Chapter V

ANALYSIS OF THE STUDY & ITS FINDING

I. INTRODUCTION:

Most important aspect of any study is to know the basic of analytical system on which the study can focus the purpose for which it is taken this study "Money Supply and Prices Theoretical postulates and Policy Analysis in the Context of Modern India" the title of the study it self provide that the main focus will be on macroeconomic indicators. The specific indicators that are used for formulating the analytical approach for this study is the use of models for which the discussion shall take place various economists have use different ways and have concluded their studies for providing policy implications and their suggestions it appears, could attempt certain results. It does not mean that the study and their results if applied to certain economy shall show the similar or same results every economy has its own peculiarity. It has its own standards of leaving and different environment considering natural resources of any economy socio-economic conditions as well as political environment the planners the decision makers, it would different and shall type of
different shall also have the difference even in the similar conditions result would not be same.

This study pertaining to Indian economy and which main focus is money supply prices GDP inflation and etc. India has entered open market operations, liberalization, and privatization and has a new beginning in the market economy. Therefore, the purpose of the study period 1990-91 to 2006-07 has been taken as a sample of the study. In this period the role of money supply its effect on prices and thus inflation the growth of GDP has been considered for the above study.

Statistical tools that are used and the methodology adopted for getting result is discussed can be explained in various forms.

Regression Model:

The linear regression model can be represented in the matrix form as:

\[ Y = X \beta + U \]  \hspace{1cm} (1)

Of value of dependent variable \( X \) denotes value matrix of values of explanatory variables.

\( \beta \) is a vector of coefficient term so that

\[ \beta = (X^T X)^{-1} X^T Y \]  \hspace{1cm} (2)

gives the estimated regression coefficient in the model.

Also

\[ V(\beta) = 6^2(X^T X)^{-1} \]  \hspace{1cm} (3)

So that the standard errors of the estimate can be computed from (3)

The multiple coefficient of determination is computed from the formula

\[ R = \beta^T X^T Y/NY^2 \]
The significance of the observed regression coefficient is tested by the used t and/or F tests.

\[ WPI_t = \beta_0 + \beta_1 M_{3t} + \beta_2 Not + \beta_3 GDP_t + \beta_4 Pt - 1 + V \]

\( WPI_t \) = Whole sale price index at time 't'
\( M_{3t} \) = Index of money supply at time 't'
\( Not \) = Population Index at time 't'
\( GDP_t \) = Index of Gross Domestic Product at constant prices at time 't'
\( Pt -1 \) = Whole sale price Index at time 't'
\( ut \) = Disturbance term for the period 't'
\( \beta_0 \) = Constant (Intercept term of the regression model) and \( \beta_1, \beta_2, \beta_3 \) and \( \beta_4 \) are the regression co-efficient in a problem like this. It is also worth while to consider the step wise regression analysis and to study the significance of the Partial regression co-efficients computer algorithm for stepwise regression analysis is used to analyze the data.

II. ANALYTICAL TOOLS

1) Systematic approach: this approach is generally accepted and implemented by the managerial economics and they do the analysis but this study has ground a considered macro-economic factor therefore a tool of model become necessary.

2) Models: on the basis of analysis models direct in making decision and a case study both of these aspects provide facts on which the study and its results depends. In various cases interrelationship co relationships stable graphs of figures arithmetical or statistical co relationship, variance Matrix regression analysis all these based on certain assumption on it can direct for future expectations in the macroeconomic generally Input-out model play an important role

Input-Output: This model explains price rigidity in the goods market real word is very complex when number of firms interacts in the process. In this given situation the firm has no idea of identity of all the suppliers when in direct links in the input-
output setup are considered, the input-output approaches has taken one aliment of Keynesian economy that is coordination failure that which notice due to shut down of private incentives for the following social problems. Lucas had brought difference between aggregate and local specific shops under these conditions the farms will be in perfect information about aggregate variables will be the adjustment in variables and the firm will be not willing to index price to nominal GNP because MS may not move with nominal GNP even if MR were to do so. The input-output showing the dependent of MC and aggregate demand provide nominal GNP and thus critical links that convert real theory of rigidity into a theory of nominal rigidity.

Blached (1997) use the term commutation hypothesis to describe the role of input-output tables to translate price adjustment at individual tables to translate price level at aggregated input-output approach need some additional element to explain why we don't considered in the real world frequently prices small changes every day as a reaction to small cost changes but to come to the proper and factual finding the hypothesis of a vast segment of economy like India some hypothesis are based on expectations which are explained below:

**Rational Expectations Hypothesis**

It was assumed that the present situation will continue in the next period also. This applied to all the variables such as Economic growth price level etc.

**a) Hypothesis of adaptive expectations**

Have it is assumed that people from expectations for the future on the basis of Past experience.

But here also expectation formation process excludes the agents. Knowledge of present situation is forming the expectation for the future.
Milton Friedman reintroduced the hypothesis of adoptive expectations, holding that people adjust their current expectations to correct expectation error made in previous periods.

\[ P_t^* = P_t - i + a (P_{t-1} - P_t) \]

where \( P_t \) is expected Price Level

This equation tells that someone corrects an error of expectation for only a fraction.

This equation can be transformed thus: \( P_t^* = \sigma \text{ (inform 1 to infinity a (1- a)) P}_{t-1} \) which shows that price expectations of \( P_t \) are determined by past observations of the price level only.

Therefore on the basis of the past values of \( P_t \) one can determine \( P_t^* \).

Adaptive expectations hypothesis is also objected on two grounds

1) it may underestimate in case of acceleration e.g. Inflation

2) it is based on limited information - past values only

b) Rational Expectations Hypothesis:

Economists assumed that consumers and firms behave rationally. Therefore it is proper to assume that economic agents act rationally when they form their expectations of the future. John Muth (1961) suggested that expectations of the individuals are rational when they are identical with the predictions of the model.

Muth's Model is as follows:

\[ P_t^* = E_{t+1} \left( P_{t+1} | I_{t-1} \right) \]

where \( P_t^* \) equals the optimal expectations of \( P_t \) at time t-1 \((E_{t+1})\) given all information at t-1 \((I_{t-1})\).
Interpretation of this expression is that people use all available information and their knowledge of how the economy works to determine their expectations.

Bagg (1982) "The hypothesis of rational expectations asserts that the unobservable subjective expectations of individuals are exactly the true mathematical conditional expectations implied by the model itself.

III. STATISTICS OF MONETARY INDICATOR

GDP — Real Gross Domestic Product Growth Rate
INF — CPI Inflation Percentage
MS — Money Supply Growth
S — Savings as a percentage of GDP
FB — Fiscal Balance as a percentage of GDP
CB — Current Account Balance
EX$ — Exports Growth in Dollar
EXRs — Exports Growth in Rupees
RES — Official Reserves
RESM — Official Reserves Monthly Imports
ED — External Debt to GDP Ratio
SD — Short Term Debt as a percentage of External Debt
CURR — Currency with Public
DD — Demand Deposits with Banks
TD — Time Deposits with Banks
AD — Aggregate Deposit
M1 — Narrow Money
M3 — Broad Money
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* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
IV. PROCESSING OF DATA

The table below has various factors to show correlation. The independent factor is GDP the other factors which are of importance and have direct relationship with the GDP and money supply. Here in this study the statistical figures focus on GDP is effect on fiscal balance, similarly GDP’s affect on saving by which current account balance is also affected.

It is noticed that in terms of significances savings has significance effects of 0.223 and current account effect is -0.019 whereby we can say though, GDP effect on it is less but inflationary effect which is to the extent of -0.369 shows the negative co-relationship but current account balance has got a positive effect with money supply to the extent of 0.127 whereas with saving which shows a negative effect -0.578 but with saving it has correlation significance at 0.05 level (5%). Similarly with fiscal balance has percentage its significance is negative that is -0.262 take into consideration exports growth it shows a negative trend of -0.500 but important thing to note is it has got the positive co-relationship with official reserve with significant correlation of 0.01 (1%).

Similarly with official reserve of imports with the significances of 0.01 (1%) its relationship is 0.929. the external debt to current account balance shows negative relationship similarly is the case with current account balance, short term debts which shows the negative trend at 0.05 level (5%) significances. But current account balances shows a positive trend with currency with public their co-relationship is significance with 0.813. Similar is the case with demand draft were it is positive with 0.842 with correlation significances 0.01 (1%) and similar is the case with Time Deposit, Aggregate deposit and above all M1 and M3, where there is a positive co-
relationship significances at 0.05 level (5%) which is 0.834, 0.841, 0.847, 0.845. This shows that co-relationship with last six factors show that current account balance directly correlated with these factors (GDP with current account balances).

a) Correlation of GDP

Correlation of GDP with other Economical variables like - CPI - Inflation as consumer index is taken to show that it has an enlarge effects directly to the consumer. It shows correlation value of -0.463 significant at the level of 0.095 which means that by the growth of GDP does not provide us with positive trend. Whatever may be the reason. It is a matter of debate but this is the result data provided by the respective published government material viz. currency and finance, RBI bulletin, Economic survey etc. it might be psychological aspect of the society having its relevancy to market, the supplier or society, buyers.

The growth of money supply (MS) also shows the correlation value has negative which is -0.418 and correlation significant to the extent of 5% level is 0.137.

Correlation of GDP with saving as a percentage of GDP shows a positive relationship of 0.482 and these correlation significance level is 0.081 whereas fiscal balance has percentage of GDP again shows a negative trend in terms of co-relation value similar is the case of current account balance taking correlation value of both is -0.211 and -0.019 respectively whereas their significance level is 0.468 and 0.948 which shows that current account balance significant at a higher level.

Taking into account co-relationship of GDP with exports growth in Rupee terms, official reserve and official reserve with monthly imports it shows a positive co-relationship with GDP and significance level of all the three is 0.093, 0.480 and 0.357 respectively.
But considering the external debt to GDP ratio as well as short term debt in percentage term or external debt both shows the negative trend which is -0.086 and -0.295 with the significance level at 0.769, 0.306 respectively which means that whenever the percentage of GDP increase the short term debt is higher in total external debt. The same thing can be explained as the dependency of any economy in the present situation is highly externalize, and has to depend upon more external debt in which short term debt is higher than long term debt. Taking currency with public and its correlation with GDP, DD with banks, TD with banks, AD with banks $M_1$ and $M_3$ all this factors shows positive relation which is 0.223, 0.048, 0.062, 0.61, 0.217 and 0.083 significance level of this economic variable is 0.444, 0.870, 0.833, 0.835, 0.457, 0.778 viz. CURR, DD, TD, AD, $M_1$ and $M_3$ respectively.

The focus of all these aspects highlight the correlation valuation and GDP in positive terms as CURR leads to expenditure of the society, which for the purpose of purchasing. If more is spend on such type of expenditure producer is going to increase leading to higher GDP growth. Similarly all the aspects that is DD, TD, AD much of the money is in the hands of banks which directly comes in the economy as investment and thus investment lead to higher growth of GDP and that's why significant of all those three variables is higher than discussed other (six) variable in this paragraph.

Similarly $M_1$ and $M_3$, $M_3$ is much of its use by the society which is less than $M_3$ and the measurement or relationship that come, is the outcome of the figure which shows that less money with higher velocity that is what higher money does and that is the reason it shows less significance of 0.457 secondly $M_1$ does not show how much the society will save is directly depends with the individual behavior. But $M_3$ is in
bigger volume or quantity of which bond to come in the economy hence co-
relationship with GDP significance show 0.778.

M₃ shows the relationship with GDP but negative relationship with CPI
percentage. GDP and its correlation value which is positive is 0.083 and with
significance of 0.778 the discussion as over highlights why GDP and M₃ are
correlated but CPI percentage shows negative relationship of -0.587 at 0.053. One of
the reason that appear with CPI percentage showing the negative co-relationship can
be commented as one higher is the rate of inflation lower will be the growth of real
income.

Money supply's growth Co-relationship with M₃ is negative and which is
0.229 with the significance level of 0.431 which shows that more money fuel more
inflation rate that is supply of money should be based on requirement of the market to
know the equilibrium price where the prices of producer quantity would not rise than
the given time.

Savings as a percentage of GDP and its correlation with M₃ shows the positive
relationship with 0.713 at 5% significant.

But fiscal balance as percentage of GDP the correlation with M₃ shows the
negative effect of -0.153 at 0.601 significant.

Current account balance exports growth rate in rupees official reserve and
external debt to GDP ratio as well as short term debt as a percentage of external debt
shows co-relationship with M₃ and current account positive at 0.845 with 5%
significant level. Exports growth negative -0.444 at 0.111.
Official reserve shows a positive relationship with $M_3$ which is 0.933 at 5% significant level external debt to GDP ratio co-relationship with $M_3$ shows negative which is -0.777 at 5% significant level out of which short term debt as a percentage of external debt shows negative trend of -0.600 at 0.01 significant.

Important thing to note here is with higher $M_3$ and Inflation, due to it exports will show a negative trend due to inner devaluation of rupee. But on the other hand official reserve and official reserve and official reserve monthly imports shall definitely increase with the increase in $M_3$ or by the role of growth of $M_3$.

External debt to GDP shall definitely increase in which short term external debt would be higher than the total external debt taking into account the co-relationship of $M_3$ with CURR, DD, TD, AD and Mx it shows a positive co-relationship of 0.948, 0.854, 0.999, 0.999, 0.923 at 5% significant level the reason is with the growth of GDP money supply should increase, It is anticipated though it does not happen generally, with the increase in the money supply specifically $M_3$ GDP should grow at the same level. But as discussed earlier there are various non-economic factors, social as well as psychological factors they may not lead the growth of GDP to the growth level of money supply.

Pearson's work was all-embracing in the wide application and development of mathematical statistics, and encompassed the fields of biology, epidemiology, anthropometry, medicine and social history. In 1901, with Weldon and Galton, he founded the journal *Biometrika* whose object was the development of statistical theory. He edited this journal until his death. He also founded the journal *Annals of Eugenics* (now *Annals of Human Genetics*) in 1925. He published the *Drapers'
**Company Research Memoirs** largely to provide a record of the output of the Department of Applied Statistics not published elsewhere.

Pearson's thinking underpins many of the ‘classical’ statistical methods which are in common use today. Some of his main contributions are:

1. **Linear regression and correlation** - Pearson was instrumental in the development of this theory. One of his classic data sets (originally collected by Galton) involves the regression of sons’ height upon that of their fathers’. Pearson built a 3-dimensional model of this data set (which remains in the care of the Statistical Science Department) to illustrate the ideas. The Pearson product-moment correlation coefficient is named after him, and it was the first important effect size to be introduced into statistics.

2. **Classification of distributions** - Pearson’s work on classifying probability distributions form the basis for a lot of modern statistical theory; in particular, the exponential family of distributions underlies the theory of generalized linear models.

3. **Pearson’s chi-square test** - A particular kind of chi-square test, a statistical test of significance.

**b) Regression Analysis**

Regression Analysis shows explanatory power of independent variable (GDP) over dependent variable (Inflation) and so on.

**Least Analysis Method**

The method we shall use to fit a line through the scatter diagram is called the Method of Least Squares. This method minimize the sum of squared vertical deviations from the fitted line i.e. No other line, No matter how it is computed, will
have a smaller sum of squared deviations. Notice the vertical deviations measure the distances between actual and predicted value of the dependent variable.

**Coefficient of Determination $R^2$**

The standard error gives us some indication on the reliability of our regression, in isolation it is not enough. How well the regression line fits the sample data, is the coefficient of determination by $R^2$.

In simple linear regression $R$ is the square of the correlation coefficient of $x$ and $y$.

A value of one can occur only if

$$\sum (y_i - \hat{y}_i)^2 = 0$$

if every data point falls exactly on the regression line.

$X$ tells us nothing about $y$ and hence there no regression relationship between $x$ and $y$.

Values between zero and one indicate the "goodness of fit" of the regression line to the sample data

The higher the value of $R^2$, the better the fit.

**Multi Regression analysis**

Suppose a simple regression is run expressing sales as a function of advertising (Independent variable) expenditure.

$R^2$ value is 0.63. This means that 37% of the variation in sales could be due to the influence of other variables besides advertising expenditure.

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For Example, per-capita income in the trading area could also have an influence on sales.

Therefore, the results of the simple regression model, while useful, might be improved by adding per-capita income as an explanatory variable.

This extension of the simple regression technique called multiple regression analysis the statistical objective is still to be obtain a set of parameters that minimizes the square distances between the regression estimate and individual observation.

In the study added with GDP broad money (M₃) and Narrow money to show to show the effect on other dependent variable and explanatory variables’ capacity to forecast or guideline.

**Introduction:** The variables that we have taken shows interrelationship and in showing this how the prices changed and affects others. This tool affects other variable which show multi-variant and having over all effects are traversed towards multi-collinearity. In found out the result independent as well as dependent variables are considered not only this non-variables or factors as independent or dependent are also taken into account to get the overall result.

**Regression Analysis:** Through minimum value system are also considered and for forecasting to know expectation hypothesis decisive factors GDP = F (CPI, MS, Saving, CMS) and anticipate value equations basis point out the expectations what is the importance of particular variable has been taken on ordinary least square methods.

OLS method points out that for getting the result from the observations situations for a given data on which regression line form with various variable taken in the study showing a technical relationship with one another this method shorten the distance through a midline between the two distance of the observations, thus method is called OLS.
c) Explanation with help of Charts, Equation, and Example

(1991-2007) Macroeconomic Indicators of Indian Economy

(In Billion Dollars)
-Not available
P = Provisional
Q = Quick estimate Information in (%)

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Sources: 1) RBI Bulletins of various years
2) Currency and Finance
3) World Bank Report

C / A — Current Account
* Growth exports: US dollar
**Growth exports: In Rupee
OR-MI- Official reserves Monthly import
ST-ED- Share of short term External debt

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Select Monetary Aggregates (ratio of GDP) as ( % ) of GDP (MP)

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Sources:  
1) IMF annual reports (different years)  
2) RBI bulletins (Different years and monthly bulletins)  
3) Taxman Economic Survey (different years)

N.B.: Inflation rates are based on average of the period indices.  

Sources
Edward Elgar Original development and current state Snowdon and Vane-2005 Publishing Inc U.K/USA Chelton U.K Northampton MA. U.S.A.

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Source: Computed from fig. in table: 1 and 2
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Correlation is significant at 0.05 level
## Correlation of GDP with other Economic Variables

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<tr>
<td>MS = Money supply growth</td>
<td>-0.418</td>
<td>0.137</td>
</tr>
<tr>
<td>S = Saving as a percentage of GDP</td>
<td>0.482</td>
<td>0.081</td>
</tr>
<tr>
<td>FB = Fiscal balance as a percentage of GDP</td>
<td>-0.211</td>
<td>0.468</td>
</tr>
<tr>
<td>CB = Current account Balance</td>
<td>-0.019</td>
<td>0.948</td>
</tr>
<tr>
<td>EX$ = Exports Growth in Dollar</td>
<td>0.380</td>
<td>0.108</td>
</tr>
<tr>
<td>EXRs = Exports Growth in Rupees</td>
<td>0.466</td>
<td>0.039</td>
</tr>
<tr>
<td>RES = Official reserve</td>
<td>0.206</td>
<td>0.480</td>
</tr>
<tr>
<td>RESM = Official reserves monthly imports</td>
<td>0.267</td>
<td>0.357</td>
</tr>
<tr>
<td>ED = External debt to GDP ratio</td>
<td>-0.086</td>
<td>0.769</td>
</tr>
<tr>
<td>SD = Short term debt as a percentage of External debt</td>
<td>-0.295</td>
<td>0.306</td>
</tr>
<tr>
<td>CURR = Currency with Public</td>
<td>0.223</td>
<td>0.444</td>
</tr>
<tr>
<td>DD = Demand deposits with bank</td>
<td>0.048</td>
<td>0.870</td>
</tr>
<tr>
<td>TD = Time deposits with bank</td>
<td>0.062</td>
<td>0.833</td>
</tr>
<tr>
<td>AD = Aggregate deposits</td>
<td>0.061</td>
<td>0.835</td>
</tr>
<tr>
<td>Mi = Narrow Money</td>
<td>0.217</td>
<td>0.457</td>
</tr>
<tr>
<td>M3 = Broad Money</td>
<td>0.083</td>
<td>0.778</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tail)
** Correlation is significant at the 0.01 level (2-tail)
To make it more understandable and real SPSS program has been used with the statistical data.

\[ Y = a + bx \]

where

\( Y \) = dependent variable
\( X \) = Independent variable
\( a \) = intercept of the line
\( b \) = slope of the regression line

GDP has been taken as an independent factor generally it is the role of GDP which focus the difference in terms of effects on various other dependent factors which has been taken up in the study with the table head impact of GDP, M3 and M1 for the effects on Indian economy with dependent variables viz.

FB, CB, ED, SD, MS, INF, RES X, I, S, C, DD, TD, AD.

FB = Fiscal Balance
CB = Current Account Balance
ED = External Debts
SD = Short term external debts
MS = Money Supply
INF = Inflation
RES = Official Reserves
X = Exports
I = Imports (in Dollars and Rupees)
S = Savings
C = Currency with public
DD = Demand Deposit with the banks
TD = Time Deposit with the banks
AD = Aggregate Deposits with the banks
A dependent variable CPI*Inflations percentage. This equation is prepared with the help of 1990 to 2004 Time series data here N = 14 taken as a base and then prepare a correlation matrix also with the help of SPSS program the above form is created.

Outcome inflation and GDP are inversely related. In the same way all above variables regression equations prepared as follows.

showing percentage on vertical line and period in horizontal line.**

*Chart-1*

\[ Y = a + bx \] \hspace{1cm} (2)

**Limitations**: Calculated inflation on the basis of CPI is a limitation of this study hence any of its effect can be expected.
Outcome: GDP and money supply are inversely related

\[ Y = a + bx \] ..............................................(3)

Saving = 20.457 + .512 (GDP)

a dependent variable: Saving as a percentage of GDP

Outcome: GDP and savings are directly related.

\[ Y = a + bx \] ..............................................(4)

Fiscal balance = 6.179 + (-.092) GDP

a dependent variable: fiscal balance as a percentage of GDP

Outcome: GDP and fiscal balance are inversely related.

Time series for the variables – GDP, CPI, MS, saving Fiscal bala. (1990-2003) showing percentage on vertical line and period in horizontal line)

\[ \text{Source from the tables Model No. 1, 2, 3, 4} \]

Chart one: Above all variables are shown in chart one with the help of diagram.

Equation No. 1,2,3,4.
Time series for the variables GDP, Res. Imp. Ex-Debt, short term debt, currency, (1990-2003) showing percentage on vertical line and period in horizontal line

Source from the tables model NO.1,9,10,11,12

Chart three: Variables GDP, Reserve imports, external debts, short term debts currency with public shown in chart three with the help of diagram. Equation No.1.

\[ Y = a + bx \] ..................(5)

Current account balance = -.655 + (-.013) GDP

a dependent variable: current account balance a percentage of GDP
Outcome: GDP and current account balance are negatively related

\[ Y = a + bx \] ......................................................... (6)

Export growth ($) = -.448 + 1.940 (GDP)

a dependent variable: Growth of exports percentage (US dollar)

Outcome: GDP and Export growth (US Dollar) are directly related

\[ Y = a + bx \] ......................................................... (7)

Export growth (Rs.) = 4.517 + 2.207 (GDP)

a dependent variable: growth of export percentage of (Rs) GDP

Outcome: GDP export growth are directly related

\[ Y = a + bx \] ......................................................... (8)

Growth of official reserve = 10.880 + 3.387 (GDP)

a dependent variable: Official reserve

Outcome: official reserves and GDP are positively related

Here we see that GDP is almost positively related with all dependent variables like Current account Balances, exports in US dollar, exports in Rs., growth of official reserves shows in equation number 1, 5, 6, 7, 8, respectively.

\[ Y = a + bx \] ......................................................... (9)

Reserve as Monthly = 5.355 + .506(GDP)

(Imports)

a dependent variable: official reserves (monthly imports)

Outcome: GDP and Reserve monthly imports are directly related and as and when GDP increase the reserve for imports also goes up.

\[ Y = a + bx \] ......................................................... (10)

External Debts - 28.251 + (-.232) GDP
Time series for the variables GDP, Dem. Depo, Time Depo, Agg Dept, M, M3 (1990-2003) showing percentage on vertical line and period in horizontal line

Source from the tables growth model No.1, 13, 14, 15, 16, 17

a dependent Variable: external debts as a percentage of GDP

Outcome: GDP and external debts are inversely related

\[ Y = a + bx \] \hspace{1cm} (11)

Short term debt = 7.199 + (-.312) GDP

a dependent variable: % of short term debts in external debts

Outcome: GDP and short term debts are inversely related it means as GDP increase short term debts may decrease.

\[ Y = a + bx \] \hspace{1cm} (12)

Currency with public = 8.957 + .073 GDP

a dependent variable: Currency with the public as a % of GDP (MP)

Outcome: GDP and currency with the public are directly related as GDP grew naturally public have more money to exchange goods and services.
Time series for the variables GDP, Dem. Depo, Time Depo, Agg Dept, M, M3 (1990-2003) showing percentage on vertical line and period in horizontal line

Source from the tables growth model no.1, 13,14,15,16,17. Chart four consists of equation 1, 13, 14, 15, and 17.

Chart four: follows variable GDP, demand deposit, time deposit, aggregate deposits, Mₐ (Narrow money), M₃ (Broad money) are shown in chart four with the help of Diagram.

\[ Y = a + bx \]

DD with banks = 6.892 + .010 GDP

a dependent variable: as a percentage of GDP (MP)

Outcome: GDP and DD are moving in the same direction but they are not significant.

\[ Y = a + bx \]

Time deposits with banks = 34.223 + .238 GDP

a dependent variable: time deposit as a % of GDP (MP)

Outcome: GDP and Time Deposits are directly related variables.

\[ Y = a + bx \]

Aggregate deposits = 41.123 + .245 GDP

a dependant variable: Aggregate deposit as a % of GDP (MP)

Outcome: GDP and AD are positive to each other.
\[ Y = a + bx \] \hspace{1cm} (16)

\[ M_1 \text{ (Narrow money)} = 15.987 + .106 \text{ GDP} \]

a dependent variable: \( M_1 \) as a % of GDP (MP)

Outcome: GDP and Narrow Money are directly related

\[ Y = a + bx \] \hspace{1cm} (17)

\[ M_3 \text{ (Broad Money)} = 50.126 + .354 \text{ GDP} \]

a dependent variable: \( M_3 \) as % of GDP (MP)

Outcome: GDP and \( M_3 \) are directly related.

In above equations all dependent variables like \( DD, TD, AD, M_1 \) and \( M_3 \) are positively related with Independent variable Gross Domestic Product (GDP).

The model summary shows that Time deposits with Bank, Aggregate deposits, Broad Money, Saving, Export, Reserves, are positively related with GDP whose slopes are .238, .245, .354, .512, 1.904, 3.387, respectively.

On the other hand external debt, short term debt, Money supply and inflations are negatively related, it means that a stable economy like India had to face volatility.

\( R^2 \) in the table suggest that effect of GDP on variable like current account is very less i.e. .000 (negligible) while effect on savings and exports in rupees is .232 and .217 respectively the maximum effect of GDP is on saving and second most affected macroeconomic variable is export in rupees.

By looking to level significance it can be said that incase of Saving exports in rupees, official reserves - .957, 0.550, 0.706 are significant respectively.

While remaining variables like inflation money supply, saving, fiscal balance, external debts, currency with public, \( DD, TD, AD, M_1, M_3 \) are not significant.
\[ Y = a + bx \] .................................................................(1)
\[
\text{GDP} = 4.747 + 0.020 \ (M_3)
\]
a dependent variable: Real GDP growth percentage

Outcome: GDP and money supply have direct relation as \( M_3 \) increases GDP also increase.

\[ Y = a + bx \] .................................................................(2)
\[
\text{CPI} = 18.178 + (-0.227) \ M_3
\]
a dependent variable: CPI inflation percentage

Outcome: Money supply and Consumer Price index are inversely related.

\[ Y = a + bx \] .................................................................(3)
\[
\text{Fiscal Balance} = 6.465 + (-0.016) \ M_3
\]
A dependent variable: Fiscal balance a percentage GDP

Outcome: Money supply and fiscal balances are inversely related.

\[ Y = a + bx \] .................................................................(4)
\[
\text{Current account balance} = -7.59 + 0.131 \ (M_3)
\]
A dependent variable: Current account balance percentage of GDP

Outcome: current account balance and Money supply are directly related

\[ Y = a + bx \] .................................................................(5)
\[
\text{Exports growth} = -5.868 + 0.314 \ (M_3) \text{ (US Dollar)}
\]
a dependent variable: growth of exports percentage (US dollar)

Outcome: \( M_3 \) and export growths are directly related.

\[ Y = a + bx \] .................................................................(6)
Export growth = 43.017 + (-0.494) M₃  
(Rupees) 
a dependent variable: growth of exports percentage (Rupee)

Outcome: export growth in rupees and money supply are inversely related

\[ Y = a + bx \] .................................................................(7)

Official reserves = -157.352 + 3.599 (M₃)  
A dependent variable: official reserves

Outcome: Official reserves and M₃ positively related

\[ Y = a + bx \] .................................................................(8)

Official reserve = -12.693 + 0.402 (M₃)  
(Monthly import)  
a dependent variable: official reserves (Monthly imports)

Outcome: Official reserve and M₃ are directly related

\[ Y = a + bx \] .................................................................(9)

External debts = 52.518 + (-0.49) M₃  
(as a % of GDP)  
a dependent variable: external debt as a percentage of GDP

Outcome: External debts and M₃ are inversely related

\[ Y = a + bx \] .................................................................(10)

Short term external debts = 13.175 + (-0.149) M₃  
a dependent variable: percentage of short term debt in external debt

Outcome: short term external debts and M₃ are inversely related.

\[ Y = a + bx \] .................................................................(11)

Currency with the public = 5.564 + 0.073 M₃  
A dependent variable: currency with public as a percentage of GDP (MP)
Outcome: Currency with public and $M_3$ are significant

\[ Y = a + bx \] \hspace{1cm} (12)

Demand deposit as a % of GDP = 4.755 + 0.42 $M_3$

A dependent variable: DD as a percentage of GDP (MP)

Outcome: DD and $M_3$ are positively related

\[ Y = a + bx \] \hspace{1cm} (13)

Time deposits = -11.177 + 0.897 ($M_3$)

(With the bank)

a dependent variable: TD as a percentage of GDP (MP)

Outcome: Time Deposit and Broad money are highly positively related.

\[ Y = a + bx \] \hspace{1cm} (14)

Aggregate Deposits = -6.494 + 0.940 ($M_3$)

(with the bank)

a dependent variable: AD as a percentage of GDP (MP)

Outcome: AD and $M_3$ are highly related

All three variables like DD, TD, AD are positively have higher level relation with Broad Money.

The model summary shows that current account balance, official reserves, currency with public are positively related with $M_3$ slopes are 1.31, 3.599, .0073 fiscal balance, export growth, external debt, STED, CPI, are negatively related.

$R^2$ in the table suggest that effect of $M_3$ on CPI, Current account balance, official reserve, external debts, currency with public is very high like 0.278, 0.741, 0.813, 0.604, 0.898 respectively it means $M_3$ in dependent variable explanatory power is very high with above dependent variable because all the variable are nominal one.
Effect of $M_3$ on GDP is very less $R^2 = 0.007$ this is because $M_3$ is a monetary phenomena and GDP is a real phenomenon.

By looking to level of significance it can be said that in case of AD, TD, DD, Currency with public external debts official reserves current account balance are not significant.

In case of GDP, fiscal balance export growth is highly significant with $M_3$.

\[ Y = a + bx \] .......................................................(1)
\[ GDP = -1/557 +0.441 \ (M_3) \]

A dependent variable: Real GDP growth percentage

\[ Y = a + bx \] .......................................................(2)
\[ CIP = 34.993 +1.727 \ (MO) \]

A dependent variable: CPI Inflation percentage

\[ Y = a + bx \] .......................................................(3)
\[ Money \ supply = 21.219 + (-0.325) \ M_1 \]

A dependent variable Money supply growth percentage

\[ Y = a + bx \] .......................................................(4)
\[ Savings = -6.801 + 1.820 \ (MO) \]

A dependent variable: saving as a percentage of GDP

\[ Y = a + bx \] .......................................................(5)
\[ Fiscal \ balance = 10.407 + (-287) \ M_1 \]

A dependent variable: Fiscal balance as percentage of GDP

\[ Y = a + bx \] .......................................................(6)
\[ Current \ account \ balance = -19.672 + 1.141 \ (M_1) \]

A dependent variable: current account balance a percentage of GDP

\[ Y = a + bx \] .......................................................(7)
\[ Growth \ export = -59.194 + 4.200 \ (M_1) \]

(US Dollar)
a dependent variable: Growth of exports (UD Dollar)

\[ Y = a + bx \]

Export growth = 55.967 + -2.333 (M<sub>1</sub>) (Rupees)

A dependent variable: Growth of exports (Rupees)

\[ Y = a + bx \]

Official reserves = -474.578 + 30.421 (M<sub>1</sub>)

A dependent variable: official reserves

\[ Y = a + bx \]

Official reserves Monthly = -50.394 + 3.534 (M<sub>1</sub>) (Monthly import)

A dependent variable: official reserves (Monthly imports)

\[ Y = a + bx \]

External debts = 82.974 + -3.377 (M<sub>1</sub>) (as a % of GDP)

A dependent variable: external debts as a percentage of GDP

\[ Y = a + bx \]

Short term debt = 25.543 + (-1.123) M<sub>1</sub> (as a % of Total debt)

A dependent variable: Percentage of short term debt in external debt

\[ Y = a + bx \]

Currency with public = -1.265 + 0.641 (M<sub>1</sub>)

A dependent variable: currency with public as percentage of GDP (MP)

\[ Y = a + bx \]

Demand deposits = 0.373 + 0.396 (M<sub>1</sub>) (With the banks)
Y = a + bx .........................................................(15)

Time deposit = -80.979 + 7.022 (M1)

A dependent variable: Time deposits as percentage of GDP (MP)

Y = a + bx .........................................................(16)

Aggregate = - 80.792 + 7.429 (M1)

A dependent variable: aggregate deposits as percentage of GDP (MP)

**Conclusion:** The table shows that GDP, CPI, Savings, Current account balances, Growth of exports, official reserves, currency with public, DD, TD, AD are positively related their slopes 0.441, 1.820, 1.141, 4.200, 30.421, 0.641, 0.396, 7.022, 7.429 show in case of CPI Money supply. Fiscal balance negative respectively -1.727, -0.325, -0.287

It means that - R² the table suggests that effect of M, on money supply, Fiscal balance, Exports growth is -0.325, -1.287, -2.333 is very less while effect on saving is 0.708, current account balance 0.718, official reserves 0.827, official reserves 0.837, currency with public 0.919, DD 0.861, TD 0.814, AD 0.831 respectively.

The maximum effect of M1, on currency with public, demand deposits 0.816, demand deposits 0.814.

By looking to level significance is very less in case of current account balance, official reserve, time deposit, AD are not significant in case of Export growth, GDP, 0.873 - 0.457 very high significant 0.236 - 0.405.