the private sector output C into the government production function (Equation 2). This modification also facilitates correcting the possible estimation bias discussed by Rao.

Second, the assumption in Ram's model (Equation 3) suggests that if the marginal product of labour of the government sector is higher than that of the private sector, its marginal product of capital must be equally higher. This assumption is questionable, as it has no theoretical basis, and is not supported by any empirical studies using the Chinese data (see Jefferson 1989). To avoid the possible estimation bias, this restriction will be relaxed.[8]

Third, the above modification of allowing changes in marginal productivity of capital and labour requires using separate input and output data for each sector. The two production functions will be estimated simultaneously, instead of estimating the reduced form equations. The initial level and growth rate of total factor productivity in each sector can be directly derived from the estimates.

Fourth, the assumption of constant relative MPL and MPK that appears in Ram's original model is deleted. Each sector's MPL and MPK will be calculated

directly from the estimated parameters on a year-by-year basis.

Fifth, the assumption that $\delta/(1+\delta)= \theta$ in Ram's Equation will be removed in this study due to its lack of theoretical base (δ is the marginal factor productivity differential between the two sectors, and θ is the government sector externality).

Sixth, for the convenience of obtaining elasticities of output with respect to capital and labour, a Cobb-Douglas production function is applied for both the state and the non-state sectors.

Finally, since the major objective of the study is not to investigate the effect of public goods but to investigate the interaction of the SOEs and TVEs in market competition, the estimation uses only industrial (manufacture, mining and power generation) data for SOEs, so that it can be comparable with TVEs, in which 70 per cent of output was industrial goods. In this way, any possible externality resulting from public goods (e.g. education or infrastructure) will be excluded.

With the above modifications, the production function for the two sectors is:

$$Y_i = A_i K_i^{\alpha_i} L_i^{\beta_i} Y_j^{\theta_{ij}} \qquad (5)$$

where the subscript i refers to the sectors (1 = non-state enterprise sector and 2 = state enterprise sector); Y_i is output in constant price; K_i is deflated capital stock and L is employment. α_t and β_i are elasticities of output with respect to capital and labour, respectively. θ_{12} is the elasticity of the non-state sector's output with respect to the state sector's output and θ_{21} is *vice-versa*. These two parameters represent the possible externalities from one sector to another.

The marginal product of capital (MPK) and of labour (MPL) in each sector can be calculated using the estimated coefficients α_i and β_i, and inputs and outputs data, as

$$MPK_i = \partial Y_i / \partial K_i = \alpha_i A_i K_i^{\alpha_i - 1} L_i^{\beta_i} Y_j^{\theta_{ij}} = \alpha_i Y_i / K_i \qquad (6)$$

$$MPL_i = \partial Y_i / \partial L_i = \beta_i A_i K_i^{\alpha_i} L_i^{\beta_i - 1} Y_j^{\theta_{ij}} = \beta_i Y_i / L_i \qquad (7)$$

Following Solow (1956), A_i is assumed to be a function of time:

$$A_i = A_i(t) = A_i(0) e^{g_i t} \qquad (8)$$

In this format, $A_i(0)$ is a constant and represents the initial level of total factor productivity (TFP) in the *i*th sector. g_i is the rate of total factor productivity growth (excluding the externality θ_{ij}). $g_i>0$ would suggest a continuous increase in productivity in the *i*th sector. T is a time trend. If both Y_1 and Y_2 are correlated with time, this might result in a significant θ_{ij}, which did not reflect the externality. Including a time trend in the production function also helps to reduce this possible problem.[9]

To allow use panel data with fixed effect, cross-sectional dummy variables are included, where D_k is a dummy variable for the k^{th} cross-sectional unit and n is the total number of cross-sectional units. Alternatively, the cross-sectional dummies

may be replaced by a few dummy variables for groups of cross-sectional units. In our case, the cross-sectional units will be 28 provinces, which may be grouped into three regions.

Substituting (8) in (5), taking logarithms on both sides, and including the cross-sectional dummies in the model, we get:

$$\ln Y_1 = \ln A_1(0) + \sum_{k=2}^{n} D_k + g_1 T + \alpha_1 \ln K_1 + \beta_1 \ln L_1 + \theta_{12} \ln Y_2 \qquad (9)$$

$$\ln Y_2 = \ln A_2(0) + \sum_{k=2}^{n} D_k + g_2 T + \alpha_2 \ln K_2 + \beta_2 \ln L_2 + \theta_{21} \ln Y_1 \qquad (10)$$

Note that $\ln Y_i = dY_i/Y_i$, which is the growth rate of Y_i. Similar definitions apply to $\ln K_i$ and $\ln L_i$. Coefficients θ_{ij}, α_i and β_i indicate the contribution of the corresponding input growth on output growth. These two equations will be estimated simultaneously as each one contains an endogenous variable on the right hand side. The initial level and growth rate of total factor productivity (TFP) in each sector, and the externalities from one sector to another can be estimated directly from the equations.

Data

For estimation, the Township and Village Enterprises (TVE) sector data (which has been the major component of the non-state non-agricultural sector) and data from the state industrial sector (which has been the major component of the state sector) have been used. Data for twenty-eight provinces are available for the years 1980, 85, 88, 90 and 92. The total number of observations is 140. Data have been calculated from SSB(a), 1986, 91, 95; SSB(b), 1990; and BTVE, 1990, 1991, and 1992.

Data used for each variable are described as follows:

Y_i is the value of gross output of the i^{th} sector. Both Y_i are deflated to 1980 constant price[10] in million yuan. The official data for constant price output of the TVE sector (BTV 1990–92) was found to be seriously underdeflated. This seems to have caused overestimations of the TVE sector productivity growth.[11] Therefore, in this study, TVE outputs have been recalculated from the current price data.

K_i, capital stock, is a combination of the value of fixed assets and working capital in the *i*th sector, deflated to the 1980 price level.

L_i is total employment in the i^{th} sector.

Estimation Results

Since many cross-sectional dummies are insignificant in the initial estimation, they are replaced by the regional dummies for the East, Central, and West regions of China, i.e., REG1 for the East, REG2 for the Central, and the constant of the model represents the West region.

Table 4 presents the 3SLS estimation results. High R^2s are obtained for the estimations. Capital coefficient α and labour coefficient β are significant for both the sectors. The significant estimates for region dummies indicate a high level of total factor productivity in the East Coast region than in the other regions of both sectors. TFP level of TVEs is slightly higher in the Central region than in the West, but that of SOEs is indifferent between these two regions. No significant externality from the state sector to the non-state sector is found. On the other hand, the value and the statistical significance of θ_{21} clearly indicate a positive externality from the non-state TVE sector to the state sector. The externality of TVEs on SOEs can be explained as the pressure of market competition induced by TVEs to push SOEs to increase their efficiency, because, without market competition, SOEs were running below their production frontier during the pre-reform period.

The value of θ_{21}, e.g. 0.112 in Table 4, suggests that every one percentage point growth rate of the TVE sector contributed to the state sector growth by 0.112 percentage point. In this period (1980–92), the average growth rate of the TVE sector was 24.2 per cent. This contributed to the state sector growth by 2.7 percentage points, accounting for one-third of the SOEs' growth rate, which was 7.8 per cent on the average per annum.

Thus, the hypothesis that the state sector positively influences economic growth in the non-state sector can be rejected. The hypothesis that growth of the market-oriented non-state sector induces pressure on the state enterprises, through market competition, pushes the latter to increase their efficiency, and thus contributes to economic growth as an externality cannot be rejected.[12]

The total factor productivity level derived from $\ln A_i$s was higher in the SOE sector than in the TVE sector in the year 1980, but was insignificant for SOEs. The results suggest a significant TFP growth (g_1) in the TVE sector during the period 1981–92, at an average rate of 4.3 per cent, but a slight negative growth (g_2) in the SOE sector, at an average rate of –1 per cent that is significant at the 5 per cent level. However, the state sector benefited from market competition of the non-state sector, as an externality, which pushed the former to increase their productivity and offset their worsening tendency. Thus, the negative TFP growth rate (g_2) of the SOE sector does not necessarily mean decreasing productivity, since the externality from TVEs on its growth rate θ_{21} is 0.112. Therefore, the results suggest that without the externality from market competition, the TFP of SOEs was possibly decreasing in 1981–92.

The above results indicate that, in 1981–92, although SOEs lost their monopolistic advantage, they benefited from market competition, particularly from the market-oriented TVEs, which generated pressure on SOEs to increase their efficiency. This positive effect has either fully or partly offset the negative effect from losing policy advantages, but has not eliminated the performance gap between the state and non-state sectors.

Table 4: Three Stage Least Squares Estimation Results

	α_1	β_1	θ_{12}	$\ln A_1(0)$	REG_1	REG_2	g_1	R2
TVE	0.471	0.501	0.065	-0.522	0.364	0.152	0.043	0.984
	(9.04)	(13.31)	(1.48)	(-1.90)	(6.50)	(3.13)	(6.69)	
	α_2	β_2	θ_{21}	$LnA_2(0)$	REG_1	REG_2	g_2	R2
SOE	0.537	0.434	0.112	0.262	0.313	0.002	-0.010	0.959
	(5.37)	(3.35)	(3.53)	(0.78)	(5.61)	(0.045)	(-0.808)	

Notes: Total number of observations is 140.

Coefficient of capital stock = α

Coefficient of total employment = ß

Coefficient of initial level of TFP = ln A(0)

Coefficient of externality = θ

Coefficient of growth rate of TFP = g

REG 1 refers to the eastern region

REG 2 refers to the central.

Marginal product of capital (MPK) and marginal product of labour (MPL) are calculated using the estimated elasticities, α and β. Table 5 shows that the TVE sector had a lower labour productivity but a higher capital productivity than the state sector. Because of that the state sector was much more capital intensive than the TVE sector. During 1980–92, both MPK and MPL increased in the TVE sector. In the state sector, the MPL increased but the MPK decreased. The different directions of changing MPK led to a divergence of MPKs, remarkably higher in TVEs than in SOEs in 1992. Although the MPL of TVEs was still lower than that of SOEs in 1992, they converged from a relative ratio of 0.24 to 0.60, owing to faster increase in labour productivity in TVEs than SOEs (11.8 per cent per annum in the former and 4.5 per cent in the latter).

The reason for the decreasing capital productivity in SOEs is the fast growth of capital with significant diminishing returns in the state sector, showing an input-driven growth pattern in SOEs. The capital intensity of the state sector resulted from the free distribution of investment funds through the state budget, during the pre-reform period. Although this has been changed since reform, some SOEs, particularly large SOEs, are still paying lower interest rate and having priorities in obtaining bank loans than TVEs. Capital intensity is growing faster in the SOEs than in the TVEs.

Contribution of the Non-State Sector to Economic Growth:

From the above results, contribution of the non-state sector (NSE) to China's non-agricultural growth or industrial growth can be calculated. To derive the contribution of the non-state sector to industrial growth, we have assumed that

Table 5: Marginal Productivity in TVE and State Sector

Year	1980	1985	1988	1990	1992	Growth per annum (%)
MPK						
TVE	0.812	1.23	0.935	0.869	0.931	1.1
State	0.526	0.506	0.48	0.406	0.326	-3.9
MPL						
TVE	0.828	1.352	1.922	2.234	3.165	11.8
State	3.453	4.302	5.114	5.267	5.867	4.5

Notes: MPK and MPL refer to marginal product of capital and labour, respectively.
Source: Calculated from the estimation results and the data set that originally come from SSB(a) 1986, 91, 94; SSB(b) 1990; and BTV 1990, 91, 92.

the TVE sector has the same production technology and output growth rate just like other minor components of the non-state sector and that the state industrial sector has the same production technology and growth rate of other minor components of the state sector. Here, we further assume that, approximately, the proportion of the TVE sector in the non-state (and non-agricultural) sector is equal to the proportion of the state industrial sector to the state sector. Thus, the TVE sector and the state industrial sector can be treated as the core components of the NSE and SOE respectively.

Table 6 provides the relative output shares and the actual growth rates of the SOE and NSE sectors (from those of the industrial SOEs and TVEs). Y_1 and Y_2 denote the NSE and SOE sectors, Y represents the non-agricultural economy; $Y_1+Y_2=Y$. The growth rates of Y are weighted aggregations of the growth rates of the two sectors. The average output shares in the corresponding period, Y_1/Y and Y_2/Y are taken as weights.

Table 7 shows the calculation results of the direct and indirect contribution of the NSEs to economic growth that are derived from Table 6 and the estimated externality in Table 4. The economic growth rate is divided into the direct contribution of the NSE's growth and that of SOEs. In Table 8, the direct contribution of NSEs is derived from its growth rate and its output share in the non-agricultural economy as $Y^*_1(Y_1/Y)$. The contribution of the SOEs is derived in the same way, but it is divided into two parts: the indirect effect of NSEs, calculated as $\theta_{21}Y^*_1(Y_2/Y)$; and the rest, i.e., the SOE's own contribution.

Thus, as shown in the last column of Table 7, the total contribution of the NSE sector to the annual non-agricultural economic growth, during 1980–92, is its direct contribution (7.8 percentage points) plus its indirect contribution through the SOE sector growth (2.0 percentage points).

Table 6: Input, Output and their Growth Rates, 1980–92[a]

	Capital[b] 100 Million Yuan 1980 Price	Labour 100 Thousand Persons	Output[c] 100 Million Yuan 1980 Price	Capital-Labour Ratio
1980				
TVE[d]	504	300	657	1.7
State[e]	4,786	309	3,767	15.5
1992				
TVE	5,942	1,059	9,051	5.6
State	18,691	445	9,226	42.0
Growth Rate 80-92 (%)				
TVE	22.9	11.1	24.2	
State	12.0	3.1	7.8	

Notes: a. Data exclude Xizang and Hainan provinces.
b. As aggregation of deflated value of fixed assets and working capital at 1980 constant price
c. Gross output value at 1980 constant price
d. Township and Village Enterprises sector
e. State-Owned Industrial sector

Source: Deflated from current price data in SSB(a) 1986, 91, 94 and BTV 1990, 91, 92. The deflator is Producer Price Index for Industrial Products (SSB 1994).

Together, the NSE sector contributed three-quarters of the 13.1 per cent economic growth. After deducting the NSE externality, the SOE sector only contributed one quarter to the economic growth.

To conclude, the most important findings from the current analysis are as follows:

(a) Although the SOEs are having difficulties as a result of losing favourable policy treatment and facing stiff competition from the non-state sector, this study shows a positive externality of the TVE sector on the state sector growth, and therefore, on economic growth, through market competition. The finding suggests that the positive effect of market competition upon SOEs' growth has at least partially offset the negative impact of the difficulties they faced on TFP growth. Although the TFP growth rate in the state sector could not be identified in this paper, the result does not support either strong TFP growth or heavy declines in this sector.

Table 7: Growth Rates of the NSE and SOE Sectors

	1981-85	1986-88	1989-90	1991-92	1981-92
Output share(%):					
NSE (Y_1/Y)	22.7	34.7	39.9	44.8	32.1
SOE (Y_2/Y)	77.3	65.3	60.1	55.2	67.9
Total	100.0	100.0	100.0	100.0	100.0
Growth rate (%):					
NSE (Y_1)	30.1	24.7	6.2	27.5	24.2
SOE (Y_2)	8.5	9.7	3.4	7.5	7.8
Overall	13.4	14.9	4.6	16.4	13.1

Table 8: Direct and Indirect Contribution of the Non-State Sector to Industrial Growth

	1981-85	1986-88	1989-90	1991-92	1981-92
Direct contribution of NSEs	6.8	8.6	2.5	12.3	7.8
Contribution of SOEs	6.6	6.3	2.1	4.1	5.3
Of which, SOE's own contribution	3.8	4.3	1.7	2.3	3.3
NSE's indirect contribution	2.8	2	0.4	1.8	2.0
Economic growth	13.4	14.9	4.6	16.4	13.1

Note: SOE refers to State-Owned Enterprises and NSE refers to Non-State Enterprises.

(b) TFP growth during the period 1980–92 in the TVE sector is found to be clearly positive and fast, at an annual rate of about 3.9–4.4 per cent.

(c) The results of this paper suggest that, during the reform period, the rapid growing non-state sector, mainly the TVE sector, made the major contribution to China's economic growth, not only through its rapid growth and productivity changes but also through its externality on the state sector. By including the indirect impact, the total contribution of the non-state sector accounted for about 75 per cent of the growth rate of the non-agricultural economy, during the period 1981–92.

(d) Labour productivity in the state sector is found to be increasing, but at a slower rate than in the TVE sector. Capital productivity is decreasing in the former and increasing in the latter. With lower capital intensity and higher labour intensity than SOEs, TVEs' capital productivity has greatly exceeded

that of SOEs by 1992. Its labour productivity was still lower than the latter, but was getting closer.

Conclusions

This paper examined the non-state sector growth and its direct and indirect contribution to China's industrial growth during the initial period of economic reform.

Using a modified Feder-Ram model, this paper examined whether any externalities existed between the growth of the state sector and that of the non-state sector during 1980–92. TFP growth and factor productivity in the two sectors were also estimated. The result of the empirical analysis confirms the faster TFP growth in the non-state sector than in the state sector. This study also suggests that, with lower capital intensity and higher labour intensity than SOEs, TVEs' capital productivity had much exceeded that of SOEs by 1992. Its labour productivity was still lower than the latter, but was getting closer. Despite the great improvement, distortions in labour and capital allocation still exist and reduce economic efficiency. They are caused by the remaining restrictions at the economy level, or by institutional problems at the firm level (e.g. the conservative employment behaviour of the collective enterprises). Therefore, there is still considerable potential for continued fast growth in the intermediate future. This should be realised by further market-oriented institutional reform, although, in the long run, economic growth will depend more on technical progress and human capital accumulation.

The study found a clear positive externality running from the growth of the non-state sector to the growth of the state sector in the reform period. Without this effect, TFP growth in the state sector would have been negative. This externality would have emerged from market competition, forcing SOEs to increase their productivity. By taking this externality into account, it is estimated that the non-state sector contributed, directly and indirectly on the average, about 75 per cent of China's economic growth from 1981 to 1992.

Considering the fact that the non-state sector, particularly the private sector, is still facing discriminative policies and has been underdeveloped in some areas, there is an urgent need for further market-oriented reform.

The above findings also generate some policy implications. Since marginal product of capital in the state sector was found to be significantly lower than in the TVE sector, market orientation will naturally lead to a reallocation of capital from the former to the latter. This will increase economic efficiency, but protective measures for the state sector, such as low interest rate bank loans, hinder an optimal allocation, and therefore reduce the overall efficiency level of the economy. Instead of policy protection, government policies on SOEs might be preferred to focus on the following aspects:

1. To promote market-oriented structural adjustment and technical innovation at the firm level. For example, in 1992 even the non-state sectors in Gansu and Qinghai accounted for only 24 per cent and 17 per cent of the total industrial output respectively. In Jilin, Liaoning, Shanxi, Shaanxi and Hunan, etc., this ratio was also much lower than the national average. The economic growth rate in these provinces has been relatively low. Qinghai had the lowest rate, on an average, among the thirty provinces during 1979–92. There are various reasons for the underdevelopment of the non-state sector in these regions. Some of the existing anti-market and discriminatory policies against the non-state sector could still be obstacles to economic growth. Removal of these restrictions would be a considerable source of further economic growth. As the above results suggest, the state sector would also benefit from the growth of the non-state sector, through the externality effect in the sense of increasing efficiency.
2. To promote factor mobility among firms, sectors, and regions by creating a more transparent factor market with more equalised factor prices.
3. Further reform of SOEs to include reforming the ownership structure to improve the incentive mechanism.

Notes

[1] SSB 1993: 52; 1995: 32. Measured by Total Output Value of Society (TOVS) at constant price. GNP statistics are not available before the year 1978, and TOVS statistics are not available after the year 1992. Therefore, growth rate used for this calculation for the years 1993 and 1994 are that of GNP with adjustment to fit TOVS. The TOVS growth rate is usually 10–15 per cent higher than the GNP growth rate.

[2] Excluding agriculture. The agricultural sector was collectively owned and controlled by the government in the pre-reform period. It changed to household-based production after reform. This made it much more productive. However, this paper emphasises only non-agricultural or industrial growth, concerning both the state and the non-state sector. The non-state sector that is investigated in this paper includes both urban and rural collective and private owned non-agricultural enterprises and individuals. Among them, Township and Village Enterprises (TVEs) account for a major part (two-thirds of the output in 1994). In TVEs, collective and private enterprises each shared half of the TVE employment, two-thirds and one-third of the TVE output in 1994 (SSB 1995: 364–75).

[3] In China's 'Double Track Price System,' market price is allowed to work at the marginal output while controlled prices remain effective, more or less, in a constant or decreasing state quotas for output. Associated with output growth, the proportion of price control on the output decreased gradually. For most products, when price control dropped to a small proportion of the total output, it was abolished. For further details on the

double track price system, see, Lawrence *et al* (2000).

4 This survey included 429 enterprises in 22 major cities. Samples are mostly state-owned large or medium-sized industrial enterprises.

5 Planning control at a lower government level is usually more flexible and more profit-oriented than that at the central level. It usually allows price changes in a certain range, and also allows firm managers to make their own decisions. Low-level government plans are usually not subject to the central plan. Acute competition is observed among state enterprises in different regions which are subject to different local plans.

6 Information from a number of reports in the *Economic Daily*, Beijing, 1994–96.

7 Similar results have been obtained by other researchers too (see, for example, Rawski 1986).

8 Nevertheless, relaxing this assumption depends on the availability of separated data for each sector's inputs and outputs. Forturnately, this requirement can be met in this study.

9 Alternatively, the time trend can be replaced by dummy variables for each year.

10 The Producer Price Index for Industrial Products (SSB 1994) is used as the deflator. The original data for fixed assets are a mixed aggregation of different years' current price data. Several calculations have been made to decompose the data into different years and to deflate them separately.

11 For example, Weitzman and Xu (1994) estimated TFP growth rate in the TVE sector during the period 1979–1991, using the official data, as 12 per cent annually. This may be an overestimation.

12 The production functions in growth rate form can be obtained by differentiating Equation (a1') and (a2') with respect to time.

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Globalising Environmental Problems and SMEs' Survival Strategies: Perspectives from a Developing Country

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Abstract

Cost leadership, product differentiation, or delivery time is traditionally chosen as a competitive strategy (Dess and Davis 1984; Miller 1988; Chen 2002b; Porter 1980, 1991; Porter and van der Linde 1995). Today, the integration of environmental problems with trading has worked as a driving force to formulate strategies of survival for small-to-medium size enterprises (SMEs), as most developing countries are now members of WTO (World Trade Organization). When SMEs in developing countries face rapid challenges arising from globalisation of environmental problems, they need to choose appropriate survival strategies. In this paper we employ a method of case study to examine the factors affecting the choice of survival strategies adopted by SMEs and the major contents of such strategies.

Introduction

In a changing world, the firms attempt to survive by identifying particular competencies and enhancing their relative competitiveness in the world market. Businesses acknowledge that participation in WTO can preserve a competitive position (e.g. Barber *et al* 1989), but the globalisation of the market system also generates high challenges to the firms and has engendered revolutionary changes in the construction and operation of international regimes in association with environmental issues and trades. This change brings about more threats, but fewer opportunities for SMEs that must cope with a large business under a WTO trade regime due to scale diseconomies when the high protectionist walls are removed and country borders opened. A large global firm may select the best location to run its activities from a worldwide perspective, but SMEs can only stay in their home country to compete with the global firms owing to resource shortages in both physical as well as human capital. Under such turbulent circumstances, many SMEs in a declining industry are forced to close down their operations.

The widespread awareness of environmentalism in the world leads to establishment of higher standards of environmental regulations and pressures firms

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to legitimise their environmental behaviour to comply with environmental regulations (DiMaggio and Powell 1983; Oliver 1997). To resolve global environmental problems, multilateral agreements have sprung up (Brown *et al* 1993), restricting the trade of some environmentally unfriendly products even though agreements to resolve global environmental problems may not be an effective solution, because each country is highly protective of its national sovereignty and is reluctant to relinquish it (Porter and Brown 1991; Brack 1996). However, some authors suggest that international agreements may well be the only way in the absence of a world government (Pearce 1995). Such effective international environmental agreements to respond to a growing set of global ecological threats are needed (Dua and Esty 1997) and must be formulated to maximise collective gain by moving from a national to an international environmental policy (Esty and Mendelsohn 1998). Today, international cooperation is already under way and has started to play a pushing hand with considerable capacity as a power-generating tool to sustain the development.

The responsive behaviours of firms when facing hostile environments have been discussed by many authors (e.g., Covin and Slevin 1989) and the factors that affect a firm's success or failure have also been examined (e.g., Zammuto and Cameron 1985; Hambrick and D'Aveni 1988). Zammuto and Cameron (1985) examine many such cases in the literature and conclude that carrying capacity is a major factor in explaining corporate failure. Hambrick and D'Aveni (1988) propose four external factors to determine corporate failures: domain initiative, environmental carrying capacity, slack, and performance. In the perspective of Hannan and Freeman (1977), corporate failure is usually due to a limited domain initiative, which stems either from the firm's restricted capacity or from environmental change. When organisational change is slower than environmental change, it cannot adapt to environmental change and this leads to an organisational downfall.

Richards (1973) concludes with ten factors to explain corporate failures from his empirical study. He states: 'Top-level decision makers are able apparently to deal successfully with riskiness in one or two of the classifications of business, financial, technological, scale, and organisational risks. Failure occurred as further excessive dimensions of risk were added to those already present' (Richards 1973: 43). Polykarpou (1992) argues that the success or failure of a firm is dependent on external environmental variables, the personality, goals, traits and skills of an organisational leader, and the way of exercising his/her power.

As to the responsive behaviours, Staw, Standelands, and Dutton (1981) present a model showing a firm's various responses to environmental threats. Koberg (1987) and Miller and Friesen (1980) propose that a responsive strategy to environmental threat would be predictable and mandated. Basically, the owner-managers of SMEs determine the survival strategy of their organisation and adjust

the existing structure according to the surrounding environments (Miles and Drogue 1986; Mintzberg 1979; Yasai-Ardekani 1986, 1989).

The strategy choices presented by these authors, in our opinion, fit with large firms or firms in developed countries without involving the globalisation of environmental problems. As to SMEs in developing countries that face the release of trade barriers and globalisation of environmental problems, the fitness is suspect. Moreover, environmental regulations are more and more stringent now and play a vital role in determining a firm's competitiveness and its environmental capabilities (Porter and van der Linde 1995; Hettige *et al* 1996; Dasgupta *et al* 2000). The survival of SMEs is becoming more and more precarious than ever before. The purpose of this paper is to examine the SME's responsive strategy to globalisation of environmental problems under free trade in a developing country.

Research Methods

To examine the survival strategies adopted by SMEs that have successfully survived in turbulent environments (including global environmental concerns and trade liberalisation), we select some industries that face ongoing deterioration, accompanied with decreasing profit margins, and reduced turnover and market share. The criteria for the sample selection include: (1) a declining industry, and (2) the size of firms.

Declining Industry

The complexity of this problem has already received attention in the literature (e.g. Winn 1989, 1993; Hofer 1980; Parker and Helms 1992). However, there is not much of a common agreement on performance measures to define a decline or a turnaround trend, nor an exact description or definition of what constitutes a turnaround. A declining industry may 'occur when an industry has experienced sustained absolute losses presumed sufficient enough to exhaust available remedies to the decline' (Parker and Helms 1992:27). In this paper, we provide a more operational definition of a declining industry as that industry with a profit rate less than the average of all the industries.

Size of the Firm

We define the SME as a firm in which the key decision-making and supervision actions of the firm are undertaken and implemented by the owner-manager (Polykarpou 1992). We selected seven SMEs as sample firms with a maximum turnover of NTD 200 million (about USD 5.7 million) in declining industries, such as food, paper, shoes, and plastics and chemicals. Surveys were conducted by in-depth interviews through semi-structured questionnaires to examine the survival strategies when they faced high environmental pressure in the past including trade liberalisation and environmental problems from globalisation. The questionnaire

was developed by the author through consultation with experts and a review of related literature.

Business performance and environmental performance are difficult to measure. A common criterion for a valid set of performances has not been accepted by most researchers in the field of organisation theory (Cameron 1981, 1986; Hitt 1988; Lewin & Minton 1986; Ostroff & Schmitt 1993). Some researchers choose employment growth, sales revenue growth, and profit growth as useful performance measures (Dess and Robinson 1984; Bagby and Shull 1987). However, ROA is popularly accepted as the main measure of financial performance for most industries (Hambrick 1983; Bettis and Hall 1982; Hoskisson 1987).

As to environmental performance, there is no generally-accepted tool for measurement. Klassen and McLaughlin (1996) use environmental awards or a crisis to measure environmental performance. We discussed with many experts and reviewed the related literature and finally decided to measure it qualitatively by identification of the firm's environmental activities such as certification of ISO 14000, prevention activities (for example, green purchasing), energy conservation, recycling practices, and waste treatments. Many authors claim that pollution prevention through clean production or green purchasing can improve both financial and environmental performances (Min and Galle 1997; Carter *et al* 2000; Green *et al* 1998). The implementation of environmental management systems can improve environmental performance and has indeed become a major factor in affecting competitiveness (Tibor and Feldman 1996; Miles *et al* 1997; Stigson 1998). In addition, the recycling of a firm's self-regulation to fulfil its social responsibility as well as autonomous response by developing new technology to reduce energy consumption and compliance with environmental regulations to treat pollution are all seen as major indicators of environmental performance (Zhang *et al* 2000).

As the sample size is small (only seven firms) and the firms to be interviewed are extracted from Taiwan, the results of the study may not hold in the case of SMEs from other developing countries. To generalise the findings it requires further study on a cross-country basis. In this paper, we attempt to identify the strategies that SMEs choose in response to the global environmental problems, and thus, the limitations in applications to other countries should be noted.

Characteristics of SMEs in Taiwan

Cross-case analysis were conducted to deduce the characteristics of SMEs in Taiwan that sought to survive when faced with environmental threats. In fact, an SME was basically characterised by its low capital base. As a consequence, some special features were inevitably created (Exhibit 1).

Exhibit 1. Special Features of SMEs

-credit constraints
-low environmental performance and low business performance
-scale diseconomy in R&D and low quality of human resources
-lack of marketing information
-manufacturing flexibility

(1) Credit Constraints

While large firms enjoyed relative advantages in financial status, SMEs faced a shortage of credit and paid higher capital costs to banks than large firms. Firms with a better financial status and performance might have better capability of and intentions to contribute to environmental protection than other firms and might be more likely to pursue voluntary regulations on environmental issues. Without financial support, there was little choice for SMEs to develop technology, to have access to knowledge, and/or to hire appropriate human resources.

(2) Low Business and Environmental Performance

The financial and environmental performance of the seven sampled firms are listed in Table 1. The average financial performance was 2.73 per cent. Among these firms, YS Corp. (a producer that recovers secondary material of PS from waste-foamed PS) reported a relatively much higher value of financial performance. We suspect that the YS overestimated its profit by excluding overhead costs as the family of the owner-manager handled the operations. Through this in-depth survey, we find that these small firms were reluctant to take up a proactive environmental strategy, but did care about cost minimisation in complying with governmental regulations even when they possessed sufficient environmental knowledge. One of the sampled firms had already employed an ISO 14000 environmental management system under pressure from an international buyer.

Our survey shows that the most important basis for the firm to formulate its environmental strategies was to minimise costs of survival and cared little about social responsibility. Without financial feedback as motives for environmental investment, SMEs would exclude the fulfilment of environmental responsibility as a member of the global village. The results show that SMEs required a proactive strategy that could support them to gain substantial benefits before they acted (Berry and Perren 1998; Sparrow and Goodman 2000).

Table 1: Descriptive Statistics of Financial and Environmental Performance

Samples	Products	Financial Performance (ROA)# (in percentages)	Environmental performance				
			(1)	(2)	(3)	(4)	(5)
A. Corp.	Pickled food	1.47	No	No	No	No	No
F. Corp.	Shoes	3.45	Yes	Yes	Yes	Yes	Yes
K. Corp.	Paper cartons	N/A	No	No	No	No	No
T. Corp.	Metal parts	0.19	No	No	Yes	No	Yes
W. Corp.	Chinese wines	3.3	No	No	No	No	Yes
Y. Corp.	PET bottles	1.06	No	No	Yes	No	No
YS Corp.	PS recovery	4.9	No	No	No	Yes	Yes

Note: In measuring environmental performance, item (1) represents 'certification of ISO 14000', (2) shows 'prevention activities,' (3) its 'energy conservation', (4) presents 'recycling practices,' and (5) includes 'waste treatments.'

The data are based on the year 2002.

(3) Scale Diseconomy in R&D and Low Quality of Human Resources

Due to low capital base, scale diseconomy in R&D and production inevitably does exist and thus, makes a negative impact on SMEs relative to competitiveness. Without efficient investment in R&D, SMEs cannot afford to use the latest 'generation' of software/hardware with their current information management system, thus, resulting in lower productivity than large firms. A low capital base and low business performance also result in a shortage of qualified personnel who require a variety of skills and talents to initiate new programmes in marketing, R&D, environmental management, and so on. As a consequence, SMEs experience considerable difficulty in differentiating their products that are indistinguishable from their competitors' offerings. They do not possess the required expertise in-house to take charge of environmental projects and services for waste treatment in order to support their business. This can be a major hurdle faced by the SMEs, becoming a weak point and limitation for their employees to access knowledge and its utilisation. Formal training of personnel in SMEs is absent since they cannot afford to do so and show little interest in the education and training of their employees. Eventually, it becomes difficult to improve the quality of human resources in SMEs and results in the resignation of high-skill employees.

(4) Lack of Marketing Information

Employees in SMEs must be qualified with sufficient knowledge to be responsible for the tasks/products and must care more about increasing efficiency through an incentive mechanism. Work experience is regarded as an important

factor and neglects the importance of a knowledge management system that can be captured and conveyed through learning from case experience. In general, SMEs do not allow employees to hold a private relationship with the environment. In our survey we find that five (70 per cent) of the interviewed firms did not know the major function and objectives of ISO 14000. Without an appropriate knowledge management system to improve the communication process, SMEs cannot obtain sufficient information about new developments in global trends.

(5) Flexibility

The need for maintaining firms' flexibility when facing an uncertain business environment has of recent been recognised as an important factor for survival. A flexible production system offers high gains through the development of product/ process designs that achieve the objectives of a reduction in lead time, an increase in throughput, a reduction in inventory, an improvement in equipment utilisation, and quality improvements. In a series of articles, Hall and his co-authors (Hall 1993a; 1993b; 1993c; Hall and Anderson 1993; Hall and Yamada 1993) emphasise that flexibility is a major characteristic of global competitive manufacturers in the future. However, it is very capital intensive and requires high investment.

Flexibility is measured by the degree or the extent of the ability of a system to increase the speed of production and its capacity, including planning, designing, and realising the production in a given time. The time for a firm to adapt to the changing environment represents its flexibility in a continuous evolution of environmental change. The rigorous constraints of time and money that small firms face reflect the particular difficulty in building up competitive advantage over large firms using traditional methods. Due to a low capital base, a small firm's production capacity may be lower and production technology may be less updated, but it compensates for this with quick service. Fortunately, SMEs are more flexible in operation and in facing new challenges due to their lower production capacity. SMEs view their business as labour-intensive products and services by offering better service in communication and human relationships.

The Survival Strategies

The in-depth survey finds that SMEs were pressured and affected very much by the trend of trade liberalisation and globalisation of environmental problems. The environmental strategy implemented by these firms could solve only a part of the environmental problems (Vatn and Bromley 1994; Miller 1994; Upreti 1994) since most of them aimed to solve only the existing ones, ignoring the seriousness of others. The challenge for SMEs was to identify their relative advantage over bigger firms in facing environmental changes and to identify how they could be persuaded, encouraged, or forced into changing their business operations. The results reveal

that SMEs formulated survival strategies by integrating their business strategy with an environmental strategy when facing environmental threats. We classify the survival strategies adopted by SMEs as follows:

(a) Tail-Cutting Survival Strategy

A. Corp. is a pickled food producer for the domestic market only. Owing to changes in tastes of the new generation, its turnover dratically declined in the past five years. In addition, governmental regulations on discharged water were made more stringent. After process analysis, they moved the most polluting unit abroad so as to avoid high environmental expenses on pollution abatements. K. Corp. used secondary (used) waste paper as raw material to manufacture paper cartons in which the recovery process yielded a large amount of wastewater and consumed a large amount of fresh water. To reduce the liability towards environmental pollution, it entrusted sub-contractors with treatment of the recovery process. T. Corp. was a metal parts maker and entrusted sub-contractors with handling of the metal painting. These three cases show that a change in environmental regulations accompanied with trade liberalisation could encourage relocation of productive facilities. Most SMEs considered the compliance with environmental regulations as a main factor in determining the location of manufacturing even though many authors emphasised that market factors or innovative personnel supply might be a more important factor affecting the decision in developing countries (Hettige *et al.* 1996; Dasgupta *et al.* 2000). This strategy might save the life of the company only temporarily. Eventually, these firms will face the pressure of environmental responsibility from international environmental groups.

(b) Participation in a Global Supply Chain

Winn (1993) suggests vertical integration as a good strategy to generate immense strategic value. F. Corp. was a shoe producer as a sub-contractor to world-class brand names such as Nike. Through close cooperation with Nike in developing new substitutes for polluted materials and introducing new environmental management systems, its environmental performance was assessed as superior in its industry by the government. Y. Corp. acted as a plastic bottle supplier to international buyers such as P&G, Unilever, and Colgate. As sub-contractors, SMEs need to meet the environmental standards regulated by international buyers to win the buyers' orders in a stable mode. Participation in the world supply chain could reduce cost through a large volume of stable orders and results in the adoption of more proactive environmental strategies.

(c) Cooperation Strategy

In declining times, a firm may choose either employment cutbacks such as short-term workforce layoffs, overtime work, or fixed asset reduction such as disposal of fixed assets, sale of plants or equipment in order to survive. Plasticizer production

is a mature technology, and manufacturers face intense competitive pressure from both domestic and international markets. Expanding into new markets may require more investments on human resources, which seems impossible due to credit constraints and marginal profits. To gain scale economies and cut down the cost of survival, W. Corp. was entrusted as a sub-contractor by most manufacturers in the plasticizer industry in Taiwan and focused on the production of plasticizer only. YS joined competitors to form an association for collecting waste foam under a stable supply with minimised transportation costs. The cooperation between the plasticizer industry and waste foam PS industry led to economic gains and environmental improvements due to labour differentiation among firms. This strategy demonstrated that SMEs on the decline might attempt to comply with environmental regulations and focussed on survival only. Horizontal cooperation might be an effective way to survive temporarily.

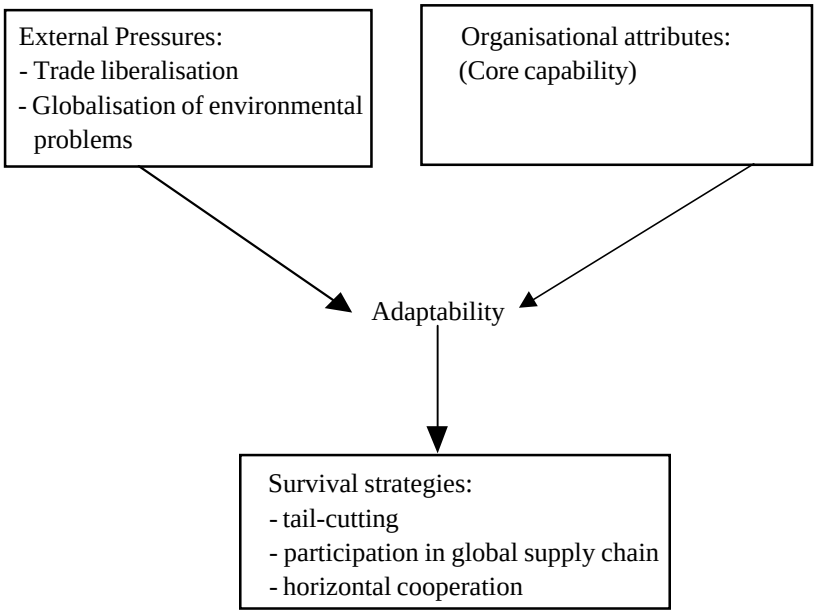
A Framework

SWOT analysis is seen traditionally as an effective tool to highlight the status of a firm and to address the potential growth and decline causes from both external and internal change of an organisation (Mintzberg 1994). Using SWOT analysis as a basis, an effective strategy that SMEs adopt must at least ensure that the firm survives and grows first through the achievement of the predetermined objectives such as revising its organisational structure, or increasing value-added products, or integrating with other firms. Only then can it achieve sustainable development by developing its specific ability and capacity to form a core advantage (Barney and Zajac 1994). This reflects on its ability to do better than its competitors in order to maintain competitiveness (Hayes and Pisano 1996).

In this paper, we develop a model to describe the development process of survival strategies in SMEs based on the results derived from these case studies and propose a framework in Fig. 1 in which the formulation of a survival strategy requires linking the 'inward-looking' (to know itself) strategies and the 'outward-looking' (to analyse the competitors') strategies (Verdin and Williamson 1994). While environmental problems and trade liberalisation have become global issues, environmental liability is becoming an important factor as an external pressure in affecting business trading. Linking corporate environmentalism with core capability to form a competitive advantage is theoretically essential and empirically evident (Banerjee 2001). Under such a trend, an extra cost for greener production arises and SMEs in developing countries face more challenges than those in developed countries that have trade liberalisation. Globalisation and liberalisation of world trade that involves environmental issues have induced major external pressure for SMEs to survive.

In this framework, shown in Fig. 1, we emphasise that the adaptability between external pressures (trade liberalisation and globalisation of environmental problems) and organisational attributes (core capabilities) may yield high impacts on survival when facing environmental uncertainty. An effective strategy must have the firm link its internal resources with its environment. The vulnerability of SMEs may provoke them to ensure their ability to adapt to a changing environment. They need to know the objective limitations and make use of their special advantages over large firms by adapting their core capabilities under external pressures.

Figure 1. The Framework of Survival Strategy



Conclusions

It has been proved that more and more stringent standards issued by developed countries can pose problems and may affect the competitive position of SMEs since they lack market information and the capacity to respond to environmental changes. Moreover, the aggravation of environmental problems in the world has generated a negative impact on the ecosystem and forced people to seriously consider the possibility of sustainable development (Chen 2002a) and incorporate a sustainability criterion into decision frameworks (Hart 1997). The 1992 Earth Summit in Rio proposed the construction of sustainable development as a guideline for humans to develop economic projects.

In this paper, we derived the special characteristics of SMEs, analysed the survival strategies adopted by these SMEs in a declining market, and developed a framework of survival strategies' formulation. The framework presented here highlights the importance of adaptability between external pressures arising from environmental problems and trade liberalisation with SMEs' core capabilities. The survival strategies in consideration of environmental problems and trade liberalisation reflect the global trend of sustainability requirements. However, the data collected from the sampled firms explain some of the factors for their survival while most firms in declining industries have already shut down. The strategies employed by these sampled firms may work only temporarily since external pressures will become more and more serious.

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Testing the Unitary and Nash Bargaining Household Models in India

T. Lakshmanasamy*

Abstract

This paper tests the unitary or common preference approach versus the collective models of household behaviour in India. Using the independent female unearned income as an indicator of female's control over resources within the household in the bargaining strategy, we study the effect of pooled unearned income versus independent unearned income of the spouses on five household decisions, viz., male and female labour supply, household expenditures on food, education and health. The OLS estimates show that while the female independent unearned income has negligible influence, the male independent unearned income has positive and significant effects on most household decisions, indicating the weak bargaining strengths and insignificant influence of female over household resource allocation decisions.

Introduction

Understanding human behaviour poses the greatest challenge to the social sciences. The problem is more complicated in trying to understand the family or household behaviour. Nonetheless, in recent years, economists have expanded the domain of the economic approach to analyse family behaviour, especially the formation of family and resource allocation decisions of households. The chief architect of the subject 'economics of family' is undoubtedly Gary Becker (1991). Since his pioneering contributions on household behaviour, many amendments of the basic framework have been made in order to better understand the economics of human behaviour within the family (Bergstrom 1997). However, no new theoretical framework has gained general acceptance as a replacement of Becker's approach, and empirical studies have mostly concentrated on debunking old models and providing fresh insights into the newer approaches. This has led to growing controversy as well as substantial literature not only on household behaviour but also on its links with the issues of theory and measurement in various other fields of economics and econometrics. This paper aims to highlight recent developments in both the theoretical and the empirical approaches to the economics of household decisions.

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In the 'conventional' economic approach of the family, a household is considered a single decision-making unit, that is, it is characterised by a single utility function that is maximised under a single budget constraint. This amounts to assuming either that the preferences of individual members are irrelevant or that they can be unrealistically assumed to be a dictatorial decision-making process. This 'single or unitary utility' view has recently been challenged by many 'modern' approaches, which claim that the household should be understood to be a 'collective or bargaining' decision-making unit. In particular, the alternative theories state that intrahousehold decision-making processes are important and complex phenomena, and that the single utility hypothesis is essentially an *ad hoc* justification for disregarding this issue. The real distinction between the traditional and modern approaches is, first, not the number of decision-makers, but whether they are allowed to have different preferences. Second, the approaches are not distinguished by whether they maximise a unique welfare index, but by whether they are interpreted as a utility function, that is, whether they are independent of prices and incomes. The modern approaches allow for differential preferences and accommodate more complex influences than the usual income and substitution effects. Unlike the traditional approach, these models of household behaviour, generally referred to as intrahousehold resource allocation decisions, deal with both the processes by which resources are allocated among the individual members and the outcomes of those processes within the family or household.

In this paper, we test the unitary *versus* collective models of family with primary household data. We test whether independent resources of household members are pooled and whether resource allocation decisions are unitary or collective. In particular, we investigate whether the female has any control over resource allocation and the decision-making process by studying the effect of independent female non-labour income on many household decisions. If the female has control over household decisions, the effect of independent female non-labour income on household allocation decisions will be greater than the independent male or pooled non-labour income. Hence, we test the effect of female non-labour income on hours of market work of both male and female, household expenditure on food, health, and education of children.

In what follows, we discuss the economic approach to household behaviour and briefly present alternative theoretical approaches to the household decision-making process. We then present the modelling of these alternative theories and their empirical tests. Next, we describe the data for this study and present the empirical results, followed by a brief conclusion.

Economic Models of Household Behaviour

The theories and models of household behaviour are classified as 'unitary models' and 'collective models'. The former includes egoistic and altruistic models,

and the latter includes bargaining models which allow for both cooperation and conflict. The former class of models assumes that household members seek to maximise utility on a set of common or unified preferences and a common budget constraint. In contrast, the latter class of models uses the game theoretic approach to incorporate a more complex understanding of how households arrive at decisions, allowing for individual differences in preferences, in budget constraints, and in control over resource use. However, there is less agreement on intrahousehold interactions. In some cases, household members cooperate insofar as cooperation makes each member better off than noncooperation, and in some cases noncooperation within the household may yield different outcomes. Hence, there is a conflict between members. Most of the alternative household models characterise the intrahousehold dynamics as a form of bargaining, barring the collective models that make no assumption other than that the outcome will be Pareto efficient. These non-unified approaches to household decision-making build on an explicit or implicit bargaining process taking place within the family. They assume that either information is shared symmetrically between cooperative individuals, which then tends to lead to allocations that are Pareto efficient, or that private information is not shared and is, hence, asymmetrical, with this failure of coordination leading to inefficient allocations across the household members. As the household allocation decisions depend largely on the relative bargaining powers of the members, the bargaining strengths depend to a greater extent on extrahousehold factors. The differences between these alternative approaches, both theoretically and empirically, are outlined excellently in Alderman *et al* (1995), Strauss and Thomas (1995), Haddad, Hoddinott and Alderman (1997), and Schultz (2001).

Unitary or Common Preference Model

Economic models of household behaviour that represent a household as a place of exchange, like a firm, have their roots in the new home economics approach or household production model (Becker 1965; 1991). The essence of this approach is that the household behaves as if it has one set of preferences, represented by a 'household' utility function. In other words, the household is treated as if it were a 'unitary' entity. The proposition that there exists a single utility function amounts to assuming either that all household members have identical or common preferences or that there is one household member (a dictator) who determines all allocation either from pure self-interest (egoist) or from altruistic motives. This also implies that all household resources and incomes are pooled. With one set of preferences, the household maximises a single unique utility function given a set of constraints dictated by the household (money and time) budget and the available technology. The household allocates the available resources of the members to produce 'commodities' that generate utility for the household; some of these commodities are sold in the market (goods and services), some are consumed at home (leisure,

food, housekeeping), and for some no market exists at all (children). Becker also recognises the possibility of divergent interests within the household but argues, in his famous Rotten Kid Theorem (Becker 1991), that even if other family members (especially children) are selfish and want to behave in their own interests, the benevolent head (altruistic parent), because he controls the purse strings, can impose his will by altering the distribution of resources within the family.

The unified household model of Becker provided a fruitful general framework on the division of labour within the family. For the first time in the economics literature, Becker's research brought attention to the unpaid work that went on within households and introduced the possibility of some influences of one spouse upon the behaviour of others. Many recent empirical works demonstrate that individual decisions can depend in important ways upon the experiences of the spouse (Hausman and Rudd 1984; Kooreman and Kapteyn 1990; Phipps 1990). Further, the model allows for the production and consumption of household 'public' goods (such as children) and the valuation of non-market goods and services. A strong feature of the unitary model is its ability to explain two aspects of household behaviour: decisions regarding the quantity of goods consumed and the equal or unequal allocation of those goods amongst household members. Moreover, the unitary model has the advantage of simplicity — results derived for a single individual can be straightforwardly extended to the family situation along with the possibility of extending beyond individuals' behaviour to that of two individuals (spouses). Thus, inequality of outcome for individuals within the family is theoretically possible in this unitary framework. If applied wisely, the single household utility model yields interesting results, even if the underlying assumptions are criticised as unrealistic. For example, it can explain why parents prefer to send boys to school because returns to boys' education are higher than those for girls; why food when it is scarce goes to adult males because they are the prime income earners of the family; or why women concentrate on household chores because their wages outside the household is lower than that of men. It is also to be noted that the main conclusions drawn in this literature have not yet been completely challenged by the alternative approaches to interpreting family behaviour. However, the notion of 'benevolent dictator' meets with strong disapproval (Folbre 1986), and the assumption of common preference implies 'conflict within the family cannot be addressed' (Woolley 1998). While the possibility of consensus in household decisions is high in the unitary model, it is silent about the solution in a conflict situation. The unitary model of family behaviour does not explicitly deal with how the family aggregates the welfare of individual members to guide its decision-making and to determine the distribution of consumption and welfare among members within the family.

Collective Models

In contrast to the unitary or common preference approach, some recent approaches, grouped as 'collective models' by Alderman, *et al* (1995), address the question of how individual preferences lead to collective choice. They also seek to redress three perceived weaknesses of the unitary approach: that its theoretical foundations — particularly the rationale underlying the aggregation of individual preferences — are based on overly strong assumptions; that a number of empirical studies have called into question the income pooling hypothesis; and that it neglects a number of important policy handles that could alter distribution within the household. They treat the household as a collection of individuals who have heterogeneous preferences and bargain over the distribution of consumption among themselves. These collective models emphasise that individuals within households have different preferences and may experience different outcomes. Consumption depends not only on the household's total income, but also on which member earns it. In essence, the collective models recognise the existence of an independent utility function for each member within the household and the bargaining strengths of each household member in the allocation decisions.

Within the collective models, household behaviour is analysed in the context of cooperative and noncooperative frameworks, using the game theoretic approach. The 'cooperative models' assume that there exists some contract, which is binding and enforceable, while the 'noncooperative models' assume that there is no binding and enforceable contract amongst individuals within the household. In the literature, there exists two subclasses of cooperative collective models, namely, 'Bargaining' models and 'Pareto-efficient' models. In the cooperative collective models, for instance, individuals can choose either to remain single or form a household. There may be some economies of scale associated with the production of certain household goods. Though the household members have divergent preferences, it is in their own interest to maximise household production, aiming for a larger share in the distribution. Thus, the existence of household generates a surplus, which will be distributed amongst the members; however, the rules governing this distribution are the central issue of the analysis.

Bargaining or Divorce-Threat Models

A subclass of collective models, known as 'Nash bargaining' models, due to Manser and Brown (1980), McElroy and Horney (1981) and McElroy (1990), describe household behaviour as a symmetric Nash bargaining solution. The members of the household are assumed to maximise the product of the individual gains from cooperation in excess of their reservation utilities outside the household. This early cooperative bargaining approach relaxed the assumption of common preferences while retaining that of income pooling of the unitary model. They suggest that the household allocation decisions are the outcome of some bargaining

process in which the household members seek to allocate resources over which they have control to goods they especially care about. Each household member has some fall-back or threat point position (or level of utility), which itself is a function of what is called 'extra environmental' parameters (the outside option that determines how well off the member would be if cooperation fails), such as applicable divorce laws, welfare policies for single mothers, extended family support networks, and even ratio of marriageable males to females. Any utility over and above the sum of the individual threat points is shared in a cooperative solution among household members, presumably in accordance with their bargaining strengths. An improvement in the fall-back position (better outside options) would lead to an improvement of a member's relative bargaining power and hence, in the deal the person receives within the household. For example, it is argued that if a woman is able to earn a good income in the labour market, or has generous transfer available to her in the event of divorce or separation, the credibility of her 'divorce threat' will be high and this will increase her bargaining power within marriage. This places some kind of structure for the bargaining process and thus places additional restrictions on the model such as the state of the world the threat points correspond to as well as to the equilibrium concept. The main limitation of the Nash solution is that it focuses on only one, relatively arbitrary, Pareto-efficient allocation solution. Moreover, there is little about the actual process of bargaining.

Non-Cooperative or Separate Spheres Bargaining Models

The extreme irrevocable divorce threat may seem unreasonable for many stable forms of household behaviour that are not currently near the margin where dissolution would be preferred by either partner. The non-cooperative approach, developed by Ulph (1988), Kanbur and Haddad (1994), and Woolley (1998) relies on the assumption that individuals cannot enter into binding and enforceable contracts with each other within the household. Instead, individual actions are conditional on the actions of others. Threat points are determined by the level of utility that each spouse would receive from non-cooperation within marriage. With non-cooperation, each spouse decides the level of resources to allocate towards his/her responsibilities, ignoring the value the spouse attaches to having these services provided. Since the spouse's valuation is ignored, non-cooperation leads to under-provision of household public goods and services relative to the level that would exist with cooperation. This conditionality of action implies that not all non-cooperative models are Pareto optimal. However, this is not as serious as it may seem, because non-cooperative solutions can serve as threat points in cooperative models (Phipps and Burton 1995).

In between the cooperative and non-cooperative models are models that combine both approaches, developed by Lundberg and Pollak (1993) as 'separate spheres' model, and Katz (1996) as 'reciprocal claims' model, recognising the

possibility of independent activities while cooperating over the production and consumption of some joint goods and activities. For many small decisions in the household, divorce is not a credible threat should cooperation fail; rather, a credible threat would be to remain within the household but withdraw into separate spheres, defined by differentiated roles that emerge without explicit bargaining. This withdrawal option would constitute an internal threat point. However, the members can still bargain over other jointly shared goods, with the bargaining operating like a Nash cooperative game. In other words, a non-cooperative solution is used as a threat point in a cooperative game. The conflicts within the household are the intermediate processes, which possibly strengthen the bargaining power, ultimately affecting the observed household behaviour. This bargaining process introduces an intermediate non-cooperative state before dissolution is reached, which is maintained on the basis of socially sanctioned gender roles and a customary division of labour within the household. In equilibrium, the husband's and wife's utilities will depend not on total family income but on the incomes controlled separately by each spouse.

Pareto-Efficient Models

In an attempt to reconcile the differential preferences of household members, Chiappori (1988, 1992, 1997) has proposed a 'Pareto-efficient' collective model in which members allocate resources in such a way that no allocation could result in one member being better off without some other member being worse off. Thus, household decisions are always efficient, whether the household follows the common preference pattern or the bargaining approach with cooperation or not. When the household is Pareto-efficient, it is possible to design efficient 'sharing rules' (Browning, Bourguignon, Chiappori and Lechene 1994). Nothing is assumed *a priori* about the nature of the decision process, or, equivalently, location of the final outcome on the household Pareto frontier. The efficiency hypothesis is sufficient to generate strong testable restrictions upon household behaviour, without assuming any particular form of bargaining. Under the sharing rule, the family acts as though decisions were made in two stages, with total family income first divided between public goods and the private expenditures of each individual, and then each individual allocating his or her share among private goods.

Modelling Household Behaviour

Let the household consist of two individuals, a male (m) and a female (f). If they are unmarried, their separate utility functions, as in the standard neoclassical theory, are given by

$$U^m(x^m, \iota^m)$$

and

$$U^f(x^f, \iota^f)$$

where U is the utility, the x's are (market) consumption goods consumed by m and f, respectively, and the ι's refer to the consumption of leisure time. Let p's be market prices, w's be wages, T's be time endowments, and y's be non-labour (unearned) incomes of m and f. Then, the individual budget constraint can be written as

$$p^i x^i + w^i \iota^i = y^i + w^i T \qquad \text{for i=m,f}$$

The utility function is then maximised subject to individual full-income constraint, yielding the demand functions for x and ι, which are determined by the market prices, p, individual wages, w, and unearned incomes, y. Often, the labour supply (h) of an individual is the mirror image of leisure (i.e. h=1-ι). A linear approximation for the labour supply function for individuals can be written as

$$h^i = a^0 + a^1 w^i + a^2 p^i + a^3 y^i + e^i$$

where e is a random disturbance due to stochastic variation and also includes errors in measurement and functional form, and the a's are parameters to be estimated.

The Unitary Model

In the unitary model, the leisure of each working family member has been added as an argument to the unified utility function, so that the earlier model is transformed as

$$U = U(x, \iota)$$

and the household full-income constraint can be written as

$$px + w^i \iota^i = y + w^i T$$

and the resulting labour supply function can be written as

$$h^i = a^0 + a^1 w^i + a^2 p + a^3 y + e^i$$

Note that p is common for both m and f. Also, non-labour income is aggregated into $y=y^m+y^f$, implying that non-labour income has an identical effect on household demands and individual labour supply regardless of the source of non-labour income.

The Nash Bargaining Model

The constrained maximisation of individual utility functions generates indirect utility functions, $V^i(p^i,w^i,y^i;\alpha^i)$. Note that the indirect utility function includes the parameters $\alpha^{m,}$ and α^f. McElroy (1990) terms these as 'extra-household environmental parameters (EEPs).' These are variables that shift the maximum value of utility obtainable outside the household.

If m and f marry, V^m and V^f serve as threat points. Then m and f are assumed to have utility functions defined over their own and their spouse's consumption of goods and leisure, $x=(x^m,x^f, \iota^m,\iota^f)$. This gives $U^m(x)$ and $U^f(x)$. The Nash-bargained solution requires that m and f choose x and ι so as to maximise the

product of the gains from forming household, that is,

$$N \equiv [U^m(x) - V^m(p^m, w^m, y^m; \alpha^m)].[U^f(x) - V^f(p^f, w^f, y^f; \alpha^f)]$$

Maximising the gains from marriage subject to the sum of the individual full-income constraints yields demand functions for goods and leisure of the following form:

$$x^i = \Psi^i (p^m, p^f, w^m, w^f, y^m, y^f; \alpha^m, \alpha^f) \qquad i=m,f$$

$$\iota^i = \Phi^i (p^m, p^f, w^m, w^f, y^m, y^f; \alpha^m, \alpha^f) \qquad i=m,f$$

Note that $\partial\Psi^i / \partial\alpha^i \geq 0$ and $\partial\Phi^i / \partial\alpha^i \geq 0$ for I = m,f. An improvement in the extra-household environmental factors for spouse i generates an increase in his or her level of consumption and thus in his or her well-being. It is important to note that these EEPs do not appear in the unitary model of household behaviour.

Empirical Tests of Household Models

Testing the Unitary Model: There is a growing body of literature that attempts to empirically test the alternative approaches to household behaviour. This is made possible by the availability of household-level data especially in developing countries like India and the Philippines. The critical empirical testing depends on the pooling of resources. A test of pooling hypothesis requires a measure of male's and female's relative control over resources. Relative earnings would seem to be an attractive candidate for this measure, but earnings are clearly endogenous. This endogeneity problem can be avoided by testing the pooling of unearned incomes. Hence, almost all the empirical studies have used independent non-labour incomes of the male and female as a measure of resource control, and test for the equality of the effects of non-earned incomes on household decisions in evaluating the alternative models of household behaviour. Income pooling implies a restriction on family demand functions that appear simple to test: if family members pool their income and allocate the total to maximise a single objective function, then only total income will affect the demands. The fraction of income received or controlled by individual members should not influence demands, conditional on total family income. For example, consider the individual supply of labour. It is generally assumed that increases in non-labour income increase the demand for leisure and non-market time and reduce the time supplied to the labour market. The unified approach to family demands and labour supply consequently assumes, because of the pooling of resources and allocation by common preferences, that the demand effects of non-labour income would be identical regardless of the individual status in the family, or that the distribution of non-labour income by personal resource would not affect family coordinated demand and labour supply behaviour. However, a growing body of literature provides considerable justification for plausibly rejecting the unitary model, or at least for 'shifting the burden of proof' on those defending it (Alderman *et al* 1995). The claim is usually on the ground that male and female

non-labour incomes do not exert the same influence on household behaviour, especially on labour supply, consumption and investment in children (Schultz 1990; Thomas 1990; Browning *et al* 1994; Bourguignon *et al* 1992; Phipps and Burton 1998; Haddad and Hoddinott 1994; Hoddinott and Haddad 1995; Fortin and Lacroix 1997). Many studies find that children appear to do better when their mothers control a large fraction of household resources.

Empirical tests of income pooling, using data from a variety of countries, show that income controlled by the husband and wife have significant and often substantially different effects on household behaviour, whether measured by expenditure on categories of goods or by outcomes such as child health. Schultz (1990) uses micro data from Thailand and rejects the prediction of the unitary model that male and female non-labour incomes should have identical effects on household labour supply. Thomas (1990) uses micro data from Brazil to show that non-labour incomes of husband and wife have different effects on family health; the effect of mother's non-labour income on child survival probabilities is almost twenty times that of father's income. Haddad and Hoddinott (1992, 1994) use the data from Cote d'Ivoire and find that the proportion of total cash income received by the mother increases the budget share of food, reduces the budget share of alcohol and cigarettes, and also increases boy's height for age (a measure of health) relative to girls. Phipps and Burton (1998), using micro data from Canada, find that the hypothesis that an additional dollar of male and female is allocated in the same way must be rejected for seven out of twelve broad expenditure categories; increase in wife's income relative to husband's income has been shown to be associated with greater expenditures on restaurant meals, child care and women's clothing, and with reduced expenditures on alcohol and tobacco. Bourguignon *et al* (1992) for Canada find that the wife's share of private non-durable consumption increases with an increase in her share of income or with an increase in her age relative to her spouse's.

Both Bourguignon *et al* (1993) and Fortin and Lacroix (1997) reject the assumption of the unitary framework that income is pooled. Phipps and Burton (1995), using Canadian data, find that country-specific institutional variables do affect individual behaviour (such as labour force participation of married women), and hence, reject the unitary framework. Thus, there is now growing evidence that relative incomes of husband and wife affect the pattern of consumption within families in ways that will alter the distribution of well-being. There exists the potential for different levels of well-being among men, women and children living together in households, given large differences in access to income. Phipps and Burton (1995) refer to certain studies that analyse the 'within household' inequality (not necessarily economic), based on simulation, case study and survey data to show that the distribution of resources within the household is unequal. However, the rules governing this differential distribution are contentious.

Testing the Collective Models: There is now so much negative evidence that most people would agree that it is no longer appropriate to conduct policy analyses, with the assumption that households composed of more than one individual can be treated as a single unit. A growing body of literature rejects the Becker's hypothesis of income pooling within the household. A small set of papers moves beyond rejecting the unitary models and attempts to test the implications of the collective models. All collective models of household behaviour assume that individuals within the household have distinct preferences. However, the cooperative Nash bargaining model assumes that the household cooperatively maximises a product of the individual's gains in their utility compared with the utility available outside the household. The existence of some form of reservation utility establishes a threat point or lower limit for consumption allocation to the members of the household. The dependence on the Nash bargaining solution is critical for empirical testing: household demands depend not only on prices and total family income but also on the determinants of threat point, such as extra-environmental parameters. In the non-cooperative or separate spheres bargaining model, the threat point is internal to the marriage, not external as in divorce-threat bargaining models. The internal threat or separate spheres bargaining generates demands that depend not on who receives income after divorce but on who receives (and controls) income within marriage.

Empirically, it has been argued that women and men have different preferences as regards children, and as women care more about the health, education and well-being of children, women will seek to allocate more resources towards improving child health than men. The tests come from the intra-family allocation of resources among the sexes of children in the household. A theoretically more compelling test of the hypothesis of different preferences of household members might examine the impact on intra-household allocation of exogenous individual-level characteristics, which are plausibly related to any income sharing rule. Thus, all collective models also share the idea that control of market income may influence decision-making power within the household, and hence, observable behaviour such as expenditure patterns or labour supply. Much of the empirical research in this area has attempted to determine whether or not income sources affect behavioural outcomes. Most studies that have attempted this strategy have used non-labour income (or the value of independent assets) as an indicator of control over resources. In principle, non-labour income is intended to capture exogenous differences across persons in their budget constraints that do not also induce a change in money and time prices of various types of consumption or behaviour. In practice, non-labour income arising out of rents, capital gains, inheritance and dowry can be viewed as exogenous at the start of household formation. Non-labour income controlled by individual members is expected to raise the threat point of the

member; it leaves the member less dependent on the household's common resources. The bargaining power of the wealthier member is thus strengthened, and this potentially changes the distribution of consumption within the household.

Bourguignon *et al* (1993), using French data and a reduced form test, focusing on household expenditures, are unable to reject the very general Pareto-efficient collective model. Fortin and Lacroix (1997), in a structural test using Canadian data and focusing on household labour supply decisions, are also unable to reject the Pareto-efficient model. Phipps and Burton (1995) are unable to reject the predictions of cooperative Nash bargaining models — both divorce threat and separate spheres bargaining models. Hoddinott and Adam (1998), using the Canadian time series data on divorce law reforms — reforms that led to improvements in women's expected settlement upon divorce — find evidence consistent with Nash-bargained models of household behaviour but not with the unitary model. The findings of Thomas (1990), Hoddinott and Haddad (1995) and Doss (1996) that enhanced female nonhuman capital increases allocations of family resources on children are consistent with the claim of collective models that women care more about and invest much more on children than do men. It has also been noted in a number of studies that increments in women's non-labour income and increments in men's non-labour income have a tendency to augment health and educational investments in children, but the effect of women's non-labour income tends to be larger than that of men's (Schultz 2001).

Chiappori (1992) demonstrates that Pareto efficiency implies, and is implied by, the existence of an income sharing rule. He demonstrates that it is possible to deduce the income sharing rule, up to a constant factor, from the observed demands for those goods that can be assigned to an individual in the household (for example, male and female adult clothing), on the assumption that one's own consumption is weakly separable from that of other household members. Browning *et al* (1994) show that empirically testable restrictions on the sharing rule, which is affected by prices and total household income, can be obtained that are similar to the matrix of income-compensated responses to prices and wages obtained in the unitary demand model, i.e., Slutsky equations. Even in the absence of assignable goods, Pareto-efficiency, which is an income sharing rule, implies that household commodity demands depend not on total non-earned income but on its distribution within the household. Given that non-earned income is exogenous, the non-earned income attributed to the husband will not have the same impact on the commodity demands as non-earned income attributed to the wife. But, according to the common preference model, re-arranging the distribution of non-earned income within the household will have no impact on household commodity demands. Thus, testing for the effects of non-earned incomes of males and females on household decisions has become an important empirical strategy in evaluating alternative models of household behaviour.

The Data and Empirical Analysis

This paper utilises the primary survey data collected during 1994–95. The original aim of the survey was to analyse the household financing of their children's higher education. For this purpose, a sample of 2,502 students enrolled in the first year of their college education during 1994–95 from a sample of 63 colleges has been selected out of a total of 96,688 students and 350 colleges. The data were collected from both rural and urban households, with representations for various occupational, religious, social, community and regional aspects. The data contain a wealth of information, besides costs and financing of school and college education, on family backgrounds, including parental education, occupation, hours of work, earnings, household income and expenditure on various items, and household land and assets. Special information about the female non-labour income for 126 women is also available in this data. Hence, in this paper, we utilise this information to test the unitary *versus* collective models of household behaviour.

In the empirical analysis, our primary objective is to test whether the household decisions are based on the common preference approach or the separate utility functions approach. Following the literature, we assume that if women have separate non-labour income, their participation in the decision-making process will be enhanced positively. Hence, female non-labour income is expected to have a greater influence on those decisions in which the female has a say. Hence, in the empirical analysis we identify five household decision variables, namely, male labour supply, female labour supply, household expenditure on food consumption, household expenditure on children's education, and household expenditure on health of family members as the dependent variables. We use the pooled non-labour income and separate male and female non-labour incomes as the main explanatory variables for testing the competing models in a simple regression analysis. The pooled non-labour income is defined as the sum of rental income and any farm income. In the unitary framework, the effect of pooled non-labour income on household decisions is analysed. In the collective models, the effects of independent male and female non-labour incomes on household decisions are analysed separately. Table 1 presents the descriptive statistics of the variables used in the analysis. The mean values reveal that most of the male characteristics are more dominant than the female characteristics. However, females also have sizeable non-labour income. The results also show that a sizeable proportion of both men and women are in the service/clerical sector compared with the professional category. The annual household expenditures on food, children's education and health are also substantial.

Tables 2–6 present the OLS estimates of the determinants of the above-mentioned household decisions. Two alternative specifications, one, using male and female wage rates and the other, using household income, are used in the

Table 1: Descriptive Statistics of the Variables

Variable	Description	Mean	S.D
MWOR	Male market work (hours/day)	8.30	1.55
FWOR	Female market work (hours/day)	7.70	1.56
EXPF(x100)	Household expenditure on food (Rs./annum)	261.46	192.15
EXPE(x100)	Household expenditure on education (Rs./annum)	211.18	219.59
EXPH(x100)	Household expenditure on health (Rs./annum)	38.13	59.44
MEDU	Male education (years)	14.87	3.41
FEDU	Female education (years)	12.28	3.25
MAGE	Male age (years)	49.67	4.84
FAGE	Female age (years)	43.80	4.54
MWAGE	Male wage rate (Rs./day)	211.21	151.74
FWAGE	Female wage rate (Rs./day)	80.33	87.53
INCOM (x100)	Household earned income (Rs./annum)	893.25	636.96
NLI (x100)	Household non-labour income (Rs./annum)	285.36	398.90
MNLI (x100)	Male non-labour income (Rs./annum)	284.18	395.24
FNLI (x100)	Female non-labour income (Rs./annum)	170.33	203.56
LAND	Household ownership of land (acres)	9.29	11.35
MPROF	If male is a professional =1, 0 otherwise	.46	.50
MSER	If male is a clerk/serviceman =1, 0 otherwise	.44	.50
MPVTS	If male is a private sector worker =1, 0 otherwise	.38	.49
MPUBS	If male is a public sector worker =1, 0 otherwise	.52	.50
FPROF	If female is a professional =1, 0 otherwise	.03	.18
FSER	If female is a clerk/service woman =1, 0 otherwise	.21	.41
FPVTS	If female is a private sector worker =1, 0 otherwise	.08	.27
FPUBS	If female is a public sector worker =1, 0 otherwise	.16	.37
N	Sample size	126	

empirical analysis. Tables 2 and 3 present the results of the regression analysis of the determinants of male and female labour supply. Both are measured in terms of hours of market work per day. The variable NLI (household pooled non-labour income) is negative and statistically insignificant in both male and female labour supply equations. The results are in line with the conventional household approach, showing the negative influence of pooled non-labour income of the household on labour supply of decisions of males and females. However, the inclusion of separate measures of independent non-labour income shows mixed results. The coefficient of MNLI (male non-labour income) is negative and significant at the 10 per cent level in the male labour supply equation, while it is positive and insignificant in female labour supply equation. The FNLI (female non-labour income) is positive in male labour supply equation and negative in female labour supply equation, but

insignificant in both labour supply equations. Thus, own non-labour income effects are negative, but cross-effects are positive. The inclusion of household income, replacing the wage rates, shows a positive and significant influence of income on household decisions. The NLI is positive and significant at the 10 per cent level in the male labour supply equation and negative and insignificant in the female labour supply equation. The independent male non-labour income is negative and significant at the 5 per cent level in the male equation, but positive and insignificant in the female equation. The FNLI is positive and insignificant in both labour supply equations. Thus, male non-labour income has some influence on decisions, while female non-labour income has no influence on spousal labour supply decisions. These results imply that the independent female and male non-labour incomes have very little influence on the female labour supply decision, supporting the common preference or unitary household model.

Table 2: Regression Results for the Male Hours of Market Work

Variable	Unitary Model		Collective Model	
MEDU	0.108*** (1.90)	0.075 (1.28)	0.102*** (1.78)	0.069 (1.17)
FEDU	0.030 (0.58)	0.010 (0.20)	0.035 (0.67)	0.016 (0.31)
MAGE	0.055 ** (2.46)	0.056** (2.53)	0.057** (2.53)	0.057** (2.60)
FAGE	-0.116** (2.26)	-0.128** *(2.55)	-0.111** (2.17)	-0.120** (2.38)
MPVTS	3.03* (6.15)	3.113* (6.34)	3.093* (6.24)	3.204* (6.50)
FPVTS	-0.231 (0.28)	-0.176 (0.21)	-0.233 (0.27)	-0.195 (0.24)
MSER	1.370* (2.96)	1352* (2.96)	1.328* (2.86)	1.330* (2.93)
FSER	0.442 (0.06)	0.351 (0.61)	0.460 (0.79)	0.299 (0.52)
LAND	-0.003 (0.16)	-0.021 (0.98)	-0.011 (0.47)	-0.030 (1.32)
MWAGE	0.003 (1.38)	-	0.003 (1.49)	-
FWAGE	0.011 (1.26)	-	0.008 (0.81)	-
INCOM	-	0.0009** (2.30)	-	0.0009** (2.32)
NLI	-0.0008 (1.44)	0.0009*** (1.74)	-	-
MNLI	-	-	-0.002*** (1.78)	-0.002** (2.25)
FNLI	-	-	0.0004 (0.31)	0.0004 (0.35)
Constant	6.375* (2.72)	6.994* (3.02)	6.035** (2.55)	6,460* (2.77)
R Square	0.48	0.48	0.49	0.49
F	8.85	9.90	8.28	9.32

Figures in parentheses indicate absolute t values.

* significant at 1 per cent level.

** significant at 5 per cent level. *** significant at 10 per cent level.

Table 3: Regression Results for the Female Hours of Market Work

Variable	Unitary Model		Collective Model	
MEDU	-0.037 (0.56)	-0.101 (1.50)	-0.036 (0.54)	-0.106 (1.55)
FEDU	0.215* (3.76)	0.195* (3.34)	0.214* (3.71)	0.198* (3.40)
MAGE	-0.029 (1.15)	-0.028 (1.08)	-0.030 (1.15)	-0.027 (1.05)
FAGE	0.168* (2.94)	0.148* (2.58)	0.167* (2.90)	0.154* (2.66)
MPVTS	-0.395 (0.70)	-0.362 (0.64)	-0.409 (0.72)	-0.294 (0.51)
FPVTS	5.50* (6.05)	5.848* (6.50)	5.50* (6.02)	5.817* (6.46)
MSER	0.731 (1.40)	0.731 (1.41)	0.740 (1.41)	0.710 (1.36)
LAND	-0.029 (1.15)	-0.052** (2.03)	-0.027 (1.03)	-0.058** (2.18)
MWAGE	-0.002 (0.95)	-	-0.002 (0.96)	-
FWAGE	0.031* (3.12)	-	0.032* (2.97)	-
INCOM	-	0.002* (2.86)	-	0.002* (2.85)
NLI	-0.0004 (0.67)	-0.0008 (1.30)	-	-
MNLI	-	-	0.0002 (0.32)	0.002 (1.55)
FNLI		-	-0.0007 (0.49)	0.0001 (0.10)
Constant	-6.320** (2.39)	5.386** (2.03)	-6.240* * (2.33)	5.744** (2.14)
R Square	0.48	0.47	0.48	0.48
F	9.69	10.44	8.81	9.54

Figures in parentheses indicate absolute t values.
* significant at 1 per cent level.
** significant at 5 per cent level. *** significant at 10 per cent level.

The regression estimates of the household expenditure on food, education and health are presented in Tables 4, 5 and 6. It has been argued in the literature that if female has control over resources, she will allocate more resources to the welfare of the family, especially to that of children as she cares more about them. In all the three household expenditure estimations, the effect of pooled non-labour income is positive and statistically significant at the 1 per cent level. The effect of independent male non-labour income is positive and highly significant in all the equations. Under the collective model approach, the effect of independent female non-labour income is negative in education and positive in health expenditure equations, and insignificant in both equations. However, the female non-labour income is positive and significant at the 5 per cent level only in the case of household food expenditure. Moreover, both the non-labour income variables, unlike the labour supply estimates, have the same positive effect, except the female non-labour income in the household education expenditure equation. Female influence on the allocation of household resources is observed only in the case of food expenditure. The inclusion of household income in the place of wage rates shows mixed results. It is, though positive in all decisions, significant only in the case of household food expenditure. The pooled non-labour income is positive and statistically significant at the 5 per cent level in all specifications. While the effect of male non-labour income is positive and significant at the 5 per cent level in all household decisions, female non-labour

Table 4: Regression Results for Household Expenditure on Food

Variable	Unitary Model		Collective Model	
MEDU	9.972** (2.22)	6.149 (1.35)	9.953** (2.20)	6.189 (1.35)
FEDU	-0.429 (0.11)	-1.450 (0.37)	-0.414 (0.11)	-1.486 (0.38)
MAGE	-0.810 (0.46)	-1.021 (0.60)	-0.806 (0.45)	-1.028 (0.60)
FAGE	2.490 (0.62)	2.795 (0.72)	2.504 (0.62)	2.744 (0.70)
MPVTS	-34.450 (0.89)	-23.438 (0.62)	-34.256 (0.87)	-23.987 (0.63)
FPVTS	-4.128 (0.06)	0.020 (0.01)	-4.103 (0.06)	0.136 (0.01)
MSER	-43.556 (1.20)	-25.750 (0.73)	-43.688 (1.20)	-25.625 (0.73)
FSER	8.480 (0.18)	-21.058 (0.48)	8.537 (0.19)	-20.749 (0.47)
LAND	-1.407 (0.82)	2.332 (1.36)	-1.430 (0.80)	-2.282 (1.28)
MWAGE	-0.108 (0.73)	-	-0.107 (0.72)	-
FWAGE	-0.401 (0.57)	-	-0.411 (0.55)	-
INCOM	-	0.081** (2.53)	-	0.081** (2.52)
NLI	0.192* (4.52)	0.141* (3.28)	-	-
MNLI	-	-	0.190* (3.14)	0.146** (2.43)
FNLI	-	-	0.196** (2.08)	0.133 (1.55)
Constant	50.53 (0.27)	44.507 (0.25)	49.46 (0.27)	47.698 (0.26)
R Square	0.26	0.29	0.26	0.29
F	3.31	4.30	3.03	3.90

Figures in parentheses indicate absolute t values.
* significant at 1 per cent level.
** significant at 5 per cent level. *** significant at 10 per cent level

income is statistically insignificant in all equations, though positive in food and health specifications, but negative in the education expenditure equation. Thus, the implication of the collective model that male and female non-labour income of the spouses will have opposite effects on the household resource allocation patterns has not been supported by these data.

Conclusions

To economists, until fairly recently, the family remained largely a 'black box' — they could analyse the behaviour of 'the family' rather than 'the individuals within the family'. Getting inside the family is high and the real challenge to a complete understanding of the family is to develop theoretical and empirical tests that would account for 'affiliation' — the presence (or absence) of which is central to well-being within the family. Increasing empirical evidence suggests that the family should be approached as a collection of individuals with heterogeneous preferences rather than as a collection of individuals with homogeneous or common preferences. The significance of independent preferences is that it increases the

Table 5: Regression Results for the Household Expenditure on Education

Variable	Unitary Model		Collective Model	
MEDU	1.752 (0.32)	1.083 (0.19)	2.568 (0.47)	1.731 (0.31)
FEDU	5.375 (1.11)	5.145 (1.06)	4.731 (0.98)	4.565 (0.94)
MAGE	1.011 (0.47)	1.003 (0.47)	0.810 (0.38)	0.883 (0.42)
FAGE	0.852 (0.17)	0.746 (0.16)	0.211 (0.04)	-0.075 (0.02)
MPVTS	-95.120** (2.02)	-93.814** (2.01)	-103.570** (2.21)	-102.647** (2.18)
FPVTS	-43.601 (0.55)	-41.804 (0.53)	-44.710 (0.57)	-39.950 (0.51)
MSER	-51.122 (1.16)	-49.800 (1.15)	-45.292 (1.03)	-47.816 (1.10)
FSER	29.361 (0.53)	27.481 (0.50)	26.840 (0.49)	32.410 (0.60)
LAND	0.122 (0.06)	-0.095 (0.05)	1.126 (0.53)	0.702 (0.32)
MWAGE	-0.014 (0.08)	-	-0.044 (0.25)	-
FWAGE	0.134 (0.15)	-	0.615 (0.69)	-
INCOM	-	0.015 (0.37)	-	0.014 (0.36)
NLI	0.118** (2.30)	0.111** (2.09)	-	-
MNLI	-		0.200* (2.75)	0.184** (2.50)
FNLI	-		-0.040 (0.76)	-0.019 (0.18)
Constant	66.612 (0.30)	72.173 (0.33)	113.67 (0.51)	123.122 (0.55)
R Square	0.17	0.17	0.18	0.19
F	1.95	2.16	2.02	2.17

Figures in parentheses indicate absolute t values.
* significant at 1 per cent level.
** significant at 5 per cent level. *** significant at 10 per cent level.

Table 6: Regression Results for the Household Expenditure on Health

Variable	Unitary Model		Collective Model	
MEDU	0.867 (0.59)	0.546 (0.36)	0.980 (0.66)	0.677 (0.44)
FEDU	2.622** (1.99)	2.575** (1.96)	2.533*** (1.91)	2.458***(1.85)
MAGE	-0.930 (1.60)	-0.973*** (1.68)	-0.957 (1.64)	-0.998*** (1.72)
FAGE	1.064 (0.81)	1.232 (0.94)	0.977 (0.74)	1.067 (0.81)
MPVTS	0.037 (0.01)	1.544 (0.12)	-1.190 (0.10)	-0.225 (0.02)
FPVTS	-13.812 (0.65)	-14.495 (0.68)	-13.964 (0.65)	-14.122 (0.66)
MSER	-6.160 (0.52)	-3.064 (0.26)	-5.363 (0.44)	-2.664 (0.22)
FSER	-8.540 (0.57)	-14.100 (0.95)	-8.884 (0.58)	-13.105 (0.88)
LAND	-0.117 (0.21)	-0.150 (0.26)	0.020 (0.04)	0.011 (0.02)
MWAGE	-0.010 (0.21)	-	-0.014 (0.29)	-
FWAGE	-0.221 (0.96)	-	-0.155 (0.63)	-
INCOM	-	0.007 (0.07)	-	0.006 (0.60)
NLI	0.037* (2.65)	0.031** (2.10)	-	-
MNLI	-		0.048** (2.42)	0.045** (2.25)
FNLI	-		0.015 (0.50)	0.004 (0.15)
Constant	-7.356 (0.12)	-13.694 (0.23)	-.933 (0.02)	-3.416 (0.06)
R Square	0.16	0.16	0.17	0.17
F	1.90	2.01	1.80	1.94

Figures in parentheses indicate absolute t values.
* significant at 1 per cent level.
** significant at 5 per cent level. *** significant at 10 per cent level.

role of a member in household decisions and hence on the allocation of resources. Following the tradition of using the extent of independent non-labour income of the female as a measure of the independence and control of females over family resources, which increases her bargaining power, this paper has empirically tested the unitary and bargaining approaches in the Indian context. The results of this paper could not conclusively reject or support either the unitary model or the bargaining model. As Alderman *et al* (1995:15) observe: 'Becker (1965) wrote: "A household is truly a "small factory": it combines capital goods, raw materials, and labour to clean, feed, procreate, and otherwise produce useful commodities". And 'We too perceive the household as a factory, but like all factories, it consists of individuals who — motivated at times by altruism, at times by self-interest, and often by both — cajole, co-operate, threaten, argue, support, and, occasionally walk out on each other.' The empirical testing of unitary *versus* collective models of this study shows that the pooled non-labour income influences male and female labour supply decisions differently. Similarly, the effect of independent female non-labour income on household expenditure on education, health and food is weak, while the effect of male non-labour is somewhat stronger. Thus, the independent non-labour income of the female has very little influence on most of the household decisions, while the effect of the independent non-labour income of the male on most of the household decisions is positive and strong. The empirical results seem to indicate that, in the Indian family context, female independent non-labour income is insignificant and may not have a significant influence on female's bargaining strengths and her control over household resource allocation decisions. Hence, the collective or bargaining models of household behaviour have limited scope in India. Rather, as Katz (1996:16) argues, 'unitary, cooperative, noncooperative, and "collective" decision-making rules may all coexist in the same household,' varying by the type of resource and expenditure.

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Fiscal Distress in Karnataka: Some Issues

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Abstract

Fiscal stress in Karnataka has been on the increase in the late nineties. This is the outcome of a fall in the revenue resources of the State government coupled with unbridled revenue expenditure. As a result, the State, which had achieved revenue surplus in the mid-nineties, has relapsed into revenue deficit. The paper delineates the fiscal situation in Karnataka and factors responsible for the growing fiscal stress by using an inter-state analysis of fiscal indicators as well as the State's own indicators over time. The paper addresses, in particular, the growing fiscal costs as well as issues associated with industrial incentive schemes in the State during the reform phase.

Introduction

Fiscal stress in Karnataka has been on the increase in the late nineties. This is the outcome of a fall in the revenue resources of the State government coupled with unbridled revenue expenditure. As a result, the State, which had achieved revenue surplus in the mid-nineties, has relapsed into revenue deficits, which have also been on the increase. There are serious concerns on the expenditure front such as rapid growth in the revenue expenditure at the cost of capital investments, especially in the areas of economic infrastructure. Diversion of borrowed funds to current consumption has resulted in an erosion of capital expenditure and further of the gross capital formation from budgetary sources. The state government is also experiencing grave problems on the revenue front. According to the first report of the Tax Reforms Commission (Government of Karnataka 2001a), the State experienced a fall in tax buoyancy during the reform phase compared with the pre-reform phase. Reflecting in particular on the slow growth in sales tax revenue, which is an important source of revenue for the State government, the report observes that industrial incentives and concessions are major factors. Fiscal cost on account of industrial incentives and concessions is observed to have increased substantially during the reform phase in Karnataka (Gayithri 2004). The resource position has been adversely affected also because of the small and declining non-tax revenue and growing implicit subsidies (Rao 2003).

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The State government has been attempting to revive its finances and strengthen the fiscal position through a varied set of measures. These include announcement of a Medium Term Fiscal Plan (MFTP) to phase out the revenue and fiscal deficits in a phased manner. Despite this, the expenditure continues to grow unbridled and revenue receipts continue to reveal sluggish growth. Thus, it appears that meeting the set targets of deficit reduction in the medium-term fiscal frame is a tough task.

Against this background the present paper attempts to discuss the fiscal situation in Karnataka and analyse the factors responsible for the growing fiscal stress in the State with a special focus on fiscal costs and industrial incentives in Karnataka.

Fiscal Indicators in Karnataka *vis-à-vis* Other States

Karnataka has proved to be a fast reforming state that has been trying to implement reforms as and when mooted at the national level[1]. The fiscal position in the State compares well with that of the southern states as well as the all-states average. This is clear from the information on various fiscal indicators presented in Tables 1 and 2. The size of the fiscal and revenue deficits has been lower than in the other states during all the time points with the exception of 1999–2000.

The State also reveals a better picture, although there are signs of deterioration across all the states, on both revenue and expenditure fronts (Table 2). The deterioration issue is addressed later in the paper. Revenue deficit as a proportion of Gross Fiscal Deficit (GFD) is lower than the all-states average for all the time points presented. Further, the State has a better capital outlay level in the GFD. The other important expenditure indicators such as the proportion of interest payments in the revenue expenditure and that of non-development expenditure in the aggregate disbursements also place Karnataka in a better position. On the resource front, while Karnataka has all along performed better than other states in terms of tax revenue as a proportion of revenue expenditure, its performance in terms of non-tax revenue does not compare favourably with that of other states.

These so-called favourable trends observed in the State should not, however, lead to complacency as the fiscal distress has been on the increase in the State, especially during the reform phase. Nevertheless, the fact remains that distress in other states has grown even more, and is evident from Tables 1 and 2.

Growing Fiscal Distress in the States

Fiscal deficit in Karnataka has increased from 2.7 per cent of NSDP in 1990–91, the lowest among all the southern states, to 5 per cent of NSDP in 1999–2000, the highest among the southern states (Table 1). Karnataka, in fact, compared very well with these states until the year 1998–99, which implies that the fiscal stress got aggravated in the recent past.

Table 1: Fiscal Deficit in Southern States

(As percentage of NSDP)

Year	Andhra Pradesh	Karnataka	Kerala	Tamil Nadu	All States
1990-91	3.2	2.7	6.6	4.1	3.3
1991-92	2.93	3.15	4.39	3.57	2.9
1992-93	3.77	4.36	3.52	4.12	2.8
1993-94	3.55	3.39	3.92	2.63	2.4
1994-95	3.80	3.31	3.82	2.44	2.7
1995-96	3.37	2.91	3.69	1.79	2.6
1996-97	2.83	2.27	4.98	3.05	2.7
1997-98	3.71	2.38	4.41	3.30	2.9
1998-99	5.5	4.1	5.3	4.5	4.2
1999-00	4.5	5	NA	4.7	4.7

Source: Various issues of *RBI Bulletin* and *CMIE Public Finance Statistics*

The situation has become all the more grim on account of the fact that the revenue deficit, which constituted 11.2 per cent share of the gross fiscal deficit for the period 1993–95, increased rapidly to 54.4 per cent of the gross fiscal deficit by 1999–2000. The State, however, compares well with the non-special category states wherein it had constituted 30 per cent and 60 per cent respectively during this period. The State is also experiencing a growing burden on account of interest payments, dwindling capital expenditure, mounting debt, etc. (Table 2).

Trends in Karnataka State Finances

Growing Deficits

Fiscal imbalances in the State finances as indicated by the fiscal, primary and revenue deficits are not of recent origin. Graph 1, depicting the trends in these deficit levels as a proportion of GSDP from 1980–81, reveals that although fiscal and primary deficit levels were high in 1984–85, they were on the decline until 1990–91.They did show some fluctuations during the reform phase but were on the increase, thus, revealing that the situation worsened during the reform phase.

On the other hand, the State had a comfortable position on the revenue account. Revenue receipts exceeded revenue expenditure. As a result there was revenue surplus. This situation continued until 1983–84, after which the State government has been experiencing mounting revenue deficits, with the exception of two or three years in between. The increase has been very sharp since 1998–99, an impact of the pay revision effected by the Fifth Pay Commission. Sales tax revenue, which constitutes a large share of the State's revenue, too decelerated in

Table 2: Karnataka's Major Fiscal Indicators

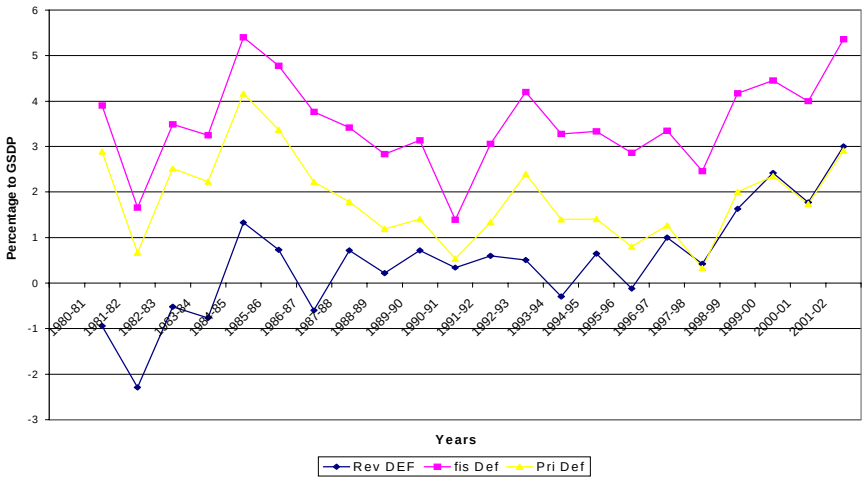
	Karnataka					
Year	**RD/GFD**	**Capital Outlay/ GFD**	**Non Development Expenditure/Total Disbursement**	**Interest Payments/ Revenue Expenditure**	**State Own Tax Revenue/ Revenue Expenditure**	**State Own Non-Tax Revenue/ Revenue Expenditure**
1991-92	NA	85.63	22.98	10.39	58.54	12.54
1992-93	NA	56.76	24.21	10.62	55.40	14.35
1993-94	-9.28	94.73	23.83	11.56	61.41	11.82
1994-95	19.57	75.15	26.22	12.00	59.04	11.67
1995-96	-4.27	85.15	25.90	12.35	62.18	14.57
1996-97	29.78	59.26	26.21	11.84	56.54	13.16
1997-98	17.20	75.16	28.70	12.80	58.88	11.61
1998-99	46.23	51.02	29.76	12.49	53.67	10.38
1999-00	54.37	41.61	30.21	13.21	50.84	10.58
2000-01	44.14	46.14	28.89	14.31	54.20	9.95
			All States			
1991-92	29.90	53.42	24.92	13.32	41.49	14.74
1992-93	24.48	51.00	26.66	14.41	41.44	13.39
1993-94	18.51	60.46	28.05	15.13	42.44	14.23
1994-95	22.23	62.65	30.28	15.83	43.39	16.86
1995-96	26.10	58.85	30.89	15.86	44.04	15.79
1996-97	43.26	47.08	30.37	15.14	42.08	13.93
1997-98	37.10	51.80	31.06	16.13	43.52	13.09
1998-99	58.78	35.02	31.43	16.08	40.73	10.72
1999-00	58.81	27.89	33.85	17.31	39.30	11.45
2000-01	59.83	34.77	34.26	17.74	40.47	10.79

Note: RD = Revenue Deficit; GFD = Gross Fiscal Deficit; NTR = Non-Tax Revenues
Source: RBI (2002). *State Finances: A Study of Budgets of 2001–02 and 2002–03*. Mumbai: RBI.

the late nineties on account of revenue loss owing to industrial incentives. These aspects are dealt with at length later

Fiscal deficit too improved during the period 1993–94 to 1997–98 when the deficit was on the decline. However, the State has fallen back into high fiscal deficit level from 1998–99. The deficit reached an all-time high of 5.36 per cent in 2001–02. This is despite the various reform measures introduced in the State.

Graph 1: Deficit Levels in Karnataka



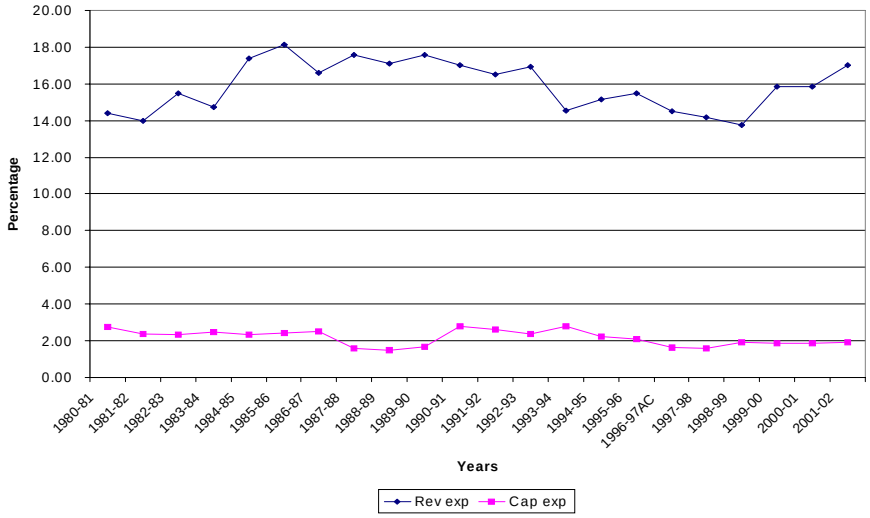
Expenditure Trends

Trends in public expenditure as a proportion of GSDP, especially during the reform phase, suggest that the proportion of money spent on the revenue account has been far higher than that of capital expenditure all along. However, the trend graph (Graph 2) clearly reveals that a sharp increase, which had occurred in 1984–85, resulted in a higher level of revenue expenditure thereafter. This reflects the fact that, by and large, a huge component of revenue expenditure is committed in nature such as salaries, pension payments, interest payments, etc. Hence, any reduction in such expenditure is possible only when the level of commitment itself is reduced. No amount of tinkering at the surface can improve the situation or, in other words, reduce the level of expenditure. An added cause for worry is that the State government has not been in a position to meet this expenditure from the revenue receipts, which normally should have been the case. This inability, however, is not of recent origin, but dates back to the mid-eighties. This growing expenditure is met out of the borrowed funds basically meant for capital investments. As a consequence of the diversion of borrowed funds, the State has been suffering from inadequate capital investments and there has been a shortage of economic infrastructure. This also results in an additional burden in the form of growing interest payments on the revenue account. The graph clearly shows that capital investments have been abysmally low, marked by sharp declines during the periods 1987–88 to 1989–90, 1991–92 to 1992–93 and the period after 1993–94. This clearly reveals that the State government is tiding over its fiscal crisis by increasingly cutting down on capital investments.

This deals a big blow to the economy, which is already reeling under severe infrastructure inadequacy. In addition to this is the problem faced by the

State in the slow growth of private investment. It is observed that severe infrastructure bottlenecks are largely responsible for slow growth in private investment. There is an urgent need to address these issues, as unless the industry in the State becomes globally competitive, it cannot survive the fierce global competition. The State has to step up capital investments in the direction of social and economic infrastructure.

Graph 2: Revenue and Capital Expenditure in Proportion to GSDP



Rapid growth in public expenditure cannot be treated as an evil. Instead, it may help in augmenting the overall development. Some idea about the nature of government expenditure is obtained when the items of expenditure are studied under certain meaningful categories such as functional and economic categories.

The share of social and community services and economic services in the State's GSDP exceeded that of general services until the late nineties (Graph 3). The share of State's expenditure under economic services in GSDP was the highest and on the increase until 1990–91, after which it has been, by and large, on the decline, reaching its lowest level in 2001–02 (Table 3).

Social services also reveal a similar pattern as that of economic services, wherein there is an increase in the percentage share in the first period and a decline in the second period. The social sector, in particular, essential sectors such as primary education, health care and rural development, need to be given increased attention since the private sector plays a limited role in these sectors. On the contrary, the proportion of general services, termed non-development expenditure, has increased from 4.11 per cent (1980–81) to 6.33 per cent (2003–04). Within general services the items that have increased sharply are interest payments, pension and retirement benefits and administration of justice.

Table 3: Expenditure Indicators

(% of GSDP)

Particulars	1980-81	1985-86	1990-91	1995-96	1999-00	2001-02	2003-04 (B.E)
Revenue expenditure	14.41	18.12	17.02	17.82	15.84	17.00	16.58
Development expenditure	12.37	14.43	18.23	13.54	11.66	12.68	12.31
Social services	5.56	7.04	6.67	6.53	6.09	6.07	5.80
Economic services	6.81	7.39	7.65	7.01	5.57	6.61	6.51
General services	4.11	5.59	5.03	5.23	5.60	5.68	6.33
Interest payments	1.00	1.40	1.87	2.05	2.09	2.45	2.74
Wage bill	4.24	4.88	5.66	4.86	NA	4.59	4.21
Pension	0.69	0.82	1.12	1.09	NA	1.50	1.56
Subsidies (of which)	NA	NA	0.17	1.18	NA	2.73	1.88
Power	NA	NA	NA	0.50	NA	2.10	1.56
Transport	NA	NA	NA	0.07	NA	0.13	0.06
Irrigation	NA	NA	NA	NA	NA	NA	NA
Food	NA	NA	NA	0.12	0.37	0.19	0.13
Other subsidy	NA	NA	0.13	0.07	0.23	0.31	0.17
Capital expenditure	2.76	2.40	2.81	2.43	2.69	1.92	2.69
Total expenditure	17.17	20.52	19.83	20.25	18.53	18.92	19.27

Note: NA**:** Not Available

Source: Government of Karnataka (2002): Accounts Reckoner, Finance Department, and Karnataka Budget Documents: Various issues.

From among the economic categories, the items that account for a large share are government wages and salaries (inclusive of pension) owing to the recent revision effected by the Fifth Pay Commission and current transfers. Interest payments, salaries and pensions together constitute a very large share of the total revenue expenditure and have also been on the increase. These three items in proportion to revenue expenditure increased from 41 per cent in 1980–81 to 45 per cent in 1991–92 and further to 52 per cent in 2000–01. As a result, a large share of revenue receipts has been increasingly diverted to meet these committed expenditures. The proportion of resources utilised for these three items has increased from 38 per cent in 1980–81 to 47 per cent in 1991–92 and further to 63 per cent. Subsidies have also been on the increase, much against the reform agenda to reduce the subsidy bill.

Public investment is very essential in certain crucial economic infrastructure such as power, irrigation, and roads. Government spending on each of these items has had a reduced share in GSDP (Table 4). The State is already experiencing severe inadequacy of economic infrastructure, and a further reduction in expenditure will

aggravate the infrastructure inadequacy and thus have an adverse effect on the overall development of the State. Government's responsibility in these areas continues as the desired private investment is yet to take place in adequate quantity.

Based on the broad trends of expenditure under the functional and economic categories, one can conclude that while government expenditure as a proportion of GSDP has had a small decline, the sectors that have been adversely affected are economic services and capital expenditure.

Government Revenue

Trends in Karnataka State government's resource position are serious cause for concern, more so during the reform phase. Revenue receipts as a proportion of GSDP increased from 15.35 per cent in 1980–81 to 16.71 per cent in 1991–92. It then declined to an all-time low of 12.85 per cent in 1998–99, after which it improved marginally to 14 per cent in 2001–02.

The performance of the State's own tax to GSDP reveals similar patterns. It increased from 7.64 per cent to 12.43 per cent during the first period referred to above. Subsequently it fell to as low a level as 7.66 per cent in 1998–99 before improving marginally to 9 per cent in 2001–02. However, the revenue performance is much lower than what it was in the early nineties.

According to the first report of the Tax Reforms Commission, tax buoyancy in the State has fallen during the reform phase. It is disappointing to note that the buoyancy of the tax revenue within the State's control has reduced even more drastically (GOK 2001). These trends are contrary to the growth performance of the State. Karnataka has shown better growth performance at an average rate of 7.9 per cent per annum than the national average for the period 1993–94 to 2000–01 (GOK 2002) in all the sectors. Despite the high rate of growth in the manufacturing sector the yield in commercial taxes has dropped from 6.38 per cent of GSDP in 1990–91 to 5.55 per cent in 2001–02. The Tax Reforms Commission cites the wide-ranging exemptions and incentives given to new industrial establishments as one of the principal factors responsible for the above behaviour.

Non-tax revenue too has shown signs of decline, but much before the reforms were initiated. It was 3.25 per cent of GSDP in 1980–81, which declined to 2.22 per cent in 1991–92, and even further to 1 per cent in 2001–02. This is poor performance by any standard.

When one looks at the composition of items under non-tax revenue, it becomes clear that it is largely the declining non- tax revenue in the economic service category that has caused the decline. The decline has been particularly marked during the reform phase. The share of dividends and profits, which was low, has declined further. The State has also suffered a decline in shared taxes from the central government and grants-in-aid from the centre have been fluctuating a great deal.

Table 4: Expenditure on Economic Services (Rev+ Cap Accounts)

(Rs. in crores)

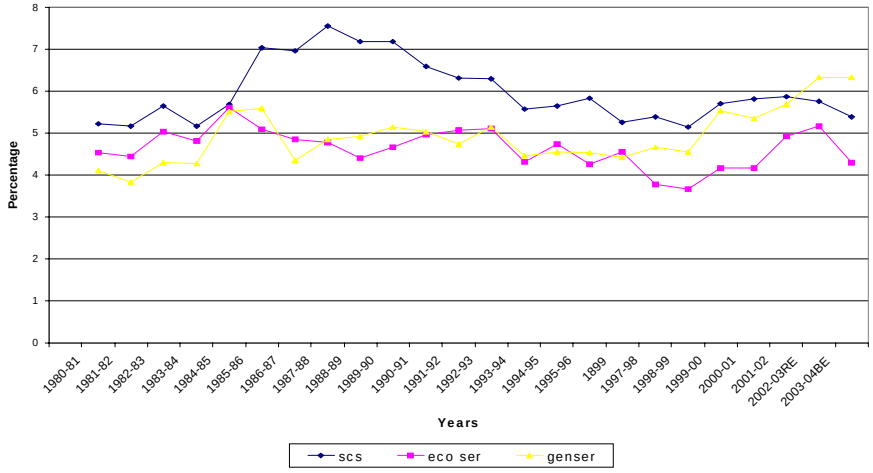
Year	Agriculture and Allied	Irrigation and Flood Control	Energy	Transport	Others	Total
1992-93	510.86	826.16	192.61	294.40	589.87	2,413.90
*	1.55	2.50	0.58	0.89	1.79	7.31
**	21.16	34.23	7.98	12.20	24.44	100.00
1993-94	597.68	821.09	502.43	265.85	726.68	2,913.73
*	1.45	2.00	1.22	0.65	1.77	7.09
**	20.51	28.18	17.24	9.12	24.94	100.00
1994-95	636.71	1118.13	289.86	311.91	752.36	3,108.97
*	1.33	2.33	0.60	0.65	1.57	6.49
**	20.48	35.96	9.32	10.03	24.20	100.00
1995-96	891.00	1210.96	460.76	340.50	675.73	3,578.95
*	1.58	2.15	0.82	0.61	1.20	6.37
**	24.90	33.84	12.87	9.51	18.88	100.00
1996-97	856.57	1422.32	975.65	311.69	701.32	4,267.55
*	1.31	2.18	1.50	0.48	1.08	6.55
**	20.07	33.33	22.86	7.30	16.43	100.00
1997-98	854.14	1419.07	614.41	364.50	681.25	3,933.37
*	1.19	1.98	0.86	0.51	0.95	5.49
**	21.72	36.08	15.62	9.27	17.32	100.00
1998-99	996.69	1448.36	688.27	382.46	1158.33	4,674.11
*	1.13	1.65	0.78	0.43	1.32	5.31
**	21.32	30.99	14.73	8.18	24.78	100.00
1999-00	1161.94	1806.53	788.39	522.31	1077.08	5,356.25
*	1.21	1.88	0.82	0.54	1.12	5.57
**	21.69	33.73	14.72	9.75	20.11	100.00
2000-01	1201.71	1986.10	939.29	694.56	1166.88	5,988.54
*	1.14	1.88	0.89	0.66	1.11	5.68
**	20.07	33.17	15.68	11.60	19.49	100.00

Notes * Indicates percentage of GSDP

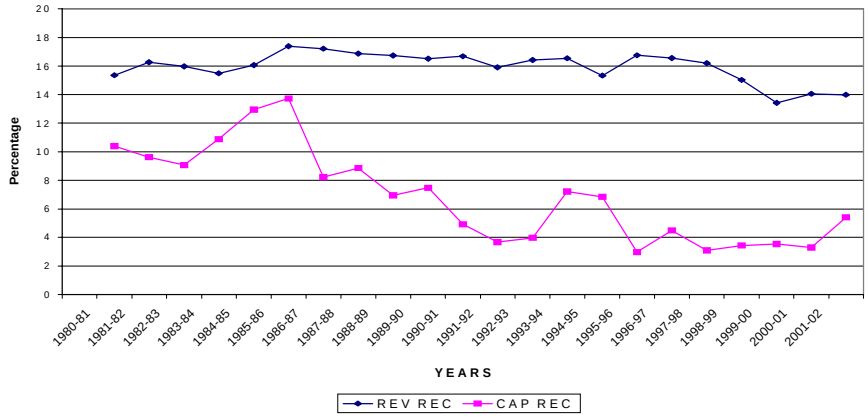
** Indicates percentage of expenditure on economic services

Source: Government of Karnataka: Budget documents, various issues

Graph 3: Functional Categories of Expenditure as Proportion to GSDP



Graph 4: Revenue and Capital Receipts in Proportion to GSDP



Similar trends with reference to central transfers were observed for all states. Net transfer of financial resources from the centre to the states has been observed to have declined (Thimmaiah 2000) during the reform phase from 33.3 per cent in 1991–92 to 24.2 per cent in 1999–2000 (Table 5).

Subsidies in the State

Issues pertaining to the low and uneconomic pricing of public services and the resultant increase in implicit subsidies have been addressed in the recent literature (Rao 2003). The State government has not made adequate efforts to recover the cost of public services even from those who can afford to pay for them. The

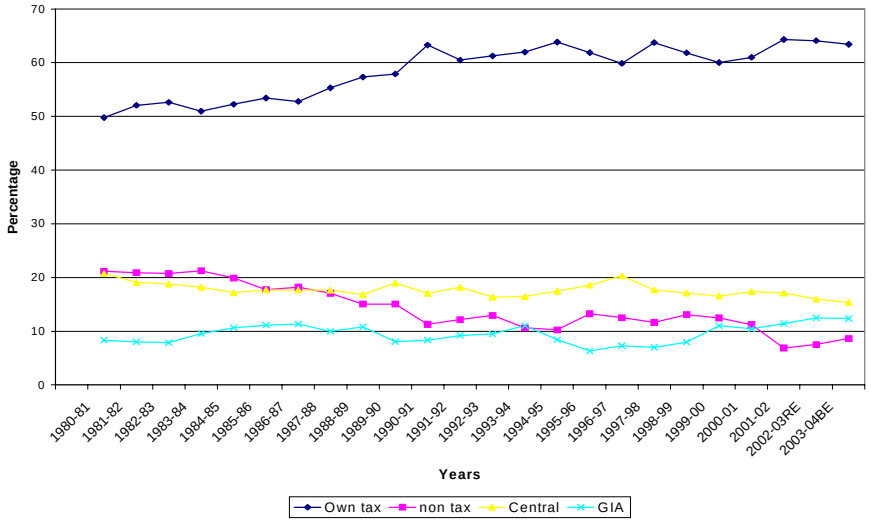
Table 5: **Net Transfers from Centre to States**

(Rs. Crores)

Year	Net Transfer from Centre	Net Transfer from Centre as % of Total Receipts
1991-92	42,420	33.3
1992-93	47,161	32.4
1993-94	53,267	31.9
1994-95	59,453	32.6
1995-96	65,712	31.7
1996-97	76,178	32.7
1997-98	81,604	30.9
1998-99	71,449	23.6
1999-00	84,989	24.2

Source: Government of India (2002). *Indian Public Finance Statistics*, various issues

Graph 5: Composition of Revenue Receipts



quantum of implicit subsidy has grown substantially during the reform phase. The study observed that 'despite large investments to irrigation, water supply and sanitation, higher and technical education, and various other public enterprises the State has not been able to recover the costs to make these activities viable and generate resources for additional reinvestments in these sectors' (Rao 2003: 1).

The sectoral studies of Karnataka reveal that the subsidy level, both implicit and explicit, has been observed to have increased sharply in the State. A macro view of subsidy reveals that budgetary subsidy in absolute terms has increased

from Rs.1,952 crores in 1990–91 to Rs.4,885 crores in 1998–99. There is yet another disappointing feature in the form of a sharp decline in the cost recovery rate from 7 per cent to 2.5 per cent during the above reference period (Rao and Amarnath 2003). Water supply and sanitation services account for a whopping Rs.1,303 crore subsidy during the 1990–99 period (Saleth and Sastry 2003). Subsidy for food and agriculture, comprising irrigation and power, was very high at Rs.4,058 crores (Deshpande *et al* 2003). The irrigation sector also has a huge subsidy which has also substantially increased from Rs.711 crores in 1990–91 to Rs.2,335 crores in 1998–99. The recovery rate has registered a sharp fall from 2.41 per cent to 0.88 per cent during the above reference period (Raju and Amarnath 2003).

Power is yet another sector that has accounted for a large and increasing subsidy particularly since 1994–95. It has increased from Rs 207 crores in 1994–95 to Rs.1,212 crores in 1999–2000. There is also an element of cross subsidy borne by a certain category of consumers which has also been on the increase. The housing sector accounts for a sharp increase in the direct or explicit subsidy. It has increased from Rs.13 crores in 1990–91 to Rs.127 crores in 1998–99. The State government is experiencing not only a direct outflow of resources in the form of explicit and implicit subsidy but also a heavy revenue loss to the exchequer on account of various concessions and exemptions. While the direct subsidy has increased from Rs.29 crores in 1990–91 to Rs.167 crores in 2001–02, implicit subsidy has grown from Rs.147 crores to Rs.232.54 crores in the above period. There has been a reduction in the recovery rate too (Gayithri 2003c). Subsidy in higher education is huge at Rs.160.55 crores in 1990–91 and has grown to Rs.818.6 crores in 1998–99 (Narayana 2003). All these studies reveal that subsidy growth during the reform phase is quite sharp. The studies have also highlighted implementation weaknesses, such as poor targeting of the benefits. Thus, the benefits of subsidy have reached the undeserving. Thus, the State finances are ailing on account of adversities on both revenue and expenditure fronts.

In what follows is a detailed discussion of fiscal costs and issues pertaining to industrial incentives and concessions announced by the government to promote industrial development of the State[2].

Fiscal Costs and Issues of Industrial Incentives and Concessions

Governments often try to attract industry into a particular region or sector by offering lucrative incentives and concessions. The important kinds of incentives used are fiscal incentives, financial incentives and market preferences. Incentives are aimed at serving a number of developmental goals. They are used as instruments to lead industrial investments into certain regions, sectors, to influence the nature of investment, and generation of employment. The scope and volume of concessions have varied from time to time and were characterised by stiff inter-state competition

to attract industrial investment until recently.

It has been argued that (UNCTAD 1998) while these incentives may serve a number of developmental purposes they can cause economic distortions and involve financial and administrative costs. Serious concern has been expressed about subsidies with reference to fiscal cost, which may grow because of:

a) revenue loss on account of various fiscal concessions; and
b) direct expenditure because of the subsidies/ financial incentives.

Besides these, there can be a real cost to the economy owing to distortions in the structure of industrialisation by types of industries, old and new industrial units, and geographical location (Government of Karnataka 2001). Sectoral investment priorities and resource allocation are likely to be distorted. Redundancy is yet another issue that arises in the case of incentives that tends to have a negligible impact on certain types of industrial investments (Rao *et al.* 1991).

Incentives and concessions to promote industrial development in Karnataka date back to 1968. Introduction of economic reforms and the formulation of New Industrial Policy (NIP) resulted in stiff interstate competition to attract industrial investment. One of the strategies adopted by the state governments was to announce very attractive fiscal incentives. The two packages announced for the periods 1990–95 and 1993–98 underwent many changes in between and were not implemented in full. Hence, they are not discussed here. The next package implemented in full was for the period 1996–2001.

A comparison of previous policy packages announced by the Government of Karnataka clearly accounts for the sharp increase that has taken place in the scope and volume of concessions in the 1996–2001 package. Details of two important incentive schemes, i.e., capital investment subsidy and sales tax, are presented in Tables 6 and 7. Capital investment subsidy, which revolved around 10–15 per cent of fixed capital investment with a ceiling of Rs.10–15 lakhs, has been enhanced to 25–30 per cent with a ceiling of Rs 25–30 lakhs. The scope has been extended to cover certain categories of tiny and SSI units in Zone I, which were not covered under the previous packages. Under the sales tax, concessions have been extended to medium and large-scale industries and the ceiling in the case of tiny units has been enhanced to 150 per cent Thus, the volume and scope of capital investment subsidy have undergone a sharp change.

In a welcome development, an inter-state agreement has been reached on having a measure of harmonisation in the sales tax system, which has resulted in restricting of this concession to small-scale industrial units. Karnataka was one of the first states to implement (from January 1, 2000) the proposals of the interstate agreement. Nevertheless, the burden still continues in view of the commitment made so far.

Table 6: Rates and Ceiling for Capital Investment Subsidy under Various Policy Packages – Karnataka

Zones	Tiny Ind.		SSI		M&L Ind.	
	Rate %	Max.ceiling Rs.Lakhs	Rate %	Max.ceiling Rs.Lakhs	Rate %	Max.ceiling Rs.Lakhs
			1983-88 Package			
I	Nil	Nil	Nil	Nil	Nil	Nil
II	10	0.5	10	5	10	10
III	15	0.75	15	7.5	15	15
IV	15	1	15	15	15	15
			1993-94 Package			
I	Nil	Nil	Nil	Nil	Nil	Nil
II	10	0.5	10	5	10	10
III	15	0.75	15	7.5	15	15
IV	15	1	15	15	15	15
			1996-2001 Package			
I	Nil**	Nil**	Nil**	Nil**	Nil**	Nil**
II	25	25	25	25	Nil	Nil
III	30	30	30	30	Nil	Nil
Note						

Note: ** Indicates tiny and small-scale industries set up in developed areas in specified non-polluting high technology industrial units shall be eligible for an investment subsidy of 25 per cent of the value of fixed assets, subject to a ceiling of Rs.25 lakhs.

Source: Gayithri K. (2003 b)

Direct Subsidy

Direct budgetary subsidy[3] for industry has increased from Rs.2,923 lakhs in 1990–91 to Rs.6,993 lakhs in 1998–99 and was budgeted to increase to Rs.16,749 lakhs in 2001–02 (B.E). Subsidy was very high during the period 1994–95 to 1996–97. Village and small-scale industry has had a larger share during all the years except 1993–94. It can be observed from the data that the subsidy component in industry expenditure (revenue account) was only 15.85 per cent before the launch of the new industrial policy, after which this share increased considerably. The main factor responsible for such a sharp increase was the interstate competition triggered after 1991 and the consequent announcement of varied incentives to attract industry to the respective states. In fact, in Karnataka, the magnitude of capital investment subsidy, which is an important subsidy scheme, was only 15 per cent of the total fixed investment until 1992–93, after which it got enhanced to 25 per cent with an additional subsidy of 5 per cent to the thrust sector industries, special category of entrepreneurs, and the units located in the growth centres.

Table 7: Rates and Ceiling for Sales Tax Concession under Various Policy Packages – Karnataka

	Tiny Indust.		SSI		M& L Indust.	
Zones	Years	Ceiling (%)	Years	Ceiling (%)	Years	Ceiling (%)
			1983-88 Package			
I	Nil	Nil	Nil	Nil	Nil	Nil
II	5(5)	100	5(5)	100	Nil	Nil
III	5(5)	100	5(5)	100	Nil	Nil
IV	5(5)	100	5(5)	100	Nil	Nil
			1993-94 Package			
I	4(6)	100	4(6)	100	4(6)	100
II	6(8)	100	6(8)	100	5(7)	100
III	7(8)	100	7(8)	100	6(8)	100
			1996-2001 Package			
I	4(6)	150	4(6)	100	4(6)	100
II	6(8)	150	6(8)	100	5(7)	100
III	7(8)	150	7(8)	100	6(8)	100

Note: Figures in paranthesis indicate number of years for which sales tax exemption was given.

Source: Gayithri K. (2003 b)

The amount of subsidy and its share in the total revenue expenditure on industry continue to be high even after the inter-state agreement to reduce the industrial incentives.

With the broader coverage and a higher rate of subsidy, the fiscal burden on the State Government on account of capital investment subsidy has increased considerably. In fact, the actual subsidy sanctioned by the department is often not met through the budget sanction for the year. Departmental statistics reveal that capital investment subsidy released to the industrial units in the State increased from Rs.7 crores (1990–91) to Rs.173.14 crores for 12,595 units at the end of March 2001 as against the budget allocation of Rs.13.75 crores for the year.

Despite such a large increase in the subsidy, the scheme has not helped to meet the professed objective of the government, i.e., to disperse industry to the backward regions of the State. On the contrary, the scheme has greatly benefited the industrially better off districts such as Bangalore Urban and Bangalore Rural. Hence, the scheme has twin adversities: (a) growth in fiscal cost; and (b) accrual of benefits to the undeserving (Gayithri 2003 b).

In addition to the above problems, the nature of the scheme itself, which takes fixed capital investment as the base, has an inherent bias in favour of capital

intensity, thus resulting in a sharp increase in the capital intensity of Karnataka's industry in the last decade. This conflicts with the government's objective of promoting employment through the manufacturing sector.

Tax Concessions

Industrial concessions are also in the nature of tax concessions, which result in a revenue loss to the government. Governments aim at promoting industrial investment by sacrificing fiscal resources. An important issue that needs to be addressed in this context is whether such costs incurred by the government are yielding a commensurate benefit in terms of promotion of industrial investment.

As mentioned elsewhere in the report, tax concessions in Karnataka date back to 1968 when the first package of incentives was announced. The focus in the first package was, however, mainly one of promoting industrial investment in the State rather than dispersing industry to the backward regions. Industrial development in the backward regions received attention from the second package, i.e., from 1974. Ever since, there have been a number of tax concessions in the areas of sales tax, stamp duty, electricity tariff, octroi, etc. It is obvious that revenue loss on account of all such concessions would be quite large.

Industry policy packages announced in 1993 and 1996 were more liberal and sales tax incentives were extended to the medium and large- scale industries. These, however, were restricted to selected categories of high-tech and non-polluting industries in the tiny and small-scale sector in Zone I.

In addition, the package (1996–2001) provided for incentives for mega projects with over Rs.100 crore investment in fixed assets. The government has the discretion to grant concessions for such investments on the merits of each case. Being discretionary, they may often not be in line with the industrial policy package announced by the government.

Cost of Tax Concessions and Incentives

Revenue foregone due to tax concessions is presently not computed by the government. The practice in some developed countries is to account for it as tax expenditures and present it in the government budgets to ensure transparency in budgetary transactions. This practice does not exist in India. In the context of Karnataka, some attempts have been made to quantify them. The white paper on Karnataka State finances states that revenue loss amounted to Rs.332 crores due to exemptions and Rs.136 crores due to deferment given to small and medium-manufacturing units between the years 1992–93 and 1997–98. Exemptions and deferment of tax have helped the industry save to the tune of Rs.6,287 crores in the 8–18 years of exemptions regime (Government of Karnataka 2001b).

Commercial Tax Department of the Government of Karnataka has attempted to estimate the revenue loss to the government on account of concessions to

medium and large-scale industrial units from 1991–92 to 2000–01 (Table 8). These figures account for a very sharp rise in the revenue loss on account of concessions from a meagre sum of Rs.1.79 lakhs in 1991–92 to Rs.5,392 lakhs on account of exemptions. There has been a sharp rise even on account of deferment, which the government hopes to get later.

Table 8: Tax Concessions Availed of by the Medium and Large-Scale Units in Karnataka (Rs. in lakhs)

Year	Exemptions	Deferment	Total
91-92	1.79	0	1.79
92-93	100.53	19.51	120.04
93-94	359.86	64.08	423.94
94-95	1,108.84	210.16	1,319
95-96	3,210.25	404.7	3,614.95
96-97	701.81	973.01	1,674.82
97-98	443.5	2,433.46	2,876.96
98-99	1,268.52	7,542.71	8,812.23
99-00	1,458.52	2,090.74	3,549.26
2000-01	5,392.04	318.82	5,711.17
Total	14,046.97	14,057.19	28,104.16

Source: Government of Karnataka, Commercial Tax Department Office Records

In addition to the above, tax concessions to the mega and small-scale industries amounted to Rs.190.74 crores and Rs.85.542 crores respectively in 1999–2000. However, these are only estimates.

Loss of Revenue: Case of Mega Industrial Units

The analysis presented below pertains to the actual loss of revenue to the government on account of sales tax concessions extended to the mega industrial units, i. e., units with investments of Rs.100 crores and above in fixed assets, in the State[4] (Gayithri 2004). Growth and distribution of the loss of revenue has been attempted from 1993–94, the year in which the policy underwent a marked change. The cost in absolute numbers has increased from Rs.737.82 lakhs in 1994–95 to Rs.51,450.82 lakhs in 2002–03 (Table 9). The cumulative total for all the years is Rs.194,652.01 lakhs. Revenue loss on account of mega industry concessions constituted a very small share, 0.29 per cent, of the total sales tax revenue generated in the State in 1994–95. However, this has substantially increased to almost 10 per cent in 2001–02. There has been a sharp increase particularly after the year 1998–99 as the number of units that have begun commercial production from 1998–99 increased sharply. Such a huge loss of revenue is only on account of 18 mega units (of which two have completed their term), which are currently enjoying the benefits,

and there are seven more mega units for which concessions will start flowing shortly. In addition to the concessions given to the mega units, concessions are extended to their suppliers, works contracts, etc, but no data are available on account of such concessions.

The impact of concessions is very revealing from the behaviour of sales tax revenue realisation in the State. The proportion of sales tax revenue in the State's GSDP recorded a significant decline from 5.55 per cent in 1993–94 to 5.11 per cent in 2000–01, reaching an all-time low of 4.85 per cent in 1998–99. In contrast to the reforms decade, the previous decade of 1980–81 to 1990–91 witnessed a significant rise in the share of sales tax revenue to the GSDP.

This, however, does not reflect the entire loss of revenue to the government, as there are many other large and medium industries and small industrial units that have enjoyed similar concessions during the last decade. Hence, we have good reason to believe that this could be an important factor in the decline that has occurred in the buoyancy of the sales tax revenue during the last decade as compared with that of 1980–81 to 1990–91. Sales tax buoyancy in Karnataka was at 1.21 for the period 1980–81 to 1992–93 (Government of Karnataka 2001b), which has substantially dropped to 0.92 for the period 1991–92 to 2001–02.

In addition to the loss of sales tax revenue, the State has lost considerable revenue on account of liberal concessions offered by the government under stamps under Registration charges. The government does not estimate such costs at present.

These trends certainly indicate that the cost in terms of revenue foregone due to the industrial concessions package announced in 1996 was significant. Increase on account of deferment has been sharper than that of exemptions**.**

Division-wise Distribution

Division-wise distribution of the incentive benefits (Table 10) reveals that the aggregate benefits until now have largely been concentrated in Bellary, Mangalore, Bangalore, and Gulbarga in the same order. The benefits enjoyed by other divisions are currently not very huge. However, the flow of benefits depends on the concession term, utilisation and pendency. The quantum of current annual burden will be more revealing when the revenue foregone is analysed as a proportion of the sales tax realisation of the respective division for the corresponding year. We are unable to attempt it now owing to lack of data.

The investment that has taken place in the State in these centres can be catgorised as local resource based and non-local resource based. It can be observed that there has been a concentration of resource-based industries in the resource-rich districts such as Bellary, Dakshina Kannada, Gulbarga and Dharwad. On the contrary, the industries that are not based on local resources are all located largely in Bangalore and to a certain extent, Mysore district, which are endowed with urban agglomeration economies.

Table 9: Annual Availment of Sales Tax Concessions: Mega Units

(Rs in Lakhs)

Year	Exemption	Deferment	Total	Total as % of Sales Tax Revenue
1994-95	620.87	116.95	737.82	0.29
1995-96	1,773.71	386.84	2,160.55	0.73
1996-97	2,006.29	2,132.28	4,138.57	1.18
1997-98	3,093.14	5,288.51	8,381.65	2.19
1998-99	5,173.73	6,230.99	11,404.71	2.67
1999-00	10,439.28	8,317.15	18,756.43	4.00
2000-01	15,268.04	29,839.04	45,107.08	8.4
2001-02	24,060.54	28,453.84	52,514.38	9.97
2002-03	25,474.48	25,971.34	51,450.82	8.9
Total	87,915.07	106,736.94	194,652.01	——

Source: Gayithri (2004)

Industrial development, as suggested by both theory and empirical evidence, is guided by many factors. Important among them are availability of resources, raw material, proximity to markets, industrial infrastructure and industrial climate of a region. Research shows that industrial incentives have played an insignificant role in the promotion of industrial investment of a region. As a result, there is a general tendency for industrial units to get concentrated in and around urban areas. Under such circumstances, an industry would either locate its unit nearer to its resource base or to an urban centre that provides the necessary facilities. In such cases, provision of incentives by the government becomes irrelevant. Theoretical discussion of industrial incentives refers to it as 'Redundancy.'

Discussions held with the resource-based industrial units concerned in the context of the recent study reveal that their location is based mainly on the availability of the natural resource base and accessibility to the raw material base. Under such circumstances, if the entire investment had been made in the absence of government concessions, the incentive scheme would become redundant. However, there are no acceptable theoretical measures to separate out the effects of incentives from other factors that influence the total investment. Similarly, in the case of non-resource based industries, they have mainly flocked in and around the major urban centres in the State, particularly Bangalore, and, to a certain extent, Mysore. Industrial investments tend to cluster around the main urban centres, and providing incentives to such units results in large-scale redundancy.

Table 10: Division-wise Concessions Availed of by Mega Industrial Units

(Rs. in Lakhs)

Year	Bangalore	Bangalore City-I	Bellary	Dharwad	Gulbarga	Mangalore	Mysore	Total
1994-95	0	0	620.87	116.95	0	0	0	737.82
1995-96	120.47	0	1653.24	386.84	0	0	0	2160.55
1996-97	206.24	0	1804.63	345.2	354.85	1427.65	0	4138.57
1997-98	6	0	2264.81	471.22	2841.9	2797.72	0	8381.65
1998-99	549.27	383	3531.66	410.5	2530.29	3999.99	0	11404.7
1999-00	4084.8	917	5661.43	435.5	3636.62	4000	21.05	18756.4
2000-01	10613	**	11582.4	700.31	5352.84	16810.43	47.93	45107.1
2001-02	10924	2173.94	18246.4	904.72	6747.9	13473.27	44.25	52514.4
2002-03	5379.1	1703.74	19024.1	908.74	4613.2	19821.91	**	51450.8
Total	31883	5177.68	64389.5	4679.98	26077.64	62330.97	113.23	194652
	(16.38)	(2.65)	(33.08)	(2.4)	(13.04)	(32.02)	(0.06)	(100)

Notes: *Data up to September 2003 ** Data are not available. Figures in parentheses indicate percentage of total.

Source: Gayithri (2004)

Abuse of Legal Provisions and Corrupt Practices

Concessions are also likely to result in corrupt practices and abuse of legal provisions. Some instances of this were observed in a recent survey of 1,500 SSI units in Bangalore Division, Karnataka (Gayithri 2003b). Corrupt practices of the industrial units have been in the nature of replacement of an old unit by a new unit, starting of bogus units, etc. Shifting of production from the old units to the new units has also been resorted to in order to avoid tax payment, thus adversely affecting the existing sales tax base. The survey also reported that a number of such new units that had come up were dummies of their parent company started with the purpose of availing fresh concessions. Such corrupt practices result in the erosion of existing tax base.

Other ill-effects caused by the incentives include creation of excess capacity. The oil industry in Chitradurga district is a good example. Despite a sharp decline in oil seed production, which forms the raw material base for the industry, the district has witnessed a sharp increase in the number of producing units.

Summary and Conclusions

The above analysis of the fiscal situation in the State reveals that the State finances have deteriorated markedly in the recent past. The deterioration is caused by a sharp fall in the revenue receipts of the State and unbridled growth of expenditure. The revenue shortfall has resulted in a steep decline in the quality of

public expenditure in the sense that cuts have occurred in the productive capital investments of the State even while it has been pursuing its populist politics, which have added to the size of revenue expenditure.

The State's resources are dwindling owing to revenue losses incurred by the government both on account of various incentives and concessions provided as well as inadequate recovery of the costs of public services provided. There is a need to tap adequate returns from huge investments made by the government in irrigation, power, water supply, etc. Wherever there is a need for subsidy for the deserving sections of society, it is important to properly target them and set deadlines. This will help avoid perennial growth of expenditure on account of these schemes.

An important factor that has had an impact on both resources and expenditure pertains to the concessions offered by the State government to industry. Concessions have been prevalent for as long as over three decades. However, the scale of these concessions has been enhanced significantly in recent years, particularly since the introduction of economic reforms in the country, caused by stiff inter-state competition to attract new industrial investment in the aftermath of liberalisation. The subsidy schemes are also large in number. As a result, the fiscal burden on account of these incentives, in terms of both direct cash outgo from the exchequer and the revenue forgone to the government, has been quite sizeable and on the increase. In a welcome development, the policy package for 2001–2006 restricts most of these concessions to the tiny units, but the burden on the exchequer continues owing to existing commitments.

Regarding measures to restructure public expenditure, there is an urgent need to address the issues pertaining to the quality of public expenditure. However, it has not received the attention of the policy makers. There is a need to review all the government programmes and eliminate the ones that have outlived their utility or are duplicative in nature. The government, in its eagerness to announce more and more programmes, has been spreading funds thinly over many programmes. It is disappointing to note that despite the announcement of the MFTP, the last two to three budgets have seen the announcement of many populist programmes which ultimately dilute the medium-term strategy drafted by the government. In fact, the trends in the last two budgets make one very sceptical about the attainment of revenue and fiscal deficit targets set by the government. The time is ripe to reduce the size of committed expenditures, which constitute a sizeable proportion of revenue expenditure. Expenditure cannot be reduced unless the commitment itself is reduced. These commitments are in the nature of huge public debt stock that the State has accumulated, the large base of employment created, etc. Last, but not the least, the governments need to overcome their political pressures and not yield to popular temptations in announcing numerous programmes.

Notes

[1] Government of Karnataka has enacted the Fiscal Responsibility legislation, which came into force in April 2003, prepared a Medium Term Fiscal Plan aiming at the reduction of revenue deficit to zero level by March 2006, and reduction of the fiscal deficit to 3 per cent of GSDP by the same period. The State has also initiated preparation of Medium Term Fiscal Plan at the individual department level, etc. Reforms have been introduced in the power sector also. This sector has been a major drain on the government's resources.

[2] The author had undertaken a detailed study of the costs of industrial incentives in Karnataka. (See, Gayithri 2003a).

[3] A number of explicit subsidy schemes exist for both village and small-scale industry and large and medium categories of industry. There are about 36 such schemes under large and medium industries category, and about 66 such schemes under the Village and Small-Scale Industry category. These are in the form of grants-in -aid, incentives, rebate, assistance and direct subsidy. Capital investment subsidy is an important scheme in terms of budgetary allocation.

[4] The results are from a study carried out by the author in 2004, 'Spin-Off Effects of Industrial Incentives in Karnataka: A Study of Mega Industrial Units.' This study involved collection of annualised revenue loss figures from the offices concerned of the Commercial Tax Department.

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Institutional Reforms in Irrigation Financing: A Case of Krishna Bhagya Jal Nigam Limited[1]

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Abstract

Canal irrigation in India has been moving towards financial crisis in recent years. Some states have introduced innovative institutional reforms to mobilise the required funds. Karnataka is one such state that has set up Krishna Bhagya Jal Nigam Limited for this purpose. Although adequate funds were mobilised since its establishment and the physical works are on schedule, 'soft components' were neglected, thereby missing an opportunity to embark upon major institutional reforms to enhance irrigation efficiency and to move towards financial sustainability of the irrigation project. This paper discusses the background of the setting up of a financial institution, its achievements, inadequacies, and potential of the innovative efforts made in irrigation financing reforms.

Introduction

Financing of canal irrigation in India suffers from two distinctive problems: (a) funding for construction of ongoing or new canal networks has been shrinking, leading to undue delay in the completion of projects, thereby raising the costs and reducing the benefits; (b) resources for normal operation and maintenance are under severe pressure as cost recovery from canal irrigation is extremely low. The state budgets are unable to allocate more funds because of the overall fiscal crunch. This state of affairs points towards an impending financial crisis in canal irrigation in India. Unless urgent steps are taken to reverse this trend, irrigation is likely to be heading towards collapse or remain much below its potential.

Resource constraints are not unique to India. Both irrigation and domestic water supply projects worldwide face serious under-financing, particularly from conventional development assistance and government expenditures. The World Water Commission (2000) made a strong plea for public–private partnerships and tapping of the international capital markets for financing water sector development and for creating a more efficient management system. Much of the emphasis in these

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discussions has been on international financial markets, particularly the role of multinational corporations in financing water-related infrastructure.

Much less attention has been given to the potential of domestic financial markets for providing such funding. Since the 1980s, Indian capital markets have emerged as an important source of funds for corporate units in the private and public sectors. Primary capital mobilisation by private sector companies in the form of equity and debt rose from less than Rs.2 billion in 1980 to over Rs.43 billion in 1990–91 and then leaped to over Rs.260 billion by the end of 1994–95 (GOI 1996:81). During this period, several state governments also began to tap the domestic financial market for financing irrigation development.

This is not the first time that such an institutional reform is being proposed. Indeed, the Working Group on Major and Medium Irrigation Projects for the Eighth Five Year Plan examined the issue of inadequate funding for projects in the Seventh Plan. Against the spillover liability of Rs.260 billion for major and medium projects that remained incomplete from previous Plans, the outlay was only Rs.115 billion. To enable a more positive role by the Central Government, the Ministry of Water Resources formulated a proposal in 1988 to establish an Irrigation Finance Corporation to provide financial assistance to projects of national importance in the irrigation sector (GOI 1995). Although the proposal was supported by a large number of states, the Planning Commission did not approve it. Over the years, however, the states that had important ongoing projects established autonomous irrigation finance corporations. Karnataka's Krishna Bhagya Jal Nigam Limited (KBJNL) is one of them.

Is KBJNL a pointer towards the type of institutional reforms that can ensure higher efficiency, better equity and greater sustainability of canal irrigation? To examine this question, the following section presents a detailed discussion on KBJNL: the background against which it came into existence; the money it has raised, and what else it is supposed to be doing, etc.

Krishna Bhagya Jal Nigam Limited

Background

At the root of establishing the KBJNL lies the question of sharing of the Krishna river water. The river flows through the states of Maharashtra, Karnataka,and Andhra Pradesh. In 1971, the Krishna Waters Dispute Tribunal (KWDT) was set up to allocate utilisation levels of the Krishna waters. The Tribunal reported its findings in 1973, and the states responded to its queries. In 1976, the Tribunal observed that the award (popularly known as the Bachawat Award) might come under review by May 2000. However, owing to lack of initiative from these states, the award has not been reviewed and the old status is continuing into 2004. Thus, a formula was evolved to utilise the given water allocations by three states. Under this Award, Karnataka is to utilise 734 TMC (20.7 million ha m) of water from the Krishna river.

The Upper Krishna Project (UKP) was developed to take advantage of the Bachawat award[2]. The state government sought the World Bank's assistance for UKP during 1980. The World Bank gave two lines of credits: one that expired in 1986 and another in June 1997, for a total of Rs. 5.48 billion.[3] Meanwhile, in 1988, the State felt the need for an authority to look into several problems in the implementation of the project.

Two factors that triggered the setting up of KBJNL were: (a) the cumbersome process of land acquisition; and (b) the deadline of 2000 AD for completion of all physical works of UKP. In 1993, just seven years short of project completion, World Bank aid was uncertain because of problems with rehabilitation and resettlement in the UKP,[4] and a dispute with Andhra Pradesh over the height of the Almatti Dam, and its impact on water availability for Andhra Pradesh. The stipulations on the World Bank loans became difficult for the Government of Karnataka to meet. Further credit on UKP was suspended owing to inadequate efforts by the State government in rehabilitation and resettlement (R&R) in the UKP. The focus of the World Bank shifted to water resources consolidation projects, which accorded priority to basin development rather than individual projects.

The State budget could have, in the normal course, supported the entire UKP execution. But the project would have taken 15 to 20 years for completion, since the State budgetary allocation of around Rs.10 billion was meant for all major and medium projects. However, UKP alone needed Rs.10 billion every year from 1994–95 to 2000.[5] The goal was to mobilise huge funds (up to Rs.60 billion) in a short time. The World Bank funding for UKP was drying up while the revenue from existing irrigation projects was too meagre to give any support to the huge funding requirements of UKP.

In Karnataka, revenue generation from the irrigation sector is not encouraging. Out of Rs.2.3 billion outstanding, the actual collection was only Rs.300 million. Penal water fees of around Rs.2.15 billion were waived during the parliamentary elections held in March 1996. Added to this, current water fee levels in Karnataka remained quite low, ranging from Rs.37 to Rs.370 per ha, depending on the crops grown. A high-level committee set up, in 1993, to consider a revision in water fee levels had not made any clear suggestions by mid-1998. The committee, headed by the finance minister, was worried about the political implications of an upward revision. However, in its July 1998 meeting, the Committee suggested, but did not make a formal announcement, doubling of the current water fee levels, and gradually raising it by four times. These recommendations were nowhere close to the suggestions made by the Water Pricing Committee of the Planning Commission in 1992 (popularly known as the Vaidyanathan Committee). One senior officer in the irrigation department said, 'If we follow the Pricing Committee's recommendations, then we have to raise the water fee levels by 20 to 30 times, which is impossible for any state government.'

These conditions led to all-party support in the Karnataka Assembly for establishing an autonomous irrigation agency that could raise funds, design and ensure construction of UKP within the stipulated time-frame of the year 2000, and to manage it efficiently. The outcome was KBJNL, which was registered under the Companies Act in August 1994, charged with mobilising large funds for UKP.[6] In 1995, the government contemplated an outlay of Rs.57.45 billion for the completion of UKP. Further, it was revised to Rs.82 billion in 2001. It included Rs.30.5 billion from market borrowing, Rs.24.5 billion from the Government of Karnataka, and another Rs.2.45 billion from internal generation. Internal accruals are mainly through interest earned from market borrowings, which are parked temporarily in commerical banks. To raise funds from the market, KBJNL needed some assets. By November 1995 the state government had transferred to KBJNL about Rs.10 billion worth of assets, including dam, canal network, buildings, vehicles, and all other physical works completed by that date.

Initially, only works that were not funded by World Bank were meant to be undertaken for completion by KBJNL. After the Bank's credit date was over, i.e., from April 1998, all works were transferred to KBJNL for implementation. With this change, the outlays were revised twice (in July 1998 and in 2001) and fixed at Rs.82 billion. This included Rs.10 billion on five lift irrigation schemes. By the year 2000, KBJNL had planned to spend Rs.55 billion, mostly on completion of physical work.[7] The second revision was made to include lining of canals (Rs.25 billion) and construction of field channels below the outlet.

Strengths

KBJNL has focused primarily on mobilising funds and completing the physical work before 2003 AD. Encouraging support from the government's top functionaries (like chief secretary and finance secretary) and having efficient and experienced persons in key positions (like executive director and finance) helped it to move faster, resulting in three main outcomes:

1. Successful mobilisation of funds

The State government's efforts to raise funds through KBJNL are an innovative experiment. To borrow funds from the market, the company got a rating from CRISIL, a credit rating agency. The rating is based on the financial health of the government of Karnataka, which provided the guarantee to all the issues of KBJNL. The rating gets revised each year. In 1998, the rating for KBJNL bonds was 'A (SO)', which is considered quite a safe investment.

KBJNL is eligible as per norms, to borrow up to 1.25 times its assets. The government has, therefore, transferred all project assets to the KBJNL account, including lands, colonies, buildings, canals, dams, and other physical work. Based on the book value from the KBJNL records, the total assets were worth Rs.24 billion.

Accordingly, in March 1996 funds were borrowed through a public issue at a hefty interest rate of 17.5 per cent, owing to tight money market conditions prevailing then. Over time, as market conditions eased, the interest rates were reduced. The issue in July 1998 was at 14.25 per cent interest rate.

In the beginning, KBJNL made a public issue of bonds mainly to reduce the risk perception. But the transaction costs of raising funds through public issue are very high, almost 7–8 per cent of the sum raised. On private placement, the company incurs 0.5 per cent expenditure.[8] Thus, all except the second issue (a public issue) made a private placement of bonds. Under private placement, each issue has, on an average, about 300 to 400 applicants, which makes for easy debt servicing and cuts down the transaction costs significantly. Initially, the company officials and ministers pursued investors to subscribe to the KBJNL bonds. From the 5th series onwards, the company opted for professional help. It appointed seven lead managers (with 0.3 per cent commission) who have taken responsibility for getting subscription for all issues.

By August 2001, KBJNL raised Rs.46 billion through ten issues (see Table 1), responses to which were good. Every issue was over-subscribed as shown in Table 1. The company is now confident of raising the remaining Rs.36 billion to meet the target of Rs.82 billion by 2005. In recent years, KBJNL has increasingly tapped central government schemes to mobilise funds. Through the Accelerated Benefit of Irrigation Project scheme of the Government of India, it had mobilised Rs.23 billion during 2001–02.

By 1998, KBJNL had a total of 3,97,000 bondholders. The KBJNL bonds and public issue have been subscribed by investors from all over the country. They include commercial banks and rural and urban cooperatives (including Maharashtra and Gujarat cooperatives). The majority are institutional investors, while the first public issue had numerous individual investors. Major categories of investors include: commercial banks (50 per cent), corporate bodies (like Sahara, Peerless) (20 per cent), provident funds (20 per cent) and gratuity, religious trusts, cooperatives, and RRBs 10 per cent.

One of the major factors behind KBJNL's success in raising funds is the involvement of the Government of Karnataka (GOK), which guaranteed the payment of interest and principal through a tripartite agreement between GOK, KBJNL, and the trustee of bondholders (earlier ICICI and now Vijaya Bank). Under this agreement, an escrow account was created, funded substantially through budgetary resources of the State, including any revenue through water fees of KBJNL. The GOK has to transfer funds to the escrow account 45 days before the due date for interest payment. By June 1998, GOK paid Rs.2.94 billion as interest through this account. From the investor's security point of view, therefore, an annualised yield ranging from almost 19 per cent (for issue no.2) to 14.76 per cent (for issue no. 7-A) on these bonds looks

Table 1: Year-wise Amount Mobilised by KBJNL

Year	Series	Issue Size (in million Rs.)	Interest Rate (%)	Amount Retained (million Rs.)
1995-96	I	1,500	17.50	1,800.00
1996-97	II	2,500	17.50	3,000.00
	III	250	17.50	250.15
	IV	1,500	17.50	1,840.33
1997-98	V	2,500	15.75	4,030.98
	VI-A	2,500	15.75	1,080.74
	VI-B	2,500	15.75	2,960.86
1998-99	VII-A	2,500	14.25	3,200.20
	VII-B	5,000	14.25	2,900.41
1999-00	VIII	3,700	14.25	3,720.00
2000-01	IX	1,160	12.00	1,164.80
2001-02 (till August)	X	5,000	12.00	4,150.00
			Total	30,116.37

Source: KBJNL (2002).

Notes: Series II (1996-97) was public placement; all other issues were private placements. The amount retained exceeded the issue size because almost all issues were oversubscribed and KBJNL was allowed to retain somewhat more than its issue size.

attractive. The bonds are, in fact, better priced than recent offerings from other companies (e.g., IDBI). Liquidity during the life of the bonds is sought to be provided through the exit routes as well as by listing them on two leading stock exchanges.

2. Financial burden reduced on the State

During the last 20 years, the government of Karnataka had allocated Rs.13 billion for the UKP project. As KBJNL increased its market borrowing, the State support (State's share of capital outlay) was reduced from 71 per cent in 1995–96 to a mere 6 per cent in 1997–98, while KBJNL's share increased from 29 per cent to 94 per cent during this period (see Table 2).

KBJNL has to maintain the regular flow of funds to complete its planned physical works by the year 2005. The company has planned to borrow up to Rs.36.7 billion during the next four years. As of mid-1998, KBJNL actually spent Rs.32.82 billion. Of the total for the project, Rs.55.84 billion will be spent on the project, and another Rs.25 billion on canal lining. As the market borrowing increases every year, the interest also accumulates over the years.

Clearly, KBJNL has relieved the Karnataka government of the greater portion of the financial burden of UKP, at least in the immediate short run. But if KBJNL fails to mobilise enough internal resources to repay the loans raised, it will eventually fall on the State government, which is the ultimate guarantor. The benefit under the present scheme, however, is that instead of allocating large funds for UKP from the State budget, which definitely disturbs the allocation for some other sectors/projects, the government now has to allocate funds only for the interest payments due. Thus, in the short run, through KBJNL, the State government gets almost six times the capital for every rupee allocated in the budget to pay for the interest (at the interest rate of about 17 per cent).

3. Timely implementation of the project

Because of regular flow of funds through KBJNL and high priority given by the State to complete all structures of UKP by the year 2000, the project seems to have made considerable progress both in terms of physical construction and in spending financial resources. By March 1999, the project had achieved 50 per cent of its financial target and 48 per cent of its physical target set for the year 2000. It should be noted that physical achievement figures are based on irrigation potential created (259,000 ha). If the actual area irrigated (145,000 ha till mid-1997) is considered, the physical achievement is short by 28 per cent of the final target. Originally, KBJNL was entrusted with the task of providing storage of 173 TMC and the main canals. Owing to inadequate performance of command area development, even the lining of canals and the construction of field channels were entrusted to KBJNL with the cost of Rs.25 billion to be mobilised during the next four years. KBJNL had allocated Rs.6.5 billion during 2001–02 for the construction of field channels to irrigate 145,000 ha.

4. Freedom to increase water rates

KBJNL is, in principle, empowered to levy and collect user charges in areas where it supplies or makes water available.[9] A committee was constituted in December 1995 to recommend a suitable organisational structure and modalities for levy and collection of water rates. The Committee's Report was discussed with the Chief Secretary in June 1996, and it was agreed that a revised proposal would be prepared considering: a) organisational cost of the proposed set-up for levy and collection of water rates; b) action plan for the development of Water Users Co-operative Societies (WUCs) and supply of water in bulk to these societies, including the plans for rehabilitating the distribution network and fixing of measuring devices; c) rationalisation of the staffing pattern for the Operation and Maintenance zone of KBJNL considering the pace of turnover of irrigation management to water users societies and the organisational arrangements required during the transition period.

Table 2: Share of KBJNL and GOK in the Project Expenditure during 1995-96 to 1998-99 (Rs. Millions)

Zone	1995-96			1996-97			1997-98			1998-99		
	NIGAM	GOK	TOTAL	NIGAM	GOK	TOTAL	NIGAM	GOK	TOTAL	NIGAM	GOK	TOTAL
Dam Zone												
Almatti	70.30	370.70	450.0	400.58	120.99	530.56	690.74	30.21	720.95	590.81	0.28	590.09
Canal Zone-1												
B'gudi	460.90	804.55	1,110.45	2,030.25	280.72	2,310.97	1,860.25	10.38	1,670.63	1,660.15	0.30	1,660.45
Canal Zone-2												
Kembhavi	160.81	790.00	950.81	1,050.92	420.9	1,480.82	1,100.78	20.75	1,130.53	1,290.33	0.43	1,290.76
O&M Zon												
Narayanapur	140.98	100.69	250.66	460.59		460.59	420.88		420.88	500.52		500.52
R&R												
Bagalkot	150.57	660.13	810.70	520.29	650.53	1,170.02	1,700.88	370.4	2,080.38	3,540.05	160.78	3,700.83
BTDA												
Bagalkot	40.13	80.00	120.13	70.59	20.19	90.78	120.22	0.05	120.27	380.38		380.36
KBJNL Office												
& Others	70.98	80.32	160.30	1,000.87	40.78	1,050.75	1,660.07	10.69	1,670.88	2,730.15	0.05	2,730.20
Total	1,130.87	2,740.38	3,880.05	5,570.18	1,570.10	7,140.29	7,380.92	460.68	7,850.60	10,680.31	170.84	10,860.21

Source: KBJNL, June 2002.

Table 3 : Estimated Flow of Funds for KBJNL (Rs. millions)

Sl.	Particulars	Up to March	Balance	Total
A	Opening balance		1,984.90	
B	Sources of funds			
1	World Bank	5,450.00		5,450.00
2	Budgetary support from GOK	17,500.10	13,744.60	31,244.70
3	Income from operations including interest earned on short-term deposits	689.60	100.00	789.60
4	Market borrowings (including HUDCO)	21,456.70	9,343.30	30,800.00
5	Short-term borrowings – Banks	2,579.00		2,579.00
C	Sub-total	47,675.40	23,187.90	70,863.30
D	Total funds available	47,675.40	25,172.80	72,848.20
1	Project expenditure	37,903.70	20,596.30	58,500.00
2	Interest on market borrowings	4,641.50	3,830.00	8,471.50
3	Interest on HUDCO borrowings		151.00	151.00
4	Interest on bank borrowings	85.80		85.80
5	Issue expenses	480.50	417.50	898.00
6	Repayment – borrowings (HUDCO)		173.10	173.10
7	Repayment of short-term borrowings – Banks	2,579.00		2,579.00
E	Sub-Total (1-7)	45,690.50	25,167.90	70,858.40

Source: KBJNL, June 2002.

Later, the KBJNL Managing Director had extensive discussions with the officials of CADA-UKP, O&M Zone, and Water and Land Management Institute on water rate collection (Bhavanishankar 1996) and to prepare revised proposals. The Nigam has accorded priority to turn over irrigation management to the water user societies, and has decided not to involve Gram Panchayats (village councils) in the process of collection of water rates.[10] The revised proposals called for: (a) appointment of two additional sub-inspectors to the proposed canal security force in the UKP; (b) issuing a voucher/ memo to the water user, indicating exemption from the water rates when free water is provided as a promotional measure during the initial years; (c) adoption of water rates in UKP to be in tune with the promotional water rates implemented for WUAs in Maharashtra; and (d) provisions permitting KBJNL to progressively increase the water rates and adopt these rates for forecasting the revenues.

The existing water rates are very low, covering only 3.75 per cent of the operation and maintenance costs. The Committee on Pricing of Irrigation Water (GoI

1992) suggested that cost recovery should be aimed at recovering the O&M costs and 1 per cent interest on capital employed. Based on this approach, the pricing per hectare in the KBJNL area would work out to Rs.962/ha. This is somewhat closer to the Rs.945/ha. as worked out by the State irrigation department.[11] Even the Agricultural Policy of the government of Karnataka (Government of Karnataka 1993) has suggested that the water fee levels be increased to 5 per cent of the gross value of the produce.[12] As indicated in Table 4, the water rates for irrigated dry crops in the Upper Krishna Project vary from Rs.37.50/ha (for pulses) to Rs. 100/ha (for cotton). If water rates are progressively increased at 25 per cent annually as recommended to the state government[13] by the board of directors of KBJNL, the water rates for different crop areas work out as shown in Table 4. The State government agreed, in principle,[14] to progressively increase water rates for forecasting the revenues receivable by the Nigam. CRISIL, a credit rating agency, accepted this proposal of the government for rating of KBJNL, although the decision remained pending until 2001. In July 2001, KBJNL implemented the water rates announced by the Government of Karnataka for the whole State. This ended all speculation of having a different set of water rates for the KBJNL area, and non-KBJNL area in the State. As indicated in Table 4, the new rates adopted are less than 17 per cent of the KBJNL proposed rates for all crops except sugarcane and tobacco, which are minor crops in the KBJNL command, and less than 3 per cent of the gross value of production.

5. Water fee levy and collection

KBJNL has accorded priority to bulk water supplies on a volumetric basis to farmers' societies and collection of water rates accordingly. The necessary amendments to the various acts and rules in Karnataka are being carried out and the State government policy on participatory irrigation management is being formulated. KBJNL has to provide water supply to individual users in areas where users' associations are not formed. To keep the administrative costs low, KBJNL has proposed to entrust levy and collection of water rates to the O & M field staff, with one additional assistant engineer/junior engineer and one additional first division accounts assistant at the sub-divisional level.

KBJNL proposes three modes of collection of water rates payment by the users/societies: (a) at the sub-divisional cash counter; b) to designated banks; c) directly to the section officer concerned of the irrigation department. After societies are adjusted to bulk water supplies, the O & M field staff will be re-deployed in new non-society areas. Levy and collection tasks will be carried out at the sub-divisional level, supervised at the divisional level, and monitored at the circle level. Passbooks will be issued to users as prescribed by the government. For delayed payments by a user/society a penalty at the rate of 18 per cent will be levied for the period of delay. Cases of non-payment of water rates and penalty may be referred to the Revenue Department for recovery as arrears of land revenue.

Table 4: Water Rates for Karnataka and KBJNL (Rs./ha)

Crop	KBJNL Rates (as per 1965 rules)	Karnataka Rates (adopted in 1985)	KBJNL Proposed Rates	Karnataka Rates Revised 2001
Sugarcane	617[a]	555.75[b]	891	988.45
Paddy	86[c]	86.45[d]	1473	247.10
Cotton	99	98.80	n.a.	148.25
Horticultural crops	99	98.80	885	148.25
Wheat	54	54.34	885	148.25
Groundnut	59	59.28	885	148.25
Sunflower	n.a.	-	n.a.	148.25
Jowar, Maize, Bajra, Ragi and semi-dry crops	49	49.40	516	86.50
Pulses	37	37.05	n.a.	86.50
Tobacco	59	61.75	209	86.50
Fodder crops	n.a.	19.76	n.a.	37.05
Others	n.a.	-	n.a.	86.50

Notes:

a For 18 months crop. For 12 month crop, Rs. 370

b For 12–18 months crop. For less than 12 months crop, Rs. 150.

c For 1st crop. For subsequent crops, Rs. 99.

d For 1st crop. For subsequent crops, Rs. 40.

n.a. Not applicable

Source: KBJNL and Department of Minor Irrigation, Bangalore, 2002.

For effective levy and collection of water fees in the UKP, as outlined earlier, certain changes in the legal framework are necessary. KBJNL has proposed certain changes in billing and collection**.** Powers to levy and collect charges, currently vested with the assistant commissioner and tahasildar,[15] should be shifted to the executive engineer and the assistant executive engineer of KBJNL. Water users should be able to file objections on levy of water rates to the executive engineer instead of the assistant commissioner. KBJNL needs to be empowered to levy a penalty on water users for payment delays. If KBJNL fails in collection, water fee and penalty should be collected as arrears of land revenue. In regard to volumetric supply to the WUAs, the assistant executive engineer of KBJNL should have the authority to levy volumetric water rates wherever volumetric water supplies are made to societies; as a promotional measure, lower water rates may be levied during the first three years.[16] The major change in the legal framework suggested is to transfer the power to levy and collect water fees from the general revenue department or irrigation

department of the state or the Executive Engineer of KBJNL, except in the case of recovery of arrears.

In practice, though KBJNL assesses water charges of Rs.50 million per year, the collection rate is only 50 per cent. This is at least partly because the KBJNL staff lacks enforcement powers accorded to the Revenue Department officials who collect water charges in the non-KBJNL area of the state. Even this 50 per cent that is collected goes to the State exchequer rather than directly to KBJNL, thereby losing any connection between farmers' payments and KBJNL revenues, as required for a financially autonomous agency.

Some recent 'innovations'

Over the years, KBJNL has experimented with more efficient use of its funds. KBJNL is getting a loan of Rs. 4,040 million at a lower interest rate (Rs. 2,040 million at 9 per cent, and another Rs.2,000 million at 12.5–14 per cent) from HUDCO (Housing and Urban Development Corporation) for housing activity in the rehabilitation and resettlement area; to that extent KBJNL's financial burden has reduced. Further, it plans to return funds borrowed earlier at higher interest rates (14–17.5 per cent). This will be done by borrowing at lower interest rates currently prevailing in the money market. KBJNL has secured approval to raise funds under infrastructure schemes, which are available at lower interest rates[17]. KBJNL has requested CRISIL to suggest and approve avenues to raise revenue in the UKP project. This includes toll tax on 600 km of roads in the UKP command area, toll collection on six bridges constructed over the Krishna river, fishing rights, leasing out of fibre optical lines for communication to be installed along the major canals, growing and selling of trees on canal bunds, etc.

Weaknesses

Although KBJNL has made considerable progress in mobilising capital for construction, it has not introduced structural reforms within the organisation, nor has it paid attention to repayment. A major weakness of KBJNL is its dependence on government support. It does not generate any income on its own. The organisation depends on the government's budgetary support even for interest and principal payments to bond subscribers and shareholders. Though the KBJNL was originally designed to be a financially autonomous body, its functions mainly on the lines of a government agency.

Functional hierarchy, lack of accountability, and inadequate performance measurement practices, lack of consultations with stakeholders, record maintenance, and method of management information system, etc., all indicate it to be an extension of a government department. Second, more than 95 per cent of the staff are on deputation from various government departments to KBJNL.[18] The work culture has hardly changed in the new set-up. Lack of proper recruitment policies and incentive and disincentive structures have led to inadequate professionalism.

Persons on deputation still hold key positions. Their stakes are not related to the performance of KBJNL. Even the management board hardly has any professionals. Third, since the beginning, stress has been on completing the physical structures of the project. Indeed, the decision-makers of KBJNL fully acknowledge that the organisation was created mainly to take care of physical structures. Thereby, there is hardly any emphasis on on-farm development works, efficient operation and maintenance of the distributory system and main system management. Crop choices, productivity, agricultural extension, reclamation of waterlogged areas and related issues have become secondary. Fourth, there is no mechanism to generate and sustain farmers' participation in this new set-up. Responsibility for the formation of water users associations rests with the cooperative wing of the command area development authority. KBJNL has not designed any plans to involve water users and other stakeholders in the project to participate in resource mobilisation, system operation and maintenance, water distribution, and water fee collection and other related activities. As a result, the organisational structure and decision-making process has remained top-down. Finally, the KBJNL bye-laws make provision for the Nigam to reset water fee levels, levy and collect it. In practice, even after six years, it has not increased the water fee levels. Even a regulatory body has not been set up to examine, costs and monitor the process. On the other hand, anticipating the proposed water fee hike, the farmers' lobby has organised a series of agitations over the last few years. These protests, held both in the project area and in the State capital, were fuelled by lack of transparency and stakeholder involvement in the system management. Farmers' opposition to increasing irrigation charges is gaining momentum. The political implications of this opposition have made the government even more reluctant to address repayment issues.

Replicability

One such corporation, known as Karnataka Neeravari Nigam Limted (KNNL), has been formed on the lines of KBJNL, to raise funds and manage eight irrigation projects in the Krishna basin of Karnataka. Four more corporations are being planned on similar lines. KNNL was set up during early 1999 with an initial paid-up capital of Rs.100 million. The State government has transferred assets worth Rs.7 billion to the corporation, raising its paid-up capital to Rs.7.1 billion. These assets include land and under-construction irrigation works in the region. It has an authorised capital of Rs.30 billion, which would be raised through bond issues and various issues at intervals depending on the fund requirements of the projects. The corporation is authorised to charge suitable water rates for irrigation, municipal, city corporations, and for industrial use.

KNNL has raised Rs.2.47 billion from two issues so far. The first bond issue (closed on April 25, 1999) has raised Rs.1.41 billion, mostly from banks and financial institutions on the basis of a floating rate of interest[19]. At the going rate, KNNL will

have to pay an interest of 13 per cent with a put-and-call option. The second issue (closed on June 7, 1999) raised Rs.1.06 billion. This was a seven-year instrument privately placed with 13.25 per cent interest.

Alternative Institutional Mechanism

KBJNL: A Model for Institutional Reforms in Irrigation Financing?

Is KBJNL pointing towards the type of institutional reforms that may be in the offing to solve the problems of canal irrigation financing? Can one take the structure and functioning of KBJNL as a model for ensuring efficiency, equity and sustainability of canal irrigation? These are difficult questions, requiring an in-depth evaluation of KBJNL against the yardstick of an irrigation institution (agency) that can achieve these basic objectives of canal irrigation.

It is useful to consider two possibilities with respect to reform options in canal irrigation. First is the idea of a financially autonomous irrigation agency (FAIA), and second an independent regulatory commission for canal irrigation (IRCCI). The idea of FAIA was recommended earlier by Small and Carruthers (1991), Gulati, Svendsen and Choudhury (1995), among many others, whereas the suggestion of an IRCCI has a recent genesis, prompted by the way many infrastructure projects like power, ports and roads are attempting to raise finances from markets and improve upon their operational efficiency by introducing some commercial principles (GOI 1996).

Financially Autonomous Irrigation Agency (FAIA)

The creation of FAIA can be an effective means of: (a) introducing administrative and financial autonomy; (b) increasing accountability; (c) facilitating contacts with, and contracting out to farmers, NGOs and private firms; (d) introducing less politicised procedures to set and collect water charges; and (e) mobilising private sector funds. The key concept here is self-financing. After a pre-defined nascent period, such corporations must provide for O&M and recurrent expenditure out of their own revenues (capital expenditures may still continue to be 'largely' funded by the State). They must have both the mandate and the authority to set water charges at a level adequate to cover their expenses and service their debts. Once such self-financing has been established and recourse to treasury funding for recurrent and O&M expenditure cut off, they can also sell debt in the bond market (World Bank 1997: 26).

A review of irrigation financing in several countries (Small *et al* 1989) identified FAIAs as one potentially powerful reform. Small and Carruthers (1991) argue that this approach is desirable from the efficiency perspective because a policy of user fees implemented by an FAIA creates the potential for improvements, both in the operation and maintenance of existing irrigation facilities and in the process by which investment decisions are made. The potential for improvements in O&M stems in part from the greater control that an FAIA can have over its budget. But the

key to attaining higher efficiency under FAIA lies in linking incentives of the agency staff with their performance in satisfying the demands of end users. If the income of these FAIAs is dependent on the revenue they themselves collect for irrigation service, this will provide an incentive for more regular and stricter collection of revenues from user groups. Since users withholding payment in response to poor service will then have a direct impact on agency budgets (including salaries), it also creates incentives for better irrigation service to facilitate fee payment. Financial autonomy thus provides a functional link between collection of revenue from users of irrigation water and more effective irrigation performance by suppliers of water (Svendsen 1991). Further, with financial autonomy, incentives are created to increase agency income, and to reduce costs.

Taken together, these factors should help establish a relationship of mutual dependence between the supply agency (i.e., irrigation department) and the farmer user-group. The irrigation agency provides an essential service to farmers, i.e., irrigation water in the quantity and quality desired by the user, while users, in turn, provide the agency with the financial resources necessary for its existence and operation. This mutual dependence can result in greatly expanded potential for efficient irrigation management (Gulati, Svendsen, and Choudhury 1994: A–78). It is the possibility of creating this critical link that distinguishes the FAIA from the typical irrigation department approach. To be an effective FAIA, it is necessary to establish the link between incentives and performance, irrespective of the kind of financial autonomy it has.

Structurally, FAIA can be an agency of user groups, or a private company, or an autonomous corporation created by the government under the Company Act, or a combination of any two or more of these. So long as it can introduce commercial principles, link incentives with performance, meet the O&M costs (and a part of capital cost), and promote efficiency, equity and sustainability in the use of canal irrigation waters, we feel it serves the purpose. The concept of a corporation like KBJNL is one of these.

This is not the first attempt in India in this direction. Andhra Pradesh State Irrigation Development Corporation was registered in 1974 to function on corporate lines and access private and institutional finance. But cost recovery never even approached actual expenses; the corporation accumulated heavy losses and could not service its bank loans. It no longer attracts bank finance due to its arrears. The Gujarat Water Resources Development Corporation, wholly owned by the Government of Gujarat and registered under the Companies Act, engaged in groundwater exploration, construction, and management of public tubewells, but faced worsening financial and operational conditions ever since its inception in 1975.[20] The 1994 finance committee suggested that the corporation be wound up (Kolavalli and Raju 1995; Shah *et al* 1995).

Four Indian states (Gujarat, Maharashtra, Karnataka, and Andhra Pradesh) have now set up corporations, or Nigams, which focus on mobilising funds for surface irrigation. All four states started their corporations mainly to overcome the reduced budgetary allocations for the irrigation sector. These corporations were broadly established on the lines of public sector companies, to mobilise funds.[21] The emphasis was on mobilising funds from institutions, particularly those which were directly or indirectly regulated and/or were linked to government[22] rather than individuals.

The capital and debt markets have provided an important alternative source of funding. The debt markets trade bonds of public sector undertakings and corporate debentures. Major investors in these bonds are institutions, owing to the investment pattern specified by the Indian government.[23] There are prospects for such financing to become a major source of funding in the near future, provided certain conditions are met:

- Only companies and corporations can issue papers which can be traded in these markets to raise funding. State-issued papers are subject to the overall ceiling on state borrowing.
- The bonds must be professionally designed and issued, with terms, interest, and payment modes that attract the specific market segment to which a particular issue is addressed.
- The issuing companies or corporations must have the capacity to generate enough cash flow to service the bonds, which is constrained by the very low levels of water charges at present.

On similar lines, the states of Maharashtra, Andhra Pradesh, and Karnataka have established independent corporate bodies. All three were established to develop and utilise water from the Krishna river. The utilisation levels and dates were determined by the Krishna Waters Dispute Tribunal (Bachawat Award) in 1973. The Maharashtra Corporation and the Karnataka company are the only two that placed bond issues recently. Both have been successful. Maharashtra's first two issues were substantially oversubscribed, allowing it to place a third issue privately, for a total of about Rs.10 billion. An innovative sort of government guarantee in both Maharashtra and Karnataka has satisfied investors that the bonds will get serviced.[24] Thus, as the states have been forced to generate funds from outside sources, the capital and debt markets have become a major avenue for irrigation financing.

The big question, however, is whether these corporations usher in reforms in canal irrigation that can lead to higher efficiency, better equity, and sustainability in the use of canal waters. The answer lies in evaluating whether corporations like KBJNL have evolved mechanisms linking incentives of the agency staff with their performance; whether they have been able to distance pricing of water from political interference; and finally, whether they have been able to raise resources by revising

water rates and collecting revenue, and/or directly from the market as market loans, and developed the capacity to repay them. It is a bit too early to evaluate the structure and functioning of KBJNL, since it began only in August 1994, but an examination reveals that the answer is both 'yes' and 'no'. Let us elaborate somewhat on this situation.

The financially autonomous, farmer-financed irrigation agencies are supposed to create different incentives for the agency and its staff. However, it has not been translated into the work plans or reward structure of KBJNL, because that has not been an objective of the agency as a whole. Moreover, because much of the staff was seconded from government line departments, KBJNL has not developed a distinct corporate culture. The expectation of the staff is that they are there only for a fixed period. Further, the main clients are the bondholders, who are not the farmers. The need to assure the bondholders that they will be repaid provides some leverage to raise water fees, but because the farmers were not consulted about this and they see no improvement in the system performance, their opposition increases. Moreover, because the expectation of bondholders, rating agency, agency staff and farmers alike is that the government will pay, their behaviour based on these expectations is no different from 'business as usual.' In simple terms, the answer is that KBJNL has not ushered in major performance improvements, mainly because the agency has some in-built lacunae:

- The financial situation demanded raising money speedily, and this it did. What it did not do was paying attention to the long-term sustainability of the system, either in terms of financial sustainability or managerial and infrastructure sustainability.
- Improvement in performance of the system was neither part of its objective nor of its current functions in spite of most of the irrigation project review studies emphasising the crucial need for performance improvement. Here, the stress was more on rapid construction.
- KBJNL in its present form is not sufficiently equipped to address the larger issues of reforms in the irrigation sector: increasing efficiency in project performance; increasing agricultural productivity; enhancing revenue generation; providing users more productive roles to play in the project; reducing operational costs over time; or sustainable management of the project.
- To fulfil the credit rating agency requirements, KBJNL had promised to raise water prices, form water users' associations, and collect revenue through WUAs. After four years since KBJNL began functioning, neither were these promises kept nor were there serious attempts to move in that direction.

As for mobilising more capital resources, KBJNL seems to have done quite a successful job.[25] The additions in structures over the last five years will keep raising the book value of assets. On the other hand, payment of interest that is due

will have to be settled by the budgetary resources of the State government, as KBJNL has failed to generate internal resources to repay even the interest on these loans, not to mention the principal. So far KBJNL has failed to revise the water rates to any reasonable level that can ensure repayment of debt even though in theory, at least, it has the power to fix and collect water rates. Not that KBJNL did not try to raise water rates, but the proposed water rates did not get the approval of the government and, therefore, could not be implemented. Because of the continued dependence on the State budget to pay for expenses, the 'financial autonomy' of KBJNL is really a myth.

On the other hand, the proposed water rates were never discussed with the farmers. The new fee recovery strategy focuses on volumetric sales, and organising users to become involved in system management and fee collection. But the failure to consult with users about basic issues in canal development, fees, or contracts, has created resistance. The approach remained typically 'top-down'. When farmers came to know of the hefty increases in the proposed water rates, they started agitations, mobilised political support, and thwarted any increase in water rates. As a result, the same old water fees are levied and only part of that is collected. This is nowhere near the actual expenses on O&M of the project, not to talk of any interest or part of the loans raised.[26] Thus, the potential of FAIAs seems to have remained unachieved, even after four years of its existence.

But did the corporation link incentives with performance to do a better and quicker job? When the National Irrigation Administration of the Philippines became financially autonomous, it introduced incentives to increase agency income and reduce its costs at the project level, and included these incentives in the performance appraisals of the employees. KBJNL has had no plans (as early as 1999) to do any of this. Clearly, there is a lack of vision among the management staff about what a financially autonomous irrigation agency can do. It also indicates inadequate conceptualisation of KBJNL as an autonomous body. Both agency staff and farmers interviewed believe that the State will repay all debts, and they continue to act on the premise of 'business as usual.' Furthermore, much of the staff has no long-term identification with KBJNL, nor an incentive to see it succeed, because it is only on deputation from the government of Karnataka (especially the regular Irrigation Department).

Nonetheless, the officials at UKP-CADA office report that things are moving somewhat faster on the financial and physical fronts, despite the bulk of the staff having come from the government on deputation. The flow of funds is faster: it takes only one to two weeks to get money from KBJNL and pay it to contractors, compared with two to three months in a system where funds have to come from the government. As a result, the construction activity stayed more or less on schedule. Thus, overall, it appears that there is some reduction in the time consumed, which should result in shortening the gestation lag between expenditures

incurred and potential created. This, in turn, should help to contain the cost escalation to the extent it was due to delays in implementation emanating from lack of resources, or erratic/halting release of funds. But it is difficult to measure precisely how much is the gain in cost reduction under the current set-up, *vis-a-vis* the departmental set-up of GOK without considering other aspects too.

To some extent, the motives for and benefits of KBJNL cannot be understood without looking at water rights. Accelerating the process of irrigation development in UKP not only reduces lags and therefore, cuts costs, but also secures water rights under the Bachawat Award. Delays in implementation between 1995 and 2000 not only increased the cost of irrigation, but also risked having water taken away from Karnataka when the Award is reviewed. If states see the demand for water rising in the future, the value (in economic and political terms) of UKP in securing water may be greater than the estimated returns on the irrigation system alone.

Independent Regulatory Commission for Canal Irrigation (IRCCI)

In recent years, there has been growing interest in privatisation as a solution to the financial crunch faced by the irrigation sector as well as other infrastructure sectors such as power, ports, and roads. Saleth (1996) advocates privatisation[27] of water resources management by involving the corporate sector in finance and construction[28] and farmers' organisation to take care of water distribution and fee collection (as a complement to the government's role).

Privatisation of infrastructure has also been advocated by the Expert Group on the Commercialization of Infrastructure Projects (GOI 1996). Though this study was not directly related to the irrigation sector, it had gathered sufficient support for privatisation of infrastructure projects like roads, ports, power, telecommunications, and urban infrastructure, including domestic water supply. The arguments put forward by this Group also apply to a large extent to the irrigation sector.[29] The expert group argues that whereas the governments in developing countries are reeling under fiscal pressures, integration of world capital markets has vastly increased the possibility of raising large funds for infrastructure investment on a commercial basis. In many cases, it is now the private sector that is capable of sourcing large funds internationally.

However, it is easy to underestimate the dangers of introducing commercial principles in a situation where the forces of competition do not work. The expert group on Commercialisation of Infrastructure (GOI 1996) warns that despite the new possibilities of competition, most infrastructure services retain very strong monopolistic elements. The State continues to be responsible for providing appropriate regulatory frameworks, which assist investors and infrastructure entities, on the one hand, and protect consumers from monopolistic exploitation, on the other. The commercialisation of infrastructure and unbundling also leads to a considerable increase in transaction costs, which have to be mitigated through transparent and

appropriate regulation (GOI 1996: 2). In a free market environment, costs of production/ service are kept low by competition. But canal irrigation is more of a natural monopoly, and unless its costs are kept under tight control and its operations made transparent, it runs the danger of passing on the high costs to the users of water. Indeed, the corporate arrangement provides *less* accountability and transparency than for government (especially Plan) expenditures. The price for faster turn-around in expenditure appears to be a reduction in cross-checks. Thus, there is a need for an independent regulatory body such as an IRCCI as a complement to financially autonomous agencies, to ensure transparency in the operations of such an agency.

The setting up of IRCCI has been recommended for two reasons: first, to bring transparency into the operations of FAIA, especially if it is to work on commercial lines, and second, to ensure that pricing of water is distanced from political interference. FAIA represents a move towards bringing some elements of corporate culture in irrigation financing. It is better to charge the users of water to recover all costs of O&M at least, and if possible even capital costs. The first purpose of an IRCCI, that of creating transparency, is essential to keep costs down and prevent exploitation of water users by the corporation. However, this same transparency can also help distance pricing from political interference. When the current level of water tariff is so low that even recovering O&M costs may require drastic increases in water rates (often more than four times), users are likely to object, obviously having political repercussions, which no political party can afford to ignore. It becomes essential to involve farmers in the entire exercise of fixing fees and checking on how they are spent, and convincing them that higher tariff would help the agency to render better service. Yet it is no easy task to convince farmers that it would be in their interests to pay a reasonable water tariff.

IRCCI can help in this direction by playing the role of an independent judiciary between the farmers and the agency. A precondition for success is that it be headed by a well-known person with an impeccable record of honesty, and that it have representatives from both the farmers' side and from the agency's side. It can always hire technical experts to work out the 'appropriate' level of tariffs. But the prime function of such a body would be to ensure transparency in costs of canal irrigation, especially capital costs. It would make known the contracts between private builders and the agency to people at large, ensure access to information relating to these contracts, invite NGOs and farmer groups to scrutinise these costs, and encourage them to participate in the bids. This would help create healthy competition amongst construction companies, and check the large leakages (rent seeking) that often characterise this sector. But no provision for such an IRCCI has been made in any of the states that have floated irrigation corporations.

Conclusions

The latest trend in financing canal irrigation in India harks back to colonial ventures to raise funds for canals and other infrastructure investments in India. Several states have now launched irrigation corporations with the primary objective of raising financial resources from the market to build irrigation structures. The model is similar for Sardar Sarovar Narmada Nigam Limited in Gujarat or Maharashtra Krishna Valley Development Corporation in Maharashtra or KBJNL in Karnataka. Their genesis lies in the acute scarcity of financial resources faced by the respective state governments, and the compulsions to build the irrigation structures rapidly. The financial crunch for canal irrigation has been felt because of stoppage/suspension of loans from the World Bank or the Central government, as the projects concerned have invited criticism and dispute either from the people at large, owing to poor implementation of R&R, or from the riparian states (as in the case of the Almatti dam). These states, finding it difficult to mobilise funds from the World Bank or the Centre under normal procedures, hit upon the idea of raising funds from the market by floating a corporation. To get the confidence of lenders, the state governments not only gave bondholders a guarantee that it would repay the interest and principal if the corporation failed to do so, but also 'persuaded' them to buy these bonds.

Theoretically, these corporations have a comprehensive programme to usher in reforms in canal irrigation of those basins/projects, and put them on a sustainable track, but their activities have largely remained concentrated in mobilising large funds, and spending them liberally to complete the structures in a reasonably short time. This has surely curtailed the gestation lag between expenditures incurred and potential created. But whether it has led to reduction in cost, whether expenditure patterns have been transparent and productive, and whether these corporations have infused the spirit of efficiency in the functionaries by linking incentives with performance remains doubtful. A detailed analysis of their style of functioning reveals that although these corporations, including KBJNL, appear to be FAIAs, they are really still financially dependent on the state, and they fail to deliver reforms beyond mobilisation of capital funds and construction of physical infrastructure. These corporations basically remain a means for raising funds from the market, thus bypassing the limits imposed on state borrowing by the Planning Commission and the Reserve Bank of India. Failure to consider repayment of capital remains their greatest weakness. As a result, they do not inspire the confidence of farmers to overcome images of inefficiency and corruption. The result is that farmers are opposing increases in irrigation fees.

Since they fail to generate internal resources to repay the loans, the burden will eventually fall on the State, and like many other corporations, whether they are for state transportation or for power generation and supplies, they are also likely to become financially sick. After a decade or so, some expert committee may recommend their closure. The experiment of ushering reforms to improve the overall functioning

of canal irrigation through financially autonomous irrigation agencies such as KBJNL may thus remain a missed opportunity.

Notes

[1] This study was funded by the Ford Foundation as part of a larger study on Institutional Reforms in Indian Irrigation (Gulati, Meinzen-Dick, and Raju 1999). An earlier version of this paper was presented at the Indian National Conference on Participatory Irrigation Management, Hyderabad, held during January 19–23, 1999.

[2] The UKP has two dams across the Krishna river and a network of canals. The main storage is at Almatti dam and a lower dam at Narayanpur serves as a diversion dam. The project was planned to be implemented in different stages and phases. A river bed project to generate 672 million units of electricity under the Almatti dam was also planned.

[3] The terms of World Bank loan specified that the government of Karnataka should first spend money, then the Bank would reimburse (90 per cent bank, 10 per cent GOK) every month. Accordingly, funds were disbursed and claimed from the Bank. The last date for filing claims was December 12, 1996, but it was extended until June 30, 1997.

[4] Even 12 years after the Bachawat Award, the R&R work has remained incomplete. The revised estimates for compensation have hiked the R&R budget to Rs.25,000 million.

[5] The financial scenario was not much different in the other states sharing Krishna water, i.e., Maharashtra and Andhra Pradesh. The other states also established similar corporations for the same reason, viz, to mobilise more funds in a shorter time.

[6] KBJNL was created with the following main objectives towards completion of UKP: a) to undertake planning, investigation, estimation, execution, operation and maintenance of all the irrigation projects under the Upper Krishna Project in the Krishna river basin or Karnataka up to the outlet point only, keeping in view the Tribunal award, and the allocation of water made by the government of Karnataka; b) to prepare detailed project reports and estimates of irrigation projects and to obtain their approvals as the case may be; c) to implement the externally aided Upper Krishna Project in Krishna valley; d) to undertake resettlement and rehabilitation of the people affected by construction of the project; e) to undertake measures for the protection and improvement of environment and health and well-being of the people including the treatment of catchment areas of the project; f) to draw standards and specifications for implementation of the project and maintenance thereof; g) to promote schemes in the State for flood control in the Krishna river basin in Karnataka; h) to promote schemes for irrigation and navigation; and i) to promote schemes for irrigation and water supply in the State for utilisation of water from the Upper Krishna Project. To fulfil the objectives and reap the benefits listed above, the company is authorised to borrow or raise the required resources through issue of shares or debentures or any other securities. The company has been empowered to sell water and recover revenues from individuals and groups of

farmers including those in the CADA, town and city municipalities and industries. It is also entrusted with rehabilitation and resettlement of the people affected by the project.

[7] KBJNL has to mobilise funds to meet R&R costs as well. From 1996–99, KBJNL has incurred Rs.3.4 billion on R&R.

[8] Under private placement, the company appoints a few lead managers, on commission basis, who, in turn, take the responsibility for getting full subscription (generally from financial institutions, corporate bodies, and other agencies).

[9] The Karnataka Irrigation (Levy of Betterment Contribution and Water Rate) (Second Amendment) Act, 1995, (Karnataka Act No. 21 of 1995) empowers the Krishna Bhagya Jala Nigam Limited to collect user charges.

[10] Gram panchayats are empowered under section 203 of the Karnataka Panchayat Act. 1993 to contract out to the agencies to collect taxes on a tender basis.

[11] Rs.945 per ha is based on the KBJNL's proposed water rates, which is 15 times as high as the current rates.

[12] The extract of the input pricing policy contained in the Agricultural Policy of the Government of Karnataka, 1995, reads as follows: 'Once farmers start getting reasonable returns on produce, they would be asked to pay appropriate prices for critical inputs, especially water and electricity that are so scarce in Karnataka. The first attempt by the State would be to hand over this responsibility of collecting the dues on water and electricity to Farmer's Organisations themselves on attractive commission basis. If they fail in this task, the private sector would be involved in the distribution of these critical inputs and collection of dues thereof. It would be desirable for the State to initiate steps for ensuring supplies and charges of both these inputs on a volumetric basis, notwithstanding the expected hurdles. The farmers must realise that these inputs are scarce, and therefore, they must ensure efficient utilisation of these, and pay an appropriate price for these. For canal waters the charges would be gradually approximated to about 5 per cent of the gross value of the produce...'

Based on the data for the year 1995–96, obtained from the agricultural wing of UKP-CADA, 5 per cent of the gross rupee value of different crop productions per hectare:

Kharif Season		**Rabi Season**	
	Rs.		Rs.
Bajra	325	Rabi Jowar	450
Hybrid Jowar	450	Bengalgram	500
Greengram	350	Sunflower	550
Sunflower	500	Groundnut	800
Groundnut	785		
Cotton	1,050		

Paddy and sugarcane are not permitted to be cultivated in the UKP-CADA area.

[13] As per Government Order No. 89 NPC 85 (P II) dated 31-10-1988.

[14] Through G.O. No. ID 18 KBN 95 dated 1-7-95.

[15] Under the Karnataka Irrigation (Levy of Water Rate) Rules, 1965.

[16] The proposed water rates are: nil in the first year, as water is released for test and trial run of the system. In the second year, one-third of the water rate and in the third year, two-thirds of the water rate should be levied. In the fourth and subsequent years, full water rates should be levied. Even when water is provided free during the first year, a bill needs to be issued to the water users, indicating that they are exempted from paying the water rates.

[17] Under section 10(23-G) of the income-tax rules, any income generated from infrastructure fund, is exempted from the income-tax.

[18] By the end of 1998 there were 1,293 technical (up from 487 in March 1996) and 2,478 non-technical (up from 721) staff on deputation; the majority being from the irrigation department. Both the managing director and director, finance, are on deputation from the government. To perform the key functions (like monitoring finance, handling computers, designing), KBJNL has 41 technical and 87 non-technical staff directly recruited on contract basis. At the field level, 70 per cent of the staff is on deputation from the government.

[19] This innovative interest rate mechanism has been fixed based on the one-year average yield on gilt-edged securities plus 300 basis points.

[20] The corporation has accumulated a loss of over Rs.700 million and depends on the government for large subsidies to continue its operations. It faces constraints on what it can charge for its services; cost escalation adds to the deficit every year. Nearly 20 per cent of the deep tubewells that were not being adequately utilised have been closed down; the corporation began leasing out the tubewells to users in 1987 to reduce costs. It had a staggering wage bill of Rs.220 million for a staff of 6,400, while its annual gross income was only Rs.60 million.

[21] The ordinance and the Act issued to establish these corporations indicate the broad intentions.

[22] Like commercial banks, cooperative banks, urban and rural cooperatives, and financial institutions.

[23] The Indian government specifies a pattern of investment to be followed by non-government institutions to invest their provident funds, superannuation funds, and gratuity funds. The revised version, effective from April 1998 (Government of India, Ministry of Finance notification dated 12 June 1998) includes: 25 per cent of investment in central government securities; 15 cent in government securities issued by any state government; and 40 per cent in bonds or securities of public financial institutions, public sector companies (including KBJNL), the Infrastructure Development Finance Company, and/or certificate of deposits issued by public sector banks.

[24] Maharashtra has gone a step ahead and has invited private bids for 52 irrigation projects

worth Rs.150 billion. These projects, with investment ranging from Rs.10 million to Rs.35.40 billion, will be allotted to private investors either on build-own-manage basis or build-own-transfer basis. In the latter case, the department will buy water at an agreed price for distribution to the farmers (Saleth 1996:272).

[25] Fund raising has become easy for KBJNL because: a) Karnataka is not a heavily indebted state; b) Rs.50 billion is not so high an amount as to shake the government's financial health in critical conditions; c) the highest payment will be only in one year, i.e., Rs.17 billion in 2004. According to KBJNL management, this is manageable. KBJNL's borrowing is only for a fixed period. Investors know the purpose of borrowing, and to boost their confidence, the project completion is on schedule. Other reasons include lack of political interference and the fact that the company also places its funds temporarily in other banks to earn interest (at 9–10 per cent).

[26] Actual O & M costs in UKP are turning out to be Rs.912/ha, which is almost 200 per cent higher than the one projected by KBJNL (Rs.300/ha.) in its prospectus. The current water fee levels, according to the senior official of KBJNL, are very low, and collection of this even lower. Even the revised rates, which would be about 20 times the current rates, may not be able to recover the high O&M costs of KBJNL.

[27] According to Saleth (1996:5), the concept of privatisation essentially means a reduction in the influence of bureaucracy and a concurrent enhancement of the role of private initiatives in economic management.

[28] Various options are possible in this regard, as shown across the globe, for different infrastructure (like roads and ports) projects: a) build-own-operate system; b) build-own-transfer system; c) build-own-sell system; d) lease-own-operate system.

[29] It is argued in this paper that infrastructure services are often monopolistic in nature (such as surface irrigation). They usually involve high upfront costs, long payback periods, and bulky and lump sum investments. They are also characterised by the existence of externalities, which make it difficult for infrastructure entities to recoup investment costs and operational expenses through the levy of user charges. All these characteristics are also typical of canal irrigation.

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Designing Contingent Valuation (CV) Surveys for Estimating Use Values: Some Experience from a Case Study of a Water Supply Project

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Abstract

Contingent Valuation Method (CVM) is a frequently used non-market valuation method of eliciting use values of infrastructural projects in developing countries. The main criticism against it is that it has biases and the results are unreliable. Yet, it is used indiscriminately, especially in the developing countries. Consequently, the policy decisions lead to inefficient outcomes. CV studies should focus more on addressing the theoretical, methodological and other empirical issues rather than merely eliciting 'numbers.' This paper, drawing mainly from a case study, discusses how an 'ideal' CV survey can be conducted for estimating 'use values' in developing countries.

General Issues in CV Surveys

Contingent Valuation Method (CVM) is a stated preference method used primarily to estimate either the Hicksian 'compensating variation' or 'the equivalent variation' arising out of a change in the non-market environmental services and damages[1] (Mitchell and Carson 1989). Although it is a most frequently used method of estimating *non-use values* (e.g., Brookshire *et al* 1983; Walsh *et al* 1984), *non-market use values* (e.g. Choe *et al* 1996; Loehman *et al* 1994; Loomis and duVair 1993; Altaf *et al* 1992) or *both* (Niklitschek and Leon 1996) all over the world, the CVM has been heavily criticised in the non-market valuation literature (see Carson *et al* 2001; Venkatachalam 2004). The CV literature can be classified into two broad categories, namely, (i) CV studies estimating the value of changes in the provision of non-market goods and services without making any attempt to evaluate the properties of the method (e.g., Garrod and Willis 1995; Briscoe *et al* 1990) and (ii) CV studies that do evaluate the properties of the method while estimating the value of the changes in environmental resources (e.g. Boxall *et al* 1996; Carson *et al* 1996; Loomis and White 1996). The basic difference between studies under category (i) and those under category (ii) is that the former do not test for the 'capability' of the CV method to estimate the 'true economic values' of environmental resources, whereas the latter do it more rigorously. The CV studies in category (ii) can be

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further classified into two sub-categories: (a) those studies which conclude that though subject to biases and errors, the CV method is capable of estimating the 'theoretically sound' economic value of the non-market goods after scrutinising the results for different sources of error that are supposed to affect the CV results. In this category, a considerable literature has been devoted to how the CV methodology can be improved upon so as to obtain error-free results (Hanemann 1994; Portney 1994; NOAA 1993); and (b) those studies which suggest that the CV method is not capable of estimating the economic values properly and therefore should not be used for estimating the non-use values of the environmental resources (e.g., Kahneman and Knestch 1992; Diamond and Hausman 1994).

A summary of the various categories of CV studies mentioned above may reveal that the major criticism of the CV method revolves around two aspects, namely, (a) validity and (b) reliability[2] (Smith 1993). One of the important conclusions derived from CV results is that the issue of validity and reliability arises from the fact that the CV method attracts several biases and 'noise' (Freeman 1993). Many studies have identified different sources of biases and noise, and have suggested various measures to improve upon the CV methodology (Mitchell and Carson 1989 and NOAA 1993). A major source of error has been identified as *lack of realism* in the 'scenario' conveyed to the respondents (Mitchell and Carson 1989; Hanemann 1994; Portney 1994). This is because the values obtained through the CV method are 'contingent' on the nature of the hypothetical market conveyed to the respondents in the form of 'scenario.' Hence, to obtain error-free results it is suggested that the 'scenario' be improved upon such that it could be 'as realistic as possible' (Portney 1994; NOAA 1993).

Despite many guidelines for conducting reliable CV surveys (e.g., Bateman and Turner 1993; NOAA 1993), CV studies in developing countries are being used indiscriminately (Merrett 2002). It should be noted that in developing countries, a larger percentage of CV studies is devoted to estimating the 'use values' derived from basic infrastructural projects, especially water supply and sanitation projects. Only a few CV studies of this kind attempt to 'validate' the results. The majority of them do not do so because of their basic assumption that the reliability and validity issues pertain mainly to the estimation of 'non-use values' and CV methods used in estimating 'use values' do generally perform well (Mitchell and Carson 1989). But, this does not mean that the CV results for use values are free from biases and errors. In the case of developing countries, apart from anomalies in 'survey design,' factors such as existence of illiteracy, deep-rooted cultural and historical values, traditional sociological and institutional set-up and inefficient government policies may affect the results of the household surveys, in general and CV surveys, in particular (Saunders and Warford 1976).[3] Moreover, these factors are found to differ among regions — even among villages within a region — in a developing country context

(Griffin *et al* 1995). An efficient CV study takes into account all these factors right from the initial stages of designing, implementing and administering the survey to interpretation of results. Many CV studies conducted in developing countries give more priority to policy-oriented issues such as socio-economic factors to be included in the econometric analysis, interpretation of performance of variables and policy implications of the results, and neglect the importance of issues related to theoretical and methodological aspects. It should be noted that 'results' can be derived even from a poorly conducted CV study but they may not be useful for effective policy-making purposes. In a developing country where poorly conducted CV study may lead to provision of misleading policy prescriptions, it is strongly felt that every CV study should give more priority to theoretical and methodological issues as well. This paper attempts to illustrate how an 'ideal CV survey' can be conducted for estimating the use values of infrastructural projects like water supply in a developing country context,[4] drawn mainly from an empirical CV study conducted in the semi-urban areas of Coimbatore district, Tamil Nadu, India.[5]

Theoretical Context of the CV Study

In any CV study, the theoretical context or framework is a prerequisite for eliciting the appropriate economic value. The precondition for conducting a CV study is that there exists an *ex-ante* situation where the 'expected Hicksian consumer surplus measures'[6] can be estimated from the responses provided by the users of the commodity. Specifically, a CV practitioner tries to estimate the 'expected change' in the utility function of the households, prior to the provision of the commodity under uncertainty conditions (McFadden 2001). When the researcher does not have a readily available 'utility function of the households,' the CV survey helps him/her to measure the 'change in the consumer surplus' by eliciting the household 'willingness to pay' value for the commodity. It should be noted that the entire exercise is well grounded in the 'expected utility theoretic framework' (Fishburn 1982). However, in many developing country CV studies, the appropriate theoretical framework is missing and, therefore, often the researchers themselves will not have any idea of 'what is being measured at all through the CV survey'. In other words, 'willingness to pay' from a layman's perspective is entirely different from 'willingness to pay' from an environmental economist's perspective. Ignorance of this important distinction on the part of a CV practitioner leads to negligence of rigorous 'theoretical validity' tests of the CV results. Most of the time, CV researchers in developing countries are interested only in 'numbers' elicited through CV surveys, giving less or no importance to the validity of the numbers. Therefore, it is always important that the entire CV survey be guided by an appropriate theoretical framework so that 'the theoretical validity' of the results can be assessed properly.[7]

Another theoretical issue to be addressed is the type of 'consumer surplus' measure (or the elicitation format) that the researcher intends to measure in an *ex-*

ante situation through a CV survey. It should be noted that there are four types of Hicksian consumer surplus measures: compensating variation; equivalent variation; compensating surplus; and equivalent surplus. Depending on the reference point in the provision of public good and the variation in the quantity of the good, the kind of surplus measure [i.e., either 'willingness to pay' (WTP) or 'willingness to accept compensation' (WTA)] to be used would vary.[8] There are certain concrete reasons why one has to use WTP format rather than WTA format in a CV survey (see NOAA 1993). For instance, a CV practitioner may be interested in estimating the loss in the 'utility' of the households owing to a fall in the quality of water from a particular source. In this case, a WTA compensation for the utility loss experienced by the households is considered to be an appropriate measure. However, the households may not have any well-defined property rights over the source of water and, as many empirical studies have suggested, the households may 'overstate' their WTA compensation. For these reasons, the CV practitioner has to design an alternative elicitation format using the WTP measure. This is where the '*ex-ante* situation' plays a crucial role. More precisely, the respondents should be asked to state their WTP value for an alternative source of water, creating an *ex-ante* situation. If the researcher does not modify the CV survey appropriately, she/he will end up using an 'inappropriate' format and hence get irrelevant results. Against this background, let us discuss how we dealt with different kinds of theoretical and methodological issues in our case study.

Our CV survey for eliciting the use value of the proposed water supply scheme was conducted in a semi-urban area of Coimbatore City, Tamil Nadu, India. The proposed scheme (namely, Pillur scheme) was sponsored by the World Bank and implemented by the Tamil Nadu Water and Drainage Board (TWAD Board). The Pillur scheme was to benefit households[9] (in terms of meeting all the water requirements at the household level and the drinking water requirement as the major one), industrial and commercial establishments located in part of Coimbatore City, 21 suburban towns and 523 wayside villages. Since the objective of our CV study was to estimate the expected 'Hicksian compensating variation' (Bateman *et al* 2000) from the beneficiaries of the Pillur scheme, we had to select an area to be benefited by this scheme. When preliminary investigation was made to select one of the areas for survey, it was found that a major part of Coimbatore City, 18 sub-urban towns and a larger percentage of the wayside villages, had already been covered by water supply from this scheme. In other words, an *ex-post* situation had arisen in these areas where there was no possibility of implementing the CV survey to elicit the 'expected utility' of the households. This being the case, we were left with only three suburban towns where the Pillur scheme was expected to be implemented in another six months' time. Since these three suburban towns provided us the *ex-ante* situation, we had to select one of these towns, namely,

Othakkalmandapam (hereafter, Mandapam) for the proposed CV survey. Two phenomena in the town provided us with appropriate input for developing an *ex-ante* situation. The first is the existing scenario on water supply in the town. Even though both ground and surface water resources are available, the existing supply was dependent mainly on groundwater sources. Public sources consisted of open wells, bore wells and hand-pumps installed by the water supply authorities of the town. Out of 18 open wells located all over the town, only one was used for pumping out water while the rest were completely dry. Even among the 27 hand pumps, only two hand pumps were frequently used by the households since these were the only hand pumps providing 'relatively good quality drinking water'. On an average, many of the existing sources of drinking water supply in this town had either dried up or become brackish when we undertook the survey.

The second factor that influenced the selection of the present study area relates to some aspects of the Pillur scheme. In the study area we had another feature that the water supply authorities had already decided about the policy on various components of the expected Pillur scheme, such as number of individual connections to be provided, amount of advance payment (or connection charge), monthly water tariff, etc, and conveyed it to the households as well. With these two aspects, we created a hypothetical '*ex-ante'* situation using the information about the proposed Pillur scheme which provided us with the appropriate theoretical context.

Developing a Hypothetical Scenario

Once an appropriate theoretical framework has been established, the next most important and challenging task in a CV survey is to provide relevant and adequate information in the CV scenario so that a 'realistic' hypothetical market about the commodity can be conveyed to the respondents. According to Mitchell and Carson (1989), the realism of the scenario improves if: (i) the respondents are made familiar with the elements included in the scenario such as the good under investigation, the method of provision, the levels of provision, the elicitation framework, etc; (ii) the key elements are presented to the respondents in such a way that it can be grasped by the respondents; and (iii) the degree to which the scenario appears plausible to the respondents.

However, it has been pointed out that not only does lack of realism in the scenario attract a bias but any attempt to increase it will also affect the results (Mitchell and Carson 1989). The scenario in a CV study contains two major elements, namely, (a) the value enhancing element (for instance, different levels of quantity of water supplied); and (b) the value neutral elements (such as photographs shown to describe the visibility). Mitchell and Carson (1989) argue that it is the value neutral elements that may lead to the problem while improving the scenario with these elements. Hence, any imbalance between different elements included in the scenario

would affect the results of the CV study. Therefore, there is a need for an optimum level of information with which a realistic scenario can be conveyed to the respondents. The concept of optimum level of information may even be irrelevant in a CV study because the context in which the CV studies are carried out differs among various studies. As there is no readily available standard scenario for application, a CV practitioner has to depend on many sources for constructing a meaningful scenario so as to obtain valid and reliable results.

One of the important aspects to be noted is that many of the CV studies, especially those trying to estimate the non-use values, depend heavily on the 'supply side information' for constructing the scenario, i. e., a larger percentage of the scenario conveyed contains information 'intended' only by the researcher. The basic assumption in these studies is that the information on non-use values may not be available from the respondents since they are generally not familiar with these kinds of values, which is also true concerning many of the use values. In the case of goods with which the respondents are already familiar, a meaningful scenario and the resulting true economic value depend mainly on the information provided by the respondents themselves. So, one way of improving the scenario, especially for the quasi-public goods like water supply, is to include information derived from the respondents themselves through a pilot study, pretesting, etc. Among these means, pretesting is considered to be one of the effective ways of not only constructing the realistic scenario but also designing, implementing and administering the CV studies. Pretesting the Interview Schedule (IS) before the main survey is considered a prerequisite for minimising biases that occur due to the very design of the IS (NOAA 1993; Smith 1992). It should be noted that pretesting helped us enormously to design not only an appropriate scenario but also the entire CV study during the main survey. We now discuss how we developed an appropriate scenario through pre-testing.

Pretesting the Interview Schedule

Before the main survey was undertaken, we proposed to pretest the IS in the study area. The draft IS prepared prior to pretesting consisted of three major parts, namely, (i) the general socio-economic characteristics of the households, (ii) the present water use behaviour of the households and, (iii) the contingent valuation part.[10] The original version of the IS had been circulated among some of the experts working on contingent valuation methodology, research students working on psychology, and project staff who had done household surveys for other CV studies.[11] After incorporating the modifications in the original version of the IS, pretesting was carried out in the study area among the 'focus group' of thirty households.[12] These households were selected from various geographical locations

of the study area so as to accommodate factors influencing the behaviour of the households, such as social, economic, institutional, and environmental.

Rapport with the Households

During pretesting, the researcher (i.e., the present author) experienced problems in establishing a rapport with the households in the town especially those located in the rural part of the town. This was because these households considered the researcher as an outsider and a stranger. This made the households reluctant to talk to the researcher. Thus, the researcher was advised to accompany the 'bill collector', an official from the town who was responsible for collecting property tax from the households. However, accompanying such an official would give the impression to the households that the researcher was actually associated with the town panchayat. This would deter them from disclosing certain information and cause them to behave strategically.[13]

In the case of those households with which the researcher had no difficulty in establishing a rapport, a different problem was encountered. That is, some of the households were reluctant to answer some of the questions included in the IS for many reasons: (a) a general tendency of the households not only in the town but also in many parts of Tamil Nadu was that they should not reveal any information about their demographic and economic status to any outsider, which they thought would affect their ***ration*** provided through the government-run fair price shops. More precisely, the poorer section of the households who were entitled to purchase goods from fair price shops at lower rates had a tendency to exaggerate the household size and understate the household income;[14] (b) it was found that some of the households were cheated by outsiders who promised them that they would convert all the household items made up of bronze and copper metals into gold, and escaped with all these items. Owing to this incident, the questions related to metal goods of the households such as storage facilities available in the household, etc. were not found to work well during pretesting; (c) frequent visits of newspaper reporters in the town in view of the assembly elections to the State government made the households reluctant to talk about general problems such as water supply and sanitation in the town. The households had the tendency to avoid talking about these things in detail to any outsider for fear that if the water supply authorities came to know of it, they would cut the existing supply itself; and (d) it was found that these households were not familiar with these kinds of household survey in the past. It should be noted that the reasons mentioned above were responsible for 'non-response' and other kinds of biases that frequently occurred in the CV study. One important aspect noted during the pretesting was that there was a lot of potential for the occurrence of 'interviewer bias' in the survey. To avoid this problem, the researcher took with him three college students experienced in conducting household surveys, throughout the main survey. This strategy worked well.

Initiating the Discussion

One of the important aspects noticed during the pretesting was that the way in which we initiated the discussion itself led to problems like non-response. The households even started spreading information to neighbours about the survey and persuading others to understate the WTP amounts.[15] Beginning the interview with an introduction about the researcher and describing the objective of the study immediately thereafter were found to create these kinds of problems. In many of the CV surveys, the first part of the questionnaire deals with the specific objective of the study followed by other aspects such as socio-demographic-economic aspects of the households/individuals. However, we found almost every part of the IS attracted problem if started with. This problem was found to attract strategic bias too, apart from 'non-response.' During the main survey, the IS as well as the interview was structured such that the households would not be given any hint that the study was about eliciting the households' WTP for water. Alternatively, the interview began with general issues in the town, historical aspects, etc, moved on to specific issues like sanitation, solid waste, water, etc, and then to specific questions related to Pillur water scheme. Moreover, the presence of college students along with the researcher conveyed to the households that the study team was an independent body not associated with any government agency.

Pretesting the CV Part

In any CV study, the contingent valuation part requires more attention than any other part of the IS/Questionnaire in the sense that this is the only part which differs from other parts of the conventional IS/Questionnaire used in the household survey. Moreover, this is the only part that is supposed to attract a number of errors. Pretesting the contingent valuation part rigorously helped the researcher to completely refine the scenarios described in the original version of the IS. Even though water is a commodity that every household is much more familiar with, what these households were ***not*** familiar with were some of the aspects related to the expected water supply scheme such as the date of commencement of the Pillur scheme in the study area, duration of water supply, timings of water supply, quantity to be supplied, method of supply, method of payment, duration of payment, etc. The households were very curious about these kinds of things which other developing country studies tended to simply ignore. Before clarifying the doubts, the focus group itself was asked to state their own preferences on all these aspects, in an open-ended way. Each household was explained with an 'improved scenario' with information provided by the previous household without changing the meaning of the scenarios. This not only facilitated the efforts of the researcher to make the scenarios more clear but also eliminated unnecessary information included in them. Moreover, this strategy helped the researcher to gain additional information that enriched the quality of the scenario. The next section

briefly discusses how various elements included in the scenario were tested during the pretesting, given the existence of different kinds of policies and the institutional set-up in the study area.

Households' Perception about the Pillur Scheme

Even if the *ex-ante* situation exists in the study area, there has to be a long interval between the time of survey and the time of water supply so as to minimise any possible 'strategic bias' occurring due to people's expectation of the supply of water. The strategic bias occurs if: (i) the households understate their true willingness to pay for water on the expectation that water is definitely supplied irrespective of their WTP amount (accompanied also with the expectation that their stated WTP would influence the future tariff policy); or (ii) households overstate their true WTP on the expectation that supply is effected soon if they overstate the WTP amount (accompanied also with the expectation that their stated WTP does ***not*** form the basis for the future tariff policy) (Mitchell and Carson 1989). A proper way of dealing with this issue is to convey to the respondents the exact month of commencement of water supply and include it as a variable to see its impact on the WTP values in a post-survey analysis. When the preliminary work for undertaking the survey began, detailed discussions with the officials in-charge of the water supply scheme revealed that the groundwork for supplying water had already started and regular supply would be effected after 4–5 months. The scenario conveyed during the main survey was modified in such a way that the households would expect the Pillur water supply in four months from the time of interview.

If the households were still uncertain over the commencement of the programme then one expected a situation in which considerable 'non-response' would occur. Some of the households in the focus group expressed their uncertainty over the implementation of the scheme. These households stated that the water supply authorities of the suburban town were constantly making announcements about the implementation of the Pillur scheme for the past six years but 'nothing had materialised.' Although these respondents were aware that overhead tanks had already been constructed and main pipelines laid under the Pillur scheme, still some uncertainty prevailed in their minds with regard to the implementation of the Pillur scheme. Moreover, these households suspected that the long delay in implementing the scheme was due to the rent-seeking behaviour of the officials who in the past collected some money towards the 'application fee' (or 'processing fee') from some of the households who applied for individual connections during previous announcements. It was found that a few households even installed their own bore-wells owing to the delay in the implementation of the programme.

It should be noted that our aim was not to eliminate the uncertainty from the minds of the users but to give unbiased information to the sample households during the main survey. All that we could do was to include a statement in the

scenario that Pillur water would be supplied in four months and how much they were willing to pay for different components of the Pillur scheme. If they were still uncertain and based their WTP on this particular aspect, then it would be taken care of during the analysis.

Another aspect the households were very curious about was the duration of the Pillur scheme. The water supply authorities mentioned that this scheme would run for another fifteen years, which was conveyed to the households during pretesting.

***Individual connection*:** When it was informed that individual house connections would be provided to those households willing to have them, the respondents started asking the following questions related to technical aspects of the individual connection: (i) whether meters would be installed? (ii) whether the pipe would be fixed with a valve which might be used to either stop or release the water? (iii) whether the delivery point would be located inside the house or outside? Instead of answering the questions, the researcher asked the respondents themselves to give their opinion on all these aspects. The following points emerged regarding the technical aspects of the individual connection: (i) most of the households felt that the individual connection should be attached with metering system. However, some of the households objected to the installation of meters for two reasons: (a) these households suspected that introduction of a metering system would lead to malpractice by some households in the town;[16] and (b) these households pointed out that the metering system would not be reliable since reading would take place even if air flows in the pipe. But most of the households suggested that the present system of 'minimum charge' is acceptable but that the meter should be installed to monitor over-consumption; (ii) since the existing individual connections at present do not have a valve, most of the respondents preferred a valve to be fixed at the delivery point so that they could stop the water once they collected the required amount of water. Under the existing system, the individual connections were not fitted with any valve, and the excess water was let free; and (iii) regarding the location of the delivery point, most of the respondents in the focus group were willing to have it just outside the house as most of the water-related activities, such as washing, bathing, cleaning utensils, watering cattle, etc., were carried out only outside the houses in the study area. Moreover, storage tanks were also located outside the house. The only activities that required water inside the house were cooling and drinking. If the delivery point was located inside, then a large quantity of water had to be carried outside the house, which was both labour and time-consuming. Hence, most of the respondents felt that the delivery point could be located outside the house. This aspect had been included in the scenario.

Apart from these aspects, the households were found to be more concerned about the length of the tariff policy that would be followed under the Pillur scheme.

They reported that the tariff policy in the past had been subject to frequent changes in the sense that once an individual got connected to individual connection for a particular tariff level, then the water supply authorities kept revising it upwards. This being the case, we asked the households to assume that the tariff policy once framed would continue at least for the subsequent five years.

Quantity: Studies on water supply in developing countries neglect the aspect of quantity (Merrett 2002). Rather, they concentrate either on 'pressure' (i.e., they convey to the households that the 'pressure' will be sufficient to collect adequate water') or convey to the respondents that they can collect 'as much amount of water as possible.' In the case of our study area, the households were found to be more particular about the quantity that they would obtain through the new scheme. Hence, we had to specify the quantity in the scenario to be conveyed during the main survey. But the next question to be addressed was, how to express the quantity — in terms of litres, barrels, etc? Every household in the study area used a plastic vessel, which was locally called *kodam,* for fetching and storing water. But the capacity of the *kodams* used differed even within the household according to the distance between the house and the sources of water supply. For instance, if a household had two sources of water supply, one close by and the other at a distance from the house, it would use two types of *kodams*, a big and a small one. The capacity of the *kodams* was found to range between 10 litres and 18 litres. But in most of the households the standard *kodam* used was of 12-litre capacity. During the main survey, the scenario included the *kodam* with 12-litre capacity as measurement.

The next aspect to be investigated was 'how many' *kodams* the household would actually require per day under the Pillur scheme so as to convey in the scenario different levels of quantity to different households and elicit the corresponding WTP of the households.[17] The central objective of this methodology was to ascertain whether the so-called 'embedding effect' occurred. Since testing for embedding effect required at least two quantity levels, during pretesting we assigned 25 *kodams* and 40 *kodams* to various households. An interesting result that emerged was that most of the households assigned 40 *kodams* stated that they did not require that much water, contrary to the conventional expectation that households would use as much water as possible if it was made available to them.[18] The reason was, according to these households, adequate water was already available but they required only as much as was necessary for drinking and cooking purposes. Moreover, the households recalled a severe water scarcity problem that they had experienced and said they were aware of the difficulties in getting good quality water. Hence, they pointed out that Pillur water would be of relatively better quality in terms of taste, suitability for cooking, etc, and therefore should not be wasted.[19] Accordingly, the two quantity levels assigned to the sample households

during the main survey were 10 *kodams* and 25 *kodams*.

Frequency and duration of supply: Some of the households raised doubts about the frequency and duration of the supply of water under the Pillur scheme. Under the existing scheme, the frequency of the public supply was found to differ among the various wards, ranging from one to three days. When there was no supply through individual connection or public taps, the households had to fetch water from other sources such as hand pumps, agricultural bore-wells, etc, which required more labour and time. Hence, a majority of the households, especially those ***without*** adequate storage facilities, preferred water supply every day under the Pillur scheme, whereas a few households with individual connections at present preferred supply on alternate days so that they could use the existing water one day and Pillur water the next day. It was observed that ***even*** those households with adequate storage facilities supported the idea of daily water supply under the Pillur scheme. These households said that if the supply of water was effected on alternate days, the households tended to store more water and empty a considerable amount when the supply was resumed. This led to huge wastage of water if all the households in the town were taken into account. Since we found that the quantity mattered to the households, the two levels of quantity decided were 10 *kodams* (the minimum) and 25 *kodams* (the maximum).

In the case of duration of water supply, especially in the case of public taps, the households were more concerned about the number of households collecting water from the public tap, the pressure, the amount of water available in a given period, etc. On pretesting, it was found that on an average, a public tap was being used by 12 households and the duration of supply ranged from 1½ – 2 hours. But many households believed that once the scheme began, many households collecting water from the public tap would switch over to individual connections, which would facilitate collection of more water from the public tap by other households. Most of the households seemed to support the idea of one-hour supply a day, which had been included in the scenario.

Time of supply: Having decided on the duration of supply, the next aspect was to decide on the time of supply. During pretesting, it was noticed that water supply was effected at any hour of the day depending on the availability of electricity. Many households reported that they were uncertain about the time of supply at present as this was entirely dependent on the availability of electricity. Many households said that they would face the same kind of problem under the Pillur scheme also. But, an earlier discussion with the water supply authorities in the town revealed that Pillur water would be pumped from the pumping stations located far away, stored in the overhead tanks, and released to the households. This had nothing to do with the electricity problem, which was local in nature. When asked

for their preferences regarding the time of supply, every household indicated morning hours especially between 6.00 a.m. and 8.00 a.m. as members of most of the households went to work after 8.00 a.m. and returned only after 6 p.m. This aspect had been included in the scenario conveyed during the main survey.

Payment Vehicle: The payment vehicle used in the CV study was found to attract a bias, which affected the results of the survey (NOAA 1993). During pretesting, the payment vehicle, namely, 'the monthly water tariff' used under the existing scheme itself had been used in the scenario. However, in some of the wards of the study area, around 40 per cent of the households were rented households, which would be sharing individual connection if the owner of the household had connected to individual connection. These rented households were not paying 'water tariff' directly to the town panchayat but were paying only the rent to the house owner, part of which included water tariff. For the renters, the payment vehicle used was 'increased house rent.' However, it was expected that having two different payment vehicles in the context of a small sample size would have led to problems later, especially when the statistical analysis was made. This being the case, the rented households were asked to state their maximum amount of 'monthly water tariff in the form of increased house rent' so that they could distinguish between house rent and water tariff, even though it was routed through the house owner.

As to payment for the public tap, most of the households pointed out that paying for the public tap was entirely new to them. But many of the households felt that the 'property tax' collected by the town panchayat included tariff on water supplied through the public tap. However, the households were asked to state whether they would agree if, as in the case of individual connection, a monthly tariff were introduced on public taps. Almost all the households in the focus group agreed to this suggestion.

Conclusion

So far we have discussed important theoretical and methodological aspects of conducting a CV survey for eliciting the true Hicksian surplus derived from the water supply project in the context of developing countries. A few important points emerging from our discussion are worth mentioning here. First, the way in which the CV methods are being practised in developed countries may not be extended in the same form to some of the environmental issues in developing countries. This is because the factors influencing household behaviour in the context of environmental issues are entirely different from those in developed countries. It is seen that the behaviour of individuals/households in the developing countries is embedded in a complex system characterised by different kinds of social, economic, political, institutional and cultural system. These points have been highlighted in many

studies on CV method on water supply (for example, Briscoe *et al* 1990). However, the present paper has highlighted the fact that the factors influencing household behaviour are not universal in nature but differ among countries, regions, etc. This implies that there is no universal CV methodology that can be applied to a single environmental issue in developing countries. It is the regional and local factors that play a crucial role that should be given priority in any CV study.

The second notable aspect about the CV method is that many of the biases that occur owing to the very design of the IS/questionnaire can be minimised even at the pretesting level itself, rather than accommodating them in the main survey and testing for their impact on the final results. In a developing country where policy-oriented research plays a vital role, the CV should be so designed as to achieve the most productive result rather than merely as an academic exercise. In this direction, rigorous pretesting of the IS, identifying sources of error and eliminating them would be the proper way of conducting CV in a developing country.

Notes

[1] CV methodology has been used also to estimate the economic values of private goods sold in the conventional markets (for example, Randall and Hoehn 1996).

[2] For a detailed discussion of validity and reliability issues, see, Mitchell and Carson 1989.

[3] We have had cases where the researchers could not even enter the field for conducting CV surveys (Paulomi, personal communication), let alone talk about conducting a good CV survey. However, this is a different kind of issue to be addressed elsewhere.

[4] For similar kinds of views regarding CV studies in other developing countries, see,Whittington 1996.

[5] The CV results, methodology used, biases addressed, validity tests conducted, etc., are discussed in detail in Venkatachalam (2000). The main purpose of this paper is to highlight how we elicited the 'valid' CV results through proper designing of CV survey in the field.

[6] See, Bateman *et al* (2000) for a detailed discussion on different kinds of Hicksian consumer surplus measures.

[7] See, Haab and McConnell (2002) for appropriate theoretical and statistical frameworks.

[8] See, Bateman and Turner (1993) and Bateman *et al* (2000), for a detailed discussion on all the four types of Hicksian consumer surplus measures.

[9] Though what kind of environmental improvements (such as health benefits) would be achieved through the Pillur scheme in the project areas has not been studied, the scheme was expected to improve the availability of 'good quality water' at the household level, thereby increasing both direct and indirect benefits.

[10] This is considered to be a standard format in most of the CV studies on water supply and sanitation, especially in developing countries (for example, Altaf *et al* 1992;

Whittington *et al* 1991).

[11] The author's involvement in two earlier CV studies (one on water supply and another on solid waste disposal) conducted by the Madras Institute of Development Studies, Chennai, has been of immense use in not only formatting the interview schedule (IS) but also in conducting the main survey in the field.

[12] Mitchell and Carson (1989) suggest that for a larger sample size of around 1,000 the focus group should consist of at least thirty households. However, our sample size for the main survey was smaller (i.e., 210 households), and eighteen IS used in the pretesting have been found to be complete and included in the analysis part later on.

[13] For instance, the households might not reveal their true WTP if they felt that the author was associated with the officials who formulated the water tariff policy (Mitchell and Carson 1989).

[14] It should be noted that the commodities sold through fair price shops targeting the poorer sections of households in Tamil Nadu are distributed on the basis of family size and household income, i.e., households of larger size and with lesser income would get more goods, and *vice versa*.

[15] Briscoe *et al* (1990) also report the same kind of problem in their study area.

[16] Even though these households were not clear about what kind of malpractice would occur, they stated that some of the households would extract as much water as possible and bribe the water supply authorities rather than paying the tariff on the basis of actual meter reading.

[17] It should be noted that in our study we have used 'open-ended' elicitation format rather than 'closed-ended' format, which is mostly recommended in the literature. The reason why we have used the open-ended format is that the CV literature also suggests that it worked well in case of goods that were familiar to respondents, and therefore there was nothing wrong in using it for familiar goods like water supply.

[18] Whittington *et al* (1992) reported that some of the households in Kenya that were experiencing severe water scarcity started hosing their water buffaloes once the water supply scheme started functioning in their area.

[19] Another way of interpreting the households' attitude towards quantity of water was that these households might have kept in mind that 'the price tag' attached to the quantity of water used would be higher if they used more water.

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Book Reviews

Michele Ruth Gamburd. *Transnationalism and Sri Lanka's Migrant Housemaids: The Kitchen Spoon's Handle.* New Delhi: Vistaar Publications. 2002. Pp.275. Rs.450.

International migration has been a means of improving the life chances of millions of people across the world. But the obvious reference in migration research was to male workers, and if at all female migrants were cited, it was only as 'dependents' of male workers. In the migration literature it is generally stated that 'the men followed the money and the women followed the men.' However, in recent decades women have been increasingly participating in labour migration across the borders, dispelling the myth that all migrant workers are men. There is growing recognition that migration among women is an important phenomenon in its own right. Many migrant women are important agents of change who devised their own strategies to make the transition between the norms and values of their societies of origin and destination, emerging as successful and capable individuals.

The book under review provides an interesting ethnographic account of migrant housemaids from Sri Lanka to the Middle East. Anthropologist Michele Gamburd most effectively employs qualitative research methods to understand the social changes in a village with a large number of women migrants working in the Persian Gulf. Interestingly, the village she has studied, Naaegama, was the same village where her mother conducted research nearly 25 years back. Naturally this had certain advantages for the researcher in understanding the nuances of village social life, by building upon personal contacts.

It is fascinating to read the process of migration of poor village women to an entirely different socio-cultural set-up with the sole purpose of improving their economic condition. We have heard a lot about the exodus of unskilled male workers from the state of Kerala in the seventies and eighties to West Asia in search of greener pastures. But this anthropological study unravels a very interesting story of ordinary village women venturing into an alien land in search of employment. Oil-rich sheikhdoms created a new demand for female labour within the household and a large number of Sri Lankan women ventured to avail themselves of this opportunity. But it is not an easy task for most of them. They need to find a job, mobilise funds for travel, deal with unscrupulous recruiting agents, adjust to a different socio-cultural environment, make arrangements for looking after the family, and cater to the demands of employers on the one hand and family members left behind at home on the other. At one level, they have to look after the children and the aged in their employers' households and at the same time, they also need to work out family-level arrangements to take care of their kin in their village. As expected, the extended families of these migrant women played a very supportive role by financing migration,

looking after the children and the aged, as well as taking care of family responsibilities in times of crisis. For these enterprising housemaids, migration is not just a journey between two countries but a periodical emotional interaction between two different families and cultures, both an integral part of their lives.

Most of these migrant women were employed as housemaids in wealthy Arab families. Naturally, they were in a vulnerable position — first as migrants and second as women. They were also targets of sensational media stories of 'exploitation' in a foreign land. What emerges from the insightful narration is not the victims of exploitation but the self confident women, who withstood all adversities, to emerge 'successful' and self-confident. This is a relevant finding particularly in a patriarchal set-up, despite the ongoing nationwide debate and concern over the 'safety and reputation' of migrant women from Sri Lanka. There are many who argue for a ban on migration of female workers to Gulf countries to protect the 'dignity' of women and 'pride' of the nation, yet the flow of women migrants continues unabated. The author aptly writes, 'It remains to be seen whether economic pragmatism or jingoistic nationalism will carry the day.'

The book carefully details the social changes and gender relations in the village as a result of female emigration. It also describes the new dimensions of masculinity and manhood, usually an overlooked aspect in gender research. Undoubtedly, female migration has affected the traditional gender arrangements within the family and in the village. By skillfully blending the stories and memories of returning migrants and interviewing family members and neighbours, the author interprets the new gender roles within a framework of duties and obligations. She also provides a detailed account of how the migrant's family copes in her absence, who is the sole breadwinner for most of the families. In many instances, men assumed the role of women and looked after the family by providing emotional support to their wives who were struggling to earn a livelihood under the most exacting conditions. Interestingly, this study shows how female migration has resulted in an acknowledgement of women's domestic service into a profession and a reallocation of a portion of women's household duties to their men. This change in sex roles disrupted the existing gender equations and the age-old norms of power and authority of women. This study is an excellent analysis of identity, power, caste, class and kinship relations, wherein migrant women play the central and dominating role. Though the economic prosperity of migrant households has often been discussed, what is forgotten is the change in the personal identities of both men and women. Gamburd undoubtedly illustrates the proven ability of these rural women to look beyond the 'kitchen spoon's handle.' With one out of eleven of the working-age women in Sri Lanka employed abroad, this phenomenon of 'feminisation of international migration' will have far-reaching socio-cultural implications.

This painstaking study, with its wealth of information and lucid presentation, is a good example of how ethnographic research can effectively unfold

the individual and familial relations in a traditional social system. The author needs to be complimented for her work on a much ignored aspect of international migration of female workers.

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Buddhadeb Ghosh and Girish Kumar. *State Politics and Panchayats in India*. New Delhi: Manohar Publications. 2003. Pp. 237. Rs.475.

The development of Panchayati Raj Institutions (PRIs), even after the 73rd Amendment, has been a matter of less concern for the majority of states of the Indian federal polity. Their emergence, survival and continuity rest solely on the wishes of the respective state governments. These institutions, created under the legal frame of the Constitution, now are structured and nurtured by the state political leadership vis-à-vis state administrative leadership. As a consequence, the fate of these grassroots level institutions hinged on the 'wilful' attitude of the respective state governments. Seen in this context, the book under review assumes importance as the authors have systematically analysed the political factors behind the creation of panchayats and the way they have since been nurtured or reasons for their non-functioning. The book provides interesting insights, as seen in four states—Maharashtra, Gujarat, West Bengal, and Bihar—into various strategies evolved by the respective states either to promote the sustenance of panchayats or to do away with them. The state leadership in both Maharashtra and Gujarat followed the strategy of strengthening the political base by establishing opportunity structures (panchayats) to accommodate the political aspirations of the rising rural elite belonging to dominant caste groups like Marathas and Patidars. In West Bengal, the local elites were co-opted in local party units, local boards, school boards, etc. Caste factor was never a strong force unlike in Maharashtra or Gujarat, and also there was no need to create more opportunity structures to accommodate the interests of the rural elite. However, all these strategies were relegated to the background with the practice of 'plebiscitary politics' (Rudolph and Rudolph 1990) by leaders like Indira Gandhi and Lalloo Prasad Yadav, which made the parties in power derive their strength not from their organisations but from their leaders. Instead of party organisation and its ideology, charisma of the leader became the decisive factor in all-important policy matters.

The four states studied have different socio-economic and cultural settings, but insofar as political strategies are concerned there seems to be no significant cleft between them, which is true of other states also. For instance, in 1983, when the then Janata Party in Karnataka went in for the establishment of Zilla Parishads

and Mandal Panchayats, there was a widely expressed feeling that the party had the hidden agenda of expanding its organisational limbs in rural areas (Sivanna 2001). Dwelling on this aspect, the authors have rightly observed that the parties in power treat panchayats as 'opportunity structures' for accommodating the political aspirations of rising rural elite belonging to dominant caste groups rather than as developmental institutions. The authors have clearly brought out how the political regimes, guided by the central leadership, were able to deepen their political base through the policy of providing reservation for socially disadvantaged groups in panchayats. Although this has been making a significant dent in the rural power structure, in reality they have been controlled and influenced by the rural elite (Inbanathan 2001).

The book presents the political events of the respective states systematically and chronologically. It is significant to know from such presentation that in creating panchayats, notwithstanding the mandate of the Acts, it is also the well-intended handiwork, political will and commitment of the state leadership, as we have seen in leaders like Y B Chavan, Karpoori Thakur, Ramakrishna Hegde and Abdul Nazir Sab, that is responsible for the sustainability and continuity of panchayats.

The interventions of parties in power were not just to establish their roots in the villages but also, at least in principle, to energise the panchayats by giving them necessary powers, functions and resources so that they are engaged actively in the development process. But the experiences (Aziz *et al.* 2002) reveal that the panchayats have been suffering from lack of adequate powers of decision–making and financial resources. As a consequence, they suffer from 'dependency syndrome' by depending heavily on the state's resources, whether human or financial. The book clearly brings out this aspect. It is surprising to note that though Maharashtra and Gujarat experiments were regarded as models for the other states to emulate, there too one could see the intervention of the state-level leadership in the critical areas of Panchayati raj administration, thereby belittling the role of panchayats.

The process of devolution of powers and resources to panchayats was significantly marred by the narrow policy approach adopted by the Union and the state governments. The 'plebiscitary politics' almost bypassed the panchayats with the inflow of populist programmes like Garibi Hatao, Twenty-Point Programme and other centrally sponsored schemes, and also by the establishment of parallel institutions like DRDS. In managing these bodies and for implementing the schemes and programmes, the bureaucracy was given an upper hand by negating the participation of the panchayat leadership. All this means that the party leadership was not in favour of strengthening panchayats but rather was solely concerned with exercising its influence with the help of bureaucracy. In effect, the autonomy of panchayats is suspect and also under threat. This needs serious attention not only

from the government but also from enlightened civil society. There is a need to review the 73rd Amendment to provide more teeth to the already weakened panchayats. The panchayat leadership needs more discretionary powers to take decisions and also disciplinary powers to exercise control over the official machinery. This was very much in practice in Karnataka under 1983 Panchayati Raj Act. The Adhyaksha of the then Zilla Parishat had powers to write confidential reports of all the district-level officers including the Chief Secretary of the Zilla Parishat.

In conclusion, the authors have done a commendable work of knitting the political events of the respective states and relating their implications for the growth and pitfalls of the panchayats. However, they have given more scope for covering the state-level events than also looking at the vortex of politics that takes place at the panchayat level itself. Further, the authors should have addressed the role of the bureaucracy since it is the latter that prepares the ground for bringing policy changes or reforms, including panchayat reforms. The bureaucracy plays a subtle role in promoting or scuttling decentralisation. Given the present scenario of centralising tendencies, lack of commitment and support from the state-level leadership, dangers of elite capture, coupled with growing corruption at the local level, it would be difficult to visualise the future course of PRIs, as third-level government, in our federal polity.

The book has opened new vistas in the area of comparative studies in Panchayati raj. It provides useful theoretical models for conducting comparative studies. As such, it is a 'must read' for students of Panchayati raj, researchers, professionals, civil servants and political leaders.

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S. C. Gulati, R. P. Tyagi and Suresh Sharma. *Reproductive Health in Delhi Slums.* Delhi: B.R. Publishing Corporation. Pp199+xxii. Rs.425.

It has often been documented that the population living in slums is subject to a higher level of health hazards than the population in villages. Although basic civic amenities and protected drinking water are being provided in some slums, they are not adequate for the entire population or all the slums. Affordability of modern health care facilities is very low because they are poor. In addition, they are subject to high-risk behaviour of alcoholism, drug abuse and other similar vices leading to health threatening diseases. Realising this, Reproductive and Child Health Project (2), which is to be implemented soon, has been considering slum population as a major component besides adolescents and tribal population. In view of this, the book under review is useful for policy makers and administrators. It has covered all the relevant aspects of RCH and also the linkages between fertility, family planning practice and utilisation of intranatal care.

The authors have selected five slums for the study, which they claim to represent not only slums in Delhi but also those in the rest of the country. A sample of 125 households has been selected from each study slum. Thus, the total number of households selected is 600 and the analysis is based on 550 households after accounting for lack of response.

Fertility among the slum population in Delhi is higher than elsewhere in India. The completed family size among Delhi slums is 4.2 children per woman. Effective age at marriage, usage of contraception and child mortality have emerged as crucial factors influencing fertility. Religious affiliation and family composition or number of living sons are also observed to influence fertility.

The current use of contraception is only 34 per cent of all eligible couples, far lower than what it has been reported to be in Delhi (71 per cent) and lower than the all-India figure (48 per cent). There are differentials in contraceptive use. It is lower among Muslims and women with low levels of literacy. But husband's occupation seems to have a greater bearing than wife's occupation on contraceptive use. Woman's age and number of living sons have a positive and significant influence on the use of contraception.

In general, utilisation of antenatal and delivery care services is found to be lower among the population living in slums compared with that in Delhi. Woman's education and husband's occupation are found to have a positive and significant influence on the utilisation of antenatal care. Delivery care is also found to have been influenced by the woman's education and husband's occupation.

Fertility, contraceptive use and utilisation of antenatal and delivery care services are found to be not only significantly correlated, but also influenced by

socio-economic and demographic variables. Fertility and contraceptive use are closely connected and are influenced by the age of woman. Utilisation of antenatal services and that of delivery services are closely interacting. The high use of antenatal services has indicated high utilisation of delivery services. Woman's education is found to have a multidimensional effect. The economic condition of the household is associated with the husband's rather than woman's occupation. Therefore, the husband's occupation is found to be significantly associated with contraceptive use and utilisation of antenatal services or delivery services. Higher levels of utilisation of antenatal services and delivery services will lead to a higher acceptance of family planning and lower fertility.

The study results have confirmed the general observations documented by other studies carried out elsewhere in India. But the most noteworthy finding in the Delhi slums is that husband's occupation influences health and demographic indicators. This is because the occupation of wife and that of husband are not related. As documented in other studies, the occupation of wife is found to influence health and demographic indicators. The authors should have probed deeper into the phenomenon of husband's occupation and its influence on the health and demographic indicators.

The book is useful to researchers, planners and policy makers. However, its utility would have increased many fold if the authors had collected information on the often neglected aspects of reproductive and child health such as personal and community hygiene, reproductive health status of widowed or separated women and adolescent girls, and child rearing and caring practices. Reproductive and child health need not necessarily be restricted to the utilisation of antenatal and delivery services, adoption of family planning and child immunisation. The scope is much larger than what is so far being focused. It is necessary to investigate into many aspects of woman's reproductive health and child health. Very few research studies have documented beyond what is being said in the book.

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Ramaswamy R. Iyer. *WATER: Perspectives, Issues, Concerns*. New Delhi: Sage Publications. 2003. Pp.368. Rs.550 (hard back).

Iyer's book is mainly a narrative and admittedly 'neither a comprehensive survey on water nor a work of scholarship or research' (*p.11*). It is a collation of his earlier writings on the theme and is a useful starter, especially at a time when concerns relating to water are at the centre stage. The concerns range from the recent National Water Policy of 2002, euphoria over the inter-linking of rivers, to

threats of water scarcity in future decades.

The book addresses four main issues: water in the context of a federal constitution, the large dams controversy, relations between India and its South Asian neighbours on river water sharing, and the future scenario.

The discussion on issues related to federalism is useful. The statement often made, namely, that water is a state subject, reflects a simplistic understanding, it is argued. A proper interpretation of Entry 56 of List I of the Constitution would reveal that the Union Government has enough power to exercise in the context of inter-state rivers (most of the rivers are so). It is only because of Parliament's reluctance to exercise its powers that water in 'practice' remains a State subject. The Sarkaria Commission was satisfied with such a position, but the book points to a few defects in such a view. There is no explicit reference to groundwater. Further, even if the river flows entirely in one state, the interventions by that state may have an impact on groundwater aquifers across its borders. What then are the legal implications? Should rivers flowing within a state's boundaries be brought under the purview of the central government? An affirmative answer assumes that central planning is best as it ensures equitable sharing of benefits across two or more states. However, given the prevailing inter-state river disputes, such a proposition would only complicate the matter further.

Iyer contends that negotiated settlement is superior to adjudication; the process of negotiation could continue even after the tribunal is established. While the Sarkaria Commission's recommendation that the tribunal's award be given the status of decree by the Supreme Court was accepted, Iyer argues that the possibility of approaching the Supreme Court should remain for 'the Supreme Court's decisions are still respected and obeyed in the country, the non-implementation problem will disappear' (*p.33*). Yet, a question remains unanswered. Should not tribunal awards be respected and implemented? Should one resort to the Supreme Court to legitimise tribunal awards? Tribunal awards are supposed to be based on a technical assessment as well as the issues related to equity in sharing benefits by the parties concerned, and one finds it difficult to accept that the Court has the expertise to examine these issues in depth.

In a critique of the National Water Policy of 1987, Iyer regrets that without attempting to bring the 1987 policy into effect, a new policy document has been prepared in 2002. The drafting of the latest policy has remained, it is pointed out, purely 'an internal government exercise,' and the Water Resources Ministry did not heed suggestions for putting it into the public domain and having a broad-based debate. The new policy is only an 'amendment exercise' and could hardly be described as 'new' (*p.57*).

The chapter on *River Basin Planning* traces the history of basin-level planning since Independence. Iyer points out that the National Water Policy (NWP) 1987 was silent on this since the state governments were apprehensive of their

powers being eroded. Although in the NWP 2002, river basin organisations are mentioned, their scope and power have been left to the basin states. Therefore, Iyer concludes that water resource planning has been largely based on planning for discrete individual projects. An approach to planning by integrating from the micro-watershed to the river-basin level has 'not really been seriously attempted in India' (p.72). Although this point is well made, he could have suggested a possible means of achieving this goal.

Iyer refers to the work of Chattrapati Singh,[1] who pointed out that the rulings of the Courts (Environment Protection Act, Water Pollution Act) have tended to reaffirm fundamental rights over clean air and water, and have tended to bring back the position of water as a natural right. Iyer's position is that water as a human right can be invoked *only* in relation to water as life support (hence only to drinking water) and cannot be extended to include irrigation, hydroelectric power or industrial use of water.

Iyer's stand is debatable, particularly in the context of irrigation water: we need to define some norms of limited water (at least life-saving quantum of water for the crops) availability to *all* farmers. Whether it needs to be made a justiciable right or not needs to be debated, but it should at least be a goal, which should drive the planning of irrigation schemes. In the absence of such an exercise, irrigation development is lopsided; a few sections of society in the proximity of rivers get all the benefits of irrigation while dryland farmers are at the mercy of the monsoons.

On the theme of groundwater, the author identifies overextraction as the main problem. Even though the NWP of 1987 laid down the principle that extraction should not exceed the annual rate of recharge, no mechanisms were devised to achieve this objective. Attempts to regulate even by legislation have been limited to a few states and are partial in scope. One of the author's recommendations is to: 'treat groundwater as a common pool resource and place it under community management. Aquifers will have to be delineated, user groups formed, rules of use and resource-management and conservation formulated, regulatory authorities established, conflict-resolution mechanisms created and so on; and the state will have to play a role in all this' (p.105). This is the way to move forward and is an arena for further research, particularly on how to craft the 'appropriate' institutions to achieve this objective.

On the issue of large dams, Iyer notes that production of food grains increased from 51 million tonnes in 1950–51 to almost 200 million tonnes in 1996–97. Yet there has been disenchantment for various reasons. He supports the push towards 'local' development — water harvesting structures and watersheds — so as to minimise the necessity for large projects and reduce the harmful environmental and human impacts.

On the Narmada judgement Iyer finds the learned judges' 'essay on the

virtue of dams' (*p.167*) unwarranted. The interesting contribution is his response to the 'charge' made against him for changing from an 'establishment figure' to an 'anti-establishment figure'. He justifies the change in his thinking from 1985 when as Secretary in the Ministry of Water Resources he gave conditional clearance to the Narmada projects (in 1987) to the latest position that he took (submission to the public hearing of the WCD in Colombo in 1998). It is for the reader to judge whether the justification is acceptable or not. However, one suspects there is a clear pattern in the views held by the author who played safe when in the establishment and has taken a more radical position when out of it.

An interesting observation in the final section reflects the status of the drinking water projects in the country — 'Despite five decades of planning and more than a decade of "Drinking Water Missions" there are a large number of "no source" villages. The curious fact is that targets for covering such "no source" villages are repeatedly achieved but the numbers grow larger rather than smaller' (p.264).

The final chapter, on interlinking of rivers, raises three questions — (a) Was the Supreme Court correct in issuing the directive that rivers should be linked? (b) Why did the Government respond with such enthusiasm to the Court's pronouncements? The author feels that the Supreme Court was not justified in taking such a proactive position, as there was no policy backing for such a proposition either in the Ninth Plan or in the Prime Minister's address to the National Water Resources Council. This *directive* was welcomed because it was politically attractive and also because it came at a convenient time for the Ministry of Water Resources (MOWR), which has been trying to enlarge its role, having earlier made attempts to transfer 'water' to the concurrent list. The author's opposition to the project is based on its technical infeasibility owing to the gigantic nature of the task and the exorbitant cost (Rs. 5,60,000 crores). The author argues for more 'local' solutions, effective demand management, and efficiency in water use, and hopes that the Task Force would consider these issues seriously.

Iyer's book is a useful starting point for laymen and researchers venturing into this area. One would only wish that Iyer had gone into some depth on the various issues discussed.

Notes

[1] Singh, Chattrapati (ed.). (1992). *Water Law in India*. The Indian Law Institute; (provides an account of how the traditional view of water as a 'natural right' in pre-colonial times changed to the assertion of the state's eminent domain).

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N. Rajalakshmi (ed.). *Environment and Economic Development.* Jaipur: Manik Publications. 2000. Pp.445+xvii. Rs.875.

The literature on environmental economics has been growing ever since the world-wide realisation of its role in sustainable growth and development of world economies. In particular, its importance has been growing since the nineties, and it appears economic growth and development would not be sustainable unless environmental issues are taken into consideration.

The edited volume under review brings together many research papers in environmental economics. It has two sections — section one contains 16 papers focussing mainly on issues related to theories, valuation of resources, and sustainability; section two, with 19 papers, addresses issues related to resource use including human, land, water and other natural resources, pollution costs and use and abuse of environment.

It has been pointed out that though environmental economics has been given more importance since the nineties, the foundations were laid by the classical school. Systematic exploration began after Kenneth Boulding (1966) argued that the economics of spaceship earth require somewhat different principles from those of the mainstream (p.3). Since then, valuation of resources and environment has formed one of the important concerns in environmental economics, and the emphasis on sustainable development has made it a central concern. The other important concept related to this is that environmental goods and services are used largely outside the market framework, and wherever market is there, it is valued partially. Demand is more than supply at zero prices, which implies that such resources have a positive scarcity price, which needs estimation (p.4–5).

It is argued that for sustainable development, accounting of the values of natural resources is important, but is rendered complex due to market failure, externality and common property character of these resources. Efforts have been made since the nineties to tackle this problem. Well-designed methods for valuation are being developed, which have considerably reduced the conceptual bottlenecks. For instance, contingent valuation methods (CVMs) have provided scope for valuing the natural resources — both use and non-use value. As a result, empirical research on valuation is growing both in quality and quantity (Pp.28–29).

It is argued that instruments of pollution control have both merits and demerits. Effluent charges or taxes are considered as an effective instrument in abating pollution to the desired level. It is suggested that combining subsidies with pollution tax is essential to suit the changing dimensions of pollution abatement in the present conditions (pp.62–63).

It has been pointed out that greenhouse gases are being released into the atmosphere through the processes of production and consumption. The most important greenhouse gases are carbon dioxide, methane, nitrous oxide, CFCs and

tropospheric ozone. An increase in average global temperature would induce a number of natural changes with significant effects on population. Another concern is depletion of the ozone layer, which results in ultraviolet light penetrating the atmosphere (p.99).

Thus an essential step in determining what should be done about environmental damage is to value it and compare it with the costs of preventing the damage. For this, environmental improvement may have to be treated as a public good (p.120).

Section two consists of papers based on empirical research on population, poverty, cultural environment, health, regional dimensions, land, forests, livestock, biodiversity, water and watershed programmes, groundwater, industrial pollution, urbanisation, tourism, etc. Essentially, these papers convey the message that the two functions of natural environment, i.e., as resource supplier and waste assimilator, imply that the following rules of environmental management should be observed: (1) utilise renewable resources at rates less than or equal to the natural rate at which they can regenerate, and (2) keep waste flows to the environment at or below the assimilative capacity of the environment.

In countries like India, environmental problems can be classified into 1) those arising from conditions of poverty and underdevelopment, 2) those arising as negative effects of the very process of development (p.235).

It has been pointed out that in the process of transforming agricultural economies into industrialised economies, enormous environmental problems emerged in the form of land degradation, soil erosion, and pollution (p.129). The short-term strategy for addressing such problems is to stabilise areas of rapid land, forest and habitat degradation. The long-term strategy is to minimise the underlying causes through broader social reforms such as land reforms, population planning and poverty alleviation (p.223). Ecologically sound policies such as rational utilisation of the resources of biosphere, in full awareness of the potential of local eco-systems as well as the global and local outer limits imposed on the present and future generations are also required (p.224).

Though there is some overlap across papers, the book under review is a valuable addition to the literature on environmental economics, and is particularly useful to students, scholars and policy makers who are concerned about the growing environmental problems and ecological issues.

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Vandana Shiva and Gitanjali Bedi (ed.). *Sustainable Agriculture and Food Security: The Impact of Globalisation.* New Delhi: Sage Publications. 2002. Pp. 513. Rs. 680.

Agriculture in the tropical countries is not merely the economics of production of food and non-food items, but rather a complex way of life that shapes the institutions associated with the livelihood of two-thirds of these countries' population.

Two of the important components of agriculture, which engaged the policy-makers of most of the countries since the Second World War, are food security (both in terms of production and distribution) and marketing of agricultural produce. Besides, sustainability of agricultural production has been an area of interest among researchers and policy-makers in the last few years in view of the increasing degradation of land and the associated cost of maintaining its productivity. The emergence of WTO has sparked major changes in agricultural policies all over the globe, commensurate with trade, Intellectual Property Rights, environmental norms, and sustainability issues related to the resource. The book under review is a timely attempt to address some of the important recent developments in agriculture. It has six sections containing twenty-one papers on various issues related to agriculture in the tropical countries. As the different sections suggest, it is not easy to compartmentalise agriculture into isolated components: globalisation and food security, impact of trade liberalisation, corporatisation, globalisation of food insecurity, corporate monopoly, food rights and responsibilities.

A student of economics of growth would recognise from a reading of Harrod or Domar's models of growth, that growth depends on three independently determined factors: savings, capital-output ratio and population growth. Harrod says it is highly unlikely that these three determinants will come to equilibrium; even if it does, such equilibrium is temporary. Similar is the case with bringing in sustainable agriculture, food security and globalisation into a common thread. The introduction by Vandana Shiva represents such an attempt. She fails to link the impact of globalisation on food security and sustainable agriculture. For example, while discussing meat export from India, she says that for every dollar of export earning, India loses 15 dollars of value that these animals would have given in terms of milk, dung, etc. However, as she does not include the feed and fodder cost of rearing these animals, such an argument is lopsided and falls far short of academic expectations.

Shiva also fails to distinguish between the impact of green revolution policies and liberalisation policies. Capital and chemical-intensive agriculture is the outcome of green revolution technology, as is the spread of monocrop culture.

However, these changes cannot be attributed to liberalisation policies

unless stronger evidence is gathered. Besides, it should be remembered that many of the liberalised agricultural policies in India were introduced after 1994. Hence, one cannot be judgemental about the impact of liberalisation policies. She lists four factors as responsible for increasing food insecurity due to liberalisation policy: transfer of resources from peasants to industry, shift of land use from food to non-food crops, export of food items resulting in domestic scarcity and rising prices, and removal of food subsidy leading to reduction in domestic consumption. However, there is little evidence for such claims. The paper on Pakistan by Khan *et al* does not make any value judgement on these issues, but rather analyses the supply-side situation in the country's potential to deliver food security. Khan *et al* suggest that the problem inherent in food insecurity is not so much in production as in distribution. Similar views are to be found in the piece by Abhijit Sen, on foodgrain stock in India. T. N. Prakash's paper on hi-tech floriculture and its effects on sustainability and food security mirrors Shiva's view. Prakash too fails to recognise that the value and the volume of floriculture production and trade are too meagre to have any effect on a large economy like that of India.

It would also be inappropriate to blame liberalisation policy as the key factor that compels a diverse subsistence economy to transform into a monocrop-based cash crop economy. Most such changes occurred during the green revolution. Bramhe examines the impact of Structural Adjustment Programme on Maharashtra's food accessibility; Shiva and Jafri look at ecological and human costs of globalisation on agriculture. These authors do not attempt to understand the basic questions raised above. On the one hand they claim that liberalisation policy is counter-productive, and on the other, they recognise the fact that lack of rain or its untimeliness destroys many paddy fields. If the basic question, therefore, is availability of water, then the focus should be on the state policies on irrigation in the last four decades and not the impact of liberalisation on agricultural sustainability and food security.

Kurien's paper on industrial aquaculture in India attempts to understand the changing scenario in aquaculture in the last decade. He explains how industrial aquaculture in India has not only displaced the fishing communities from their basic livelihood but also generates negative externalities, which is unsustainable.

The penultimate section of the book, *corporate monopolies on life*, contains two papers on monopoly and monoculture by Shiva and Crompton, and on biodiversity and biotechnology by Burrows. Shiva and Crompton describe the nature and extent of monopoly in the seed industry. With the introduction of hybrid and genetically modified seeds, they argue, farmer-saved seeds will not be available in the market. Second, with the big corporate players becoming part of research, development, and marketing, small companies will cease to exist. Though it is true that in a capitalist system larger companies will come forward in the sectors where

the profit margin is lucrative, the strategy should rather be to link the farmers to the chain of this income flow and develop a strategy to establish the farmers' rights instead of protecting a certain group of industries or reversing the process of change. The paper is silent about any such implications. Instead of linking the changing scenario of agricultural trade with biodiversity and biotechnology, Burrows' paper is a statement of the rhetoric that with the growth of genetically engineered organism, local species will proliferate and get extinguished by predation, competition, genetic pollution, and habitat disturbance. Thus, it will reduce biodiversity.

Among the three papers in the section on 'democratising the food systems', Perla's paper seeks the role of civil society or 'associative economics', as he terms it, as an alternative to the emerging global market. He fails to recognise that civil society complements the role of either state or market and their emphasis is not discounted for improving the quality of life among the small peasants even in a liberalised economy. Further, Norberg-Hodge's thesis on developing local interdependent economy, instead of global dependence economy, stems from nowhere. Interdependence is the key to the system of production in agricultural societies in the tropics. The question of how to link local interdependent economy to the global market in order to improve the market for the agriculture-dependent communities would have given a new dimension. Interdependency aspect is rather vividly dealt with in the paper by Bajaj and Srinivas on the Indian value system in growing and sharing food. They analyse the Indian value system from the ancient literature and argue that the British administration systematically destroyed these systems, giving rise to both food and fodder insecurity. However, this has very little to do with the impact of globalisation.

The preconceived notion that globalisation is an evil term compels one to reproduce the set idea repeatedly irrespective of the facts and scenario. Similar is the case with the postscript by Shiva. She fails to make any impressive link between globalisation and food insecurity in the postscript too. Sustainability of agriculture, which appears in the title of the book, does not even get any remarkable mention in the entire postscript.

To sum up, this book is a congeries of writings on poorly linked topics, straying from the thrust area of the impact of globalisation on sustainable agriculture and food security. Careful editing and a more comprehensive treatment of the issues would have improved the quality of the book.

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Rob Vos, Lance Taylor, Ricardo Paes de Barros (ed.). *Economic Liberalization, Distribution and Poverty: Latin America in the 1990s.* UNDP and Edward Elgar, Cheltenham, UK. Northampton, MA, USA. 2002.

Economic reforms attempt to replace a protectionist economic regime with a competitive environment in the belief that free market forces automatically ensure efficient use of resources, which makes an economy globally competitive. In other words, economists who propagate the *free market mantra* consider opening up the economy as an end in itself. This belief has its roots in the first fundamental theorem of welfare economics, which proves that under locally non-satiated preferences any competitive equilibrium allocation is Pareto optimal. While market equilibrium is efficient in the Pareto sense, its distributional implications sometimes may not be socially desirable.

However, while stressing the efficiency aspect, one often tends to ignore the equity issues. Given the increasing literature in support of the free market view on the ground of efficiency, it is refreshing to read a book emphasising the distributional implications of a free market equilibrium. Latin American countries going through reform and crisis at different points in time are interesting examples in this context. The book gives excellent country-wise descriptions of the reform process followed in Latin America, and examines the distributional aspects using rigorous econometric techniques.

The first paper, by Lance Taylor and Rob Vos, in this edited volume looks at external sector liberalisation and its impact on growth, distribution and poverty. It gives a brief but elegant diagrammatic presentation of the causal implications of change in policies. Moving from the protectionist regime towards a liberalised economy, many countries found themselves saddled with a high real exchange rate, which, in turn, hampered export-led growth. Though opening up of the external sector attracted foreign capital, and in some cases, resulted in positive economic growth, instability persisted in many countries as the crisis of the Mexican peso and the Brazilian samba clearly reveal. More importantly, even with improved growth rates, poverty remained unchanged for quite a few countries and income inequality increased.

The subsequent papers are mainly country specific, highlighting the impact of liberalisation on poverty, employment and income inequality. As far as employment opportunities are concerned, they varied considerably with skill and education, with labour at the lower end of the market suffering the worst. The paper on the Mexican economy (by Jaime Ros and Cesar Bouillon, pp.347-89)) shows that

though moderate growth of income has been witnessed in the post-reform period, income inequality has indeed increased. Trade reforms shifted the demand for labour against unskilled labour and resulted in an increase in wage premium for skilled labour, which, in turn, brought about an increase in income inequality. This experience was not Mexico's alone, but that of many other countries as well. The devaluation of the peso nevertheless helped to improve certain overall macroeconomic performance variables like the growth rate. However, some countries like Ecuador failed to achieve even an improvement in the overall growth rate. Economic growth in Ecuador during 1988–98 averaged only 2.7 per cent (pp.276) and there is hardly any difference seen between the pre- and post-liberalisation periods.

The use of rich econometric techniques like micro-simulation to isolate the effects of each of the main determinants of the changes in poverty and inequality adds rigour to the results. However, like any other method, these too have their limitations. For example, to use the micro simulation methodology, the second paper by Ganuza *et al* assumes that (pp.58) the labour market is segmented in the sense that there exists no rural-urban migration. Such limitations need to be kept in mind while interpreting the results. Furthermore, as poverty is a major aspect of study in all the papers, it would have been useful for the readers to get the exact definitions of poverty measures used in different chapters dealing with specific countries, together with a discussion of their scope and limitations. For example, the paper on Columbia, after observing (pp.249) a decline of poor urban households from 37.5 per cent to 28.9 per cent, comments that this may have been due to the change in relative prices of the consumption basket used for measuring poverty. As far as income inequality is concerned, almost all the studies found it higher in the post-liberalisation era. However, a theoretical framework to explain this phenomenon is missing. Theoretically, one may raise the question whether the observed increase in inequality is a Pareto inferior allocation compared with the pre-reform period. This question is particularly relevant in a situation that has witnessed a reduction in poverty. If indeed income inequality corresponds to a Pareto inferior allocation it raises further questions about the kind of policies that need to be adopted by the government. This calls for a theoretical framework within which suitable policies may be prescribed.

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***Economic Development of the Scheduled Castes: With Special Reference to Agricultural Landless Labourers*. Pune: Gokhale Institute of Politics and Economics. 2001. Pp.249. Rs.250 (paperback).**

This volume comprises the proceedings of a workshop organised by the Gokhale Institute of Politics and Economics jointly with the Department of Social Welfare, Government of Maharashtra, at Pune during March 16 – 17, 2001. The main objective of the workshop was to bring out the current socio-economic status of landless labourers belonging to the Scheduled Castes (SC).

V. S. Chitre, in his Foreword, outlines the relevance and objectives of the workshop. He says that nearly 17 per cent of India's population consists of Scheduled Castes, of whom 45 per cent of the working population are agricultural labourers.

Nilakanth Rath says that sixty per cent of the rural SC households are either landless or owned only a small house site. He attributes the backwardness among SCs to the poor quality of primary education. V. M. Rao stresses that the SCs suffer from the double handicap of low social and occupational status. He visualizes a scenario of progress in development of SCs through effective implementation of the provisions for decentralisation and participatory institutions with representation.

Sanjay Chahande discusses the development programmes initiated by Maharashtra Government and their achievements. His paper includes programmes for SCs, a review of welfare schemes, demographic and occupational patterns, Special Component Plan, and difficulties arising in the manner of investigating and enforcement of the SC/ST Act 1989. Those interested in evaluation of rural development programmes would enjoy reading Anand S. Nadkarni's treatment of the impact of agricultural development programmes of the Government of Maharashtra on SC/ST population compared with that on the rest of the population. Specifically, it informs us about assistance schemes for agriculture, livestock, wage labour, education, housing, drinking water, electricity and gobar gas, and medical aid and family planning.

Most of the other papers deal with the issues of literacy, occupation patterns, income inequality, poverty, amenities and welfare schemes in rural areas. They are based on descriptive analysis of data produced by population censuses, various rounds of NSSO, NCAER, Planning Commission, and Ministry of Labour. B. B. Mohanty, presenting data on atrocities commited against the SC population, shows that Madhya Pradesh has the maximum rate of atrocities per one lakh population (396.32). West Bengal has the minimum (0.81). Although the data are outdated, they raise a significant question as to what explains the differences between

Madhya Pradesh and West Bengal. Two papers, one by A. Narayanamoorthy, and the other written jointly by R. S. Deshpande, Amalendu Jyotishi, and A. Narayanamoorthy, analyse indebtedness among agricultural labour households.

In 'Valedictory Address' B.S. Baviskar suggests reforms in financial allocations for the betterment of the living conditions of SCs, implementation of minimum wages, and urban occupations.

The chief strength of the book is that it focuses attention on the condition of the poorest of the poor — agricultural labourers belonging to SC. However, the book lacks a holistic theory in terms of which the problems of SCs could be addressed in a global perspective without necessarily depending on the particularistic approach adopted by the State in India. It also lacks a rigorous multivariate examination of data and causal analysis. Further, it ignores important issues such as population growth, gender issues, migration, social mobilisation among dalits, and role of ideology, which have an important bearing on economic development.

B. N. Kamble makes an attempt to analyse total family income among different categories of population using the multivariate regression model. However, in the absence of a sound conceptual framework that defines interconnections between the dependent and independent variables such as agricultural income, assets, livestock value, food and non-food consumption, loan and subsidy, it adds little to existing knowledge on the subject. Correlation matrices presented in the paper can hardly be termed as such. The inference is: '52.72 per cent of the households seem to have used the developmental programme assistance effectively as against 48.18 per cent of the households who could not make use of the programme due to various constraints. These constraints come out very clearly in the form of discriminating variables.' The conclusion that among the poor, wage income is the dominant source of income is obvious.

Srijit Mishra calculates correlation coefficient between average land size, proportion of labourers without land, Gini coefficient, proportion of agricultural labourers, and proportion of literates. He develops a composite index by combining Gini Coefficient of land distribution and literacy at the state level. The table generated for 'Gini of Land Distribution' by 'Proportion of Literates' is very useful though it must be recognised that interpreting small sample correlations with complex indicators such as Gini coefficient poses enormous difficulties and is amenable to different interpretations.

M Thangaraj's paper 'Agricultural Labourers Social Security and Welfare Scheme in Tamil Nadu' suggests a remedy for the plight of agricultural labourers. It describes social security programmes in Tamil Nadu, with data on distribution of workers engaged in the agricultural sector and number of days, and presents major recommendations of Kolappan Committee on Agricultural Labourers. There is no analysis of the recommendations or of factors that interfered with their

implementation. What the reader finds are statements of the type: 'Marriage assistance has to be increased from Rs.2,000 to Rs.10,000 to the members of registered agricultural labourers.' This paper on Tamil Nadu does not seem to fit with other papers devoted to analysis of data either at the national level or for Maharashtra State.

Despite the above limitations, the book would be useful to scholars working on poverty, agrarian relations, development, and special problems of Scheduled Castes.

Professor ***A. K. Sharma***
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Journal of Social and Economic Development
Index to Volume V, 2003

Ghosh, Buddhadeb & Girish Kumar	State Politics and Panchayats in India	N. Sivanna	V (2)	287–289
Gokhale Institute of Politics and Economics	Economic Development of Scheduled Castes: With Special Reference to Agricultural Landless Labourers	A.K. Sharma	V (2)	302–304
Gulati, S.C., R.P. Tyagi & Suresh Sharma	Reproductive Health in Delhi Slums	K.N.M. Raju	V (2)	290–291
Gurpreet, Mahajan	The Multicultural Path: Issues of Diversity and Discrimination in Democracy	R. Santosh	V (1)	145–147
Iyer, Ramasamy R.	Water: Perspectives, Issues, Concerns	G. Ananda Vadivelu	V (2)	291–294
Kannan, K.P. & Vijayamohanan Pillai	Plight of the Power Sector in India — Inefficiency, Reform and Political Economy	S. L. Rao	V (1)	147–150
Kundu, Amitabh & Alak N. Sharma (eds.).	Informal Sector in India: Perspectives and Policies	Abdul Aziz	V (1)	150–153
Maddison, Angus, D.S. Prasada Rao & William F. Shepherd (eds.).	The Asian Economies in the Twentieth Century	K. Gayithri	V (1)	153–157
Raffer, Kunibert & H.W. Singer	The Economic North-South Divide: Six Decades of Unequal Development	Subramanian S.	V (1)	157–159
Rajalakshmi, N. (ed.).	Environment and Economic Development	Syed Ajmal Pasha	V (2)	295–296
Shiva, Vandana & Gitanjali Bedi (ed.).	Sustainable Agriculture and Food Security	Amalendu Jyotishi	V (2)	297–299
Varghese, N. V. & Arun C. Mehta	Investment Priorities and Cost Analysis: A Study of Upper Primary Education in India	Usha Devi M. D.	V (1)	159–161
Vos, Rob, Lance Taylor, Ricardo Paes de Barros (ed.).	Economic Liberalization, Distribution and Poverty	Meenakshi Rajeev	V (2)	300–301

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CONTENTS

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CONTENTS

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