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Fiscal Marksmanship in India

R.K. Pattnaik*

Fiscal marksmanship studies the degree of accuracy between 'estimates' and 'actuals' of budgetary data. The need for fiscal marksmanship or forecasting accuracy of the budget has been emphasised both in developed and developing economies. In the Indian context the budget represents a key link between the formulation and implementation of five year plans. Without a sound budgetary forecast, a satisfactory integration between plan formulation and implementation is difficult to be achieved. Moreover, large forecast errors may result in distortions in fiscal management. In India, while errors in budgeting have attracted attention, due emphasis has not been placed so far to examine the sources of the budget forecast errors, decomposing them in terms of their systematic and random parts. It is, however, desirable to see to what extent systematic part of the forecast error also affects the budget projections. The present paper is a step in this direction in the Indian context for the fiscal years 1950-51 through 1988-89.

In order to evaluate the fiscal marksmanship in India Theil's inequality co-efficient or U-statistics and its decomposition into first inequality and second inequality proportions has been considered in the study. The main findings of the study indicate that U - statistics is higher in the case of budget estimates than that of the revised estimates. The systematic errors in terms of bias proportions and regression proportions are conspicous in the forecasting of budget as well as revised estimates of the fiscal variables. Therefore, the conventional method of forecasting is not sufficient to estimate the budgetary data which have grown in their magnitude over the years because of the developmental needs of the economy. In view of this it is suggested that a more sophisticated econometric model linking fiscal sector, real sector and financial sector is required to forecast the budgetary data. Further, while projecting the fiscal variables care should be taken to minimse the systematic bias through improved forecasting techniques.

Introduction

One of the key processes of budgetary exercise is to make projections or estimates of different fiscal variables for the next

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financial year. Budget formulation in India is an evolutionary process, wherein 'budget estimates' evolve into 'revised estimates' and finally, these estimates are recorded as 'accounts' or 'actuals'. As a result, between the 'actuals' and estimates', there are variations in data either in the form of overestimation or underestimation. The study of the degree of accuracy between the 'estimates' and 'actuals' of the budgetary data is known as 'fiscal marksmanship'[1]. In other words, fiscal marksmanship tests the predictive performances (i.e., the ability of the estimates to predict the actuals) of the fiscal variables.

As the budget formulation is influenced to a great extent by the political system, economic theories, management approaches, accounting principle and conduct of public administration, it would be unrealistic to expect a perfect forecast (i.e., absence of forecast errors in the projections of fiscal variables). However, large forecasting errors may result in distortions in fiscal management. For instance, accuracy of revenue estimates is required for smooth implementation of expenditure programmes as well as facilitating a realistic choice of expenditure policy options. Similarly, accuracy in expenditure estimates is needed in order to avoid distortions in the estimates of deficit. Moreover, wide variations between the estimates and actuals of the budgetary parameters are indicators of non-attainment and non-optimisation of desired fiscal objectives. In the words of Prest, "No Government can hope to execute its economic policies successfully if its budgetary forecasting is inaccurate"[2]. Therefore, an improved understanding of the predictive value of the budget (i.e., fiscal marksmanship) is of assistance for evaluating budgetary policy and practice.

The need for fiscal marksmanship or forecasting accuracy of the budget has been emphasised even in developed economies[3]. It is opined that forecasting accuracy in the budget is desirable if fiscal policy is to be used to move the economy towards full employment without the danger of inflation. It is also held that the estimates of taxes and spending of the Government are used by private sectors who base their decisions on whole or in part on fiscal variables. Therefore, the accuracy of these estimates is a measure of the reliability of the *ex-ante* fiscal information available

to decision makers. According to the theory of efficient markets, rational economic agents use all available information. Fiscal marksmanship is one more piece of information these agents consider when they form their expectations. This argument may also be extended to Indian context. Most forecasters and analysts seem to have an implicit faith in Government's ability to fully meet the expenditure and receipt targets as reflected in the budget provisions. A comparison of the estimates and actuals, however, in many cases would show that the belief is not justified. Further, in Indian context, the budget represents a key link between the formulation and implementation of five year plans. Without sound budgetary forecasts, a satisfactory integration between Plan formulation and implementation cannot be easily achieved.

Budget forecast errors may be broadly divided into systematic errors and random errors[4]. Systematic errors emanate from forecasting techniques and therefore, could be reduced with the help of better methodology to estimate fiscal variables. While errors in budgeting have attracted attention, due emphasis has not been paid so far to examine the sources of the budget forecast errors decomposing those in terms of their systematic and random parts. This is however required to see to what extent the systematic part of the forecast error also affects the budget projections. The present paper is a step in this direction in the Indian context for the fiscal years 1950-51 through 1988-89 for which firm data are available.

This paper is organised thus. Section I gives a review of the literature dealing with the subject under reference. The scope, coverage and data source of the study are presented in Section II. Section III covers the methodology on the basis of which empirical results are derived, followed by Section IV where the quantitative results emanating from the study are discussed. Section V contains summary and concluding observations.

Section I
Review of Earlier Studies

An attempt has been made in this section to present a brief review of some of the important earlier studies on errors in budget

forecasts mainly to indicate how useful they have been in pointing out the error components in budgetary forecasting.

With regard to the study of fiscal marksmanship in the case of other countries mention may be made of the works of Prest (1961) and Allan (1965). These authors examined the errors in budget estimates of the United Kingdom (U.K.) and drew similar conclusions. On an average, revenue and expenditure were found to be underestimated by both the writers, with the extent of underestimation being higher in the case of expenditure. Allan in his study had mentioned that errors in estimates were caused by exogenous as well as endogenous factors. However, he failed to quantify these factors. Theil (1966, 1971) investigated the Dutch experiences using his famous inequality co-efficient. It was Theil who for the first time quantified the systematic errors and random errors while examining the macro-economic forecasts for the Netherlands (1952-63). In recent years using Theil's inequality co-efficient, a few studies have been developed. These were : Auld (1970), Davis (1980) and Morrison (1986). These studies were in the context of Canada, U.K. and U.S.A., respectively. These studies show that in the U.S.A., outlays were estimated more accurately than receipts and budget surpluses/deficits, while the U.K. had greater success in estimating revenues than expenditure. The Canadian experience shows that the overall error for total taxation was higher than that for expenditure. In all these cases there is wide scope for the elimination of systematic errors.

A few studies have been made on the empirical behaviour of budget errors in India as well. Methodologically, these studies may be divided into two categories viz., (1) those with descriptive statistics and (2) those using advanced statistical techniques. In the studies which used descriptive statistics, arithmetic mean and mean deviation methods were employed to calculate forecasting efficiency. The major contributions in this category are first set out.

Mahesh Chand (1962) found that there was on an average an underestimation of both revenue and expenditure in budget as compared with the actuals during the period 1950 - 1959. The underestimation was generally higher in revenue than in expenditure. He also found no improvement of revenue and expenditure forecasts in

the revised estimates of the budget as compared with the budget estimates.

Mukul Asher (1978) while attempting to examine the errors in the budget estimates and revised estimates of revenue and expenditure during the period 1968 to 1976 found that both revenues and expenditure were underestimated. However, the extent of error for expenditure was larger. As a result the actual impact of the budget had generally been more expansionary than the estimated impact.

Chakrabarty and Verghese (1982) had drawn similar conclusions as that of Mukul Asher while examining the error components of the budget forecasts for the period 1971 to 1980. Their analysis also indicates that both revenues and expenditure were underestimated and the extent of errors for expenditure was much greater.

The first major step to examine the forecasting accuracy of the budget with advanced statistical techniques was attempted by Paul and Rangarajan (1974). The study covering the period 1950-51 to 1965-66 was limited to the expenditures on construction and industrial development of the Centre as well as State Governments. The predictive ability of these expenditures was tested with the help of the co-efficient of determination (R^2) and Theil's inequality co-efficent. The study concluded that the prediction error was small in the case of the Central Government and that the majority of State Governments had a rather poor record in terms of predictive performance.

Madhur, Nayak and Ray (1982) presented a macro-econometric model of the fiscal and monetary sectors of the Indian economy for short-term macro economic forecasting and policy formulation and in particular for analysing the implications of the annual budget of the Central Government for the economy at large. The authors' fiscal sector equations showed why actual budget deficits differed from those estimated by the finance ministry. The deviations of the actual magnitudes from the budgeted ones may arise as a result of systematic and deliberate misrepresentation - what the authors call the 'Fudge Factor' - or due to the Government's inability to accurately forecast inflation and real growth of

the economy or due to random occurences or some combinations of all of them.

Bhattacharya and Anita Kumari (1988) have evaluated budget forecasts of the Central Government for the period 1962 to 1985. The evaluation was made in terms of unbiasedness, rational expectations and improvement/deterioration in forecasting efficiency over time with the help of regression equations. They also used average percentage error, root mean square error and Theil's inequality co-efficient to examine the forecasting accuracy. The main finding of their study was that the budget as well as the revised estimates of the Central Government revenue and expenditure do not satisfy the criteria of rational expectations of forecasting or even unbiasedness. There was also very little evidence of improvement in efficiency of budgeting over time.

Section II
Scope, Coverage and Data Source

Scope

While budget forecast errors should have ideally covered projections made by both the Central and State Governments, the present study would cover projections of the fiscal variables of only the Central Government. This has been done on the assumption that the Central Government budget provides fiscal leadership and also gives direction to state budgets. Therefore the issues involved in error estimation in budget forecasts in India are adequately explained by an analysis of forecasting errors in the Central Government budget.

Coverage

The study covers the period from 1950-51 through 1988-89. In addition, there would be four sub periods viz., (i) 1950-51 to 1959-60, (ii) 1960-61 to 1969-70, (iii) 1970-71 to 1979-80 and (iv) 1980-81 to 1988-89. The choice of sub-periods is based on the hypothesis that after every decade forecasting techniques might have improved through refinements in forecasting procedures resulting in reduced systematic errors.

Data Source

For computing empirical results time series data are taken from several issues of the article on 'Finances of Government of India' published annually in the Reserve Bank of India Bulletin. It may be noted that during the period of reference in the study, there were two major accounting and classification changes in the budget in 1974-75 and in 1986-87, besides minor changes that had taken place in many other years. Due to non-availability of details, it is not possible to make a complete adjustment in the time series data for 1950-51 to 1988-89. However, broad adjustments have been made to make the data consistent and comparable for the purpose of the study[5]. Adjusted time series budget data for fiscal years 1950-51 through 1988-89 are set out in statements 1 and 2.

Section III
Methodology

In order to evaluate fiscal marksmanship in India, Theil's inequality co-efficient or U-Statistics and its decomposition into first inequality proportion and second inequality proportion have been considered in the study. Statistical measures to evaluate forecasting performance such as average absolute errors (AAE) and average percentage error (APE) and correlation co-efficient, although simple, have limited utility, as they do not take into account systematic bias. No doubt the standard test for examining the forecasting accuracy could be conducted by regressing actual values on estimated values i.e. running the regression in the form of $A_t = \alpha + \beta p_t + e_t$. If the forecast is unbiased, the intercept 'α'should not be significantly different from 'zero' and its slope i.e. co-efficient 'β' should not be significantly different from 'one'. With the help of the regression approach one can adjudge the unbiasedness of the forecast and can also test whether forecasts are efficient and rational by extending the model (Bhattacharya 1988). These inferences useful as they are, do not, however, throw much light on the sources of forecast errors. For policy makers what is important is not the qualitative attribute of the forecast but the relevant sources of errors which would be used for improving the future forecasting

The advantage of Theil's measure is that it not only allows a study of the magnitude of errors but also that the sources of errors can be segregated into their systematic and random parts. However, Theil's inequality co-efficient has the limitation of having no specific probability distribution (Bhattacharya 1988). Notwithstanding this limitation this measure has the operational significance of permitting decomposition analysis of errors.

Theil's Inequality Co-efficient :

Theil's inequality co-efficient is based on the mean square prediction error,

$$1/n \lesssim (Pi - Ai)^2, \quad \ldots\ldots\ldots (1)$$

Pi and Ai are the estimated and actual year to year changes, respectively, of the fiscal variables in question. The square root of the above mentioned expression is the familar root mean square error (RMS). Dividing the root mean square error by the square root of the mean square actual change produces the inequality co-efficient (U).

$$U = \frac{\sqrt{\frac{1}{n} \lesssim (Pi - Ai)^2}}{\sqrt{\frac{1}{n} \lesssim (Ai)^2}} \quad \ldots\ldots\ldots (2)$$

In equation 2, the inequality co-efficient 'U' measures the forecast accuracy. In a perfect forecast it equals 'zero'. However, 'U' does not have an upper bound. Therefore, the values of 'U' lie between 'zero' and 'infinity' (i.e. $o \leq U \leq \infty$)[6]. U equals unity (i.e., U = 1) if Pi = o and the predictive performance of the model is as bad as it possibly could be. In other words, the forecast has the same accuracy that would have been achieved by means of a "naive no change extrapolation". If U is greater than unity (i.e., U>1) the predictive power of the model is worse than the zero change prediction. Thus, the smaller the value of the inequality co-efficient the better is the forecasting performance.

The relative changes in Pi and Ai given in equation (2) could be calculated using natural logarithm. Thus,

$$Pi = \ln \frac{Pt}{At-1} \text{ and } Ai = \ln \frac{At}{At-1}$$

According to Theil, logarithmic prediction error has the advantage of symmetry in the forecast than the relative (percentage) error[7].

The mean square prediction error defined in equation (1) i.e., $\frac{1}{n} \Sigma (Pi - Ai)^2$ after some algebraic transformation can be decomposed into three parts each showing the different sources of errors in forecast[8]. This is what Theil called as the first set of inequality proportions. The first set of inequality proportions can be decomposed as follows :

$$\frac{1}{n}\Sigma(Pi-Ai)^2 = (\bar{P}-\bar{A})^2 + (SP-SA)^2 + 2(1-\gamma PA)\,SPSA \quad \ldots\ldots (3)$$

where,

$\bar{P}$ = mean of predicted values $= \frac{1}{n}\Sigma Pi$

$\bar{A}$ = mean of actual values $= \frac{1}{n}\Sigma Ai$

SP = Standard deviation of predicted values $= \sqrt{\frac{1}{n}\Sigma (Pi - \bar{P})^2}$

SA = Standard deviation of actual values $= \sqrt{\frac{1}{n}\Sigma (Ai - \bar{A})^2}$

γPA = Correlation co-efficient of predicted and actual values $= \frac{\frac{1}{n}\Sigma (P_i - \bar{P})(A_i - \bar{A})}{SPSA}$

The three components shown in equation (3) are also called

partial inequality co-efficients. Further $(\bar{P} - \bar{A})^2 = 0$, if and only if, the average predicted change coincides with the average realised change. Errors leading to positive value for this term may be called errors in central tendency. $(SP-SA)^2 = 0$, if and only if, the standard deviations of predicted and actual values are equal. Prediction error which led to a positive value of second term may be referred to as errors due to unequal variation. $2(1-\gamma PA)\,SPSA = 0$, if the correlation coefficient (i.e. γPA) is 1. Therefore, prediction error which leads to a positive value of the third term may be termed errors due to incomplete co-variation. A useful way to present the various sources of the forecast error is to divide both sides of the equation (2) by the total forecast variation i.e. $\frac{1}{n} \Sigma (Pi - Ai)^2$. Thus, dividing both sides by $1/n \Sigma (Pi - Ai)^2$ one gets:

$$U_m = \frac{(\bar{P}-\bar{A})^2}{1/n \Sigma (Pi-Ai)^2} \qquad \ldots\ldots (4)$$

$$U_s = \frac{(SP - SA)^2}{1/n \Sigma (Pi-Ai)^2} \qquad \ldots\ldots (5)$$

$$U_c = \frac{2(1-\gamma PA)\,SPSA}{\frac{1}{n}\Sigma (Pi - Ai)^2} \qquad \ldots\ldots (6)$$

$$U_m + U_s + U_c = 1 \qquad \ldots\ldots (7)$$

U_m, U_s and U_c are inequality proportions and they may be indicated as bias proportion, variance proportion and co-variance proportion, respectively

Such a decomposition is useful as it sheds some light on the nature of the forecast error. The first component U_m (or bias proportion) shows that the cause of the discrepancy between the estimated values (or predicted values) and actual values (or realised values) is the difference between their means (or central tendencies). This is clearly a serious error. On heuristic grounds one should expect that the forecast must be able to reduce such errors

in course of time. The second expression Us (or variance proportion) attributes the error to the unequal variance of Pi and Ai. The third term Uc (or co-variance proportion) shows that still another cause of the discrepancy between Pi and Ai is their imperfect co-variance. The first two sources (i.e. Um and Us) represent systematic errors for which the forecaster should be able to make an adjustment. Similarly, outside users of budget forecasts could make an allowance for systematic errors. In other words, Um and Us can be reduced by improved forecasting technique. The third source of error is the co-variance proportion (Uc). It represents the remaining error after deviations from average values and average variabilities have been accounted for. Since it is unreasonable to expect predictions that are perfectly correlated with actual outcomes, this component of error is less worrisome. Therefore, it is called random component and is beyond the control of the forecaster. Indeed for any value of $U > o$, the ideal distribution of inequality over the three sources is $Um = Us = o$ and $Uc = 1$.[9]

The Second Set of inequality proportions is as follows :

$$\frac{1}{n}\Sigma (Pi - Ai)^2 = (\bar{P} - \bar{A})^2 + (SP - \gamma PA\ SA)^2 + (1 - \gamma PA^2)\ SA^2 \quad \ldots\ldots (8)$$

Equation (8) is identical with equation (3) so far as the first term on the right hand side is concerned but is diffierent as to the last two terms. However, the present decomposition is not symmetric in the P's and A's as it is the case with first inequality proportion.

After normalisation, (equation 8) becomes

$$U_m = \frac{(\bar{P} - \bar{A})^2}{\frac{1}{n}\Sigma (Pi - Ai)^2} \quad \ldots\ldots (9)$$

$$U_R = \frac{(SP - \gamma PASA)^2}{\frac{1}{n}\Sigma (Pi - Ai)^2} \quad \ldots\ldots (10)$$

$$U_D = \frac{(1 - \tau PA^2)\, SA^2}{\frac{1}{n} \lesssim (Pi - Ai)^2} \qquad \ldots\ldots\ldots (11)$$

Thus, when there is existence of prediction error

(i.e. when $\frac{1}{n} \lesssim (Pi - Ai)^2 > o$), we have $U_m + U_R + U_D = 1$ .. (12)

Here, U_m is the same bias proportion of equation 4. U_R is called the regression proportion because it deals with the deviation of the regression slope from one. U_D is called the disturbance proportion because it deals with the variance of the regression disturbances.

Of the two decomposition of mean-square error into bias, variance and co-variance proportion and bias, regression and disturbance proportion though the former is often reported, as it is not a useful decomposition the latter decomposition should be used[10].

The present study has attempted to employ (1) Theil's inequality co-efficient (U), (2) the partial co-efficients of the first inequality proportions viz. Um (bias proportion), Us (variance proportion) and Uc (co-variance proportion) , (3) the parital co-efficients of the second inequality proportions viz. Um (bias proportion) U_R (regression proportion) and U_D (disturbance proportion). Further, an attempt has also been made to examine the scope and magnitude of systematic error which has been named as Maximum Possible Reduction Error (MPRE) (i.e. $U_m + U_R$). The study also examines the underestimation and overestimation aspects. The overestimation or underestimation of the mean actual change has been done taking the difference between $\bar{P}$ and $\bar{A}$. If $\bar{P} - \bar{A} < o$, it indicates an underestimate of the mean actual change and if $\bar{P} - \bar{A} > o$, it indicates an overestimate. Similarly, the overestimation or underestimation has also been indicated in a ratio form showing the difference between the SP and SA. If SP/SA > 1, it indicates an overestimate of actual variation and if SP/SA < 1, it reflects an underestimate[11]. In the present study two sets of forecasting errors are calculated viz, (1) comparing the budget estimates with the actuals and (2) comparing the revised estimates with the

actuals[12]. For example, A_i represents in this study the actuals of the fiscal variables in question whereas P_i may be budget estimates or revised estimates. Therefore, in order to avoid confusion while tabulating the data, budget estimates are designated as P_{Bi} and the revised estimates are named as P_{Ri}. All those associated with budget estimates are indicated by subscript 'BE' and those with revised estimates are indicated by subscript 'RE'.

Section IV
Empirical Results

The analysis of the empirical results is conducted at both aggregate and disaggregate levels. At the aggregate level, while evaluating fiscal marksmanship on the receipts side, aggregate receipts, revenue receipts and capital receipts, are covered and on the expenditure side, aggregate expenditure, revenues expenditure and capital expenditure are included. In addition, forecasting efficacy of overall budgetary surplus/deficit has also been done. At the disaggregate level, forecasting accuracy is examined with respect to total tax revenues, income tax, corporation tax, union excise duties and customs duties because of the importance of tax revenues in the entire budgetary process. For example, the amount of funds to be raised from other sources such as borrowings crucially depends on the anticipated tax revenues. Further, the direction of the future tax policy very much depends on the expected revenues from the present tax rate structure. Similarly, accurate revenue estimates also facilitate realistic choice of expenditure policy. Apart from influencing the budgetary structure, tax revenue estimates also help in fixing guidelines or targets for tax collections.

Following the methodology discussed in Section III, the empirical results are set out in Tables 1 through 12. Tables 1 and 2 cover the mean, standard deviation and correlation co-efficient of budget estimates and revised estimates, respectively. Mean and standard deviations of the actuals are depicted in Table 3. The inequality co-efficients of the budget and revised estimates are presented in Table 4. Overestimation/underestimation, sources of errors from first inequality proportions and second inequality proportions and maximum possible error reduction of the budget

estimates are covered in Tables 5 through 8. Similar results with regard to revised estimates are presented in Tables 9 through 12.

The forecasting accuracy highlighted in the empirical results has been differentiated into Budget Estimate Accuracy (BEA) when budget estimates are compared with actuals and Revised Estimate Accuracy (REA) when revised estimates are compared with actuals.

A. Budget Estimate Accuracy (BEA)

This part discusses BEA at aggregate level with regard to receipts (aggregate receipts, revenue receipts and capital receipts) and expenditure (aggregate expenditure, revenue expenditure and capital expenditure) and overall deficit/surplus. Further at the disaggregated level the discussion is on tax revenues (total tax revenues, income tax, corporation tax, union excise duties and customs duties).

As mentioned earlier since the decomposition of second inequality proportions viz., bias, regression and disturbance components is more illuminating (Granger and Newbold, 1973 and Madala, 1986) the discussion that follows, therefore, is set out uniformly in terms of the above mentioned components.

1. Receipts : Aggregate Receipts, Revenue Receipts and Capital Receipts

For the whole period (i.e., for fiscal 1951-89), the inequality co-efficient (U_{BE}) for budget estimates of aggregate receipts was 0.5701. The values of U_{BE} during the sub-periods ranged between 0.3588 (during 1961-70) and 0.7995 (during 1951-60). Thus, with 'zero' the value of U_{BE} for a perfect forecast and 'unity' in its value in a naive *status quo* forecast, best results for the budget estimates of aggregate receipts were achieved during the period 1961-70 (U_{BE} around 0.36), and bias and regression proportion together accounting for only 1.6 per cent and 98.4 per cent of the total error is accounted for disturbance proportion. Although U_{BE} was around 0.39 during 1981-89 the bias and regression proportion together accounted for nearly 84 per cent. During 1951-89

the predicted changes in the mean and standard deviation were overestimated *vis-a-vis* the actual change. In the sub-periods except for 1951-60 when both mean and standard deviation changes were overpredicted, in the remaining three sub-periods both these changes were underpredicted.

Inequality co-efficents of the revenue receipts and capital receipts were as high as 0.5080 and 0.6299 for the fiscal years 1951-89, resepctively. They were in the range of 0.3239 (1981-89) and 0.6381 (1951-60) for revenue receipts and 0.4385 (1961-70) and 0.7954 (1951-60) for capital receipts. Despite a decline in U_{BE} during 1981-89 in respect of revenue receipts the systematic error in terms of bias and regression proportion was the highest at 79 per cent.

2. Expenditure : Aggregate Expenditure, Revenue Expenditure and Capital Expenditure

U_{BE} for aggregate expenditure for 1951-89 was 0.5312. In the four sub-periods it ranged between 0.3891 (1961-70) and 0.6128 (1971-80) with best performance coming in 1961-70 as the bias and regression proportion together were the lowest at around 10 per cent. However, during 1971-80 and 1981-89 budget makers had greater difficulty with bias and regression proportion when these combined together were around 71 per cent and 81 per cent, respectively. Disturbance proportion as a source of errors at 19 per cent was the lowest during 1981-89 varying within the range of 19 per cent (1981-89) and 85 per cent (1961-70). For the whole period the budget estimates of mean actual outlays demonstrated negative bias and standard deviation was positive. In the sub-periods a mixed trend was witnessed. During 1961-70 and 1981-89 both mean and standard deviation of actual changes were underestimated. During 1951-60 mean actual changes were overestimated but standard deviation changes were underestimated and during 1981-89 mean actual changes were underestimated but standard deviation changes were overestimated.

For the fiscal years 1951-89, U_{BE} for revenue expenditure and capital expenditure were 0.4879 and 0.6186, respectively. In the sub-periods U_{BE} for revenue expenditure varied between

0.3725 (1961-70) and 0.6438 (1951-60). The best performance with regard to the forecast of budget estimates of revenue expenditure was during 1961-70 when U_{BE} was 0.3725 and systematic errors in terms of bias and regression portions as sources of errors were only 9 per cent. The disturbance proportion at 91 per cent was the highest during this period. During 1981-89 the bias and regression proportion combined together were the highest at 83 per cent.

As regards capital expenditure in the sub-periods, U_{BE} ranged between 0.4673 (1961-70) and 0.7179 (1951-60). The bias and regression proportion combined together for the full period were 25 per cent and the balance 75 per cent was on account of the disturbance proportion. The systematic error was the highest at 69 per cent during 1988-89.

3. Overall Deficit/Surplus

Difficulties in estimating changes in aggregate receipts and aggregate expenditure were reflected in the results of estimates of absolute changes in deficits/surpluses. Inequality co-efficient for the fiscal years 1951 through 1989 was around 0.40 and varied between 0.3978 (1951-60) and 0.6229 (1961-70) during the four sub-periods. For the whole period, nearly 80 per cent of the total forecast error was due to random variation (U_{DBE}). During the four sub-periods, U_{DBE} was in the range of 34 per cent (1961-70) and 0.76 per cent (1951-60). Thus the maximum possibilities of reducing systematic error through improvements in forecasting techniques was 20 per cent for the whole period and varied between 27 per cent (1981-89) and 65 per cent (1961-70).

The negative signs in Table 5 indicate that in case of the budget estimates in all periods except one (i.e. 1961-70), the mean change in overall deficit/surplus was underestimated. The standard deviation of predicted changes in deficits was overestimated *vis-a-vis* the standard deviation of actual changes in the whole period (1951-89) and also during two sub-periods viz. 1951-60 and 1961-70. During, the sub-periods 1971-80 and 1981-89, the standard deviation of actual changes was underestimated.

4. Tax Revenues : Total Tax Revenues, Income Tax, Corporation Tax, Union Excise Duties and Customs Duties

For the fiscal years 1951-89, the size of the forecast errors i.e. U_{BE} was 0.6091 for total tax revenues, 0.6558 for income tax, 0.6723 for corporation tax, 0.6579 for union excise duties and 0.6668 for customs duties. The mean and standard deviation of actual change *vis-a-vis* the changes in budget estimates were by and large underestimated during the whole period as well as in the sub-periods. For 1951-89, the disturbance proportion (U_{DBE}) accounted for around 60 per cent for total tax revenues and Income-tax, around 67 per cent and 77 per cent for corportion tax. The sub-periods witnessed a mixed trend. Sometimes disturbance proportion were more and at some other times systematic errors. were higher.

B : Revised Estimate Accuracy

1. Receipts : Aggregate Receipts, Revenue Receipts and Capital Receipts

The inequality co-efficient (U_{RE}) was 0.4517 for aggregate receipts for fiscal years 1951 through 1989. During the sub-periods, it ranged between 0.0948 (1981-89) and 0.7562 (1951-60). The mean of the predicted change was overestimated *vis-a-vis* the actual change. The standard deviation of predicted changes was also overestimated during the sub-periods except for two sub-periods viz., 1961-70 and 1971-89. The disturbance proportion accounted for nearly 58 per cent of the total forecast error for the whole period and during the sub-periods it ranged between 22 per cent (1951-60) and 81 per cent (1971-80). The U_{RE} for revenue receipts and capital receipts for the whole period were 0.4084 and 0.4392, resepctively, for the whole period, U_{RE} varied between 0.1000 (1981-89) and 0.5496 (1951-60). The range was between 0.0967 (1981-89) and 0.6573 (1951-60) for the capital receipts for the sub-periods. The mean actual change for revenue receipts was underestimated for all periods except one (i.e. 1981-89). The actual variation as reflected by standard deviation changes was overestimated in all periods except for sub-periods 1979-80 and 1981-89. With regard to the capital

receipts mean actual change was overestimated for all periods and the standard deviation actual changes showed a mixed trend. The disturbance proportion in case of the revised estimates of revenue receipts was between the range 36 per cent (1961-70) and 79 per cent (1981-89). Thus, the possibility of reducing systematic error or MPRE was in the range between 21 per cent (1981-89) 64 per cent (1961-70). The disturbance proportion (U_{DRE}) in case of capital receipts accounted for nearly 60 per cent for the whole period and ranged between 39 per cent (1951 - 60) and 75 per cent (1981-89) during the sub-periods.

2. Expenditure : Aggregate Expenditure, Revenue Expenditure and Capital Expenditure.

The inequality co-efficient of the revised estimates (U_{RE}) for aggregate expenditure, revenue expenditure and capital expenditure were 0.3931, 0.3055 and 0.5172, respectively, for the whole period (i.e., fiscal years 1951 through 1989). U_{RE} was in the range between 0.0967 (1981-89) and 0.6573 (1951-60) for aggregate expenditure during the sub-periods. U_{RE} for revenue expenditure varied between 0.0890 (1981-89) and 0.5620 (1951-60), for capital expenditure it was 0.1116 (1981-89) and 0.7456 (1951-60). The mean actual changes for aggregate expenditure, revenue expenditure and capital expenditure were, by and large, overestimated for the whole period as well as for the sub-periods. The standard deviation actual changes showed a mixed trend. Nontheless the dominace of overestimation was noticed. The disturbance proportion (U_{DRE}) was around 54 per cent for the whole period and was in the range of 22 per cent (1961-70) and 62 per cent (1971-80) during the sub-periods for aggregate expenditure. In case of revenue expenditure and capital expenditure U_{DRE} accounted for about 63 per cent and 57 per cent, respectively, of the total forecast error. U_{DRE} varied between the range of 19 per cent (1951-60) and 76 per cent (1981-89) for the former: between 32 per cent (1981-89) and 50 per cent (1951-50) for the latter.

3. Overall deficit/surplus

The forecasting error in the revised estimates of the overall budgetary deficit/surplus measured in terms of inequality

co-efficient (U_{RE}) was computed at 0.4299 for the whole period (i.e. 1951-89) and varied in the range of 0.1355 (1981-89) and 0.4795 (1961-70) during the sub-periods. The mean actual change showed a mixed trend. However, the standard deviation of actual change was overestimated. The bias and regression proportions combined together accounted for 36 per cent of the total error for the whole period and they varied in the range of 10 per cent (1961-70) and 63 per cent (1951-60).

4. Tax Revenues : Total Tax Revenues, Income Tax, Corporation Tax, Union Excise Duties and Customs Duties

During the fiscal years 1951 through 1989, the forecast error as measured by U_{RE} was 0.4875 for total tax revenues, 0.5485 for income tax, 0.5442 for corporation tax, 0.5341 for union excise duties and 0.5044 for customs duties. During the sub-periods U_{RE} for total tax revenues varied between 0.1077 (1981-89) and 0.7068 (1951-60), for income tax 0.2347 (1981 -89) and 0.6905 (1951-60); for corporation tax 0 2448 (1981-89) and 0.6675 (1951-60); for union excise duties 0.2377 (1981 - 89) and 0.6502 (1951-60), for customs duties 0.2273 (1981-89) and 0.6087 (1951-60). The mean and standard deviation of actual changes in case of all types of tax revenue by and large showed an underestimation. The dominance of disturbance proportion (U_{DRE}) was a conspicous aspect in the revised estimates of all types of tax revenue under reference in the study.

C. Maximum Possible Error Reduction in the Budget and Revised Estimates

As mentioned earlier, an attempt has also been made in this paper to examine to what extent the error components of the fiscal variables could have been reduced in the budget and revised estimates. This has been examined with the help of Theil's second order of inequality co-efficient. The empirical results examining the Maximum Possible Error Reduction (MPER) are set out in Tables 8 and 12. As it may be seen from the tables, the errors in aggregate receipts could have been corrected upto 29 per cent in budget estimates and 42 per cent in the revised estimates for the whole period. Similarly, errors in the aggregate expenditure could

have been reduced to 35 per cent in the budget estimates and 46 per cent in the revised estimates for the whole period. There was wide scope to reduce systematic errors in the revenue receipts, capital receipts, revenue expenditure, capital expenditure, budgetary surplus/deficit and tax revenues for the budget as well as for the revised estimates. This could have been done with the improvement in forecasting techniques.

Section V
Summary and Concluding Observations

In order to evaluate fiscal marksmanship in India, use of Theil's inequality co-efficient or U-statistics and its decomposition into first inequality and second inequelity proportions gave the following results.

The error in the forecasting of fiscal variables at the aggregate level as well as at the disaggregate level as measured in terms of Theil's inequality co-efficient (i.e., U - statistics) was higher in the budget estimates than those in the revised estimates except in the case of budgetary deficit where the revised estimates had higher errors. The reduced forecast errors in the revised estimates may be attributable to the fact that revised estimates are based on 9 months actual data and once the budget makes it through the Parliament, political assumptions are less an issue.

For the fiscal years 1951 through 1989, all the variables under reference were underestimated in their mean values except for aggregate receipts, capital receipts and union excise duties which were overestimated. In case of revised estimates, six fiscal variables viz, aggregate receipts, capital receipts, aggregate expenditure, revenue expenditure, total tax revenues, and corporation tax were overestimated and other fiscal variables were underestimated. The sub-period analysis, however, indicated a mixed trend.

The systematic error components of the budget estimates of the fiscal variables under reference for the fiscal years 1951 through 1989 at the aggregate level varied between the range of 15 per cent in the case of revenue expenditure and 41 per cent in

the case of revenue receipts. At the disaggregate level the range was between 23 per cent for corporation tax and 40 per cent for total tax revenues. In the case of the revised estimates the systematic error was 25 per cent for revenue receipts and 46 per cent for aggregate expenditure at the aggregate level. It was 5 per cent for corporation tax and 53 per cent for union excise duties at the disaggregate level.

Trends witnessed in respect of systematic errors for the whole period i.e., 1951 through 1989 were also true for the sub-periods. During the sub-periods, presence of large systematic errors were noticed at aggregate as well as disaggregate level for the fiscal variables under reference. Particularly, during the last decade i.e., fiscal years 1981 through 1989 the systematic error components for the budget estimates were the maximum with regard to most of the fiscal variables under study viz., aggregate receipts (0.8410) aggregate expenditure (0.8090) revenue receipts (0.7899) revenue expenditure (0.8279) and total tax revenues (0.7507).

From the foregoing analysis, one may conclude that the size of the forecast error of fiscal variables under study in budget as well as revised estimates is large despite a reduction in forecast error in the case of the revised estimates. To a great extent these errors are systematic. The presence of large systematic errors is a matter of serious concern to the extent that systematic errors are the result of improper estimation of key parameters of budgeting viz., tax and expenditure elasticities as also inaccurate forecasts of key macro economic varibales such as national income, savings and inflation rate (which influence Government revenues and expenditure). Therefore, if cognizance is not taken of the seriousness of the presence of large systematic errors, the utility of the entire budgetary exercise could be seriously jeopardised.

Two distinct approaches may be examined to reduce the budget forecast errors viz., one which seeks to bring about the corrections without making a departure from the existing framework while the other dealing with an overhaul of the systems and procedures. The former includes the review and monitoring techniques and the latter involves some proposals for budgetary reform.

The review technique may take the form of variation analysis or item-by-item review. In respect of variation analysis the increase or decrease over the previous year is examined whereas in the case of item-by-item review. review of the annual budget in terms of specific object is undertaken.

The review technique, however, has the limitation of not correcting systematic bias, whichever form it takes. Therefore, there is an imperative need for improvement in the forecasting technique which requires overhauling of the existing system. Medium-term expenditure and revenue policy (say for three years) may be formulated through a macro econometric model. Once the medium-term expenditure and revenue policy is formed, these fiscal aggregates can be annually adjusted for exogenous factors such as rate of inflation and changes in economic climate etc. Further, the problem of price bias[13] can be better solved through an econometric model.

No activity of the Government touches every member of society as does the budget which is reflected in the sensitivity of the common man. The art of budget making lies not merely in providing a solution to immediate problems but also in the precise anticipation of the likely things to come and in providing flexibility in policies. The usefulness of the budgetary exercise critically hinges on the ability of the budgeteer to forecast the relevant fiscal variables with reasonable accuracy. In this regard introduction of improved forecasting techniques such as econometric models certainly merits attention especially in the context of the requirements of developmental planning in India. Further, while projecting the fiscal variables care should be taken to minimise the systematic bias through improved forecasting techniques

Notes

1. As reported by C.M. Allan in his article 'Fiscal Marksmanship 1951-63' Oxford Economic Papers Vol. 17, No. 2, 1965 the term 'Fiscal Marksmanship' was used in the literature by A.K. Cairncross in his Wicksell Lectures, 'Monetary Policy in a Mixed Economy, Stockholm, 1960 to connote the accuracy with which chancellors of exchequer have been able to forecast their budget outlay.

2. See Prest (1975).

3. Allan C. M. (1966), Auld D.A.L. (1970) and Prest AR (1961), Davis (1980) and Morrison (1986).

4. Possible reasons for the budget forecast error besides being technical (in the form of unsophisticated and poor forecasting methodology) are on account of organisational, political and attitudinal factors, [See Richard Goode (1984) and Premchand (1983)]. The most common technical reason for the budget forecast error is that the values of the exogenous variables contemparaneous with the endogenous variables are not available at the time of forecast and hence judgemental considerations or expert opinions about their future values are provided by the forecaster. In other words, the knowledge needed to make a good forecast is severely limited, see Haitvosky (1974) and Schnitzer and Chen (1972).

5. For detailed reference with regard to revised classification in 1974-75 and 1986-87, see, 'Finances of Government of India', published in May 1974 issue of RBI Bulletin and Budget Documents of 1986-87 and 1987-88, respectively.

6. Koutsoyiannis (1986)

7. According to Theil, the relative or percentage changes have the disadvantage of certain asymmetry between numerically equal percentage increases and decreases. For example, let current year's level exceed previous year's level by 25

per cent and next year's level be 25 per cent below current year's level. Then next year's level is not the same as last year's level, the ratio between the two being 3/4 x 5/4 = 15/16. Further, a negative 50 per cent prediction error implies that forecast is one half of the observed value, a positive 50 per cent prediction error implies that the observed value is two-thirds of the forecast. This difficulty is avoided if we take natural logarithmic changes instead of relative change.

8. See Technical Appendix in the paper for algebraic derivation.

9. Pindyck and Rubinfield (1981).

10. For detailed discussion see Granger and Newbold (1973) and Maddala (1986).

11. As regards the underestimation and overestimation of the mean and standard deviation actual changes there are four posibilities viz., (1) Mean underestimated and standard deviation underestimated, (2) Mean overestimated and standard deviation overestimated, (3) Mean underestimated and standard deviation overestimated and (4) Mean overestimated and standard deviation underestimated.

12. There is also a third possibility i.e. comparing budget estimates with revised estimates. This has not been considered in this study.

13. One of the major problems encountered in formulating budget is the choice of the base prices. In India, while estimating the fiscal variables, preference is for current prices. As prices rise and become relatively unpredictable, the problems of budgeting are severe. Thus the formulation and execution of Government budget is greatly complicated by inflation as it affects both expenditure and revenues and makes inapplicable some traditional methods of forecasting and control. For detailed discussion on how inflation affects estimates of fiscal variables, [see Sarma (1982) and Jadhav and Singh (1990)]. These authors conclude that the Government expenditures adjust at a faster rate than Goverment revenues to inflation leading to a higher budgetary deficit.

Technical Appendix

The algebraic proof of the decomposition of mean square prediction error i.e. $\frac{1}{n}\Sigma(Pi-Ai)^2$ into first set of inequality proportion and second set of inequality proportion is set out below.

First Set of Inequality Proportions

$$\frac{1}{n}\Sigma(Pi-Ai)^2 = (\bar{P}-\bar{A})^2 + (SP-SA)^2 + 2(1-rPA)\,SPSA$$

LHS

$$= \frac{1}{n}\Sigma(Pi-Ai)^2$$

$$= \frac{1}{n}\Sigma\left[(Pi-\bar{P}+\bar{P}) - (Ai-\bar{A}+\bar{A})\right]^2$$

$$= \frac{1}{n}\Sigma\left[(Pi-\bar{P}) - (Ai-\bar{A}) + (\bar{P}-\bar{A})\right]^2$$

$$= \frac{1}{n}\Sigma\left[(Pi-\bar{P})^2 + (Ai-\bar{A})^2 + (\bar{P}-\bar{A})^2 - 2(Pi-\bar{P})(Ai-\bar{A})\right.$$

$$\left. -2(Ai-\bar{A})(\bar{P}-\bar{A}) + 2(Pi-\bar{P})(\bar{P}-\bar{A})\right]$$

$$= \frac{1}{n}\Sigma(Pi-\bar{P})^2 + \frac{1}{n}\Sigma(Ai-\bar{A})^2 + \frac{1}{n}\Sigma(\bar{P}-\bar{A})^2$$
$$- \frac{2}{n}\Sigma(Pi-\bar{P})(Ai-\bar{A}) - \frac{2}{n}\Sigma(Ai-\bar{A})(\bar{P}-\bar{A})$$
$$+ \frac{2}{n}\Sigma(Pi-\bar{P})(\bar{P}-\bar{A})$$

$$= \frac{1}{n}\Sigma(Pi-\bar{P})^2 + \frac{1}{n}\Sigma(Ai-\bar{A})^2 + \frac{n(\bar{P}-\bar{A})^2}{n} - \frac{2}{n}\Sigma(Pi-\bar{P})(Ai-\bar{A})$$
$$- \frac{2}{n}(\bar{P}-\bar{A})\Sigma(Ai-\bar{A}) + \frac{2}{n}(\bar{P}-\bar{A})\Sigma(Pi-\bar{P})$$

$$= \frac{1}{n}\Sigma\left(Pi - \bar{P}\right)^2 + \frac{1}{n}\Sigma\left(Ai - \bar{A}\right)^2 + \left(\bar{P} - \bar{A}\right)^2 - \frac{2}{n}\Sigma\left(Pi - \bar{P}\right)\left((Ai - \bar{A}\right)$$

$$\left[\text{Since } \Sigma\left(Ai - \bar{A}\right) = 0 \text{ and } \Sigma\left(Pi - \bar{P}\right) = 0\right]$$

$$= SP^2 + SA^2 + \left(\bar{P} - \bar{A}\right)^2 - 2\left[\frac{\frac{1}{n}\Sigma\left(Pi - \bar{P}\right)\left(Ai - \bar{A}\right)}{SPSA}\right] SPSA$$

$$= \left(\bar{P} - \bar{A}\right)^2 + SP^2 + SA^2 - 2\,\gamma PA\ SPSA$$

$$= \left(\bar{P} - \bar{A}\right)^2 + \left(SP^2 + SA^2 - 2\,SPSA\right) + 2\,SPSA - 2\,\gamma PA\ SPSA$$

$$= \left(\bar{P} - \bar{A}\right)^2 + \left(S\bar{P} - SA\right)^2 + 2\left(1 - \gamma PA\right) SPSA$$

Second Set of Inequality Proportions

$$\frac{1}{n} \lesssim (Pi - Ai)^2 = \left(\bar{P} - \bar{A}\right)^2 + \left(SP - \gamma PA\ SA\right)^2 + \left(1 - \gamma PA^2\right) SA^2$$

LHS

$$\frac{1}{n}\lesssim\left(Pi - Ai\right)^2$$

$$= \frac{1}{n}\lesssim\left[\left(Pi - \bar{P}\right) - \left(Ai - \bar{A}\right) + \left(\bar{P} - \bar{A}\right)\right]^2$$

$$= \frac{1}{n}\lesssim\left[\left(Pi - \bar{P}\right)^2 + \left(Ai - \bar{A}\right)^2 + \left(\bar{P} - \bar{A}\right)^2 - 2\left(Pi - \bar{P}\right)\left(Ai - \bar{A}\right)\right.$$
$$\left. - 2\left(Ai - \bar{A}\right)\left(\bar{P} - \bar{A}\right) + 2\left(Pi - \bar{P}\right)\left(\bar{P} - \bar{A}\right)\right]$$

$$= \frac{1}{n}\lesssim\left[\left(Pi - \bar{P}\right)^2 + \lesssim\left(Ai - \bar{A}\right)^2 + \lesssim\left(\bar{P} - \bar{A}\right)^2 - 2\lesssim\left(Pi - \bar{P}\right)\left(Ai - \bar{A}\right)\right.$$
$$\left. - 2\left(\bar{P} - \bar{A}\right)\lesssim\left(Ai - \bar{A}\right) + 2\left(\bar{P} - \bar{A}\right)\lesssim\left(Pi - \bar{P}\right)\right]$$

$$= \frac{1}{n}\lesssim\left(Pi - \bar{P}\right)^2 + \frac{1}{n}\lesssim\left(Ai - \bar{A}\right)^2 + \frac{n\left(\bar{P} - \bar{A}\right)^2}{n}$$
$$- 2\,\frac{1}{n}\lesssim\left(Pi - \bar{P}\right)\left(Ai - \bar{A}\right)$$

$$= \left(\bar{P} - \bar{A}\right)^2 + \frac{1}{n}\lesssim\left(Pi - \bar{P}\right)^2 + \frac{1}{n}\lesssim\left(Ai - \bar{A}\right)^2$$

$$- 2\,\frac{1}{n}\lesssim\left(Pi - \bar{P}\right)\left(Ai - \bar{A}\right)$$

$$= \left(\bar{P} - \bar{A}\right)^2 + SP^2 + SA^2 - 2.\gamma PA\ SPSA$$

$$= \left(\bar{P} - \bar{A}\right)^2 + SP^2 + SA^2 - 2\gamma PA\, SPSA + \gamma PA^2\, SA^2 - \gamma PA^2 SA^2$$

$$= \left(\bar{P} - \bar{A}\right)^2 + \left(SP^2 + \gamma PA^2\, SA^2 - 2\,\gamma PA\, SPSA\right) + SA^2 - \gamma PA^2 SA^2$$

$$= \left(\bar{P} - \bar{A}\right)^2 + \left(SP - \gamma PA\, SA\right)^2 + \left(1 - \gamma PA^2\right) SA^2$$

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Table 1 : Mean (P_{BE}) Standard Deviation (SP_{BE}) and Correlation Co-efficient (rPA_{BE}) of Budget Estimates

Items	Mean (P_{BE})					Standard Deviation (SP_{BE})					Correlation Co-efficient (rPA_{BE})				
	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)
1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Aggregate Receipts	0.1351	0.2520	0.1114	0.0724	0.0997	0.1210	0.1677	0.0879	0.0548	0.0237	0.6382	0.7885	0.8542	0.6456	0.6528
2. Revenue Receipts	0.0758	0.0170	0.0866	0.1214	0.1191	0.1172	0.1080	0.1190	0.1159	0.0249	0.8574	0.7405	0.7959	0.8964	0.1712
3. Capital Receipts	0.2699	0.8264	0.1161	0.0234	0.0721	0.4109	0.4683	0.2189	0.0998	0.0447	0.6395	0.8391	0.7846	0.7938	0.4507
4. Aggregate Expenditure	0.1121	0.2063	0.0994	0.0543	0.0829	0.0987	0.1087	0.0945	0.0692	0.0376	0.6763	0.9536	0.8061	0.5321	0.7113
5. Revenue Expenditure	0.1187	0.1330	0.1308	0.0861	0.1175	0.0669	0.0758	0.0826	0.0516	0.0366	0.6217	0.7316	0.9450	0.4791	0.8312
6. Capital Expenditure	0.1116	0.3255	0.0717	0.0148	0.0290	0.1895	0.2409	0.1219	0.1024	0.0634	0.7732	0.9088	0.7228	0.5947	0.4261
7. Overall Deficit/Surplus	3.0200	9.3443	0.7078	1.1909	0 9257	11.7216	22.8945	0.4200	1.3213	0.2341	0.9258	0.9205	-0.0919	0.9023	0.5288
8. Total Tax Revenues	0.0718	0.0105	0.0817	0.0845	0.1206	0.0788	0.1123	0.0413	0.0637	0.0301	0.7294	0.8781	0.0099	0.6666	-0.0334
9. Income Tax	-0.0763	-0.0509	-0.0190	-0.1271	-0.0417	0.2463	0.1402	0.2049	0.3148	0.2517	0.6930	0.6465	0.7200	0.7560	0.7804
10. Corporation Tax	0.0892	-0.0381	0.1113	0.1489	0.1381	0.1257	0.1612	0.0789	0.0635	0.0688	0.3778	0.5303	0.0978	-0.1588	0.7845
11. Union Excise Duties	0.0867	0.0864	0.0439	0.1015	0.1195	0.1016	0.1396	0.0510	0.1110	0.0746	0.7701	0.8293	0.5937	0.9345	0.8772
12. Customs Duties	0.0426	-0.0689	0.0756	0.0300	0.1411	0.1066	0.1122	0.0868	0.0603	0.0422	0.5783	0.6347	0.5626	-0.1904	0.2491

Table 2 : Mean ($\bar{P}_{RE}$) Standard Deviation (SP_{RE}) and Correlation Co-efficient of Revised Estimates (τPA_{RE})

Items	Mean ($\bar{P}_{RE}$)					Standard Deviation (SP_{RE})					Correlation Co-efficient (τPA_{RE})				
	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)
1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Aggregate Receipts	0.1743	0.2626	0.1344	0.1287	0.1644	0.1195	0.1671	0.1044	0.0783	0.0343	0.8344	0.8918	0.9758	0.9808	0.9160
2. Revenue Receipts	0.1089	0.0535	0.1042	0.1572	0.1663	0.1231	0.1303	0.1079	0.1214	0.0187	0.9729	0.9761	0.9568	0.9931	0.8062
3. Capital Receipts	0.3210	0.8268	0.1571	0.0929	0.1613	0.4216	0.5678	0.1922	0.1500	0.0900	0.6871	0.7668	0.9624	0.9860	0.9742
4. Aggregate Expenditure	0.1683	0.2164	0.1509	0.1427	0.1658	0.0955	0.1270	0.1099	0.0698	0.0456	0.8923	0.8562	0.9902	0.9674	0.9825
5. Revenue Expenditure	0.1565	0.1442	0.1564	0.1554	0.1764	0.0714	0.0803	0.0967	0.0533	0.0420	0.9194	0.9174	0.9938	0.9611	0.9860
6. Capital Expenditure	0.1926	0.3482	0.1460	0.1265	0.1486	0.2071	0.3292	0.1558	0.1026	0.0653	0.8732	0.8520	0.9867	0.9798	0.9751
7. Overall Deficit/Surplus	3.5725	9.8865	1.2525	2.0487	1.3580	12.8008	25.1581	0.6009	1.9739	0.6354	0.9310	0.9280	0.5943	0.9719	0.9742
8. Total Tax Revenues	0.1009	0.0421	0.0906	0.1230	0.1600	0.0913	0.1361	0.0577	0.0750	0.0221	0.9502	0.9833	0.9023	0.9245	0.8362
9. Income Tax	-0.0707	-0.0538	-0.0898	-0.0710	0.0389	0.2359	0.1557	0.2434	0.2702	0.1805	0.7135	0.8862	0.7536	0.8223	0.8246
10. Corporation Tax	0.1413	0.0466	0.1372	0.1944	0.1964	0.1281	0.2435	0.1126	0.0629	0.0830	0.7712	0.9023	0.7827	0.5209	0.9560
11. Union Excise Duties	0.0963	0.0845	0.0656	0.0999	0.1380	0.1422	0.2015	0.0566	0.1261	0.0611	0.9045	0.9755	0.6789	0.9704	0.9363
12. Customs Duties	0.1004	-0.0008	0.0795	0.1436	0.1867	0.1457	0.2015	0.1482	0.0728	0.0468	0.9814	0.9966	0.9888	0.9500	0.9139

Table 3 : Mean ($\bar{A}$) and Standard Deviation (SA) of Actuals

Items	Mean ($\bar{A}$)					Standard Deviation (SA)				
	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)
1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Aggregate Receipts	0.1340	0.1282	0.1163	0.1212	0.1580	0.1075	0.1592	0.1092	0.0797	0.0336
2. Revenue Receipts	0.1240	0.0710	0.1376	0.1706	0.1589	0.1177	0.1186	0.0953	0.1253	0.0259
3. Capital Receipts	0.1609	0.2596	0.0950	0.0646	0.1568	0.3805	0.7095	0.1991	0.1564	0.0824
4. Aggregate Expenditure	0.1365	0.1420	0.1241	0.1304	0.1530	0.0872	0.1135	0.1055	0.0641	0.0485
5. Revenue Expenditure	0.1336	0.0823	0.1396	0.1479	0.1691	0.0757	0.0769	0.0913	0.0614	0.0424
6. Capital Expenditure	0.1434	0.2299	0.1094	0.1081	0.1259	0.1741	0.2765	0.1546	0.0968	0.0759
7. Overall Deficit/Surplus	3.6884	10.6317	1.0340	1.9209	1.2368	10.6455	20.1994	0.4058	1.9497	0.6287
8. Total Tax Revenues	0.1197	0.0652	0.1226	0.1391	0.1599	0.0889	0.1290	0.0755	0.0735	0.0289
9. Income Tax	0.0753	-0.0216	0.0735	0.1586	0.1353	0.2807	0.1639	0.1842	0.3760	0.3256
10. Corporation Tax	0.1230	0.1066	0.1286	0.1469	0.1516	0.1523	0.2361	0.1376	0.0715	0.1133
11. Union Excise Duties	0.1337	0.1596	0.1401	0.1037	0.1345	0.1115	0.1727	0.0592	0.1133	0.0669
12. Customs Duties	0.1213	-0.0007	0.1013	0.1910	0.1917	0.1562	0.2014	0.1638	0.0810	0.0607

Table 4 : Inequality Co-efficient (U - Statistics)

Items	Budget Estimates (U_{BE})					Revised Estimates (U_{RE})				
	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)
1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Aggregate Receipts	0.5701	0.7995	0.3588	0.5384	0.3940	0.4517	0.7562	0.1884	0.1190	0.0948
2. Revenue Receipts	0.5080	0.6381	0.4355	0.5024	0.4084	0.3239	0.5496	0.2198	0.1155	0.1000
3. Capital Receipts	0.6299	0.7954	0.4385	0.5340	0.4392	0.5212	0.7797	0.2399	0.1397	0.0958
4. Aggregate Expenditure	0.5312	0.6118	0.3879	0.6128	0.4399	0.3931	0.6573	0.1897	0.1303	0.0967
5. Revenue Expenditure	0.4871	0.6438	0.3725	0.5096	0.4085	0.3055	0.5620	0.1951	0.1169	0.0890
6. Capital Expenditure	0.6186	0.7179	0.4673	0.5873	0.4985	0.5172	0.7456	0.2392	0.1473	0.1116
7. Overall Deficit/Surplus	0.3983	0.3978	0.6229	0.4370	0.4508	0.4299	0.4344	0.4795	0.1765	0.1355
8. Total Tax Revenues	0.6091	0 7066	0.4901	0.5253	0.4783	0.4875	0.7068	0.2494	0.1533	0.1097
9. Income Tax	0.6558	0.7143	0.5443	0.6684	0.5485	0.5485	0.6905	0.3765	0.3178	0.2347
10. Corporation Tax	0.6723	0.7423	0.5758	0.6647	0.5287	0.5242	0.6675	0.3861	0.3351	0.2448
11. Union Excise Duties	0.6579	0.7214	0.5877	0.6316	0.5098	0.5341	0.6502	0.4028	0.3247	0.2377
12. Customs Duties	0.6668	0.7306	0.6000	0.6626	0.4998	0.5044	0.6087	0.3811	0.3182	0.2273

Table 5 : Overestimation or Underestimation of Budget Estimates

Items	Overestimation or Underestimation Calculated from Mean ($\bar{P}_{BE} - \bar{A}$)					Overestimation or Underestimation Calculated from Standard Deviation (SP_{BE}/SA)				
	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)
1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Aggregate Receipts	+0.0011	+0.1232	-0.0439	-0.0215	-0.0370	1.1256	1.0534	0.8045	0.6875	0.7054
2. Revenue Receipts	-0.0482	-0.0540	-0.0510	-0.0492	-0.0395	0.9958	0.9106	1.2487	0.9249	0.9614
3. Capital Receipts	+0.1090	+0.5668	+0.0211	-0.0412	-0.0847	1.0799	0.6600	1.0994	0.6381	0.5425
4. Aggregate Expenditure	-0.0244	+0.0643	-0.0247	-0.0761	-0.0701	1.1319	0.9577	0.8957	1.0796	0.8868
5. Revenue Expenditure	*-0.0149*	*+0.0507*	*-0.0088*	*-0.0618*	*-0.0516*	*0.8838*	*0.9857*	*0.9047*	*0.8404*	*0.8632*
6. Capital Expenditure	-0.0318	+0.0956	-0.0377	-0.0933	-0.0969	1.0855	0.8712	0.7885	1.0579	0.8353
7. Overall Deficit/Surplus	-0.6684	-1.2874	-0.3262	+0.9988	-0.3111	1.1011	1.1334	1.0350	0.6772	0.3723
8. Total Tax Revenues	-0.0479	-0.0547	-0.0409	-0.0546	-0.0393	0.8751	0.8705	0.5470	0.8667	1.0415
9. Income Tax	-0.1516	-0.0293	-0.0925	-0.2857	-0.1770	0.8774	0.8554	1.1124	0.8372	0.7730
10. Corporation Tax	+0.0338	-0.1477	-0.0173	+0.0002	-0.0135	0.8257	0.6828	0.5734	0.8881	0.6072
11. Union Excise Duties	-0.0470	-0.0732	-0.0962	-0.0022	-0.0150	0.9112	0.8083	0.8615	0.9797	1.1151
12. Customs Duties	-0.0787	-0.0682	-0.0257	-0.1610	-0.0506	0.6825	0.5571	0.5299	0.7444	0.6952

Table 6 : Sources of Errors From the First Set of Inequality Proportions of the Budget Estimates

Items	Bias Proportion (Um_{BE})					Variance Proportion (Us_{BE})					Co-variance Proportion (Uc_{BE})				
	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)
1	2.	3.	4.	5.	6.		8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Aggregate Receipts	0.0001	0.5742	0.0072	0.3911	0.8392	0.0190	0.0027	0.1388	0.1016	0.0243	0.9809	0.4231	0.8540	0.5072	0.1365
2. Revenue Receipts	0.3712	0.3016	0.3333	0.4388	0.5123	0.0001	0.0117	0.0718	0.0162	0.0003	0.6287	0.6867	0.5949	0.5450	0.4874
3. Capital Receipts	0.0946	0.6606	0.0227	0.1500	0.5673	0.0074	0.1196	0.0199	0.2827	0.1123	0.8980	0.2198	0.9574	0.5673	0.3203
4. Aggregate Expenditure	0.0942	0.7796	0.1327	0.5814	0.8074	0.0212	0.0043	0.0263	0.0026	0.0194	0.8846	0.2161	0.8410	0.4160	0.1732
5. Revenue Expenditure	0.0539	0.4508	0.0787	0.5258	0.8270	0.0186	0.0002	0.0767	0.0132	0.0104	0.9275	0.5490	0.8446	0.4610	0.1626
6. Capital Expenditure	0.0625	0.4053	0.1096	0.5197	0.6232	0.0145	0.0563	0.0825	0.0019	0.0104	0.9230	0.5384	0.8079	0.4784	0.3664
7. Overall Deficit/Surplus	0.0222	0.0201	0.2222	0.3724	0.2474	0.0575	0.0881	0.0004	0.2759	0.3981	0.9203	0.8918	0.7774	0.3517	0.3545
8. Total Tax Revenues	0.3721	0.4396	0.1853	0.4809	0.4625	0.0201	0.0390	0.1298	0.0157	0.0004	0.6078	0.5214	0.6849	0.5034	0.5371
9. Income Tax	0.3453	0.0489	0.2841	0.5703	0.4306	0.0178	0.0317	0.0142	0.0262	0.0749	0.6369	0.9195	0.7017	0.4035	0.4945
10. Corporation Tax	0.0448	0.3362	0.0128	0.0004	0.0327	0.0275	0.0900	0.1477	0.0062	0.3584	0.9277	0.5738	0.8395	0.9935	0.6089
11. Union Excise Duties	0.2936	0.3649	0.7860	0.0030	0.1119	0.0127	0.0748	0.0058	0.0032	0.0295	0.6937	0.5603	0.2028	0.9938	0.8586
12. Customs Duties	0.2731	0.1595	0.0347	0.6825	0.3797	0.1083	0.2734	0.3120	0.0112	0.0504	0.6186	0.5671	0.6533	0.3063	0.5699

Table 7 : Sources of Errors From the Second Set of Inequality Proportions of the Budget Estimates

Items	Bias Proportion (Um_{BE})					Regression Proportion (U_{RBE})					Disturbance Proportion (U_{DBE})				
	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)
1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Aggregate Receipts	0.0001	0.5742	0.0072	0.3911	0.8392	0.2861	0.0667	0.0089	0.0018	0.0008	0.7137	0.3591	0.9839	0.6070	0.1600
2. Revenue Receipts	0.3712	0.3016	0.3330	0.4388	0.5123	0.0425	0.0419	0.2386	0.0023	0.2776	0.5863	0.6564	0.4281	0.5590	0.2101
3. Capital Receipts	0.0946	0.6606	0.0227	0.1500	0.5673	0.2236	0.0332	0.2001	0.0524	0.0045	0.6818	0.3062	0.7772	0.7976	0.4281
4. Aggregate Expenditure	0.0942	0.7796	0.1327	0.5814	0.8074	0.2513	0.0000	0.0195	0.1234	0.0016	0.6546	0.2204	0.8479	0.2952	0.1920
5. Revenue Expenditure	0.0539	0.4508	0.0787	0.5258	0.8270	0.0955	0.0674	0.0136	0.0006	0.0006	0.8506	0.4818	0.9076	0.4736	0.1724
6. Capital Expenditure	0.0625	0.4053	0.1096	0.5197	0.6232	0.1854	0.0080	0.1196	0.0121	0.0639	0.7521	0.5899	0.8824	0.3607	0.3128
7. Overall Deficit/Surplus	0.0222	0.0201	0.2222	0.3724	0.2474	0.1730	0.2244	0.4368	0.1340	0.0247	0.8048	0.7555	0.3410	0.4936	0.7279
8. Total Tax Revenues	0.3721	0.4396	0.1853	0.4809	0.4625	0.0272	0.0000	0.1824	0.0346	0.2882	0.6007	0.5604	0.6323	0.4845	0.2493
9. Income Tax	0.3453	0.0489	0.2841	0.5703	0.0178	0.0402	0.0665	0.1733	0.0065	0.0001	0.6145	0.8847	0.5426	0.4232	0.5693
10. Corporation Tax	0.0448	0.3362	0.0128	0.0004	0.0275	0.1810	0.0208	0.1835	0.5285	0.0729	0.7742	0.6430	0.8037	0.4711	0.8944
11. Union Excise Duties	0.2936	0.3649	0.7860	0.0003	0.0748	0.0334	0.0009	0.0212	0.0157	0.1846	0.6730	0.6342	0.1929	0.9813	0.7035
12. Customs Duties	0.2731	0.1595	0.0347	0.6285	0.2734	0.0117	0.0084	0.0015	0.1511	0.1089	0.7153	0.8321	0.9638	0.1664	0.5714

Table 8 : Maximum Possible Error Reduction of the Budget Estimates ($MPER_{BE}$)

Items	$MPER_{BE}$ = Bias Proportion + Regression Proportion ($U_{m_{BE}} + U_{r_{BE}}$)				
	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)
1	2.	3.	4.	5.	6.
1. Aggregate Receipts	0.2862	0.6409	0.0161	0.3929	0.8410
2. Revenue Receipts	0.4137	0.3435	0.5716	0.4411	0.7899
3. Capital Receipts	0.3182	0.6938	0.2228	0.2024	0.5719
4. Aggregate Expenditure	0.3515	0.7796	0.1522	0.7075	0.8090
5. Revenue Expenditure	0.1495	0.5182	0.0923	0.5264	0.8276
6. Capital Expenditure	0.2429	0.4133	0.2292	0.6393	0.6872
7. Overall Deficit/Surplus	0.1952	0.3721	0.6590	0.5064	0.2721
8. Total Tax Revenues	0.3993	0.2445	0.3677	0.5155	0.7507
9. Income Tax	0.3855	0.1154	0.4574	0.5768	0.4307
10. Corporation Tax	0.2258	0.3570	0.1963	0.5289	0.1056
11. Union Excise Duties	0.3270	0.3658	0.8072	0.0187	0.2965
12. Customs Duties	0.2848	0.1679	0.0362	0.8336	0.4886

Table 9 : Overestimation or Underestimation of Revised Estimates

Items	Overestimation or Underestimation Calculated from Mean ($\bar{P}_{RE} - \bar{A}$)					Overestimation or Underestimation Calculated from Standard Deviation (SP_{RE}/SA)				
	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)
1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Aggregate Receipts	+0.0403	+0.1344	+0.0181	+0.0075	+0.0064	1.1163	1.0496	0.6558	0.9824	1.0208
2. Revenue Receipts	-0.0151	-0.0175	-0.0334	-0.0134	+0.0074	1.0459	1.0986	1.1322	0.9689	0.7220
3. Capital Receipts	+0.1601	+0.5672	+0.0621	+0.0283	+0.0045	1.1080	0.8003	0.9653	0.9591	1.0922
4. Aggregate Expenditure	+0.0318	+0.0744	+0.0268	+0.0123	+0.0128	1.0952	1.1189	1.0417	1.0109	0.9402
5. Revenue Expenditure	+0.0229	+0.0619	+0.0168	+0.0075	-0.0073	0.9432	1.0442	1.0519	0.8681	0.9906
6. Capital Expenditure	-0.0492	+0.1183	+0.0368	+0.0184	+0.0227	1.1895	1.1906	1.0078	1.0599	0.8603
7. Overall Deficit/Surplus	-0.1159	-0.7452	+0.2184	+0.1278	+0.1212	1.2025	1.2455	1.4808	1.0124	1.0107
8. Total Tax Revenues	+0.8901	-0.0231	-0. 032	-0.0161	+0.0001	1.0270	1.0550	0.7642	1.0204	0.7647
9. Income Tax	-0.1460	-0.0322	-0.1633	-0.2296	-0.0964	0.8404	0.9500	1.3214	0.7186	0.5544
10. Corporation Tax	+0.0183	-0.0600	+0.0086	+0.0475	-0.0235	0.8411	1.0313	0.8183	0.8797	0.7326
11. Union Excise Duties	-0.0374	-0.0751	-0.0630	-0.0038	+0.0035	1.2753	1.1668	0.9561	1.1130	0.9133
12. Customs Duties	-0.0209	-0.0001	-0.0218	-0.0474	-0.0005	0.9328	1.0005	0.9048	0.8988	0.7710

Table 10 : Sources of Errors From the First Set of Inequality Proportions of the Revised Estimates

Items	Bias Proportion (Um_{RE})					Variance Proportion (U_{SRE})					Co-variance Proportion (U_{CRE})				
	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)
1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12	13.	14.	15.	16.
1. Aggregate Receipts	0.2692	0.7563	0.3629	0.1885	0.1728	0.0242	0.0026	0.0257	0.0064	0.0020	0.7067	0.2411	0.6114	0.8050	0.8253
2. Revenue Receipts	0.2183	0.2611	0.5160	0.4420	0.1896	0.0282	0.1154	0.0727	0.0376	0.1767	0.7535	0.6235	0.4113	0.5204	0.6337
3. Capital Receipts	0.2005	0.6074	0.5686	0.5350	0.0444	0.0132	0.0379	0.0071	0.0278	0.1254	0.7863	0.3547	0.4243	0.4373	0.8302
4. Aggregate Expenditure	0.3518	0.5608	0.7449	0.3574	0.1728	0.0242	0.0185	0.0202	0.0013	0.0020	0.6240	0.4207	0.2349	0.6413	0.8253
5. Revenue Expenditure	0.3709	0.7878	0.6684	0.1505	0.5185	0.0129	0.0025	0.0684	0.1759	0.0011	0.6162	0.2097	0.2632	0.6736	0.4804
6. Capital Expenditure	0.1908	0.2878	0.6772	0.4365	0.5889	0.0857	0.0571	0.0008	0.0443	0.1286	0.7234	0.0655	0.3220	0.5192	0.2825
7. Overall Deficit/Surplus	0.0006	0.0056	0.1682	0.0700	0.4158	0.1980	0.2500	0.1343	0.0025	0.0013	0.8014	0.8918	0.6975	0.9275	0.5829
8. Total Tax Revenues	0.3011	0.4554	0.4682	0.2898	0.0000	0.0050	0.0439	0.1438	0.0023	0.1846	0.6939	0.5007	0.3880	0.7079	0.8154
9. Income Tax	0.3482	0.1501	0.5104	0.5269	0.1825	0.0326	0.0096	0.0670	0.1119	0.4131	0.6192	0.8403	0.4226	0.3612	0.4044
10. Corporation Tax	0.0338	0.2287	0.0101	0.3399	0.5356	0.0594	0.2706	0.0839	0.0112	0.2442	0.9068	0.5007	0.9060	0.6489	0.2201
11. Union Excise Duties	0.2601	0.4435	0.7198	0 0139	0.0217	0.1760	0.3946	0.0009	0.1602	0.0589	0.5639	0.1619	0.2793	0.8258	0.9193
12. Customs Duties	0.3145	0.0000	0.3777	0.7741	0.0353	0.0787	0.0000	0.1925	0.0232	0.2731	0.6068	1.0000	0.4298	0.2027	0.6919

Table 11 : Sources of Errors From the Second Set of Inequality Proportions of the Revised Estimates

Items	Bias Proportion (Um_{RE})					Regression Proportion (U_{RRE})					Disturbance Proportion (U_{DRE})				
	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)
1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Aggregate Receipts	0.2692	0.7563	0.3629	0.1885	0.1728	0.1481	0.0264	0.0052	0.0001	0.0522	0.5827	0.2172	0.6319	0.8114	0.7750
2. Revenue Receipts	0.2183	0.2611	0.5160	0.4420	0.1896	0.0712	0.1781	0.1283	0.0227	0.0165	0.7105	0.5608	0.3557	0.5353	0.7939
3. Capital Receipts	0.2005	0.6074	0.5686	0.5350	0.0444	0.2009	0.0011	0.0000	0.0121	0.2052	0.5986	0.3915	0.4314	0.4529	0.7504
4. Aggregate Expenditure	0.3518	0.5608	0.7449	0.3574	0.1728	0.1093	0.0902	0.0307	0.0190	0.0158	0.5389	0.3490	0.2244	0 6236	0.3273
5. Revenue Expenditure	0.3709	0.7878	0.6684	0.1505	0.5185	0.0024	0.0198	0.0838	0.0879	0.0006	0.6267	0.1924	0.2478	0.7616	0.4808
6. Capital Expenditure	0.1908	0.2878	0.6772	0.4365	0.5889	0.2394	0.2100	0.0054	0.0788	0.0868	0.5698	0.5022	0.3174	0.4847	0.3242
7. Overall Deficit/Surplus	0.0006	0.0056	0.1682	0.0700	0.4158	0.3560	0.4183	0.4564	0.0268	0.0149	0.6434	0.5761	0.3754	0.9032	0.5693
8. Total Tax Revenues	0.3021	0.4554	0.4682	0.2898	0.0000	0.0401	0.0742	0.0491	0.0359	0.0178	0.6588	0.4704	0.4826	0.6743	0.9822
9. Income Tax	0.3482	0.1501	0.5104	0.5269	0.1825	0.0208	0.0160	0.2091	0.0152	0.1519	0.6310	0.8339	0.2805	0.4579	0.6659
10. Corporation Tax	0.0338	0.2287	0.0101	0.3399	0.5356	0.0115	0.1131	0.0033	0.0990	0.1705	0.9546	0.6582	0.9866	0.5612	0.2939
11. Union Excise Duties	0.2601	0.4435	0.7198	0.0139	0.0217	0.3191	0.4431	0.0349	0.2552	0.0041	0.4209	0.1134	0.2453	0.7309	0.9742
12. Customs Duties	0.3143	0.0000	0.3777	0.7741	0.0353	0.0411	0.0019	0 1500	0.0060	0.1063	0.6445	0.9981	0.4724	0.2200	0.8583

Table 12 : Maximum Possible Error Reduction of Revised Estimates ($MPER_{RE}$)

Items	$MPER_{RE}$ = Bias Proportion + Regression Proportion ($Um_{RE} + U_{RRE}$)				
	Period I (1951-89)	Period II (1951-60)	Period III (1961-70)	Period IV (1971-80)	Period V (1981-89)
1	2.	3.	4.	5.	6.
1. Aggregate Receipts	0.4173	0.7828	0.3681	0.1886	0.2250
2. Revenue Receipts	0.2895	0.4392	0.6443	0.4647	0.2061
3. Capital Receipts	0.4014	0.6085	0.5686	0.5471	0.2496
4. Aggregate Expenditure	0.4611	0.6510	0.7756	0.3764	0.6727
5. Revenue Expenditure	0.3733	0.8076	0.7522	0.2384	0.5192
6. Capital Expenditure	0.4302	0.4978	0.6826	0.5103	0.6758
7. Overall Deficit/Surplus	0.3566	0.4239	0.6246	0.0968	0.4307
8. Total Tax Revenue	0.3412	0.5296	0.5174	0.3257	0.0178
9. Income Tax	0.3690	0.1661	0.7195	0.5421	0.3341
10. Corporation Tax	0.0454	0.3418	0.0134	0.4388	0.7061
11. Union Excise Duties	0.5791	0.8866	0.7547	0.2691	0.0258
12. Customs Duties	0.3555	0.0019	0.5276	0.7800	0.1417

Statement 1 : Budget Estimates, Revised Estimates and Actual Budget Data for Aggregate Receipts, Aggragate Expenditure, Overall Surplus/Deficit, Revenue Receipts, Revenue Expenditure, Capital Receipts and Capital Expendite
(1950-51 to 1988-89)

(Rs. Crore)

	AGGREGATE RECEIPTS			AGGREGATE EXPENDITURE			OVERALL SURPLUS(+)/DEFICIT(-)			REVENUE ACCOUNT REVENUE RECEIPTS			REVENUE ACCOUNT REVENUE EXPENDITURE			CAPITAL ACCOUNT CAPITAL RECEIPTS			CAPITAL ACCOUNT CAPITAL DISBURSEMENTS		
YEAR	BE	RE	ACT	BE	RE	ACT	BE	RE	ACT	BE	RE	ACT	BE	RE	ACT	BE	RE	ACT	BE	RE	ACT
1950-51	467	527	484	490	581	472	-23	-54	+12	339	387	411	338	379	351	128	140	73	152	202	121
1951-52	567	715	566	619	718	565	-52	-3	+1	402	498	515	376	405	387	165	217	51	243	313	178
1952-53	483	500	457	557	581	520	-74	-81	-63	405	419	435	401	422	396	78	81	22	156	159	124
1953-54	586	587	533	614	635	595	-28	-48	-62	423	398	416	422	415	408	163	189	117	192	220	187
1954-55	808	872	782	797	859	788	+11	+13	-6	452	451	456	467	456	421	356	421	326	330	403	367
1955-56	1040	947	752	1027	929	912	+13	+18	-160	482	502	481	499	489	441	558	445	271	528	440	471
1956-57	1190	1150	986	1190	1096	1090	0	+54	-184	527	572	563	545	534	473	663	578	343	645	562	617
1957-58	1233	1160	1014	1516	1541	1474	-283	-381	-460	668	672	673	632	667	631	565	488	341	884	874	843
1958-59	1362	1317	1267	1562	1573	1488	-200	-256	-221	684	640	670	712	700	675	678	677	597	850	873	813
1959-60	1637	1594	1534	1859	1769	1694	-222	-175	-160	688	746	779	747	762	736	949	848	755	1112	1007	958
1960-61	1814	1937	1944	1968	1972	1827	-154	-35	-117	824	828	878	885	862	826	990	1109	1066	1083	1110	1001
1961-62	2070	2080	1972	2140	2202	2084	-70	-122	-112	920	978	1040	926	944	912	1150	1102	932	1214	1258	1172
1962-63	2549	2592	2613	2638	2880	2768	-89	-288	-155	889	953	1061	1236	1364	1314	1660	1639	1552	1402	1516	1454
1963-64	3293	3339	3252	3475	3491	3419	-182	-152	-167	1680	1753	1846	1697	1665	1659	1613	1586	1406	1776	1826	1760
1964-65	3806	3850	3711	3903	3930	3883	-97	-80	-172	1960	2079	2081	1877	1850	1807	1846	1771	1630	2026	2080	2076
1965-66	4163	4114	3952	4053	4278	4126	-110	-164	-174	2289	2300	2320	1953	2018	2001	1874	1814	1632	2100	2260	2125
1966-67	4345	5030	5009	4377	5379	5305	-32	-349	-296	2474	2457	2473	2170	2282	2245	1871	2573	2536	2207	3097	3060
1967-68	4968	4776	4868	4967	5077	5075	+1	-301	-207	2728	2545	2554	2425	2459	2450	2240	2231	2314	2542	2618	2625
1968-69	4817	4924	4760	5106	5184	5023	-289	-260	-263	2726	2714	2760	2595	2711	2679	2091	2210	2000	2511	2473	2344
1969-70	5280	5509	5535	5543	5763	5581	-263	-254	-46	2958	2924	3028	2921	2935	2902	2322	2585	2507	2622	2828	2679
1970-71	5559	5931	5866	5785	6161	6151	-227	-230	-285	3241	3340	3342	3103	3142	3179	2318	2591	2524	2682	3019	2972
1971-72	6240	7138	7003	6472	7523	7522	-232	-385	-519	3667	4021	3972	3527	4047	4120	2573	3117	3031	2945	3490	3450
1972-73	7077	7752	7549	7328	8302	8418	-251	-550	-869	4415	4573	4578	4072	4536	4593	2662	3179	2971	3256	3766	3825
1973-74	8355	8585	8719	8443	9235	9047	-88	-650	-328	5079	5103	5073	4778	4955	4636	3276	3482	3646	3665	4280	4211
1974-75	9238	9977	9854	9364	10602	10575	-126	-625	-721	5640	6484	6558	5408	5860	5793	3598	3493	3296	3956	4742	4782
1975-76	11044	12702	12773	11291	13191	13139	-247	-489	-366	7093	8023	8075	6491	7117	7189	3951	4679	4698	4800	6074	5950
1976-77	13366	14407	14345	13827	14832	14476	-461	-425	-131	8219	8507	8739	7766	8554	8440	5147	5900	5606	6061	6278	6036
1977-78	16296	15937	15381	16911	16912	16314	-615	-975	-933	9541	9779	9792	9737	9743	9362	6755	6158	5589	7174	7169	6952
1978-79	18011	18238	18178	19548	20383	19684	-1537	-2145	-1506	10812	11020	11240	10958	11148	10948	7199	7218	6938	8590	9235	8736
1979-80	17837	17330	17465	19219	20030	19898	-1382	-2700	-2433	11182	11177	11340	11396	12047	12034	6655	6153	6125	7823	7983	7864
1980-81	22205	23005	22261	23650	24980	24838	-1445	-1975	-2577	12327	12894	12829	14256	14620	14544	9878	10111	9432	9394	10360	10294
1981-82	24040	25567	25730	25579	27267	27122	-1539	-1700	-1392	14327	15373	15574	15300	15948	15868	9713	10194	10156	10279	11319	11254
1982-83	28663	31370	31377	30038	33305	33033	-1375	-1935	-1656	17595	18117	18091	18227	19415	19345	11068	13253	13286	11811	13890	13688
1983-84	34046	37734	37152	35632	39429	38569	-1586	-1695	-1417	20594	20964	20493	22419	23339	22890	13452	16770	16659	13213	16090	15679
1984-85	41722	43671	43127	43496	47656	46872	-1774	-3985	-3745	24005	24932	24384	26342	28301	27881	17717	18739	18743	17154	19355	18991
1985-86	49258	53984	53137	52574	58474	58074	-3316	-4490	-4937	27116	29021	29206	32717	34961	34771	22142	24963	23931	19857	23513	23303
1986-87	56302	59249	59201	60005	67534	67462	-3703	-8285	-8261	31309	35153	34768	38464	42386	42544	24993	24096	24433	21541	25148	24918
1987-88	65670	68464	66447	71358	74544	72263	-5688	-6080	-5816	38947	40208	38992	45689	48705	48129	26723	28256	27455	25669	25839	24134
1988-89	74968	77468	78804	82452	85408	84446	-7484	-7940	-5642	44994	45336	45740	54836	56366	56253	29974	32132	33064	27616	29042	28193

Note BE = Budget Estimates.
RE = Revised Estimates
ACT = Actual.

Statement 2 : Budget Estimates, Revised Estimates and Actual Budget Data for Total Tax Revenues, Income Tax, Corporation Tax, Union Excise Duties and Customs Duties (1950-51 to 1988-89)

(Rs. Crore)

	TOTAL TAX REVENUES			INCOME TAX			CORPORATION TAX			UNION EXCISE DUTIES			CUSTOMS DUTIES		
YEAR	BE	RE	ACT	BE	RE	ACT	BE	RE	ACT	BE	RE	ACT	BE	RE	ACT
1950-51	303	340	357	82	80	85	38	39	41	72	70	68	107	145	157
1951-52	393	446	460	80	86	93	33	38	41	80	84	86	156	232	232
1952-53	357	372	387	68	73	85	31	40	44	70	49	66	165	177	174
1953-54	354	348	363	68	69	66	37	38	42	78	78	79	170	160	159
1954-55	390	395	399	71	71	66	38	38	37	87	89	93	175	180	185
1955-56	416	426	412	77	79	76	40	40	37	115	123	129	165	165	167
1956-57	458	495	494	83	86	93	48	51	51	128	152	172	150	171	173
1957-58	560	558	575	90	83	90	51	51	56	232	224	233	168	183	180
1958-59	571	530	553	85	87	96	56	56	54	236	228	240	170	136	138
1959-60	555	612	642	88	73	70	59	78	107	250	276	286	133	160	156
1960-61	676	686	730	53	41	80	135	138	111	305	320	341	163	163	170
1961-62	762	823	875	52	49	72	141	160	157	356	390	409	190	200	212
1962-63	889	953	1061	69	77	91	179	188	222	408	429	474	208	232	246
1963-64	1233	1310	1374	120	116	139	222	275	275	560	568	594	301	320	335
1964-65	1438	1554	1563	140	144	143	297	342	314	629	646	674	337	385	398
1965-66	1789	1756	1785	170	136	149	372	330	305	704	715	752	501	531	539
1966-67	1935	1929	1934	163	143	172	372	345	310	798	799	914	560	596	585
1967-68	2151	1946	1937	132	175	151	350	320	300	956	929	1030	640	523	513
1968-69	2087	1999	2019	163	144	184	320	322	326	1012	1030	1195	539	445	447
1969-70	2197	2110	2201	174	107	155	326	320	353	1195	1204	1203	435	415	423
1970-71	2390	2442	2451	89	101	114	342	365	371	1424	1415	1369	465	487	524
1971-72	2717	2901	2928	70	81	75	411	442	472	1609	1628	1587	534	652	696
1972-73	3347	3472	3343	121	110	138	494	558	558	1822	1862	1758	720	810	857
1973-74	3934	3878	3895	135	141	214	608	627	583	2088	2003	1971	974	974	996
1974-75	4300	4904	5097	218	235	362	661	713	710	2346	2482	2528	936	1300	1333
1975-76	5436	5871	6010	248	326	480	781	954	862	2899	2967	2998	1284	1357	1419
1976-77	6257	6392	6581	308	313	557	1025	1113	969	3124	3149	3194	1507	1490	1554
1977-78	7207	7107	7060	353	350	327	1298	1275	1221	3489	3340	3335	1728	1780	1824
1978-79	8058	8207	8568	399	403	471	1442	1365	1252	4024	3955	4127	1912	2197	2424
1979-80	8020	8219	8568	435	455	475	1530	1380	1392	3404	3295	3481	2389	2814	2924
1980-81	8921	9341	9388	494	428	504	1515	1550	1311	3550	3586	3723	2969	3350	3409
1981-82	10537	11480	11573	415	503	459	1690	1962	1970	4032	4261	4180	3832	4140	4300
1982-83	13363	13271	13056	465	431	438	2382	2339	2185	4864	4810	4567	4997	4990	5119
1983-84	15460	15700	15477	530	498	528	2362	2565	2493	6018	6068	6164	5879	5879	5583
1984-85	17516	17925	17694	560	579	696	2568	2824	2556	6520	6642	6625	7103	7100	7040
1985-86	19265	20979	21180	426	551	663	3052	3118	2865	6937	7294	7331	8166	9296	9526
1986-87	22643	24207	24318	565	605	717	3123	3330	3160	7876	8052	8164	10404	11500	11475
1987-88	27711	28337	28015	620	761	598	3537	3650	3433	9852	9577	9423	12867	13500	13702
1988-89	31890	32652	33751	887	911	1488	4099	4270	4407	10283	10629	10922	15626	15812	15805

Note BE = Budget Estimates.
RE = Revised Estimates
ACT = Actual

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Payments System in India – Clearing House Operations

S. Venkateswaran*

An attempt is made to present the operations of clearing houses that have introduced computers which could process payment instruments using Magnetic Ink Character Recognition (MICR) technology. The analysis is conducted for the year 1989-90 (July – June) with respect to the operations in the metropolitan centres of Bombay, New Delhi, Madras and Calcutta. The problems that are encountered on the computer operations are identified and issues relating to the payment system in future are discussed.

Introduction

A payments system is the collection of instruments, rules and procedures by which people meet payments obligations. Banks and other financial institutions are enabled by the system to exchange cash (value) on their own behalf or on behalf of their clients. Cash and cheques are the two important components of the Indian payments system. Cheque includes its variants such as banker's cheques, drafts, interest warrants, dividend warrants, refund warrants or orders which are look alikes of cheques. Demand and chequable savings deposits maintained by individuals, businesses and other organisations and governments, both Central and State, support the cheque payments. There are also other payment media currently in use in the country such as credit cards and automated teller machine cards of banks, Indian Postal Orders of the Postal Department, but these play an insignificant role in the Indian Payments System. This article gives a very brief overview of the Indian Payments System and some details about clearing operations in major centres.

Institutional Framework
Cash Payments

Central banks have been traditionally regarded as responsible for the smooth and efficient functioning of the financial system, of which the payments system is an integral part, since it facilitates

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* Shri S. Venkateswaran was formerly Director-in-charge, National Clearing Cell, Management Services Department, Reserve Bank of India.

production and trade. The Reserve Bank of India as the central bank of the country has the sole right to issue bank notes in the country under the Reserve Bank of India Act, 1934. It arranges for the printing of the notes at the presses owned by the Central Government and currently issues notes in the denominations of Rs.2, Rs.5, Rs.10, Rs.20, Rs.50, Rs.100 and Rs.500. The Reserve Bank issues fresh notes, recycles notes fit for recirculation and destroys soiled notes. It has made elaborate arrangements throughout the country to meet the cash requirements of the public, banks and Government. Besides bank notes of Reserve Bank of India, coins and Re. 1 notes issued by the Government of India constitute a part of the cash used by the public and these coins are circulated by the Reserve Bank of India. As at the end of June '90 the value of cash in circulation with the public in the country was Rs.50,082 crore. As in many other countries, cash is widely used for payments. While the currency with the public can be estimated with a certain degree of precision, similar estimate of the number and value of day-to-day cash transactions is not available.

The Reserve Bank of India, also acts as banker to Central and State governments and other banks and exercises supervisory and regulatory powers over banks under the Reserve Bank of India Act, 1934 and the Banking Regulation Act, 1949. It has powers to regulate the clearing houses in the country.

Banks and cash/cheque payments

Banks in India can be broadly categorised on the basis of their ownership as Public Sector Banks, Co-operative Banks, Foreign Banks and Private Sector Banks. Public Sector banks and, to a lesser extent the other banks also, have a large network of branches spread throughout the country. The Reserve Bank through its own offices and the branches of banks in the public sector arranges for the distribution and circulation of currency throughout the country. The bank branches facilitate cash payments and the bank deposits support cheque payments. At a few places circulation of currency is arranged through the State treasuries. There are also postal savings banks run by the Postal Department of the Government having chequable deposits. They do

not offer credit facilities like other banks mentioned above and are not directly regulated by the Reserve Bank of India.

Cheque Clearing

Clearing of cheques and other payment instruments is a traditional activity of banks. It is central to the banking operations. It is also a major component of the payments system. The Reserve Bank of India is interested in an efficient and safe payments system, and as such has set rules for payments. The Reserve bank is also a direct participant in the system.

Payments settlements are effected through clearing houses. As of the end of 1989, there were bankers' clearing houses at 834 centres in the country: 14 of these are managed by the Reserve Bank of India. The remaining clearing houses are managed by other banks- 577 by the State Bank of India, 237 by its Associates and 6 others by other banks in the public sector. The management and conduct of these clearing houses are governed by uniform regulations and rules adopted by the banks which are members of clearing houses and applicable throughout the country. The Reserve Bank of India has an important say in the framing of the regulations and rules and in making changes in them.

The volume and value of cheques cleared through the Indian clearing houses during the calendar year 1989 are given in Table 1 below :

Table 1 : Volume and value of cheques cleared through clearing houses during 1989*

(Figures in crores)

Bank managing the clearing houses	No. of centres	Cheques cleared			
		No.	Percentage to Total No.	Value Rs.	Percentage to Total Value
(1)	(2)	(3)	(4)	(5)	(6)
Reserve Bank of India	4 Metro cities	23.45	39.49	509,860	48.73
-do-	10 other cities	9.02	15.20	247,505	23.66

(1)	(2)	(3)	(4)	(5)	(6)
Sub Total	14	32.47	54.69	757,365	72.39
State Bank of India	539	24.38	41.02	253,148	24.19
Associates of SBI	185	2.53	4.27	35,552	3.40
Other banks	5	0.01	0.02	240	0.02
	743*	59.39	100.00	1,046,305	100.00

*Note : Exclude statistics for 38 offices of State Bank of India, 52 offices of its Associates and one other bank.

There has been a phenomenal growth of bank branches since 1969 when major Indian banks were nationalised; the number of centres having five or more bank branches also increased. With a view to expediting the collection of local cheques at such centres and reducing the need for physical presentation of cheques at the specific bank branches for realisation, the Reserve Bank of India identified such centres and arranged for the opening of clearing houses at most of these centres. The new clearing houses are also managed by local branches of State Bank of India, its Associates or other banks. This step increased the total number of clearing houses in the country by 166 in the last 4 years.

Clearing of cheques has for long been treated as a routine activity in banks. In the last few years, importance has been given to this activity by introducing computers to speed up some of the processes involved in the clearing houses. Computers were initially introduced in most of the clearing houses managed by the Reserve Bank of India to speed up the clearing house settlement operation which, under manual processing was error prone and time consuming as the number of member banks grew large. In the next phase, processing of payment instruments using MICR (Magnetic Ink Character Recognition) technology employing high-speed reader sorters was introduced in the clearing houses at Bombay, Madras, New Delhi and Calcutta in June 1987, July 1987, March 1988 and May 1989 respectively. This processing is referred to as MICR clearing in the rest of this article. One of the benefits of the computerised processing of cheques in the clearing houses at these centres is the availability of useful information on several aspects of

the clearing mechanism. Nearly 40% of the total number and 49% of the total value of local cheques cleared during the calendar year 1989 in the clearing houses all over India is accounted for by just 4 metropolitan centres of Bombay, New Delhi, Madras and Calcutta. In addition to MICR clearing, two other special clearings viz. one for cheques of the value of Rs. 1 lakh and above and the other for exchange of cheques of banks payable by one to another are also in vogue at these centres. These are referred to as High Value clearing and Inter-Bank clearing respectively and they give same day final value to the beneficiaries. Volumewise, the number of cheques exchanged in these two clearings is quite small but their values are quite large. An analysis of the cheques etc. handled in these four clearing houses is presented in the following paragraphs.

Methodology

Because of the availability of encoded information on the MICR code line in the payment instruments cleared in the MICR clearing at the metropolitan centres, these original documents themselves are in machine-readable form. Data captured from machine-readable input (for clearing settlement among banks and listing of documents for the branches of banks where the cheques etc. are payable) are used for the analysis and are, therefore, relatively more reliable. Computerised settlements take place for the High Value and Inter Bank Clearings and the data for these are collected from the interbank settlement figures.

Analysis

An analysis of the payment instruments presented for MICR clearing at Bombay, New Delhi, Madras and Calcutta during the year July 1989 to June 1990 based on value and type of transaction is given in Appendices 1 to 10.

For the purpose of valuewise analysis, payment instruments have been classified as low value (Rs. 2,500 or less), high value (Rs. 1 lakh and above) and the middle category (above Rs. 2,500 and below Rs. 1 lakh). For the analysis on the basis of type of transaction, payment instruments have been classified as Savings Bank Account, Current/Cash Credit Accounts, Dividend Warrant,

Interest Warrant, Refund Orders, Drafts, Bankers Cheques, Government Cheques and Others.

The main observations are based on the statistics for the year July 1989 to June 1990.

A summary of MICR cheques cleared at 4 metropolitan centres during July 1989-June 1990 is given in Table 2 in the form of percentages. This reveals the relative importance of different categories of cheque transactions in banks.

About two percent of the total number of instruments of the individual value of Rs. 1 lakh and above account for more than 63% of the total value of payment instruments exchanged in the MICR clearing. The average value of a cheque in this category is about Rs.4.87 lakhs. At the other end of the spectrum, nearly 60% of the number of payment instruments comprise small value cheques of Rs.2,500 or less and they account for a value of 2.6% of the total value of all clearing instruments. The average value of a cheque in this category is about Rs.730.

The middle category i.e instruments of the value above Rs.2,500 but below Rs. 1 lakh account for 38% of the number and 34% of the value. The average value of an instrument in this category is about Rs. 15,300.

The analysis on the basis of type of transaction shows that current and cash credit accounts together constitute nearly 51% and 63% of the number and value respectively of the MICR clearing instruments. Dividend, interest and refund warrants constitute 18% and 1% in number and value respectively.

Bankwise, just 10 banks out of 114 banks which are members of the clearing houses account for 55% of the total number and value of payment instruments delivered in the MICR clearing.

Based on ownership category of the banks they compare as given in Table 3.

Bombay accounts for 51% and 46% of the number and value

Table 2 : Percentages of MICR Clearing Instruments based on type of transactions and their value (July 1989–June 1990)

Category of Transaction	No. of instruments				Value of instruments			
	Upto Rs.2500	Above Rs.2500 & below Rs.1 lakh	Rs.1 lakh and above	Total	Upto Rs.2500	Above Rs.2500 & below Rs.1 lakh	Rs.1 lakh and above	Total
1.	2.	3.	4.	5.	6.	7.	8.	9.
Savings Bank Account	11.0	4.0	0.1	15.1	0.5	2.8	1.1	4.4
Current Account	22.3	20.8	1.2	44.3	1.2	18.9	31.4	51.5
Cash Credit Account	3.0	3.4	0.3	6.7	0.2	3.4	8.4	12.0
Dividend Warrant	6.3	-	-	6.3	0.1	0.1	0.1	0.3
Interest Warrant	7.7	0.2	-	7.9	0.1	0.1	0.1	0.3
Refund Orders	2.8	0.6	-	3.4	0.2	0.2	-	0.4
Govt. Transactions	0.8	0.8	-	1.6	-	0.8	7.3	8.1
Total	53.9	29.8	1.6	85.3	2.3	26.3	48.4	77.0
Drafts	4.3	6.5	0.4	11.2	0.2	6.3	6.4	12.9
Bankers Cheques and Cheques in lieu of Payment Orders	1.2	1.1	0.3	2.6	0.1	1.5	7.7	9.3
Other transactions#	0.7	0.2	-	0.9	-	0.2	0.6	0.8
Grand total	60.1	37.6	2.3	100.00	2.6	34.3	63.1	100.00

Note : # This includes miscellaneous types of payment instruments issued by banks such as cheques payable at par at different centres, travellers cheques, gift cheques etc.

respectively of the clearing items followed by New Delhi (22% and 28%), Madras (14% and 10%) and Calcutta (13% and 16%).

Table 3 : MICR cheques cleared by banks on the basis of their ownership category

Category	Cheques etc. delivered to clearing house		Cheques etc. received from clearing house	
	Percentage		Percentage	
	No.	Value	No.	Value
(i) RBI & Public sector banks including General Post office	77.62	78.95	79.47	80.43
(ii) Other Indian commercial banks	5.36	3.54	4.93	4.03
(iii) Co-operative banks	9.58	4.58	8.08	4.95
(iv) Foreign banks	7.44	12.93	7.52	10.59
Total	100.00	100.00	100.00	100.00

Value-wise analysis

As mentioned earlier, payment instruments passing through clearing at the four metropolitan centres have been classified into three categories, viz., low value (Rs. 2,500 or less), high value (Rs. 1 lakh and above) and the middle category (above Rs.2,500 but below Rs. 1 lakh).

Rs.2,500 and below

Instruments of the value upto Rs.2,500 account for more than 60% in number but less than 3% in value of the payment instruments cleared. Though the maximum value in this category is Rs.2,500 the average value is about Rs.730 only. More than 31% of the total number payment instruments cleared are for an individual value of Rs.500 or less and the aggregate value of these instruments is less than 8.5% of total MICR clearing value. In the context of growing volume of clearing instruments, the advantage in adding more and more reader-sorters to process further growth in the volume of this category may not be commensurate with the

cost involved. Instead, more economical and efficient ways of handling the increasing clearing volume in this category need to be explored and put in place. Conscious attempts should be made to substantially reduce use of paper for making payments falling under this category.

Above Rs.2,500 but below Rs.1 lakh

Payment instruments of the value above Rs.2,500 but below Rs. 1 lakh account for 38% of the number of instruments cleared and 34% of value of instruments cleared in the MICR clearing. The average value of a payment instrument in this category is about Rs.15,300. Efforts to clear this category of instruments using reader-sorters and computers produce commensurate results.

Rs.1 lakh and above

On the other hand, payment instruments of the value of Rs.1 lakh and above account for 2.3 per cent in number but more than 63% of the total value of the clearing items. Though the minimum value of this category is Rs.1 lakh, the actual average value of an instrument lodged in MICR clearing is more than Rs.4,87,000. These instruments vegetate for about 3 days in the clearing pipe line. This is the position despite (a) introduction of a special same-day-value clearing for cheques of the value of Rs.1 lakh and above in which cheques accounting for upto 45% of the total clearing value are exchanged and (b) all persuasive efforts of the Reserve Bank of India with banks to make better use of this special clearing. The reason for the constraint in the present high value clearing is that only branches in close proximity to the Clearing House and only cheques presented by and drawn on these branches and deposited by customers in the early part of the day on week days can participate in the clearing. Additional efforts to quicken the clearing cycle for this category of instruments could produce more than commensurate results.

Types of transactions or payment instruments

The payment instruments presented in clearing are sorted

mechanically under 19 different categories in the Bank's computerised MICR clearing centres to facilitate further processing at the branches of banks. The major categories are Savings Bank, Current/Cash Credit Accounts, Dividend/Interest/Refund Warrants, Drafts, Bankers' Cheques and Government transactions. An analysis based on the major categories of payment instruments participating in clearing follows.

Current and Cash Credit Accounts

Current accounts occupy the pre-eminent position and account for 44% and 51% in number and value respectively of the MICR clearing instruments. Cash credit transactions account for 7% and 12% of the total number and value respectively of the MICR clearing transactions. Current and cash credit accounts together account for 51% and 63% of the number and value respectively of the MICR clearing transactions. Efforts to process these transactions mechanically produce commensurate results. Industry, trade and business community which generally operate these accounts have, therefore, benefitted considerably by the introduction of technology in clearing (sub-heading on impact on customers services later).

Within the category of current/cash credit accounts, 1.5% of the total clearing instruments of Rs. 1 lakh and above account for 40% of the total value of clearing transactions. Apparently, most of these transactions would be those of major corporate customers of banks. An exercise by banks to identify these customers and offer of cost-effective facilities to them could (a) provide prompter service to them (b) improve funds management by banks and the customers and (c) enable banks to share additional costs (of such better service) with these customers.

Drafts

These account for 11% and 13% of the number and value of clearing transactions respectively. The time taken for despatching the drafts from the place of issue to the place of payment and the time taken in the clearing cycle could normally be 7 days and for this duration a fund float is available to the banks on a continuous

basis for nearly 13% of the total clearing transactions. Thus it is estimated that drafts provide a fund float to banks to the extent of more than 90% of the average daily value of the total clearing.

Another significant factor is that drafts for Rs. 1 lakh and above comprising 0.4% of the total number of clearing transactions account for little over 6% of the total value of clearing transactions. Issue and payment of drafts by banks is a major area giving rise to inter-branch reconciliation problems. Exploring ways and means of reducing the issue of drafts for value above Rs. 1 lakh and substituting them by electronic transfer of funds could reduce related inter-branch reconciliation problems and at the same time quicken money transmission service.

Interest/Refund/Dividend Warrants

These three types of payment instruments which are investment related together constitute 17.6% and 1% respectively of the number and value of total clearing items. These instruments are characterised by: (a) seasonality (bulk of them come for clearing in the months of April, July, October and December and that too in the first week or so of the months); (b) predetermined amounts and dates of payment (e.g. interest on company deposits/debentures; though dividend rate may vary year to year, payment is related to accounting year); (c) small value (78% of these payments are for individual values of Rs. 500 or less); (d) computerised issue of the payment instruments by the corporate customers of banks and (e) invariably these payment instruments are crossed necessitating clearance by banks.

Substantial MICR quality superior paper is used for printing these warrants and considerable time and effort are spent in handling these instruments at each stage from the time of issue till payment. If, to the extent possible, these payments could be induced to be made without using paper (say, by conveying payment instructions in magnetic media as is being done in the Bankers' Automated Clearing Services in the United Kingdom), significant improvement can be brought about in the small value payments clearing system and the overall efficiency of the clearing system in general.

Government Payment Transactions

Payment instruments issued by Central and State Government Departments and participating in the clearing system account for 1.6% and 8.1% of number and value respectively. These are confined to the Reserve Bank of India and public sector banks.

Bankers' Cheques

Bankers' cheques and cheques issued (by banks) in lieu of payment orders account for 2.6% and 9.3% of the number and value respectively of the clearing items. What is significant in this category is that 0.3% of the instruments of the value of Rs.1 lakh and above in number account for 7.7% of the value of clearing. These instruments are akin to drafts (carrying the certainty of payment by banks) but are generally drawn and payable by banks within a city. Like drafts, these instruments also give a substantial fund float (albeit for a shorter duration of, say, 2 to 3 days) to banks from the date of issue till the date of payment. One of the major advantages to the purchaser of banker's cheque is that he keeps control over the payment till he delivers the cheque to payee. Even though the values involved in this category are large, hardly anything substantial can be done to improve the efficiency in this category since it would affect the control the purchaser has over the funds till the delivery of the cheque to the payee and simple evidentiary value for large payments.

Other transactions

Payment instruments such as travellers cheques, gift cheques and cheques payable at different centres at par account for less than 1% in number and value. These transactions are, therefore, not significant.

Inter Branch Clearing

Till MICR technology was introduced for processing cheques at the four metropolitan centres, clearing mechanism was used for exchanging inter-bank cheques only Settlement of inter-branch cheques (i e cheques drawn on a branch but deposited for

collection at another branch of the same bank at the same centre) used to be attended to by the main or service branch of the bank at its inter-branch clearing department. After the introduction of MICR technology and high speed reader sorter systems for processing local cheques, major banks (with several branches within a city) are using the clearing mechanism for exchanging their inter-branch cheques also, for faster clearance and reducing the work of listing, sorting and balancing of their inter-branch cheques both delivered and received. Even banks who have large volumes of such cheques and who have installed medium speed cheque reader sorter systems at Bombay find it more convenient to use the MICR clearing mechanism at metropolitan centres rather than using their own systems for sorting their inter-branch cheques. With the growth of cheque volumes, the number of inter branch cheques would grow in volume and it is desirable that at least those banks which have their own sorters use them for their inter branch clearing.

Volume growth of MICR clearing cheques

MICR clearing was introduced in Bombay, Madras, New Delhi and Calcutta in June 1987, July 1987, March 1988 and May 1989 respectively. It has been in vogue for two full years in Bombay, Madras and New Delhi and the volumes handled in these three centres in the 2 years show an average growth rate of 14.7%. The growth rate of the three centres is 12.3%, 15.6% and 19.8% respectively. In absolute terms, the growth is 1.3 crores, 0.45 crore and 0.89 crore at these three centres respectively and this is relevant in reviewing the installed capacity of equipments and premises which need a longer lead time for making additions. MICR processing is currently done in a single cycle in the nights; with the current growth rate, very soon it may become necessary to add a day time cycle at Bombay unless counter measures are taken to reduce the volume of paper (i.e., MICR cheques) clearing.

High Value Clearing

A high value cheque clearing is now in vogue at all the four metropolitan centres. This clearing was introduced in Bombay, Madras, Calcutta and New Delhi in October 1988, March 1989,

October 1989 and May 1990 respectively and is restricted to cheques of the value of Rs. 1 lakh and above drawn on and collected by branches of banks in close proximity to the clearing house. Under this clearing, credit to customers' cheques is available on the day of deposit. Since the number of cheques to be handled on a day to day basis is very small these cheques are not mechanically processed but physically exchanged in the clearing houses; clearing house settlement is, however, computerised. The number and value of high value cheques cleared in high value clearing are given in Table 4.

Table 4 : High value clearing

(Value in Rs. Crore)

	Bombay July '89 to June '90		Madras July '89 to June '90		Calcutta October '89 to June '90*	
	No.	Value	No.	Value	No	Value
Absolute	180521	150509	82550	10225	54045	7159
Percentage	0.15	45	0.25	20	0.19	46

(Percentages are to total of high value and MICR clearing)
* Calcutta commenced high value clearing only from October 1989; hence the periods do not exactly correspond.

Inter-bank cheque clearing

Till recently transactions between banks were being settled by issue of cheques on Reserve Bank of India and these cheques were individually accounted for in the books of the Reserve Bank. The criss-cross issue of cheques by banks increased the volume of such transactions giving rise to operational problems. A separate clearing has been introduced for such transactions at all the four metropolitan centres, settlement taking place in the books of the Reserve Bank of India for the net amounts only. This was introduced at Bombay, Madras, Calcutta and New Delhi in October '88, March '89, October '89 and May '90 respectively. The extent

of utilisation of this clearing at these centres is given in Table 5.

Table 5 : Inter-bank cheque clearing

(Value in Rs. Crore)

	Bombay Jan '90 to June '90		Madras Jan '90 to June '90		Calcutta Jan '90 to June '90	
	No.	Value	No.	Value	No.	Value
Absolute	59,755	408,782	71,434	48950	23,716	7566
Percentage to local clearing (MICR + High Value)	0.1	211.00	0.4	185.00	0.2	19.1

In a way, the local clearing (MICR and high value together) could be considered as retail transaction clearing and the interbank clearing as wholesale transaction clearing. The percentage figures given above show the relationship between the two types of clearing.

Outstation Cheques Clearing

Intercity clearing is in operation among the four metropolitan centres. These cheques take just 7 days or less for clearance. "Speed Post" service which is utilised for transporting these cheques for more than a year has been found to be quite reliable. The volume of outstation cheques received for clearance is, however, quite low. They constitute 0.4% of total of local and outstation cheques cleared in 3 centres, whereas drafts which are used for making outstation payments generally, constitute about 11.2% of the local cheques cleared. The inference is that cheques are not quite popular for transactions outside the centres where the relative bank accounts are maintained.

Quality of Clearing Service

The service level objective of MICR clearing is processing of unsorted cheques etc. received in the evening from collecting banks and delivery thereof early in the morning on the next working day duly sorted, listed and balanced, overnight, to the paying (drawee) banks. This service level could be affected by disruption/break-down of power, failure of air-conditioning plant/uninterrupted power supply equipment and computer/reader-sorter breakdown which are additional factors peculiar to the use of technology for processing payment instruments. These factors have hardly affected the service.

Impact on Customer Service

The clearing service is intended to provide cheque collection service for customers. The following improvements have come about since the introduction of technology for clearing at the three centres.

(i) Increase in the number of branches participating in the local clearing consequent on enlargement of the jurisdiction of the clearing houses (Table 6).

Table 6 : Number of bank branches participating in clearing

	Prior to introduction of technology	Current position	Increase
	No of branches	No. of branches	
Bombay	1,336	2,087	751
Madras	715	804	89
New Delhi	1,117	1,429	312
Calcutta	NA	1,159	-
Total	3 168	5,479	-

(ii) Prior to the introduction of MICR clearing, local cheques used to

take 3 to 4 days or sometimes more but now they take 2 to 3 days only for clearance. Inter-metropolitan city cheques take 7 days or less for clearance now as against 3 weeks or more previously.

(iii) Under the high value clearing same day value is available for cheques of the value of Rs. 1 lakh and above drawn on and deposited in the early part of the day in branches of banks in close proximity to the clearing house.

(iv) Reports about cheques presented for MICR clearing and lists of cheques payable by drawee banks are collected by a few banks in magnetic media i.e. tape or floppy disk/s and are used for updating of computerised customers' accounts, after appropriate validation.

(v) Reports of cheques delivered to bank branches include particulars such as cheque number, collecting bank/branch besides amount of each cheque; earlier such lists of cheques received in the Clearing House used to contain amounts only and not any other particulars.

Problems encountered

Successful machine processing of cheques depends on the quality of (a) equipments, (b) printing of cheques and other payment instruments (c) recording of information on the cheques in a machine-readable form (i.e. encoding) by collecting banks. The quality of printing and encoding affects the processing considerably. In the initital stages these factors affected the quality of processing to a large extent leading to the machines rejecting the cheques, etc. as not fully readable and consequent need to enter the data manually through computer terminals and later physical or manual sorting of the rejected cheques. This led to errors and clearing differences in banks. The initial reject rates were of the order of 13% to 15% and currently the rates at the four centres vary from 2.0% to 4.5%. The reduction in reject rates brought about by conscious and persistent efforts have greatly contributed in reducing the clearing differences. Some quality enhancements made in the software have reduced considerably the time taken for processing as well as for printing of reports and also introduced

additional validity checks to reduce errors.

Prospects of further quality improvement

With further improvements in the quality of printing and encoding of cheques and consequent reduction in reject rates and introduction of new automated clearing of small value payments, it may be possible to reduce the actual time for processing and increase to some extent the time upto which the cheques could be accepted in the Clearing House for processing. With further computerisation of customers' accounts at banks, tapes/floppy disks containing information on clearing cheques drawn on the accounts could be more extensively used for posting the accounts with a consequent reduction in the time for updating of accounts. With improvements in telecommunication methods, high value clearing can be extended geographically and interbank clearing can become more efficient.

Technology Investment

MICR clearing introduced in India is a major experiment by the Reserve Bank of India in the use of technology for the benefit of banking industry. Technology is generally perceived as a threat and opportunity : it is a threat in that new competitors employing technology can drive out established organisations, with all its evil effects. The Reserve Bank has softened the threat by itself introducing the technology for the benefit of the industry; as an opportunity the introduction of technology has facilitated change management and promoted processing efficiency. The investment has been made by the Reserve Bank of India and the service is priced to user banks taking a long time view of the benefits. The pricing of the cheque processing service by the Reserve Bank of India compares favourably with the pricing of similar service by the Federal Reserve in the United States; the pricing also does not involve subsidising the banks by the Reserve Bank of India in any major way. The pricing policy in India would enable recovery of costs in 5 to 6 years.[1]

Risks

Clearing system is a mechanism by which instead of exchanging individual obligations to payment in money, a netting system operates so that the financial obligation is exchanged for a similar, offsetting obligation, and only the net difference is settled in money. The system provides a service that is a very close substitute for the function of money as a medium of exchange. The bankers clearing system carries with it the credit risk that one or more banks may not settle an obligation for full value either when due or at any time thereafter. There is also the liquidity risk that settlement of an obligation may not be made on the due date, but on some unspecified date thereafter. There is also the systemic risk that the inability of one bank in the clearing system to meet its obligations when due may cause other banks to be unable to meet their obligations when due.

Measures to reduce the risks

Banks in India do not appear to have sufficiently recognised these risks, may be, because there have been no major upheavals arising out of bank failures in the recent past. The Reserve Bank of India, as a supervisory and regulatory authority, has, however, taken certain steps: the Reserve Bank has a major say in the framing and making changes in the regulations for the conduct of clearing houses in the country: the regulations prescribe criteria for becoming member of the clearing house; the regulations also prescribe a limit on the value of cheques that may be presented in the clearing by any bank: the prescribed limits are realistically enforced at major centres: the Reserve Bank has also taken steps to monitor the proportion of unpaid items to the total value of items presented for clearing with a view to assess that the proportion is not out of step with the general trend and does not disclose undesirable signs of using clearing mechanism for collection of accommodation cheques drawn without real balance in the accounts.

Future :

Growth :

Cheque volumes are observed to be growing at the rate of

14.7 per cent in a year between July 1989 and June 1990. If this growth rate continues, cheque volumes will double in the next 5 years. Linear growth in investments and cost for managing such growth can be checked to some extent if improvements are made in the payments system, particularly for small value payments of periodical and recurring nature, by making such payments on the basis of standing instructions which lend themselves eminently suitable for automation and for bringing about reductions in the total costs of servicing such payments.

Electronic Banking :

Computer, communication and control technologies which used to be strictly separate are being increasingly linked together into integrated information systems. Banks in the West and some of the South East Asian countries have availed of the opportunities opened up by the integration for improving their services and for providing new financial services-automated teller machines, electronic funds transfers at point of sale (EFTPOS), home and office banking, Society for Worldwide Interbank Financial Telecommunication (SWIFT), Clearing House Automated Payments Systems, Automated Clearing Services etc. Banks in India have been using computers for a number of years and computer technology is also indigenously available in our country; but telecommunication facilities available in India are not comparable to those in the countries referred to earlier. Chains of supermarkets which can afford point of sale terminals are conspicuous by their absence in India. Electronic banking for retail transaction is therefore likely to take several years for catching up in India; for wholesale transactions however, electronic banking may be used much sooner. (The establishment of BANKNET a dedicated communication facility for banks being established by the Reserve Bank of India, and banks' plan to avail of SWIFT facilities for international payments and large value payments are pointers in this direction).

Impact :

Introduction of technology in payments systems gives rise to issues such as impact on employment, law relating to banking, frauds and security aspects, audit and control practices etc.

Introduction of computers in banking has not so far led to any major impact on employment in the industry. Security aspects are important irrespective of whether the systems followed are manual or computer based. Fortunately banks, financial institutions and others are conscious of the need for adequate audit and control practices. As for laws, they will evolve with time as has been the case with banking so far.

Institutional arrangements :

Clearing houses which constitute a major component of payments system are managed at 14 major centres by the Reserve Bank of India and at other places by some other bank, under the rules and regulations framed with the guidance of Reserve Bank of India. Having regard to the importance and impact of payments system on the economy, continued guidance, supervision and regulation by the Reserve Bank of India in consultation with the participating member banks are essential. However, the Reserve Bank need not necessarily actually conduct the processing operations which can be entrusted to a separate organisation where participating member banks can have greater role.

Costs :

Introduction of technology involves large investments. The outlays made by the Reserve Bank of India in introducing computers and other equipment as well as the operational costs will have been recovered over a period of 5 to 6 years, by the prices charged to banks for the service availed of by them and it is expected that replacement of equipment on a large scale before that period may not be necessary.

Conclusion

Considering the level of technology in use in banks prior to the introduction of MICR technology, efforts needed for choice of technology, standardisation of payment instruments, selection of equipment, training of staff, arrangements for import of hardware and software etc., the performance of the Indian banking industry in the absorption of technology has been indeed remarkable. The

reduction in the rate of rejects of cheques as unreadable by reader/sorter machines to 2% from about 15% in a matter of 2 to 3 years (notwithstanding the fact that payment instruments are printed by various printers throughout the country, different makes of encoders, both imported and indigenous, are used by banks and consumables such as MICR ribbons are locally procured) is an indicator of the absorption of technology. It may be pertinent to note that countries where the technology had its origin had taken a number of years to stabilize in the use of this technology. Banks abroad had taken considerable time for the systems development cycle for introducing MICR processing. Indian banks by going in for ready to use software packages had substantially reduced the time otherwise needed for systems development. Notwithstanding the performance of the Indian banking industry in this respect there is scope for improvement.

Valuewise, payment instruments of the individual value above Rs.2,500/- but below Rs.1 lakh account for nearly 38% and 34% respectively of the total number and value of clearing items. As efforts to clear this category of instruments produce commensurate results, this category would normally influence decisions regarding additions to processing equipment.

Instruments of the individual value of Rs.2,500/- and below which account for nearly 60% in number contribute less than 3% in value. Exploring more economical ways than adding costly cheque processing equipment and controlling the costs of processing this category of instruments is called for.

The number of payment instruments of the individual value of Rs.1 lakh and above is about 2% but by value they contribute more than 63% of the total value of clearing items. Bulk of these instruments are not now able to participate in the high value clearing probably because of the distance between the clearing house and the concerned branch of the bank or the time of day when they are deposited for collection. Additional efforts to reduce the time for the clearing cycle for this category of instruments are necessary. Electronic clearing can be considered in this respect. These efforts would to a large extent benefit corporate account holders having current and cash credit accounts and result in better utilisation of resources.

Efforts to reduce the issue of drafts for Rs 1 lakh and above and use of electronic media for money transmission instead, would contribute to reduce the related interbranch reconciliation problems and also quicken the money transmission service.

Interest/Refund/Dividend warrants are mostly low value instruments for payment of fixed or nearly fixed sums at more or less regular intervals for sums and dates of payment which are known well in advance. If these payment instructions can be recorded in magnetic media on the basis of customer's/payee's advance authorisation, final settlement and accounting of the transactions can be effected in a cost-effective manner without the use of paper-based instruments and the costs associated with them.

More extensive use of reports in magnetic media from the clearing centre would considerably reduce the time required for updating of customers' accounts in banks. Banks having reader-sorter equipments should use them effectively for interbranch clearing.

Outstation cheques are not popular in metropolitan centres.

Notes :

1. In the United States, demand and other chequable deposits maintained by consumers, businesses and state and local governments have an aggregate value of about $550 billion and support daily payments amounting to more than $1.6 trillion. As a result, these deposits turnover on an average three times per day. The remaining payments are made with cash and amount to about $6 billion a day. Demand deposits in New York city banks turnover approximately 11 times per day, compared with 1.4 times at all other banks. Credit, liquidity and systemic risks in such a situation are much larger to be a matter of concern than in India where the ratio of average daily clearing value to deposit liabilities of major banks even in the most important financial centre of Bombay does not exceed 10%.
   (Bank for International Settlements, *Payments Systems in Eleven Developed Countries*, Basle, May 1989).

APPENDIX 1

Transaction-wise, Value-wise Analysis of cheques and other instruments processed in local clearing in Bombay, Delhi, Madras and Calcutta (July 1989 - June 1990)

NO. OF INSTRUMENTS BY AMOUNT CATEGORY

Transaction category	Upto Rs. 2500/-		Above Rs.2500/- < Rs.1 lakh		Rs. 1 lakh & above		Total		% growth over previous year*
	No.	% to total	No.	% to total	No.	% to total	No.	% to total	
1. Savings A/C. Cheques	260,34,296	11.03	94,30,574	3.99	1,74,156	0.08	3,56,39,026	15.10	18.4
2. Current Account Cheques	526,99,422	22.32	491,37,549	20.82	27,32,946	1.16	10,45,69,917	44.30	7.6
3. Cash Credit Account Cheques	71,50,461	3.03	79,83,361	3.38	6,46,738	0.27	1,57,80,560	6.68	14.2
4. Dividend Warrants	147,75,583	6.26	2,55,592	0.11	20,919	0.01	1,50,52,094	6.38	21.1
5. Interest Warrants	181,48,027	7.69	3,94,290	0.17	10,191	-	1,85,52,508	7.86	19.5
6. Refund Orders	65,94,670	2.79	13,52,012	0.57	2,578	-	79,49,260	3.36	136.6
7. Govt. & RBI Transactions	18,61,092	0.79	18,43,306	0.78	1,85,798	0.08	38,90,196	1.65	31.6
Sub total:	1,272,63,551	53.91	7,03,96,684	29.82	37,73,326	1.60	20,14,33,561	85.33	11.1
8. Demand Drafts	101,08,343	4.28	153,85,468	6.52	8,51,062	0.36	2,63,44,873	11.16	11.9
9. Bankers Cheque & Cheques issued in lieu of Payment Orders	27,56,681	1.17	27,53,745	1.16	5,03,801	0.21	60,14,227	2.54	14.3
10. Other Transactions	16,69,913	0.71	5,61,365	0.24	34,722	0.02	22,66,000	0.97	72.3
GRAND TOTAL	14,17,98,488	60.07	890,97,262	37.74	51,62,911	2.19	23,60,58,661	100.00	11.7

* In respect of 3 centres only viz. Bombay, New Delhi and Madras, Calcutta commenced operations only in May 1989.

APPENDIX 2

Transaction-wise, Value-wise Analysis of cheques and other instruments processed in local clearing in Bombay
(July 1989 - June 1990)

NO. OF INSTRUMENTS BY AMOUNT CATEGORY

Transaction category	Upto Rs. 2500/-		Above Rs. 2500/- < Rs. 1 lakh		Rs. 1 lakh & above		Total		% growth over previous year
	No.	% to total	No.	% to total	No.	% to total	No.	% to total	
1. Savings A/C. Cheques	1,24,60,416	10.41	47,91,936	4.00	98,916	0.08	1,73,51,268	14.49	14.1
2. Current Account Cheques	2,81,23,083	23.49	263,73,623	22.03	13,82,254	1.15	5,58,78,960	46.67	6.3
3. Cash Credit Account Cheques	36,02,646	3.01	41,63,486	3.48	3,52,095	0.30	81,18,227	6.79	10.8
4. Dividend Warrants	84,97,434	7.10	1,50,628	0.12	16,839	0.02	86,64,901	7.24	18.8
5. Interest Warrants	1,04,45,513	8.72	2,12,073	0.18	4,358	-	1,06,61,944	8.90	17.2
6. Refund Orders	33,22,343	2.77	6,09,945	0.51	1,201	-	39,33,489	3.28	20.2
7. Govt. & RBI Transactions	6,44,816	0.54	6,30,278	0.53	58,713	0.05	13,33,807	1.12	15.9
Sub total :	6,70,96,251	56.04	369,31,969	30.85	19,14,376	1.60	10,59,42,596	88.49	
8. Demand Drafts	32,15,031	2.69	67,47,033	5.64	3,40,207	0.28	1,03,02,271	8.61	10.3
9. Bankers Cheque & Cheques issued in lieu of Payment Orders	10,36,546	0.87	11,52,988	0.96	2,43,814	0.20	24,33,348	2.03	10.7
10 Other Transactions	7,41,988	0.62	2,89,703	0.24	13,921	0.01	10,45,612	0.87	57.6
GRAND TOTAL	7,20,89,816	60.22	451,21,693	37.69	25,12,318	2.09	11,97,23,827	100.00	12.3

APPENDIX 3

Transaction-wise, Value-wise Analysis of cheques and other instruments processed in local clearing in New Delhi (July 1989 - June 1990)

NO. OF INSTRUMENTS BY AMOUNT CATEGORY

Transaction category	Upto Rs 2500/-		Above Rs 2500/- < Rs. 1 lakh		Rs. 1 lakh & above		Total		% growth over previous year
	No	% to total	No	% to total	No	% to total	No.	% to total	
1. Savings A/C. Cheques	64,48,923	11.99	24,53,379	4.56	35,934	0.07	89,38,236	16.62	25.3
2. Current Account Cheques	1,06,57,500	19.81	1,15,40,639	21.45	6,09,676	1.13	2,28,07,815	42.39	10.0
3. Cash Credit Account Cheques	15,05,257	2.80	19,12,551	3.56	1,28,514	0.24	35,46,322	6.60	20.5
4. Dividend Warrants	25,13,037	4.67	48,202	0.09	864	-	25,62,103	4.76	27.4
5 Interest Warrants	30,07,442	5.59	85,966	0.16	3,832	0.01	30,97,240	5.76	32.1
6. Refund Orders	16,35,683	3.04	4,12,052	0.77	684	-	20,48,419	3.81	164.8
7. Govt. & RBI Transactions	5,51,151	1.02	6,39,725	1.18	66,695	0.12	12,57,571	2.32	15.2
Sub total:	2,63,18,993	48.92	1,70,92,514	31.77	8,46,199	1.57	4,42,57,706	82.26	
8. Demand Drafts	28,08,972	5.23	43,16,831	8.03	2,30,804	0.43	73,56,607	13.69	18.3
9. Bankers Cheque & Cheques issued in lieu of Payment Orders	7,27,524	1.35	8,68,110	1.62	1,23,071	0.23	17,18,705	3.20	21.2
10. Other Transactions	3,32,794	0.62	1,23,451	0 22	9,084	0.01	4,65,329	0.85	87.1
GRAND TOTAL	3,01,88,283	56.12	2,24,00,906	41.64	12,09,158	2.24	5,37,98,347	100.00	19.8

Transaction-wise, Value-wise Analysis of cheques and other instruments processed in local clearing in Madras
(July 1989 - June 1990)

NO. OF INSTRUMENTS BY AMOUNT CATEGORY

Transaction category	Upto Rs. 2500/-		Above Rs.2500/- < Rs.1 lakh		Rs. 1 lakh & above		Total		% growth over previous year
	No.	% to total	No.	% to total	No.	% to total	No.	% to total	
1. Savings A/C. Cheques	38,53,474	11.47	9,95,750	2.96	15,815	0.05	48,65,039	14.48	22.3
2. Current Account Cheques	83,51,767	24.86	51,60,245	15.36	2,44,263	0.73	1,37,56,275	40.95	8.9
3. Cash Credit Account Cheques	14,85,678	4.42	11,67,837	3.48	74,946	0.22	27,28,461	8.12	17.1
4. Dividend Warrants	9,40,408	2.79	16,935	0.05	1,285	-	9,58,628	2.84	25.5
5. Interest Warrants	26,22,711	7.81	44,139	0.13	895	-	26,67,745	7.94	15.8
6. Refund Orders	5,93,106	1.77	1,14,407	0.34	268	-	7,07,781	2.11	164.4
7 Govt. & RBI Transactions	3,74,194	1.12	2,83,642	0.84	22,923	0.7	6,80,759	2.03	179.9
Sub total :	1,82,21,338	54.24	77,82,955	23.16	3,60,395	1.07	2,63,64,688	78.47	
8. Demand Drafts	31,03,016	9.24	25,88,704	7.70	1,34,375	0.40	58,26,095	17.34	7.2
9. Bankers Cheque & Cheques issued in lieu of Payment Orders	6,83,137	2.03	3,37,130	1.01	48,171	0.14	10,68,438	3.18	12.1
10. Other Transactions	2,84,877	0.85	55,418	0.16	2,403		3,42,698	1.01	109.5
GRAND TOTAL	2,22,92,368	66.36	1,07,64,207	32.03	5,45,344	1.61	3,36,01,919	100.00	15.6

APPENDIX 5

Transaction-wise, Value-wise Analysis of cheques and other instruments processed in local clearing in Calcutta (July 1989 - June 1990)

NO. OF INSTRUMENTS BY AMOUNT CATEGORY

Transaction category	Upto Rs. 2500/-		Above Rs.2500/- < Rs. 1 lakh		Rs. 1 lakh & above		Total	
	No.	% to total	No.	% to total	No.	% to total	No.	% to total
1. Savings A/C. Cheques	32,71,483	11.31	11,89,509	4.11	23,491	0.08	44,84,483	15.50
2. Current Account Cheques	55,67,072	19.24	60,63,042	20.95	4,96,753	1.72	1,21,26,867	41.91
3. Cash Credit Account Cheques	5,56,880	1.92	7,39,487	2.56	91,183	0.31	13,87,550	4.79
4. Dividend Warrants	28,24,704	3.76	39,827	0.14	1,931	0.01	28,66,462	9.91
5. Interest Warrants	20,72,361	7.16	52,112	0.18	1,106	-	21,25,579	7.34
6. Refund Orders	10,43,538	3.61	2,15,608	0.74	425	-	12,59,571	4.35
7. Govt. & RBI Transactions	2,90,931	1.01	2,89,661	1.00	37,467	0.13	6,18,059	2.14
Sub total	1,56,26,969	54.01	85,89,246	29.68	6,52,356	2.25	2,48,68,571	85.94
8. Demand Drafts	9,81,324	3.39	17,32,900	5,99	1,45,676	0.51	28,59,900	9.89
9. Bankers Cheque & Cheques Issued in lieu of Payment Orders	3,09,474	1.07	3,95,517	1.37	88,745	0.30	7,93,736	2.74
10. Other Transactions	3,10,251	1.07	92,791	0.32	9,314	0.04	4,12,356	1.43
GRAND TOTAL	1,72,28,018	59.54	1,08,10,454	37.36	8,96,091	3.10	2,89,34,563	100.00

APPENDIX 6

Transaction-wise, Value-wise Analysis of cheques and other instruments processed in local clearing in Bombay, Delhi, Calcutta and Madras (July 1989 – June 1990)

VALUE BY AMOUNT CATEGORY (Value in Rs. lakhs)

Transaction category	Upto Rs. 2500/-		Above Rs.2500/- < Rs. 1 lakh		Rs. 1 lakh & above		Total		% growth over previous year
	Value	% to total	Value	% to total	Value	% to total	Value	% to total	
1. Savings A/C. Cheques	2,07,662	0.52	10,97,482	2.76	4,33,290	1.09	17,38,434	4.37	22.5
2. Current Account Cheques	4,90,390	1.23	75,02,205	18.85	1,24,86,633	31.38	2,04,79,228	51.46	9.4
3. Cash Credit Account Cheques	70,130	0.18	13,52,688	3.40	33,65,263	8.45	47,88,081	12.03	19.2
4. Dividend Warrants	35,466	0.09	28,742	0.07	53,699	0.14	1,17,907	0.30	21.3
5. Interest Warrants	41,467	0.10	30,915	0.08	52,715	0.13	1,25,097	0.31	19.5
6. Refund Orders	61,417	0.16	87,727	0.22	14,437	0.03	1,63,581	0.41	27.6
7. Govt. & RBI Transactions	17,041	0.04	3,16,897	0.80	29,04,909	7.30	32,38,847	8.14	26.2
Sub total :	9,23,573	2.32	1,04,16,656	26.18	1,93,10,946	48.52	3,06,51,175	77.02	13.5
8. Demand Drafts	79,236	0.20	25,14,205	6.32	25,52,950	6.41	51,46,391	12.93	20.6
9. Bankers Cheque & Cheques Issued in lieu of Payment Orders	18,693	0.05	5,94,006	1.49	30,82,398	7.75	36,95,097	9.29	11.7
10. Other Transactions	12,285	0.03	80,678	0.20	2,09,471	0.53	3,02,434	0.76	53.6
GRAND TOTAL	10,33,787	2.60	1,36,05,545	34.19	2,51,55,765	63.21	3,97,95,097	100.00	14.6

* In respect of 3 centres only viz. Bombay, Delhi and Madras since Calcutta commenced operations only in May 1989.

APPENDIX 7

Transaction-wise, Value-wise Analysis of Cheques and other instruments cleared at Bombay (July 1989 - June 1990)

VALUE BY AMOUNT CATEGORY (Value in Rs. lakhs)

Transaction category	Upto Rs. 2500/-		Above Rs. 2500/- < Rs. 1 lakh		Rs. 1 lakh & above		Total	
	Value	% to total	Value	% to total	Value	% to total	Value	% to total
1 Savings A/C. Cheques	97,906	0.53	5,64,368	3.10	2,19,291	1.20	8,81,565	4.84
2 Current Account Cheques	2,63,194	1.45	39,70,769	21.84	57,49,759	31.61	99,83,722	54.90
3. Cash Credit Account Cheques	35,741	0.20	7,04,618	3.87	17,67,851	9.72	25,08,210	13.79
4. Dividend Warrants	20,282	0.11	16,378	0.09	39,740	0.22	76,400	0.42
5 Interest Warrants	25,373	0.14	16,146	0.09	23,005	0.13	64,524	0.36
6 Refund Orders	30,237	0.17	36,979	0.20	6,836	0.04	74,052	0.40
7 Govt. & RBI Transactions	5,796	0.03	1,07,088	0.59	5,77,863	3.18	6,90,747	3.80
Sub total	4,78,529	2.63	54,16,346	29.78	83,84,345	46.10	1,42,79,220	78.51
8 Demand Drafts	26,372	0.15	10,73,283	5.90	9,48,638	5.22	20,48,293	11.27
9. Bankers Cheque & Cheques Issued in lieu of Payment Orders	7,658	0.04	2,48,511	1.37	14,72,508	8.10	17,28,677	9.51
10 Other Transactions	6,283	0.03	40,113	0.22	83,996	0.46	1,30,392	0.71
GRAND TOTAL	5,18,842	2.85	67,78,253	37.27	1,08,89,487	59.88	1,81,86,582	100.00

APPENDIX 8

Transaction-wise, Value-wise Analysis of Cheques and other instruments cleared at New Delhi (July 1989 – June 1990)

VALUE BY AMOUNT CATEGORY

(Value in Rs. lakhs)

Transaction category	Upto Rs 2500/-		Above Rs.2500/- < Rs 1 lakh		Rs. 1 lakh & above		Total	
	Value	% to total	Value	% to total	Value	% to total	Value	% to total
1. Savings A/C. Cheques	57,330	0.51	2,87,189	2.53	1,28,692	1.14	4,73,211	4 18
2. Current Account Cheques	1,06,792	0.94	18,47,620	16.31	32,43,693	28.63	51,98,105	45.88
3. Cash Credit Account Cheques	15,762	0.14	3,39,564	3.00	6,01,607	5.31	9,56,933	8.45
4. Dividend Warrants	6,087	0.06	7,339	0.06	5,623	0.05	19,049	0.17
5. Interest Warrants	6,471	0.05	7,472	0.07	19,436	0.17	33,379	0.29
6. Refund Orders	15,729	0.14	31,460	0.28	5,213	0.04	52,402	0.46
7. Govt. & RBI Transactions	5,132	0.04	1,07,503	0.95	18,32,512	16.18	19,45,147	17.17
Sub total	2,13,303	1.88	26,28,147	23.20	58,36,776	51.52	86,78,226	76.60
8 Demand Drafts	21,539	0.19	7,27,482	6.42	8,03,790	7.09	15,52,811	13.70
9 Bankers Cheque & Cheques Issued in lieu of Payment Orders	4,767	0.04	1,90,569	1 68	8,18,776	7.23	10,14,112	8.95
10 Other Transactions	2,598	0.03	19,372	0.17	62,491	0.55	84,461	0.75
GRAND TOTAL	2,42,207	2.14	35,65,570	31.47	75,21,833	66.39	1,13,29,610	100.00

APPENDIX 9

Transaction-wise, Value-wise Analysis of Cheques and other instruments cleared at Madras (July 1989 - June 1990)

VALUE BY AMOUNT CATEGORY

(Value in Rs. lakhs)

Transaction category	Upto Rs. 2500/-		Above Rs.2500/- < Rs.1 lakh		Rs. 1 lakh & above		Total	
	Value	% to total	Value	% to total	Value	% to total	Value	% to total
1. Savings A/C. Cheques	25,848	0.65	1,02,391	2.56	37,757	0.95	1,65,996	4.16
2. Current Account Cheques	68,193	1.70	6,95,440	17.37	10,77,967	26.93	18,41,600	46.00
3. Cash Credit Account Cheques	13,164	0.33	1,71,394	4.28	4,04,408	10.10	5,88,966	14.71
4. Dividend Warrants	2,190	0.05	1,740	0.04	2,956	0.07	6,886	0.16
5. Interest Warrants	4,853	0.12	3,708	0.09	5,630	0.14	14,191	0.35
6. Refund Orders	5,363	0.13	6,968	0.17	999	0.02	13,330	0.32
7. Govt. & RBI Transactions	3,546	0.09	47,293	1.19	1,79,308	4.48	2,30,147	5.76
Sub total :	1,23,157	3.07	10,28,934	25.70	17,09,025	42.69	28,61,116	71.46
8. Demand Drafts	23,625	0.59	3,92,367	9.80	3,73,913	9.34	7,89,905	19.73
9. Bankers Cheque & Cheques Issued in lieu of Payment Orders	3,813	0.10	65,644	1.64	2,66,922	6.67	3,36,379	8.41
10. Other Transactions	1,527	0.04	6,645	0.17	7,881	0.19	16,053	0.40
GRAND TOTAL	1,52,122	3.80	14,93,590	37.31	23,57,741	58.89	40,03,453	100.00

APPENDIX 10

Transaction-wise, Value-wise Analysis of Cheques and other instruments cleared at Calcutta (July 1989 - June 1990)

VALUE BY AMOUNT CATEGORY (Value in Rs. lakhs)

Transaction category	Upto Rs. 2500/-		Above Rs.2500/- < Rs.1 lakh		Rs. 1 lakh & above		Total	
	Value	% to total	Value	% to total	Value	% to total	Value	% to total
1. Savings A/C. Cheques	26,578	0.42	1,43,534	2.28	47,550	0.76	2,17,662	3.46
2. Current Account Cheques	52,211	0.83	9,88,376	15.75	24,15,214	38.49	34,55,801	55.07
3. Cash Credit Account Cheques	5,463	0.09	1,37,112	2.18	5,91,397	9.42	7,33,972	11.69
4. Dividend Warrants	6,907	0.11	3,285	0.05	5,380	0.09	15,572	0.25
5. Interest Warrants	4,770	0.08	3,589	0.06	4,644	0.07	13,003	0.21
6. Refund Orders	10,088	0.16	12,320	0.20	1,389	0.02	23,797	0.38
7. Govt. & RBI Transactions	2,567	0.04	55,013	0.88	3,15,226	5.02	3,72,806	5.94
Sub total.	1,08,584	1.73	13,43,229	21.40	33,80,800	53.87	48,32,613	77.00
8 Demand Drafts	7,700	0.12	3,21,073	5.12	4,26,609	6.80	7,55,382	12.04
9 Bankers Cheque & Cheques Issued in lieu of Payment Orders	2,455	0.04	89,282	1.43	5,24,192	8.35	6,15,929	9.82
10. Other Transactions	1,877	0.03	14,548	0.23	55,103	0.88	71,528	1.14
GRAND TOTAL	1,20,616	1.92	17,68,132	28.18	43,86,704	69.90	62,75,452	100.00

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BOOK REVIEWS

Appropriate Remuneration in Developing Countries : Three-Dimensional Models for Executives and Workers, by Rama Murthy Kuppachi (Sage Publications, New Delhi/Newbury Park/London, First published in 1990, Hardback Price Rs. 195.00, pp. 262).

Dr. Rama Murthy Kuppachi's study, using his two three - dimensional models developed by him for carrying out job evaluation and pay structuring, is a path - breaking one and promises to be extremely useful for manager in all types of organisations. The two models, for executives and workers respectively, have been applied and tested by him, as an Indian management consultant, in four developing countries of Asia and Africa, in private as well as public sector organisations, including the civil service of a country. As he says in the Preface, the competitive compulsions of an enterprise to attract and retain the best available talent/skills in the market, together with the organisational setting and job design in the organisation, are the determinants for organisational setting and pay structuring in any enterprise. The quality of personnel and their motivation will in turn, eventually be the decisive factor in the growth and economic prosperity of the enterprise. Dr. Kuppachi emphasizes the fact that together with job-person matching, an equitable matching of pay also is a must.

He traces the evolution of "need for linking compensation to the job performed" to F.W. Taylor, father of the Scientific Management Movement (late 1880's and early 1900), whose chief concern was for a "fair wage for fair work".

Today the concept of "equity", that is, equal pay for equal work, has given way to such notions as "comparable worth" and "comparable wage", which is, equity beyond considerations of

gender, race or ethnicity! Dr. Kuppachi has also touched on the exciting new possibilities of a national wage/salary, and even international trade unions (for example those covering the North American subcontinent enabling free mobility of labour at inter - country levels).

Dr. Kuppachi then expounds the conventional methods of job evaluation in use today, which can be grouped into two - Qualitative and Quantitative systems - the first consisting of the Ranking (now passé), Slotting and Classification methods, which last one has been used by him in his studies. The Quantitative System consists of Factor Comparison, Point Rating and Quantitative Job Analysis methods. The Point Rating method has been employed by him in his job evaluation studies. The above systems are applicable to evaluation of non-managerial positions, while for managerial job evaluation, we are told that the Hay System is in use.

About the main reason why stigma is attached to job evaluation by trade union circles, he tells us that in the past, job evaluation was practised by consultants whose methods were kept confidential to protect "trade secrets", shrouding them in an aura of mysticism, sometimes bordering on deception, leading to deep-rooted suspicion and hostility towards job evaluation by trade unions everywhere.

Outlining the pre-requisite for a job evaluation program as job analysis and resultant job description, the latter containing data about job identification, list of principal duties of incumbents, minimum levels of knowledge, nature and extent of supervision received/given, physical and mental effort involved, etc., Dr. Kuppachi feels that labour-management participatory procedures should be involved in preparation and approval of job evaluation. Issues related to job evaluation like job titles, living wage, Management by Objectives, market valuation in salary structuring and the role of labour are also briefly touched upon by him.

Coming to the 3-dimensional models which he has developed, he concedes that there are certain similarities in the structural format of Hay's Managerial Evaluation Model and his own Models, although he had no detailed knowledge of the Hay system

when he developed his own model. Dr. Kuppachi's own models are of 2 types. One model is for evaluation of management/executive position jobs; the other for non-executive (unionized) jobs, including clerical jobs. The broad features of the job evaluation plan consist of factors like know-how, variety, accuracy in jobs, human relations factors, mental and physical effort, responsibility factor and working conditions, all of which are to be measured in degrees; the weightages given to each factor and their sub-factors are to be computed statistically. The weightages are checked with reference to certain key or benchmark jobs, fairly priced and selected by joint labour management consensus. After the job evaluation is completed by computing point scores (e.g. if sub - factor education was allotted 14 points for Degree 1, then points score for Degree 5 would be 14 x 5 = 70 points), the jobs are classified into homogeneous groups (with due consideration for borderline jobs), to provide a rational basis to formulate a single, unified salary structure for the organization. The Joint Job Evaluation Committee consists of members from management and the trade union/s.

Delineating on the conceptual framework of his managerial model for instance, he explains that it is broadly formed of (a) the input the manager brings in (b) the output he puts into and (c) the output he contributes to a job. Input consists of know-how, output he puts into consists of decision - making, and the output he contributes to the job consists of accountability. Each of these factors is divided into 3 sub - factors, for example, Decision - making consists of decision scope, challenge in job and time span. In case of the non - managerial model, there are some changes, for instance, the output the worker puts into a job become Work effort (instead of Decision-making) comprising of physical effort, mental effort and conditional need. Each factor in the 2 models is divided into a certain number of application levels or degrees covering the total spectrum of job range at an enterprise. These degrees recommended by him are exhaustive in nature.

Dwelling at length on the labour-management participation in preparing job evaluation plans, Dr. Kuppachi states that in case of non-managerial plan, a Joint Committee of members of trade union and management, together with the consultant carries out the evaluation for implementing reclassification of jobs and a new

wage/salary structure, while in a managerial evaluation plan, the senior management and staff association assist the consultant.

In the book, Dr. Kuppachi treats us to a sample of job evaluation plans, ranging from the job of a Design Manager in a Chemical company-incorporating his managerial model, to that of a Heavy Vehicle Driver in a company-with the worker evaluation plan.

The statistical computation of the evaluation is explained by him by means of examples. He cautions that a model, however well-conceived and applied in other than one's own situation, cannot be entirely transplanted into another situation. A model cannot be routinely applied in every other case without first probing the organizational pre-requisites vis-a-vis factor composition. For example, if in an organisation, minimum or entry level educational norm is set at a high level, then number of degrees for this sub-factor will be fewer than the degrees recommended in his model. Similarly, the assumptions in determining factor weights are tied to a consensus within each organisation on minimum and maximum limits of pay scales as well as certain well-defined "benchmark" jobs in it.

Dr. Kuppachi thereafter focuses on the 4 case studies he carried out in four countries and the preparatory, application and implementation phases of these models there. An interesting case study is that of establishing equity or parity in multiple corporations of varying sizes, activities and social importance in the public sector (in an African country). The scope of the project here was to review the organizational structure and salary grades of the executive (or non-unionized) staff in 6 corporations (under the country's Ministry of Agriculture), and to develop a common, unified classification for the group as a whole. Under the project, using a common set of factors and weights like net assets, turnover, profitability, complexity of operations, etc., the corporations were ranked on a 1-5 scale, to facilitate a broad review of the organisational structure at each unit. Subsequently, a common evaluation plan was developed to cover all executive positions, including the Chief Executive Officers at these units. About 200 executive positions were evaluated and classified. Certain

organizational changes were also effected in the process.

As a result of the reclassification, the revised grade structure for the 6 units ensured inter-unit comparability and paved the way for uniformity in job titles and service conditions and inter-transferability of persons.

And finally, of interest is the evaluation of unionized employee categories in a petroleum refining company in the Indian public sector having 3 trade unions. Around 180 jobs were evaluated here and eleven grade structures for these non-managerial jobs were agreed upon after reclassifying them, by the Co-ordinating Committee, consisting of the representatives of the company and each of the 3 trade unions and the author (as consultant). As a result of the review and job reclassification, about 58 per cent of the jobs and 67 per cent of employees were placed in higher grades; 38 per cent of jobs and 32 per cent of employees remained at the current level and 3.4 per cent of jobs and 1.2 per cent of employees went to a lower grade. The high per cent benefit to employees was primarily due to, as he says, updating and correct assessment of job content at each level/position as was acutally performed and also due to merger of special allowances and the jobs so performed into the job classification, thereby eliminating the need for special allowances in the normal course.

It is through these lucidly presented case studies that Dr. Kuppachi has succeeded in dispelling the cloud of academia which would otherwise have surrounded such a book. The studies reveal his expertise in being able to use his experiences in the field of job evaluation for application in varied situations. He almost makes you believe that all is not lost in a sagging enterprise and that all it needs to turn the corner is a touch of his almost magic wand of models and lo behold - a trimmer, streamlined new organisation would be created! But, of course, reality is much more complex. One is tempted to visualize his models being applied to the Indian public sector units to remodel them into more compact and manageable ones, though this may of course be at the cost of retrenchment of workers, as a result of the exacting job evaluation and reclassification, as his studies demonstrate. However, since the job evaluation exercise in case of non-management jobs is carried

out in consultation with the labour unions, the latter cannot really beleaguer the management subsequently about unfair practices! His emphasis on labour management participative role in job evaluation paves the way for better industrial relations. However, the great difficulty is in getting the worker unions to accept the need for such an exercise.

In the final analysis, Dr. Kuppachi could probably have given an assessment of the state of the organizations to which he applied his models, after a lapse of say three to five years, for better evaluation of the models. Secondly, he could have simplified for lay-readers, the statistical computation of his models; the suggestions could perhaps be taken up in the next edition of his book.

M. Jambholkar*

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* Miss M. Jambholkar is Assistant Adviser in the Management Services Department.

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World Development Report 1990, World Bank, Washington DC 1990

THE latest World Development Report (WDR), 1990, is laudable for picking up 'poverty' as its theme and covering all its aspects - the present poverty situation in different parts of the world, its measurement, and prospects for the poor in the future. Coming at the same time is the World Bank's Annual Report 1990 focussing attention on changing the face of poverty in India and its implications for the Government's policy. Another entrant to the related field is the United Nations Conference on Trade and Development's (UNCTAD) Annual Report on 'The Least Developed Countries - 1989' which also highlights the plight of the people living in abject poverty in these countries. The outburst of literature on this theme seems to show a consensus in the world that the most pressing problem of the developing countries i.e., poverty, should be addressed quickly and in a determined manner.

Chapter 1 of WDR on *'Diverging trends in the world economy'* after examining the recent developments in the world economy postulates the prospects for 1990. Though 1980's has been regarded by the Report as a lost decade for many of the world poor, in Asia, however, poverty declined, especially in India, Indonesia, Malaysia and Pakistan. On the other hand, in many countries of Sub-Saharan Africa, Latin America and Eastern Europe, there was an increase in the poverty due to external and internal shocks. The decade (1980-89) witnessed a high growth of 3.2 per cent in the real per capita GDP in South Asian countries as against a growth of 1.7 per cent registered during 1973-80. The Report attributes the improved growth performance of South Asian countries to the macro-economic stability, low and sustainable rate of inflation, realistic exchange rate and manageable level of fiscal expenditures in these countries.

Regarding the future the Report is quite optimistic about performance during the 1990's. The Report forecasts developing countries to grow on an average by 5.1 per cent (1989-2000) a year compared with 4.3 per cent in 1980s (1980-89). This reflects the World Bank's confidence that there would be improvement in domestic policy and larger flows of external assistance. However the World Bank's highly optimistic projections are based on the assumptions of a normal decade (of 1990), a rise in real commodity prices and a fall in real interest rates over the decade.

Per capita income in South Asia is expected to continue growing at 3.2 per cent a year, nearly three times as fast as between 1965 and 1980. India, is expected to lead the region with a 3.4 per cent growth in per capita GDP - enough to allow substantial progress in reducing poverty. A critical assumption in the projection for India, however is that the policies, that allowed investment, productivity and exports to expand rapidly in the 1980s will be maintained. With careful management of the real exchange rate, export volume could grow at a robust 8 per cent a year. If measures are taken to restrain the fiscal deficit, this rise should prevent debt service costs from undermining growth.

Chapter 2 entitled *'What we know about the poor'?* attempts to define poverty in terms of inability to attain a minimal standard of living. For inter-country comparisons, the Report uses country-specific poverty lines. The Report uses two poverty lines i.e., $275 and $370 per person a year (at constant 1985 PPP prices), the lower limit of range coinciding with a poverty line commonly used in India. The Report employs the head count index (percentage of population below the poverty line) and poverty gap (aggregate income shortfall of the poor as a percentage of aggregate consumption) to measure the extent of poverty in the developing countries. In India, according to the Report, the poverty is more pronounced in rural sector than in urban sector judged in terms of indicators viz., infant mortality (per thousand of live births) and access to safe water (percentage of population) etc. This chapter points out the two most important determinants of poverty viz., access to income earning opportunities and the capacity to respond.

Chapter 3 on *'Progress on poverty : lessons for the future'*, highlights the improvement in per capita consumption, life expectancy and primary net enrollment rate in developing countries over the twenty years i.e., from 1965 to 1985. Judged by head count index, India, the country with the world's largest concentration of the poor has reduced the incidence of poverty by 11 percentage points in just eleven years from 1972 to 1983. This chapter concludes that the evidence suggests that there has been a considerable progress in reducing the incidence of poverty is effecting a modest reduction in the number of the poor and in achieving of somewhat better living standards for those who have remained in poverty.

The Report clearly substantiates the negative correlation between rural poverty and farm income. Citing India, the Report says that poverty decreased by 11 percentage point from 1973 to 1983, a period that corresponds to rise in agricultural purchasing power by less than 0.4 per cent a year. Notably most of the decline in poverty in India by 7 percentage points between 1977 and 1983 was coupled with an increase in the agricultural purchasing power at 1.5% a year. This has an important implication for the Indian economy in view of the vast labour force in the rural sector. The Eighth Plan's emphasis on employment is expected to result in increasing purchasing power in the hands of rural labour force thereby dampening the incidence of poverty.

Abandoning the old-belief of a trade off between growth and poverty, the Report suggests from country experience that with appropriate policies, the poor can participate in growth and in fact contribute to it. Pointing to the two approaches meant for increasing the assets of poor i.e., redistribution of existing assets (such as land) and increased public investment in human capital of the poor, the Report highlights here that the feasibility of the first approach (i.e., land reforms etc.) is remote in a country like India. Therefore, the attempt, has to be on spending more on education and other forms of investment in human capital.

Focussing on the Government Policy and rural development in Chapter 4 entitled *'Promoting economic opportunities for the poor'* the Report points out that credit subsidization leading to excessive

mechanisation has reduced the demand for farm labour in India. The demand for labour is reduced further since the 1970's due to labour saving innovations sometimes encouraged by subsidies for mechanisation. The Report highlights that the growth in the rural non farm economy is needed for creating rural employment and for raising labour incomes. To substantiate this, the Report quotes an Indian study highlighting that employment in the non farm sector grew by 35 per cent in the 1970s compared with 14 per cent for employment in agriculture. Without such a growth rate rural wages would have risen much more slowly.

Regarding demand for urban labour, the Report opines that often industrial protection reduces both the level and growth of labour use in the formal sector. Quoting data for the year 1986 regarding effective protection and labour intensity of manufacturing in India, the Report points that higher the degree of protection in the industry, the lower is the employment. The Report therefore, advocates that greater neutrality in the trade regime can support a more labour-intensive pattern of industrial expansion in import competing as well as exporting sectors. Though the implications of the above study in terms of employment potential have to be viewed against the stage of infancy of product/industry, yet at the overall macro level the Indian industry is gearing itself to an era of liberalisation.

As regards the role of the informal sector in poverty reduction, the Report says that the policy of reservation for the small sector has not led to any gain in employment. On the contrary credit subsidies have led many small firms to adopt relatively capital intensive techniques and indeed the evidence suggests that small firms in the manufacturing sector are not necessarily more labour intensive than large firms in the same line of business. This view was corroborated by Prof. J.C.Sandesara (Small Scale Industrialisation : the Indian Experience, Economic and Politcal Weekly, March 26, 1988 vol. xxiii, No. 13, pp 640-654), when he said "Most of the discussion on the small industry question in the context of employment objective is focussed on the choice of methods of production and sizes of units in industry on the assumption of given pattern of demand. It should be understood that from the stand point of employment, the latter is perhaps more important than the former. Thus for example, if consumers are generally reconciled with

coarse cloth, ghani oil, chappals etc. instead of by having fine cloth, mill oil and shoes etc. greater employment can be created, as the former can be produced in more labour intensive and small sized units than the latter. Perhaps from the stand point of employment the question of pattern of demand is more significant than the question of choice of methods of production and sizes of operating units. Paradoxically, however more thought has been given to the latter and this has probably tended to belittle the significance of the former". The Report suggests a three pronged attack to reduce poverty viz. (i) economywide and sectoral policies to encourage rural development and urban employment, (ii) specific policies to improve the participation of the poor in growth process by increasing their access to land, credit and public infrastructure and services and (iii) treatment of the resource poor regions, in a manner different from that of other regions.

The 5th Chapter on *'Delivering social services to the poor'* reviews the progress witnessed in improving health, nutrition and education in the developing world during the past decades. However the progress is uneven, the poor of the developing countries continue to suffer from illiteracy, sickness, malnutrition and early death. To avert the dismal future, the Report urges that the Governments in cooperation with the international community, must make a long term commitment for improving the social infrastructure helpful to the poor.

The Chapter 6 regarding the role of *'Transfers and safety nets'*, examines the range of policies e.g. food pricing and distribution, public employment schemes and social security in eradicating poverty. The Report is appreciative of the Employment Guarantee Scheme of Maharashtra (India) in providing employment to the rural force. The guarantee of employment even for a short period acts as a substitute for unemployment insurance and these schemes also achieve some self targeting through the unattractiveness of such work to higher income households. However another World Bank Study (India- An Industrialising Economy in Transition, 1989) adds that in view of Maharashtra's experience, attention must be paid to the quality of the public works, the choice of projects and the integration of the projects with the regional eco-system so that employment is productive and recources are not wasted.

A review of Chapter 7 on *'The 1980s : shocks, responses and the poor'* stresses that in order to tune to the adjustments in the 1990's, a combination of effective action on the policy fundamentals (notably changes in relative pieces to favor agriculture) and efforts to moderate declines in consumption (through a pause in investment for instance) can help many of the poor in most cases.

Chapter 8 on *'International factors in reducing poverty'* dwells on the implications of world trade, international debt and supply of foreign aid to developing countries and its consequential impact on poverty reduction. As regards aid, the Report fails to find a clear link between aid and poverty reduction. Donors especially bilateral donors have many different motives political, strategic, commercial and humunitarian. It may be mentioned here that reducing poverty is often not stressed. Consequently about 41 percent of aid still flows to middle and high income countries and there is little relationship between per capita aid allocations and the extent of poverty in individual countries. The chapter stresses that in the longer term progress of developing countries including their progress in reducing poverty will demand substantially more reliance on countries' own domestic resources and on their income from foreign trade rather than on external official support through aid.

Chapter 9 the concluding chapter entitled *'Prospects for the poor'*, emphasises a dual approach to reduce poverty viz., (i) efficient labour-intensive growth based on appropriate market incentives, physical infrastructure, institutions, and technological innovation, and (ii) adequate provision of social services, including primary education, basic health care, and family planning services. This has to be supplemented by transfers to help those who would not otherwise benefit (the extremely destitute, the sick, and the aged) and the safety nets to those who are most vulnerable to income-reducing shocks.

Though this Chapter postulates optimistic projections of growth of developing countries in the 1990's, there is a feeling of disquiet that if the global economy performs less favourably than the forecast, the level of world poverty will be considerably higher. A slow down in industrial countries growth, persistently high real

interest rests, rising protectionism and setback in the current debt reduction initiatives could all seriously dampen progress towards poverty reduction.

Coming to South Asia, the Report concludes that there is considerable potential for progress towards reducing poverty particularly in India through sustained growth and internal policy reforms. The Report calls for a curb on growing Government deficits, containing foreign and domestic debt and ensuring adequate savings to support domestic investment. The above mentioned measures need to be supplemented by trade liberalization encouraging exports and allowing efficient labor-intensive import substitution. Agriculture needs access to new technology, and rural infrastructure must be expanded and maintained particularly in lagging subregions.

World Bank's Annual Report 1990, on the other hand while applauding India's recent success in raising annual average growth rates opines that if the rate of growth achieved during the Seventh Plan period (1985-86 to 1989-90) of 5.6 per cent could be sustained at this level, with gains accruing to the poor, poverty could be reduced by the year 2,000. However, as per the Planning Commission's statistics, one of the disquieting features of Indian economy has been the slow growth in employment. In this regard, the Reserve Bank of India's Annual Report 1989-90 has cautioned that the strategy for employment growth so far pursued needs to be carefully worked out so that the increase in employment goes in tandem with technical and economic efficiency, as otherwise growth itself cannot be sustained over a longer period.

Deepak Gupta*

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* Shri Deepak Gupta, Assistant Adviser, Department of Economic Analysis & Policy, Reserve Bank of India, is presently on deputation to Industrial Reconstruction Bank of India, as Manager, Economic Analysis & Policy Wing. The views expressed here are author's personal views and not of the institution he belongs to

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Third World Debt - The Search for a Solution : Edited by Graham Bird. 1989, Edward Elgar Publishing Ltd. England. pp xiii + 239, £32.

THE book has been somewhat overtaken by events. Published before the announcement of the 'Brady Plan', it calls for a new strategy addressing the external debt problem of heavily indebted developing countries. But it takes the precaution of not spelling out the new strategy it has in view. This is perhaps the most desirable route to follow, for after all, a number of debt proposals that emerged during the six years since the Mexican announcement of default on debt in August 1982, have come to nought. It is clear that there can be no general model to follow. Countries in debt have to continuously search for solutions in consultations with creditors.

The book under review is a collection of papers read at an international conference held at the University of Surrey in Spring 1988. The book provides a non-technical approach to the problem. Its merit lies in the fact that it not only focusses on a wide range of issues, but also brings together an integrated analysis of the debt problem. Introducing the issues in Chapter 1, Graham Bird stresses that the marginal productivity of the resources borrowed vis-a-vis the interest rate on the loan, domestic savings, export earnings and import payments are central to the debt-servicing capacity of the country. Factors that have a bearing on the incidence of the debt problems are, according to Bird, not all beyond the control of the debtors. A country can service its debt if it is willing to undertake sufficient domestic sacrifice. According to Bird, the issue here is that of "willingness" as opposed to "ability", a point on which there has been considerable disagreement among major commercial debtors. However to the credit of Bird, it may be said that he views that the willingness and ability are in practice positively related, implicitly assuming that where there appears a possibility of a net benefit from default, a "rational" debtor would

repudiate its debt. However as Bird cautions, "Given the uncertainty sorrounding the costs of default, it may be assumed that a government's propensity to default will depend significantly on its degree of risk aversity" (pp-5).

Basically there are four "global" approaches to deal with the debt problem - market solution, economic adjustment in debtor countries, adjustment in other countries, and rescheduling. Of these, the first and the third have not been found to be acceptable to the international financial community, because the market approach could lead to undesirable externalities, and adjustment of surplus countries would mean expansion of demand in their economies, the effects of which need not be felt on highly indebted countries. The debt problem therefore has been viewed and handled by a formal (under the auspicies of the IMF) combination of adjustment in developing countries and rescheduling, a conclusion which has become too well known and has been accepted as a necessary condition for addressing the debt problem but not sufficient enough to resolve it.

In Chapter 2, Philip Suttle concentrates on the need for evolving an appropriate debt management system together with the pattern of total financing of the economy. He believes that an analysis of domestic financial policies is an important baseline for assessment of debt-servicing capability. Ideally a country should have a debt management system which closely monitors the evolution of total external debt within the pattern of total financing of the economy. Stephany Griffith-Jones, in her paper, focusses on the reasons for the debtor nations showing enormous patience for such a long time even in a situation of reverse transfer of funds, and for not resorting to a more consistent unilateral action. She attributes the former to causes which are country-specific and related at least partly to non-economic variables. Unilateral action has not been taken by major debtor governments owing to uncertainty of the impact of such actions on the international banking system. Another reason might be the "complex social and political realities of debtor countries, which are reflected in the actions of governments" (pp-50). Although unilateral action by debtor governments is undesirable, the author seems to believe that such action or even the threat of it may be necessary for debtor governments "to

achieve financial deals that are consistent with growth and development of their economies;" (p.-66) and that such tough "bargaining positions" should be possible with a unified support from the government, political parties, and trade unions. But the experience of Peru in the mid-'eighties is a pointer to the dangers inherent in unilateral action, even if it has massive domestic support.

Miguel A. Olea in his paper strikes the familiar point that as industrial countries, in the first place, transferred resources to Latin America because of lack of domestic absorption, the Latin American debt problem has emerged and caused considerable internal, political and economic strains. The ultimate goal, in his view should be to look for a genuine political solution in terms of placing of co-responsibility and of sharing of burden and distribution of costs among the debtors, creditors and financial institutions. This viewpoint which prevailed for some time in the mid - '80s did not last long, simply because it has no practical relevance. After all, one should also remember that the Latin American countries landed themselves in such a problem mainly due to their expansionary policies and overambitious investment programs that were never completed.

Tony Killick explores some issues arising from the spread of adjustment programs and the consequent conditionality. The 1980s have seen a "veritable explosion of conditionality" (pp-83). However, as Killick reminds us, all the measures suggested as part of conditionality are not those imposed by the creditor agencies; there is often genuine agreement between them and the governments about the policy changes that ought to be adopted. Since 1985, there has been a "new orthodoxy" about the measures necessary for successful adjustment. The author discusses in detail, issues such as the design of adjustment with growth, implications for long-run adjustment of the present approaches and their effect on poverty alleviation, relative roles of the private and public sectors, and measures to raise saving and investment and the related issue of capital flight. In the latter context, the author's observations - one regarding the importance of quality or productivity of the investment that takes place and the second regarding the need for better utilisation of the existing capital - are highly pertinent for countries to grow out of debt. However as Killick

cautions, there is considerable danger of too many expectations being built upon a design of adjustment which may fail to deliver goods.

Bahram Nowzad describes the role of the Fund in the debt problem. The IMF's endeavour in assisting countries' debt problem is not recent and dates back to the Argentine rescheduling in 1956. Secondly, the debt problem reflects balance of payments difficulties which are the concern of the IMF. When a country finds it difficult to service its external debt, it has three options - default, pay up (no matter what the sacrifice) or reschedule. Most countries have chosen the third option and here the Fund has played a very important role, especially since 1982 with reference to commercial bank debt. However, in future, it is important to recognise that countries should not lay much faith in rescheduling as the method of addressing the payment difficulties problem. Adjustment efforts by debtor countries and a cooperative approach between the debtors and creditors are other important methods and it is here the IMF could continue to play a central role. But as Benjamin J. Cohen explains in Chapter 7, "genuine cooperation" on the debt issue could become elusive and spontaneity in it may have to be actively promoted. Ingrid Iversen highlights the potential risks to the present strategy (in existence in early 1988). As banks are not going to be willing to lend on a voluntary basis, some form of debt relief is inevitable, a point which has been conceded subsequently in the Brady Plan. However, even after providing debt relief *a la* the AMEX proposal, the key source of development finance, according to the author, should come from increase in domestic savings with foreign involvement seen as a "bonus". Speaking about external financing, quality and not quantity is important. The author advocates promotion of direct foreign investment in place of commercial bank debt.

Continuing on the lines of Ingrid Iversen, Graham Bird sets out to identify the basic principles underlying debt reform. He discusses a broad range of policy approaches and examines them against the criteria of equity and efficiency. Although market based reforms are not without merit, they can at best be described as a process of "muddling through". Some of the grander schemes which envisage an expanded role for the official sector and involve a centrally planned approach to solving the third world debt problem

are less likely to succeed. What is needed is a new initiative requiring fundamental institutional change and significant amount of public money which may be politically unacceptable. In these circumstances, Bird believes that a strong case exists for a negotiating framework among debtors and creditors to find a solution to the debt problem. But as the 1989 developments show, the creditor governments' preceptions as well as the views of the IMF and the World Bank, on the debt problem have been helpful enough to give a framework for negotiations between debtors and creditors. It is too early to judge the outcomes, but considering the sudden disappearance of interest in the debt problem of some of the heavily indebted countries towards the end of 1989 and in 1990, it appears that the present strategy is likely to continue for quite some time.

In the final Chapter, deviating from the main theme of the book, Mike Faber deals with the debt parlance and the potency of the language regarding the debt problem.

The arguments in this book centre on two main points - that debtor countries need debt relief and any solution to the debt problem can be approached only through a collaborative approach. These ideas have been there for quite some time. This in part explains the reason for lingering of the problem ! While one should give due importance to granting debt relief, one should not sidestep the issue of 'new money' as the book seems to have done. The present problem could be tackled effectively only if both debt relief and new money - flows take place in sufficient amounts in the context, of course, of the debtor countries undertaking an adjustment program that is perceived as appropriate to the country in question.

As already indicated, the year 1989 was marked by an extraordinary recognition, in the form of Brady initiative, that some portion of debt of some countries is just not serviceable and as such has to be duly reduced. Several countries viz., Mexico, The Philippines, Costa Rica, Venezuela, Uruguay and Morocco have already entered into negotiations under the Brady terms. Official debtors which are mostly poorer countries of Africa, have also received relief under the Toronto terms and several creditor governments have provided support in the form of forgiveness of a portion of debt owed by the sub-Saharan countries.

Notwithstanding these developments, total outstanding debt has increased to $1237 billion in 1989 and is estimated to rise to $1303 billion by end-1990 although debt and debt-service ratios have shown declines.

A. Prasad*

* Shri A. Prasad is Research Officer in the Department of Economic Analysis & Policy