# CHAPTER - I

## An Overview

### 1.1 INSTABILITY EPISODES IN THE 1960S & 1990S IN THE INDIAN ECONOMY: SOME DATA PRELIMINARIES

In particular macroeconomic episodes, short-term movements are often quite different from measured longer term. One striking aspect of macroeconomic instability is that it is a phenomenon when constituent elements may well show similar patterns consistent to output and thereby reflects their mutual interdependence. During this situation, the downturns of any economy show the tangible signs of over-all economic activity began its rapid deceleration and the considerable fall in many economic aggregates in sectors that experience economic contraction over a given span of time. This situation is consequent to either supply shocks or policies of contractionary effects on aggregate demand, particularly when neighbourhood timing entails war conflicting or poor harvesting or international oil price hiking situation or compounding of them. It can arguably be said that GDP series alone may not be a reasonable basis for determining instability situation. In addition to output dimension, there are also other important dimensions to aggregate economic activity which need to be considered. The analysis of macroeconomic instability episodes gives very valuable insights into the conduct of policy then.

Due to cascading effects of instability situation, macroeconomic variables of different sectors affect each other which yield to include a wide variety of economic disorders, reflect in the changes of a list of macroeconomic aggregates, including production, consumption, capital formation, savings, price levels, terms of trade, and the others. The tendency of candidate macroeconomic variables to move together with GDP with limited and partly systematic timing differences constitutes a defining characteristic of macroeconomic instability. In such a context, this section has made an attempt in preliminary effort to present the Indian economy at level values by integrating the basic time-series on national and related sectoral aggregates in a comprehensive and consistent set of macroeconomic framework over a number of decades. The resulting identification of empirical patterns and regularities should help the present research to depict the growth of both the real and financial sectors of the Indian economy, and also its

**TABLE 1.1:** KEY NATIONAL ACCOUNTS AGGREGATES FOR THE INDIAN ECONOMY (1950-51 TO 2003-04) AT LEVEL VALUES

(*Rupees, crore*)

| Year | Y | YZ | CG | CGZ | IGZ | SGZ | XZ | MZ | YFCZ | YFC | CP | GNP/Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1950 | 148503 | 9934 | 9067 | 592 | 276 | 182 | 736 | 710 | 9547 | 140466 | 128612 | 0.9962694 |
| 1951 | 152979 | 10566 | 9161 | 621 | 321 | 266 | 845 | 1037 | 10080 | 143745 | 136787 | 0.9977383 |
| 1952 | 156960 | 10366 | 9172 | 643 | 274 | 160 | 714 | 702 | 9941 | 147824 | 142307 | 0.9982161 |
| 1953 | 166625 | 11282 | 9287 | 679 | 311 | 143 | 643 | 652 | 10824 | 156822 | 150862 | 0.9986077 |
| 1954 | 174745 | 10678 | 9341 | 708 | 477 | 168 | 704 | 749 | 10168 | 163479 | 155811 | 0.9979799 |
| 1955 | 180530 | 10873 | 9600 | 759 | 522 | 190 | 757 | 839 | 10332 | 167667 | 157301 | 0.9992688 |
| 1956 | 190578 | 12951 | 10268 | 837 | 691 | 251 | 767 | 1174 | 12334 | 177211 | 164259 | 0.9989243 |
| 1957 | 189960 | 13349 | 11563 | 978 | 859 | 266 | 799 | 1304 | 12610 | 175068 | 161014 | 0.9983575 |
| 1958 | 203958 | 14874 | 11973 | 1049 | 844 | 251 | 720 | 1104 | 14106 | 188354 | 175796 | 0.9978966 |
| 1959 | 209408 | 15675 | 12188 | 1105 | 932 | 262 | 779 | 1010 | 14816 | 192476 | 177795 | 0.9963755 |
| 1960 | 220560 | 17167 | 12846 | 1206 | 1178 | 454 | 784 | 1236 | 16220 | 206103 | 187909 | 0.9958877 |
| 1961 | 228921 | 18196 | 13757 | 1336 | 1187 | 526 | 802 | 1100 | 17116 | 212499 | 191112 | 0.9947056 |
| 1962 | 235834 | 19566 | 16693 | 1620 | 1490 | 602 | 835 | 1209 | 18302 | 216994 | 193602 | 0.9940933 |
| 1963 | 250208 | 22482 | 20822 | 2088 | 1733 | 751 | 985 | 1363 | 20916 | 227980 | 200804 | 0.9943927 |
| 1964 | 268821 | 26220 | 21482 | 2240 | 2007 | 865 | 1015 | 1526 | 24436 | 245270 | 212800 | 0.9933115 |
| 1965 | 262029 | 27668 | 23458 | 2570 | 2282 | 863 | 932 | 1464 | 25586 | 236306 | 212988 | 0.9927031 |
| 1966 | 261586 | 31305 | 23725 | 2808 | 2209 | 728 | 1325 | 2115 | 29123 | 238710 | 215756 | 0.9928742 |
| 1967 | 281971 | 36649 | 24180 | 3126 | 2415 | 735 | 1508 | 2201 | 34225 | 258137 | 227962 | 0.9918644 |
| 1968 | 291759 | 38823 | 25473 | 3428 | 2259 | 933 | 1597 | 1897 | 36092 | 264873 | 233950 | 0.9925075 |
| 1969 | 310847 | 42750 | 27888 | 3847 | 2361 | 1115 | 1625 | 1747 | 39691 | 282134 | 242640 | 0.9924625 |
| 1970 | 326925 | 45677 | 30453 | 4289 | 2919 | 1343 | 1771 | 1816 | 42222 | 296278 | 250880 | 0.9928271 |
| 1971 | 332516 | 48392 | 33663 | 4982 | 3415 | 1379 | 1785 | 2175 | 44923 | 299269 | 255761 | 0.992238 |
| 1972 | 330594 | 53947 | 33761 | 5283 | 3875 | 1442 | 2225 | 2049 | 49415 | 298316 | 257475 | 0.9922443 |
| 1973 | 341050 | 65613 | 33372 | 5765 | 4904 | 1931 | 2830 | 3176 | 60560 | 311894 | 263793 | 0.9943 |
| 1974 | 345101 | 77479 | 31862 | 6995 | 5753 | 2835 | 3835 | 4779 | 71283 | 315514 | 263594 | 0.9970878 |
| 1975 | 376731 | 83269 | 35170 | 8265 | 7806 | 3520 | 4812 | 5664 | 75709 | 343924 | 278563 | 0.9980065 |
| 1976 | 383163 | 89739 | 37873 | 9192 | 8822 | 4378 | 6139 | 5614 | 81381 | 348223 | 284118 | 0.9981914 |
| 1977 | 410873 | 101597 | 39011 | 9780 | 8101 | 4375 | 6640 | 6517 | 92881 | 374235 | 307285 | 0.9981235 |
| 1978 | 434437 | 110133 | 41862 | 10852 | 10165 | 5009 | 7115 | 7423 | 99823 | 394828 | 326066 | 0.9988652 |
| 1979 | 411663 | 120841 | 44482 | 12481 | 12137 | 5226 | 8340 | 10094 | 108927 | 374291 | 318753 | 1.0008478 |
| 1980 | 439201 | 143764 | 46581 | 14492 | 12105 | 4929 | 9029 | 13596 | 130178 | 401128 | 347443 | 1.0019171 |
| 1981 | 467139 | 168600 | 48675 | 17075 | 16986 | 7570 | 10256 | 14809 | 152056 | 425073 | 362552 | 1.0002034 |
| 1982 | 484217 | 188262 | 53280 | 20135 | 20139 | 8172 | 11563 | 15736 | 169525 | 438079 | 366178 | 0.9968981 |
| 1983 | 518491 | 219496 | 55605 | 23216 | 21265 | 7168 | 13139 | 17675 | 198630 | 471742 | 394599 | 0.9952767 |
| 1984 | 539874 | 245515 | 59620 | 26631 | 25600 | 6956 | 15846 | 19484 | 222705 | 492077 | 405973 | 0.9946821 |
| 1985 | 570267 | 277991 | 66255 | 31734 | 29990 | 8946 | 14951 | 21754 | 249547 | 513990 | 422916 | 0.9948638 |
| 1986 | 597850 | 311177 | 72802 | 37507 | 34772 | 8543 | 16543 | 22359 | 278258 | 536257 | 436262 | 0.9929146 |
| 1987 | 623371 | 354343 | 78698 | 43990 | 33757 | 7879 | 20281 | 25259 | 315993 | 556778 | 451215 | 0.9913872 |
| 1988 | 684832 | 421567 | 82775 | 50673 | 40136 | 8770 | 25913 | 32010 | 378491 | 615098 | 479378 | 0.9884775 |
| 1989 | 728952 | 486179 | 86659 | 57909 | 46405 | 8179 | 34609 | 40212 | 438020 | 656331 | 503167 | 0.9887194 |
| 1990 | 771295 | 568674 | 89601 | 66030 | 53099 | 6279 | 40635 | 48698 | 510954 | 692871 | 525641 | 0.9880707 |
| 1991 | 778289 | 653117 | 89008 | 74285 | 57633 | 12868 | 56254 | 56249 | 589086 | 701863 | 536980 | 0.9862262 |
| 1992 | 819318 | 748367 | 91795 | 83957 | 63997 | 11865 | 67312 | 73000 | 673221 | 737792 | 550828 | 0.9860652 |
| 1993 | 859220 | 859220 | 97725 | 97725 | 70834 | 5445 | 86147 | 85999 | 781345 | 781345 | 574772 | 0.9859407 |
| 1994 | 923349 | 1012770 | 98935 | 108639 | 88206 | 16845 | 101607 | 104710 | 917058 | 838031 | 601481 | 0.985688 |
| 1995 | 993946 | 1188012 | 106881 | 128816 | 90977 | 24065 | 130733 | 144953 | 1073271 | 899563 | 638938 | 0.9873212 |
| 1996 | 1067445 | 1368208 | 111640 | 145725 | 96187 | 22917 | 144854 | 161022 | 1243546 | 970083 | 689566 | 0.9899545 |
| 1997 | 1115248 | 1522547 | 123978 | 172189 | 100653 | 20255 | 165203 | 184333 | 1390148 | 1016595 | 707285 | 0.9904515 |
| 1998 | 1182021 | 1740985 | 139963 | 214033 | 114545 | -17169 | 195280 | 224745 | 1598127 | 1082748 | 752440 | 0.9898699 |
| 1999 | 1266284 | 1936831 | 158432 | 251108 | 134484 | -20049 | 227697 | 265702 | 1761838 | 1148368 | 797653 | 0.9911694 |
| 2000 | 1316201 | 2089499 | 159194 | 264237 | 131505 | -48371 | 290185 | 306085 | 1902998 | 1198592 | 819637 | 0.991186 |
| 2001 | 1384011 | 2282143 | 164037 | 284308 | 133003 | -62704 | 307577 | 321799 | 2090957 | 1267833 | 866736 | 0.9942168 |
| 2002 | 1447595 | 2469564 | 169069 | 308827 | 140386 | -45730 | 375873 | 385271 | 2249493 | 1318321 | 897243 | 0.9920489 |
| 2003 | 1567399 | 2772194 | NA | NA | NA | NA | NA | NA | 2523872 | 1426701 | NA | 0.9904434 |

***Source*:** Government of India, *Economic Survey*, various issues

***Notes*:** (i) 'NA' means not available

(ii) XZ and MZ for the period 1950-51 to 1992-93 not estimated at 1993-94 prices as NAS has not provided

*Notations*:

| | |
|---|---|
| Y | GDP at 1993-94 prices (real) |
| YZ | GDP at current market prices (nominal) |
| CG | final consumption expenditure of the government sector at 1993-94 prices |
| CGZ | final consumption expenditure of the government sector at current prices |
| IGZ | gross domestic capital formation of the government sector at current prices |
| SGZ | savings of the government sector at current prices |
| XZ | Exports of goods and services at current prices |
| MZ | Imports of goods and services at current prices |
| YFCZ | GDP at factor cost at current prices |
| YFC | GDP at factor cost at 1993-94 prices |
| CP | final consumption expenditure of the private sector at 1993-94 prices |
| GNP | GNP at 1993-94 prices |

structural changes over the entire sample period, in general, and between the pre-and post-liberalisation phases, in particular as first approximation. It facilitates translation of certain important theoretical constructs on structural adjustment problems into various policy relevant solutions and inter-relationships.

## BEHAVIOUR OF KEY EXPLANATORY VARIABLES

Combing the following Tables 1, 2 & 3 which, in fact, yield the following plots from 1.1 to 1.9 with an analysis of the behaviour of the key explanatory variables allows this sub-section to understand the two specific episodes of instability in the 1960s and 1990s in India, which represent a significant departure from the overall trends have generated a considerable discussion on the underlying causes. While no detailed econometric analysis is undertaken in this sub-section, a few observations, based on the empirical patterns and regularities, detected the Indian macroeconomic instability sub-periods in the statistical time-series contained in the following Tables and Figures.

This first substantive part of this research deals with macroeconomic time-series at level values to derive instability stages of the Indian economy and to estimate local trends and timing measures. In this sense, the rules of thumb in this sub-section are restricted to those years where inter-year declines in the real GDP as an indicator of imminent recession. Real GDP is the most comprehensive and largely widely used measure of total output or income. However, GDP is a very complex measure of total economic activity. The following figures portray the movements of some of the important macroeconomic indices for India over the studied period from 1950-51 to 2003 – 04.

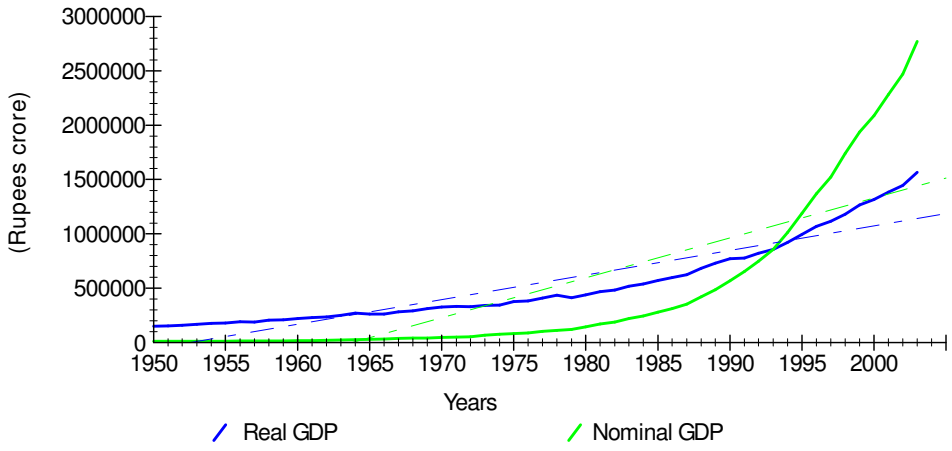


**Figure 1.1:** GDP at 1993-94 prices & GDP at current market prices (Rs. crore)

***Source*:** Table 1.1, CSO, *National Accounts Statistics*, *Economic Survey*, various issues; EPWRF [2004]

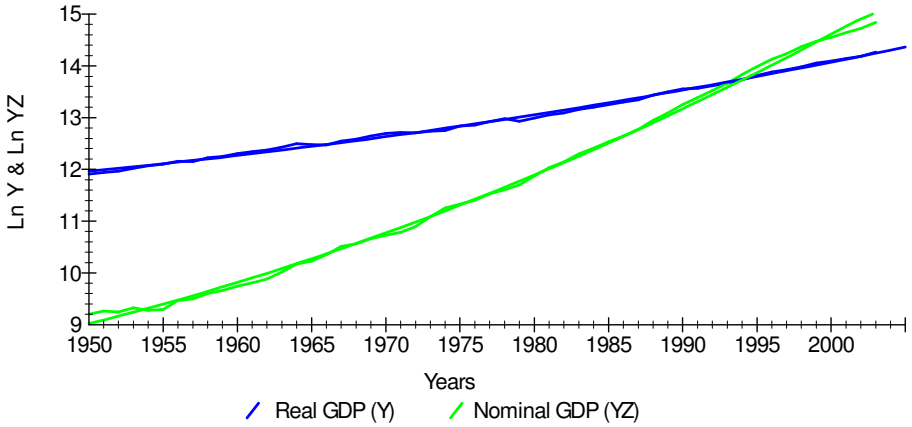


**Figure 1.2:** Annual GDP at constant 1993-94 prices (Y) and Annual GDP at current market prices (YZ) at logarithmic scale

***Source*:** Table 1.1, CSO, *National Accounts Statistics*, *Economic Survey*, various issues; EPWRF [2004]

The figures presented above are almost self explanatory. One of the important aspects clearly reflected is the fact that the range in nominal GDP fluctuation in India has been much more than that of real GDP. This indicates that nominal GDP is much more volatile and price level variations tend to dominate, though by varying intervals. Figure 1.2 shows the dynamics

of real GDP and nominal GDP at natural logarithmic transformed scale and how actually they zigzagged around the smoothed long-run trend line between positive and negative readings. During the mid-1960s and early 1990s, the Indian GDP can be found to have moved to low at level values, which are more likely related to some diverse economic shocks or policy failure. There observed structural changes in the fitted trend function. There observed differences in trend patterns in the pre-90s and the post-90s. And the data during the mid-60s, early and late 70s, and early 90s show different kind of disparity as Indian GDP drifted variously to low levels and tilted with respect to prior time-periods. The study needs to explore the timing of structural break in the relationship between macroeconomic variables. The figure 1.1 indicates that there is a distinct structural break in the Indian economy in the mid 1960s and the early 1990s. The comparability aspects prompt the present study to present comparative retrospect of two-regime's instability in the 1960s and the 1990s. The changes considered are of three kinds: a change in intercept (for example, exogenous shocks), a change in slope (productivity slowdown) or both. It is important to note that some kind of big shocks that have permanent effects on the level of the series can cause the structural changes to the trend function. The estimated trend function show a kink at the time of structural break and the trend function is simply the fitted values from a least-square regression in the outlier version. The outlier model preferred as it translates into a non-linear trend function showing a gradual adjustment to the new path following the structural break. This study needs an examination of the comparative changes that have occurred distinguishing the mid-60s and the early-90s. This research needs to understand the implications with respect to the transition effect. The dating of these breaks in trend function are associated with the major events like wars with China in 1962, with Pakistan in 1965 and in 1971; droughts (poor harvesting) of 1965-66, 1966-67, 1972-73, 1973-74, 1979-80 and 1987-88; and, international oil price jump in 1973-74, 1979-80, and the Gulf War driven oil price hike in 1990. For which, as might be expected to have mirrored the behaviour of relevant candidate variables such as revenue receipts fell, government real consumption expenditure rose partly as a result of increased defence expenditure of wars and increased expenditures on subsidies due to droughts and the large fall in real public investment and thereby fiscal deficits increased and worsened the public finance position, and imports bill risen in the oil crises years.

The above Table 1.1 shows that government final consumption expenditure had increased ceaselessly from 1950-51 onwards; declined though marginally, since late 1980s to mid 1990s and again increased, which may be partly as a result of the fiscal austerity measures adopted. The rapid increase in interest payments on the growth of internal debt with the advent of liberalisation might have made public sector savings fell to a very low level, implying that a reduction in government current expenditures may no longer be a sufficient condition for fiscal stabilisation. And private final consumption expenditure continues to decline monotonically. This decline in the consumption propensity has been mirrored by a rise in the private savings in the post-90s.

**Table 1.2:** Gross Domestic Capital Formation & Gross Domestic Savings & their Components at Level values (*Rupees crore*)

| Year | IGZ | IHZ | ICZ | IPZ | GDIUZ | Errors & Omissions | GDIAZ | SGZ | SHZ | SCZ | SPZ | GDSZ | NFCIZ (-)/ OF(+) | NFIFAZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1950 | 276 | 550 | 218 | 768 | 1044 | -178 | 866 | 182 | 612 | 93 | 705 | 887 | -21 | -41 |
| 1951 | 321 | 569 | 256 | 825 | 1146 | 22 | 1168 | 266 | 583 | 136 | 719 | 985 | 183 | -35 |
| 1952 | 274 | 565 | 78 | 643 | 917 | -90 | 827 | 160 | 637 | 64 | 701 | 861 | -34 | -25 |
| 1953 | 311 | 513 | 9 | 522 | 833 | 42 | 875 | 143 | 655 | 90 | 745 | 888 | -13 | -19 |
| 1954 | 477 | 437 | 149 | 586 | 1063 | -42 | 1021 | 168 | 719 | 118 | 837 | 1005 | 16 | -29 |
| 1955 | 522 | 617 | 222 | 839 | 1361 | 48 | 1409 | 190 | 1046 | 134 | 1180 | 1370 | 39 | -10 |
| 1956 | 691 | 845 | 345 | 1190 | 1881 | 63 | 1944 | 251 | 1178 | 155 | 1333 | 1584 | 360 | -17 |
| 1957 | 859 | 706 | 394 | 1100 | 1959 | -102 | 1857 | 266 | 997 | 121 | 1118 | 1384 | 473 | -20 |
| 1958 | 844 | 654 | 242 | 896 | 1740 | 43 | 1783 | 251 | 1016 | 140 | 1156 | 1407 | 376 | -35 |
| 1959 | 932 | 868 | 303 | 1171 | 2103 | -124 | 1979 | 262 | 1301 | 185 | 1486 | 1748 | 231 | -57 |
| 1960 | 1178 | 798 | 540 | 1338 | 2516 | -46 | 2470 | 454 | 1254 | 281 | 1535 | 1989 | 481 | -72 |
| 1961 | 1187 | 792 | 744 | 1536 | 2723 | -251 | 2472 | 526 | 1281 | 320 | 1601 | 2127 | 345 | -98 |
| 1962 | 1490 | 1034 | 539 | 1573 | 3063 | -144 | 2919 | 602 | 1533 | 344 | 1877 | 2479 | 440 | -108 |
| 1963 | 1733 | 875 | 869 | 1744 | 3477 | -274 | 3203 | 751 | 1618 | 394 | 2012 | 2763 | 440 | -112 |
| 1964 | 2007 | 1161 | 906 | 2067 | 4074 | -345 | 3729 | 865 | 1875 | 389 | 2264 | 3129 | 600 | -145 |
| 1965 | 2282 | 1530 | 705 | 2235 | 4517 | -48 | 4469 | 863 | 2602 | 405 | 3007 | 3870 | 599 | -164 |
| 1966 | 2209 | 2359 | 625 | 2984 | 5193 | 105 | 5298 | 728 | 3223 | 424 | 3647 | 4375 | 923 | -230 |
| 1967 | 2415 | 2345 | 820 | 3165 | 5580 | -388 | 5192 | 735 | 3210 | 410 | 3620 | 4355 | 837 | -258 |
| 1968 | 2259 | 2554 | 769 | 3323 | 5582 | -445 | 5137 | 933 | 3349 | 439 | 3788 | 4721 | 416 | -255 |
| 1969 | 2361 | 3521 | 675 | 4196 | 6557 | -212 | 6345 | 1115 | 4440 | 549 | 4989 | 6104 | 241 | -271 |
| 1970 | 2919 | 3263 | 1045 | 4308 | 7227 | -184 | 7043 | 1343 | 4634 | 672 | 5306 | 6649 | 394 | -284 |
| 1971 | 3415 | 3664 | 1204 | 4868 | 8283 | -438 | 7845 | 1379 | 5219 | 769 | 5988 | 7367 | 478 | -291 |
| 1972 | 3875 | 3496 | 1350 | 4846 | 8721 | -552 | 8169 | 1442 | 5624 | 806 | 6430 | 7872 | 297 | -302 |
| 1973 | 4904 | 4373 | 1651 | 6024 | 10928 | 463 | 11391 | 1931 | 7985 | 1083 | 9068 | 10999 | 392 | -325 |
| 1974 | 5753 | 5706 | 2733 | 8439 | 14192 | -1159 | 13033 | 2835 | 8080 | 1465 | 9545 | 12380 | 653 | -291 |
| 1975 | 7806 | 5825 | 2169 | 7994 | 15800 | -1571 | 14229 | 3520 | 9743 | 1083 | 10826 | 14346 | -117 | -255 |
| 1976 | 8822 | 6997 | 1325 | 8322 | 17144 | -1045 | 16099 | 4378 | 11849 | 1181 | 13030 | 17408 | -1309 | -233 |
| 1977 | 8101 | 8501 | 2377 | 10878 | 18979 | -302 | 18677 | 4375 | 14354 | 1413 | 15767 | 20142 | -1465 | -233 |
| 1978 | 10165 | 10357 | 2288 | 12645 | 22810 | 994 | 23804 | 5009 | 17015 | 1652 | 18667 | 23676 | 128 | -156 |
| 1979 | 12137 | 10609 | 3078 | 13687 | 25824 | -930 | 24894 | 5226 | 16690 | 2398 | 19088 | 24314 | 580 | 153 |
| 1980 | 12105 | 11258 | 3505 | 14763 | 26868 | 2362 | 29230 | 4929 | 19868 | 2339 | 22207 | 27136 | 2094 | 345 |
| 1981 | 16986 | 11611 | 9186 | 20797 | 37783 | -3817 | 33966 | 7570 | 21225 | 2560 | 23785 | 31355 | 2611 | 40 |
| 1982 | 20139 | 10477 | 10170 | 20647 | 40786 | -3852 | 36934 | 8172 | 23216 | 2980 | 26196 | 34368 | 2566 | -634 |
| 1983 | 21265 | 14871 | 7060 | 21931 | 43196 | -2092 | 41104 | 7168 | 28165 | 3254 | 31419 | 38587 | 2517 | -944 |
| 1984 | 25600 | 17188 | 10238 | 27426 | 53026 | -3671 | 49355 | 6956 | 35067 | 4040 | 39107 | 46063 | 3292 | -1424 |
| 1985 | 29990 | 21257 | 14556 | 35813 | 65803 | -5402 | 60401 | 8946 | 39795 | 5426 | 45221 | 54167 | 6234 | -1429 |
| 1986 | 34772 | 21736 | 15695 | 37431 | 72203 | -6897 | 65306 | 8543 | 45072 | 5336 | 50408 | 58951 | 6355 | -1805 |
| 1987 | 33757 | 32337 | 12263 | 44600 | 78357 | 1376 | 79733 | 7879 | 59157 | 5932 | 65089 | 72908 | 6825 | -2619 |
| 1988 | 40136 | 43474 | 16266 | 59740 | 99876 | 341 | 100217 | 8770 | 70657 | 8486 | 79143 | 87913 | 12304 | -4496 |
| 1989 | 46405 | 48957 | 19673 | 68630 | 115035 | 4223 | 119258 | 8179 | 86955 | 11845 | 98800 | 106979 | 12279 | -5731 |
| 1990 | 53099 | 60257 | 23498 | 83755 | 136854 | 12682 | 149536 | 6279 | 109897 | 15164 | 125061 | 131340 | 18196 | -7545 |
| 1991 | 57633 | 48635 | 36992 | 85627 | 143260 | 4025 | 147285 | 12868 | 110736 | 20304 | 131040 | 143908 | 3377 | -10077 |
| 1992 | 63997 | 65706 | 48316 | 114022 | 178019 | -1297 | 176722 | 11865 | 131073 | 19968 | 151041 | 162906 | 13816 | -11645 |
| 1993 | 70834 | 63572 | 48213 | 111785 | 182619 | 15793 | 198412 | 5445 | 158310 | 29866 | 188176 | 193621 | 4791 | -12080 |
| 1994 | 88206 | 78625 | 69953 | 148578 | 236784 | 26572 | 263356 | 16845 | 199358 | 35260 | 234618 | 251463 | 11893 | -13083 |
| 1995 | 90977 | 110421 | 113781 | 224202 | 315179 | 4348 | 319527 | 24065 | 216140 | 58542 | 274682 | 298747 | 20780 | -13484 |

| Year | IGZ | IHZ | ICZ | IPZ | GDIUZ | Errors & Omissions | GDIAZ | SGZ | SHZ | SCZ | SPZ | GDSZ | NFCIZ (-)/ OF(+) | NFIFAZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1996 | 96187 | 91591 | 110084 | 201675 | 297862 | 37137 | 334999 | 22917 | 233252 | 61092 | 294344 | 317261 | 17738 | -13082 |
| 1997 | 100653 | 121660 | 121399 | 243059 | 343712 | 30768 | 374480 | 20255 | 268437 | 63486 | 331923 | 352178 | 22302 | -13205 |
| 1998 | 114545 | 146456 | 111208 | 257664 | 372209 | 20812 | 393021 | -17169 | 326802 | 65026 | 391828 | 374659 | 18362 | -14968 |
| 1999 | 134484 | 198658 | 125120 | 323778 | 458262 | 32407 | 490669 | -20049 | 404401 | 84329 | 488730 | 468681 | 21988 | -15431 |
| 2000 | 131505 | 235494 | 105709 | 341203 | 472708 | 36125 | 508833 | -48371 | 458215 | 86142 | 544357 | 495986 | 12847 | -17285 |
| 2001 | 133003 | 264736 | 111321 | 376057 | 509060 | 18857 | 527917 | -62704 | 519040 | 78849 | 597889 | 535185 | -7268 | -12086 |
| 2002 | 140386 | 304851 | 118579 | 423430 | 563816 | 11217 | 575033 | -45730 | 559258 | 84169 | 643427 | 597697 | -22664 | -19221 |
| 2003 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | -25932 |

***Source*:** CSO, *National Accounts Statistics*, EPWRF [2004]

*Notations*:

| | |
|---|---|
| IGZ | Gross domestic capital formation of the government sector at current prices |
| IHZ | Investment of the household sector at current prices |
| ICZ | Investment of the private corporate sector at current prices |
| IPZ | Gross domestic capital formation of the private sector at current prices |
| GDIUZ | Unadjusted gross domestic capital formation at current prices |
| GDIAZ | Adjusted gross domestic capital formation at current prices |
| SGZ | Gross savings of the government sector at current prices |
| SHZ | Gross savings of the private household sector at current prices |
| SCZ | Gross savings of the private corporate sector at current prices |
| SPZ | Gross savings of the private sector at current prices |
| GDSZ | Gross domestic savings at current prices |
| NFCIZ (-) / OF (+) | Net foreign capital inflow (-) and outflow (+) |

***Notes*:** GDSZ not estimated at 1993-94 prices as given by the CSO

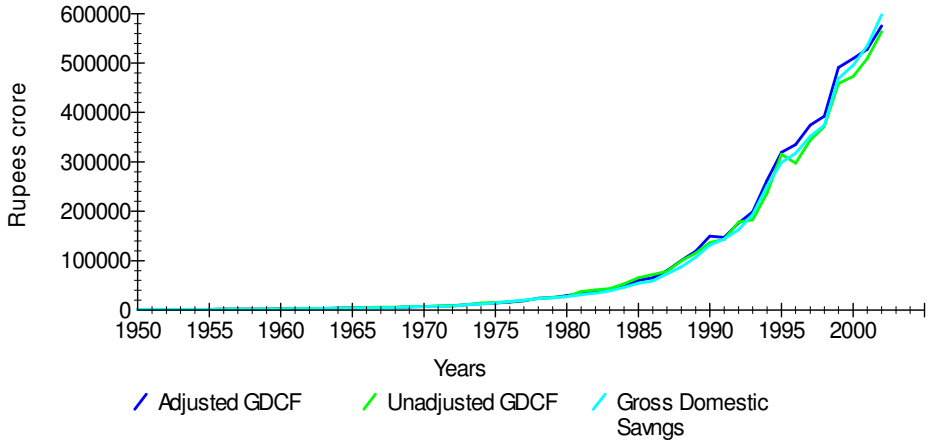


***Figure 1.3:*** *Gross Domestic Savings, Adjusted & Unadjusted Gross Domestic Capital Formation (Rupees crore)*

***Source*:** Table 1.2, CSO, *National Accounts Statistics*, *Economic Survey*, various issues; EPWRF [2004]

There has been overall similarity between savings and investment patterns. No significant differences can be observed across decades in terms of the degree of reliance on net foreign capital inflows (foreign savings) for domestic capital formation. The difference between

investment and savings rate for each year represent net foreign capital inflow, which has varied in the narrow range through the period under study. Domestic investment seems to have predominantly been financed by domestic savings as there has not been any noticeable increase in the share of net foreign capital inflow in the domestic capital formation, reflecting the restrictive capital account regime, though changed marginally even after the 1991 policy reforms. There has been an increase of gross domestic savings in the post – 90s may be the impacts of financial liberalisation measures and to mirror this increase, there has been a distinct fall in overall final consumption expenditure may be the prime reason for the fall in absorption might have led demand recessions in the mid-90s.

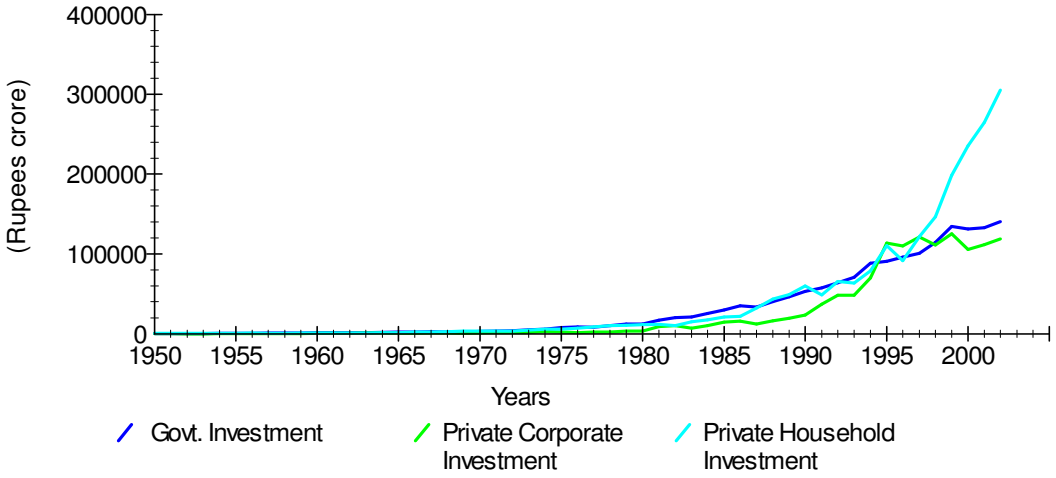


Figure 1.4: Components of Gross Domestic Capital Formation (unadjusted) (Rupees crore)

*Source*: Table 1.2, CSO, *National Accounts Statistics*, *Economic Survey*, various issues; EPWRF [2004]

With overall gross domestic capital formation, any variation in investment of the government sector is mirrored by investment of the private sector implying that an over-prediction in one sector implied an under-prediction in the other, and vice-versa. The figure shows that apart from a brief zone of instability during the 1960s when estimated government investment lay far below its fitted minimum bound and many similar things also happen during the 1990s as estimated government investment lay far below any other extreme outliers in either series. The Figure 1.4 indicates that government investment expenditure after peaking during 1981-86, fluctuating around a declining trend. There has also been a marginal increase in the share of private investment.

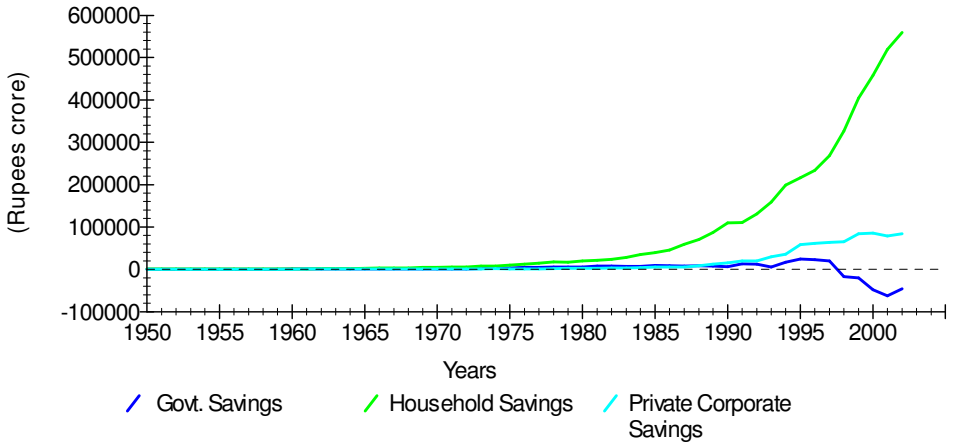


***Figure 1.5:*** *Components of Gross Domestic Savings (Rupees crore)*

***Source*****:** Table 1.2, CSO, *National Accounts Statistics*, *Economic Survey*, various issues; EPWRF [2004]

Gross domestic savings being largely dominated by private savings, despite the rapid growth of corporate savings over the years, household savings continue to dominate total private savings, with public saving declining persistently from the mid-1980s.


***Figure 1.6:*** *Exports & Imports at current market prices*

***Source*****:** Table 1.1, CSO, *National Accounts Statistics*, *Economic Survey*, various issues; EPWRF [2004]

Promoting exports has always been a challenging task to developing nations, particularly those affected severely by a balance of payments crisis, ever inflating the size of the external debt. India has definitely been a case in point on that count. Indian imports have generally outpaced exports, leaving significant current account imbalance and thereby balance of payment crisis. One of the important aspects clearly reflected is the fact that the range in GDP fluctuation in

India has been much more than that of exports. The share of export has also surged may be as an outcome of external sector liberalisation. The economic openness that got initiated during 1980s and intensified during 1990s, affected the purchasing power infusion or leakages of Indian economy through the net trade flows, net foreign factor income inflows and the net capital account inflows. However their position is judged in terms of external debt service and foreign exchange reserves.

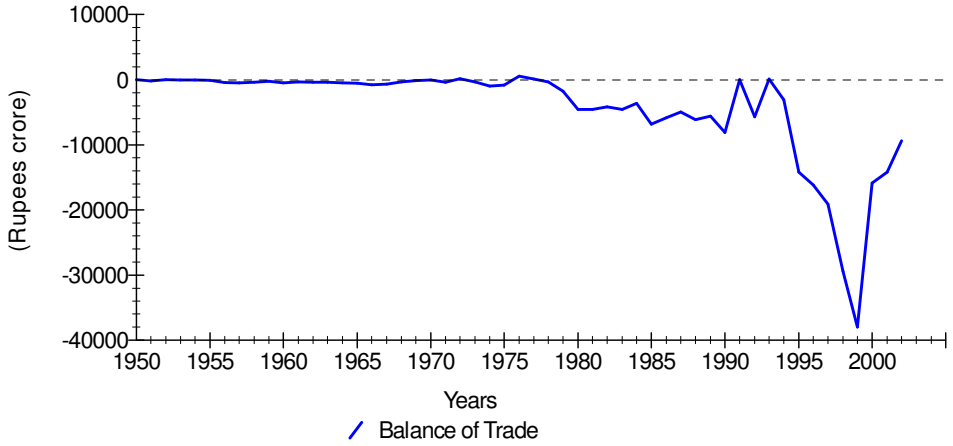


***Figure 1.7:*** *Behaviour of Balance of Trade at current market prices (Rupees crore), 1950-2003*

***Source*:** Table 1.1, CSO, *National Accounts Statistics*, *Economic Survey*, various issues; EPWRF [2004]

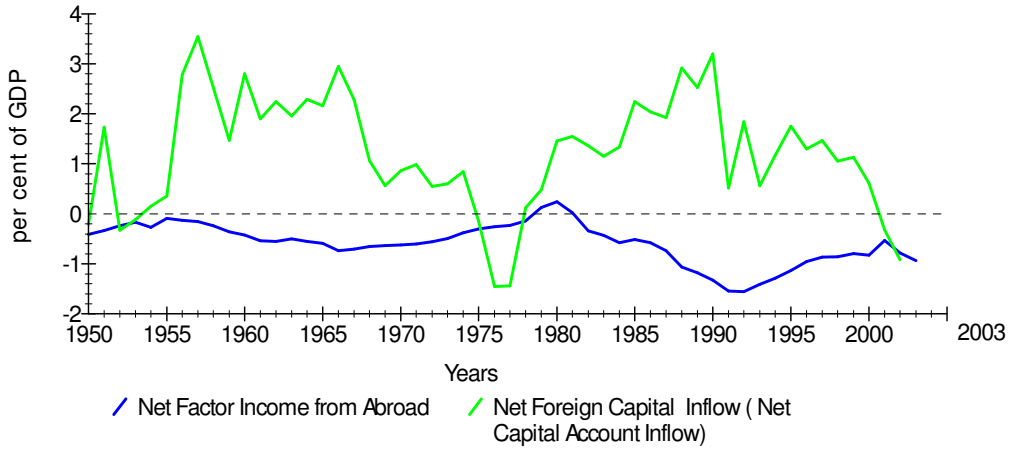


***Figure 1.8:*** *Behaviour of Net Factor Income from Abroad & Net Foreign Capital Inflow As percentage of GDP at current market prices*

***Source*:** Table 1.2, CSO, *National Accounts Statistics*, *Economic Survey*, various issues; EPWRF [2004]

**TABLE 1.3:** Gross domestic product by economic activity at 1993-94 prices

| Year | YA | YM | YC | YINFS |
|---|---|---|---|---|
| 1950 | 81069 | 12491 | 5722 | 5102 |
| 1951 | 82278 | 12886 | 6113 | 5328 |
| 1952 | 84873 | 13334 | 5670 | 5473 |
| 1953 | 91409 | 14366 | 5845 | 5690 |
| 1954 | 94096 | 15373 | 6568 | 5996 |
| 1955 | 93283 | 16577 | 7812 | 6444 |
| 1956 | 98354 | 17821 | 8710 | 6977 |
| 1957 | 93936 | 18508 | 7645 | 7484 |
| 1958 | 103401 | 19425 | 8543 | 8088 |
| 1959 | 102360 | 20744 | 9129 | 8671 |
| 1960 | 109254 | 22465 | 10558 | 9281 |
| 1961 | 109346 | 24383 | 10929 | 10007 |
| 1962 | 107171 | 26158 | 11336 | 10849 |
| 1963 | 109678 | 28632 | 12720 | 11726 |
| 1964 | 119795 | 30612 | 13742 | 12392 |
| 1965 | 106567 | 30897 | 14659 | 13151 |
| 1966 | 105051 | 31140 | 15864 | 13688 |
| 1967 | 120673 | 31260 | 17005 | 14646 |
| 1968 | 120482 | 32992 | 17600 | 15607 |
| 1969 | 128226 | 36531 | 18147 | 16584 |
| 1970 | 137320 | 37389 | 18107 | 17260 |
| 1971 | 134742 | 38611 | 18186 | 17985 |
| 1972 | 127980 | 40125 | 18613 | 19194 |
| 1973 | 137197 | 41910 | 17404 | 19910 |
| 1974 | 135107 | 43132 | 16850 | 21644 |
| 1975 | 152522 | 44041 | 19252 | 23709 |
| 1976 | 143709 | 47903 | 21135 | 25615 |
| 1977 | 158132 | 50885 | 23274 | 26387 |
| 1978 | 161773 | 57170 | 22755 | 28455 |
| 1979 | 141107 | 55328 | 21554 | 29785 |
| 1980 | 159293 | 55436 | 24395 | 31737 |
| 1981 | 167723 | 59881 | 25731 | 33811 |
| 1982 | 166577 | 63859 | 23924 | 35097 |
| 1983 | 182498 | 70306 | 25216 | 36777 |
| 1984 | 185186 | 74923 | 26089 | 39693 |
| 1985 | 186570 | 77871 | 27566 | 42679 |
| 1986 | 185363 | 83290 | 28225 | 45773 |
| 1987 | 182899 | 89374 | 29843 | 49064 |
| 1988 | 211184 | 97263 | 31941 | 52013 |
| 1989 | 214315 | 108703 | 34188 | 56112 |
| 1990 | 223114 | 115282 | 38218 | 59097 |
| 1991 | 219660 | 111075 | 39005 | 63482 |
| 1992 | 232386 | 115669 | 40363 | 66852 |
| 1993 | 241967 | 125493 | 40593 | 70115 |
| 1994 | 254090 | 140491 | 42830 | 76924 |
| 1995 | 251892 | 161424 | 45496 | 84495 |
| 1996 | 276091 | 177013 | 46452 | 100824 |
| 1997 | 269384 | 179689 | 51208 | 98204 |
| 1998 | 286094 | 184579 | 54389 | 105871 |
| 1999 | 286983 | 191926 | 58740 | 116009 |
| 2000 | 286666 | 206189 | 62651 | 127961 |
| 2001 | 305263 | 213681 | 64562 | 137469 |
| 2002 | 289386 | 227035 | 69273 | 151022 |
| 2003 | 315635 | 243605 | 73558 | *NONE* |

***Source*:** CSO, *National Accounts Statistics*, EPWRF [2004]

***Notes*:** GDP in infrastructure (YINFS) is total GDP in electricity, gas and water supply, and transport, storage and communications at 1993-94 prices

*Notations*:

YA real GDP from agriculture at 1993-94 prices
YM real GDP from manufacturing at 1993-94 prices
YC real GDP from construction at 1993-94 prices
YINFS real GDP from infrastructure at 1993-94 prices

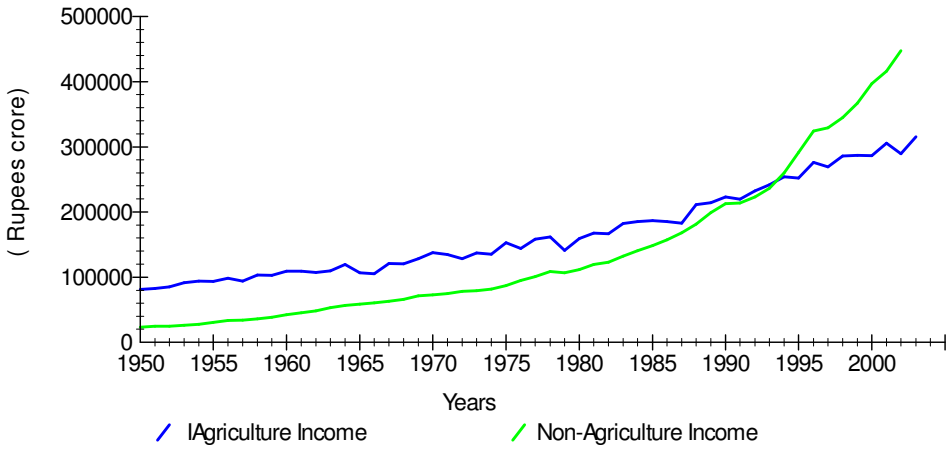


***Figure 1.9:*** *GDP by Economic- Activity at constant 1993-94 prices (Rupees crore)*

***Note:*** *Non-Agriculture Income means the sum of GDP derived from construction, manufacturing and infrastructure*

***Source*****:** Table 1.3, CSO, *National Accounts Statistics*, *Economic Survey*, various issues; EPWRF [2004]

It is important to note that controls were relaxed to a lesser extent since 1980s and problem with the 1990s seem to be the removal of restrictions which existed earlier on repatriation of profits and other incomes earned in India and on royalty payments. The above Figure 1.8 and GNP-GDP ratio (see Table 1.1) show the net flow of factor income from abroad. In the Indian economy, except for three years around 1979-81, GNP always remained lower than GDP (as the GNP – GDP ratio remained less than unity), thus net factor income outflows. The extent to which the economic openness of India in respect of net trade flows, net foreign capital inflows and net factor income from abroad affected the Indian macroeconomic growth process needs to incorporate other explanatory factors such as exchange rate, interest rate, and external debt service scenario.

In the above figure 1.9, presence of volatility in the agriculture sector can easily be seen compared to the non-agriculture sector. It is because agriculture sector depends predominantly on the rainfall. The agricultural output declined significantly during the crises years with poor rainfall, causing a fall in the overall GDP also. Poor harvests tended to adversely affect the demand for manufactured goods from small farmers, depressing the wages of industrial workers and leading to recessions resulting from the propagation of these shocks within an increasingly independent economic system.

However, such shifts are generally poorly understood unless being converted to growth changes. When differenced to show changes rather than levels, even comprehensive series such as real GDP are very volatile, often swinging up and down strongly from year to year. The discussion moves from levels to growth rates of the selected macroeconomic time-series in the rest of this ensuing research to measure the Indian macroeconomic instability sub-periods and to consider their relative durability and the role of policy volatility. The series have been smoothed out particularly to reduce volatility and to show the local trends and to avoid false signals of macroeconomic instability. To take into account the magnitudes of instability movements, leading, coincidence and lagging aspects of candidate variables have also got paid commendable attention. Vertical shaded regions and lines are drawn to trace the movements and co-movements of the constituent macroeconomic variables particularly to understand how they have been in tandem with in the instability zones in the following discussion. This research has also filtered out sub-periods that produce false signals of instability and necessarily considered the sub-periods that include constraints that led the consecutive GDP declined sufficiently large to get a valid signal of recessionary episodes. Instability indicators consistently leads growth cycle turning points and focuses mainly on growth cycles based on the deviation of indicators from trend. However, this sub-section may imply the need for making a more in-depth analysis for a comparative evaluation of the empirical results of instability episodes for different sub-periods over the studied period in the Indian economy. In tune with the different policy scenarios in different sub-periods, an attempt has been made to evaluate the inter-temporal differences in the degree of relationship of the variables.

## 1.2 PROBLEM STATEMENT

Macroeconomic imbalances arising from both exogenous shocks such as economic sanctions or natural events and distortions on account of unsustainable domestic policies repeatedly confront developing economies with the need to restore internal and external balance. The research problem provides the basis for the analysis of macroeconomics of imbalance and adjustment. The term ‘adjustment’ in recent years refers essentially to the policy changes considered necessary to correct both the internal and external dimension. The problem hinges

on to trace out the moving short-run disequilibrium dynamics of an economy towards steady-state long-run equilibrium growth path, explaining the details of adjustment.

Indian economy over a given span of time has gone by fits and starts like any dynamic open economy. Over the past few decades, India has gone through several economic and institutional changes, including in its fiscal policy framework, monetary policy framework, exchange rate regime, financial regulatory framework and trade policy structure. Its macroeconomic policy context including the role of the public sector, the pervasive influence of legislation, and degrees of government controls have changed over time. Relative priorities in setting economic strategies have varied in contents across sectors and policy areas, and pace of policy changes also varied as surfaced extraneous economic and political shocks from time to time. And the nature of the shocks, their origin, degrees of gravity, and government responses to them varied with different intensities.

India's post-independence macroeconomic staying displays alternating periods of relative stability and instability. Its macroeconomic growth prospects was accentuated gloomy (or patchy or disastrous) for some sub-periods, moderately good or in between (or period of adjustment to economic difficulties for resumption of growth), and successful for several others. India's macroeconomic growths were fragile and unsustainable in the 1960s and 1990s as it had plunged into deep economic crises (see Table 1.1). Thus it is computationally demanding how the Indian stop and go growth track and its underlying adjustment dynamics are realised. How India's complex disequilibrium dynamic lurched out growth process took shape and how its transient staying varied in response to policy changes in the face of various economic and political shocks that provides an interesting background to assess the success and failures of policies pursued from the point of view of stabilisation and growth. This research evaluates various macroeconomic policy options from the point of view of macroeconomic stability and growth in the Indian economy. It has been about India's changing macroeconomic policy contexts, which were adopted to maintain economic stability in the wake of international price, interest rate, and demand shocks or domestic crises in the forms of investment booms and related budgetary problems. Its main purpose is to analyse the underlying economic relationships to draw upon the cause and effect relationships behind these policies to generate ideas, which characterise the Indian economy in question for associated recessions in the 1960s

and 1990s, particularly to present a comparative perspective as to whether both the controlled and deregulated policy regimes behaved alike.

Macroeconomics study covers economy's sector - wise and economic activity - wise details and is the study of the behaviour of very large economic aggregates and their relationships and determinants such as gross national and domestic product, national investment and savings, imports and exports, and the balance of overseas payments, etc. It is concerned with both real and nominal values of these aggregates and thereby with changes in price levels (inflation, or rarely deflation). And macroeconomic policies refer to those that are intended to influence the values of such macro aggregates over time.

Comprehensive systematic research studies on disequilibrium analysis focussing the Indian twin instability episodes of the 1960s and 1990s in the long-run approach have so far been few and far between; may be because of dearth of time-series data of sufficient length. If there be, the existing studies are partial in period, policy and sector coverage. Moreover, most of the existing studies found inadequate as barely consider the issue of presence of unit-roots in variables. Thus it is demanding to fill this gap by placing this topic in this ensuing research.

The most important feature of this research is emphasis on policy analysis. Under the new policy regime, policy evaluation can no longer be based on rule of thumb or casual empiricisms. Market driven liberalisation and globalisation have insisted on greater space involving dynamics of behavioural patterns and adjustment processes that need to be mapped in a systematic and coherent way. However, policy issues are not always easy to quantify particularly when entails fuzziness what are often seen in some areas of socioeconomic policies, leaving to depend on intuitive plausible linkages, and thereby such policy analysis has been beyond the purview of this research. Thus the major problem that concerned the present research is the historical sources of instability. The explicit focus has been on the empirical assessments, which are analytically relevant to macroeconomic policies and the underlying macroeconomic adjustments in the Indian economy so that such judgements can be made with some measure of confidence. Quite naturally, references to actual policies would be made by illustrating specific points relating to instability linkages.

The constituent elements of gdp due to economic shocks change in magnitude and direction. Though these changes are mostly gradual, they are often seen to shift in values and

parameters of economic variables. Because of the complicated character of disequilibrium processes, the movements of the main macroeconomic aggregates can only be understood when they are to some extent broken-down or decomposed into constituent co-movements so that macroeconomic cause and effect relationships can be analysed. To that end, one of the most important functional breakdowns is in between public, private, and external sectors; the sub-classification of the private sector again into private corporate and household sectors. Others include agriculture, industry and services; some further breakdown of industry into different sub-sectors like capital goods and consumer goods; the subdivision of goods and services into traded and non-traded categories; of savings into financial and physical, and so on. The present research has made an attempt to evaluate macroeconomic changes in India in the long-term rather than on the long-run deterministic trends towards growth, applying economic relationships on the short-period disequilibrium tendencies within this process of change.

No single computable macro-econometric model used, but the framework of the open-economy standard dynamic adjustment specification model has been followed to ensure consistency while generalising the study results. It requires separate understanding of some knowledge of certain other elements like the magnitudes of critical parameters including the familiar propensities and elasticities associated that govern the different linkages and adjustments evaluating the strength of different adjustments and the extent of their relevance and the effects of length and variability of lags of key policy variables on target variables as the resultant behaviour may be the function of past levels of policy actions. That resulting integrated analytical framework helps to detect the following set of questions in some depth and detail, including (i) what the possible policy variables and exogenous variables can be, (ii) the kind of underlying instability linkages that exist between different economic phenomena and thus the critical equilibrating variables, (iii) the nature of equilibrium and the underpinning adjustments that have occurred in response to policy induced or purely exogenous changes, detecting whether variables are short-run or medium-run or long-run in nature, (iv) how correctly the formulation of macroeconomic policies been consistent with the accepted socio-economic objectives to the particular period or to the particular sector or set of activities, in economic development process. Only when all these interactions are well understood, it then specifies an analytical basis, which in turn helps to identify the nature of long-term dynamic equilibrium, if any, in the absence of instability-causing or disequilibrating factors and the

short-run dynamic adjustments that came about to translate the implied interrelationships into various policy relevant solutions in the face of internal and external shocks as surfaced in the Indian economy over the studied sample period.

Though the analytical approach of this research being mathematical, it tries to capture all the complexity of economic reality, in which economic theory provides guidelines as far as the instability aspects are concerned. This study often possess the underpinnings of paradigms that manifest themselves in differences in the underlying assumptions, specification of equations, direction of causality and the manner in which the economic discussion is closed. These identities, however, by themselves are an empty box, which need to be supplemented by economic relations that got to be carried out by explaining how some of the variables responded to changes in other variables. These behavioural relationships can then be combined with the identities in order to form a schematic quantitative representation of economic process involving the accounts, or variables, which define the Indian economy in question.

Thus the problems faced this present research are relating with its designing in terms of model specification, variables selection, equation specification, parameters estimation, optimum lag length determination for presenting a comparative perspective of recessionary episodes in the 1960s and the 1990s in the Indian economy.

## LOCATION OF THE PROBLEM AGAINST THEORETICAL & POLICY FRAMEWORKS

The situation of macroeconomic malice arises whenever disequilibria persist between aggregate domestic demand and aggregate domestic supply, and macroeconomic adjustment comprising stabilisation and structural reform policies in terms of reducing absorption as well as improving the balance of payments (BOP) are needed in order to correct the deteriorating situation. Such a situation can sustain as long as foreign resources are available despite at severe economic costs, such as rising external debt, high inflation and stagnant growth.

The purpose of this research is to discuss some salient economic relationships, which characterize the Indian economy's instability episodes from a macroeconomic viewpoint. The research has not attempted which theory of macroeconomics is more appropriate in the Indian context because such an attempt has fallen outside the scope of this research. Rather, the explicit focus of this research is only on the empirical judgments, which are analytically

relevant that can be made with some measure of confidence illustrating a particular period or phase of its development or the particular sector or the set of activities that are due to either demand-constrained or supply-constrained management policies; and, what linkages exist and types of adjustments they permit. The analytical focus has been on issues, which are relevant in the context of macroeconomic policies having aggregative consequences and not distributional. Discussions of macroeconomic policy have got to be carried out on empirically observed interrelationships between different quantifiable economic phenomena with historical antecedents. It has assessed the consequences of changes in the exogenous and policy variables on the endogenous variables in the Indian economy. The theoretical merged approach that followed in this study has seldom made differences that exist within each fold in the alternative theoretical paradigms of the classical and Keynesian formats in order to ensure analytical clarity and smoothness in the discussion.

Fiscal, monetary and exchange rate policies are generally thought of as demand management policies. The theoretical basis underscores as to whether these policies are counter-cyclical or pro-cyclical; expansionary or contractionary, in mediating the Indian underlying macroeconomic growth process and to neutralize perverse exogenous shocks in particular from the perspective of growth and stability. The purview of focusing supply side policies like license, quota, rationing, administered prices, buffer stock, food management, etc. in the wake of various exogenous supply shocks like poor agriculture due to bad weather or oil price hike is limited because that are short-run, anticipatory and erratic in nature. However, short-run stabilization policies may have consequence of distributional shifts in production, consumption and income processes. Macroeconomic evaluation in the ambit of control, instrument (policy), target, and objective variables in feedback approach is not always easy particularly when objectives are open ended or implied in intermediate target or the targets are policy mix issue.

This research has drawn attention from the literatures on political business cycle / political budget cycles [PBCs] as found having widespread macroeconomic instability implications within many recent studies. However, instead of electoral cycles studied in most PBC literatures, this study focuses particularly on the macroeconomic impact of the cyclic mobilisation of budgetary support for the Five-Year Plans by the Government of India over the time-horizon of this study since dates back from the First Five-Year Plan with interim plan

holidays as public capital formation is believed retaining plausible historic policy information in mediating macroeconomic growth process for the long-run and for how transmitted themselves in jeopardy disequilibrium. The problem theoretically also provides a basis for analysis of interrelationship between public and private investment.

The methodological approach of this research has been in positive mode as is interested in pursuing a more limited objective: to ascertain empirically the route of transmission channels of macroeconomic instability in the Indian economy, with emphasis on the role of policy in mediating the postulated relationships, incorporating historical experiences. This research examines how policies had direct bearing upon the short-run, medium-run and long-run macroeconomic impacts in delineating the links between translation of certain important theoretical constructs on macroeconomic adjustment problems into various policy relevant solutions and interrelationships as surfaced exogenous shocks from time to time by understanding the effects of policy-relevant variables such as interest rates, exchange rates, capital inflows, amongst others, on key macroeconomic outcomes such as inflation, international reserves, savings, investment, fiscal deficits, BoP, income distribution and, above all, economic growth.

The inclusion of unit roots, co-integration technique, error correction method and causality run in this study has important implications as they can jointly verify the underlying theoretical support for specific instability linkages and can specify the nature of equilibrium. Prior verifying the underlying theory, standard diagnostic tests like endogeniety, exogeniety, parameters estimation carried out to minimising the risk of uncovering spurious relations to rule out the possibility of estimates to be biased, unreliable and simultaneity. This research would confirm whether disequilibrium macro-dynamics are asymptotic stable or, cyclic unstable in the short-run and the steady-state long-run equilibrium (static in nature) growth path; however, not India's long-run trend or potential growth path but what actual adjusted moving path followed from its disequilibrium positions by abstracting the fact from the policy analysis in historical perspective. Thus this research applies a short-run analysis with long-run approach to macroeconomic instability. To examine the link between instability macro-indicators and candidate macro-policy variables, this research needs to have an analytical framework which appropriately captures the channel-wise causality at the aggregate as well as sectoral levels to determine whether unilateral or bilateral in an empirical testable manner

satisfying the essence from both theoretical and empirical points of view. In this way, the theoretical framework to the problem of this research has several important features.

### 1.3 LISTED OBJECTIVES OF THE STUDY

Following are the broad objectives of this research:

1. to study the causes and consequences of the two major episodes preceding the recessions that occurred in the Indian economy during the 1960s and 1990s to put them in comparative perspective
2. to examine the Indian varied macroeconomic policy appropriateness concerning the roles of fiscal, monetary, exchange rate and trade policies and their policy mix for stabilisation and growth in pursuit of planned economic development, and the nature of the extraneous and endogenous shocks that disrupted long-term growth process necessitating occasional policy shifts for short-term economic management
3. to examine the nature of the relationship between deficits, seignorage and debt in the inflationary process examining whether the fiscal stance reflected has been consistent with the monetary stance of trying to reduce inflation and interest rate in consonance with endogenously determined exchange rate following the advent of financial reforms
4. to study the nature and consequences of devaluation doses adopted in 1966 and 1991 particularly to understand their successes expected to secure a substantial improvement in the current account deficits and thereby accelerating Indian macroeconomic growth
5. to study the issues of the optimal sequencing of reforms, in general, and the manner in which the real and financial sectors can be expected to interact with and respond to the domestic and external shocks
6. to predict the effects of policy-relevant variables such as interest rates, exchange rates, capital inflows, amongst others, on key macroeconomic outcomes such as inflation, international reserves, savings, investment, fiscal deficits, BOP, income

distribution and, above all, economic growth over the entire sample period, in general, and between the pre- and post- liberalisation phases, in particular

7. To study the sustainability of India's fiscal deficits by analysing how caters around the split between fiscal stance in terms of its borrowing strategy as well as the monetary stance in terms of monetisation strategy either to ensure the avoidance of high interest rate - inflation trap or the subsequent spectrum of an economic slowdown across the sub-periods

8. to examine how the widening in the fiscal deficits has spilled over into BOP crisis over the entire sample period, in general, and between the pre- and post- nineties, in particular

9. to examine variations in trends and shares of sectoral components in the patterns of macroeconomic growth by observing the role of sectoral savings and capital formation in determining the overall growth process of the Indian economy

10. To examine whether an increase in the fiscal deficits financed by government borrowing necessarily raises the real rate of interest and thereby crowding out of private investment particularly after the deregulated interest rate regime since 1991 to obtain a comparable macroeconomic performance between the pre-nineties and post-nineties

11. to evaluate the impacts of India's external sector reforms with exchange rate management in the 1990s whether to be a powerful instrument (policy variable) of adjustment in the current account deficit putting the BOP on a sustainable path

12. To examine the successes with the implementation of external sector reforms in terms of surging foreign capital inflows to transform them into opportunities to stabilize the Indian economy additive to tuning of efficient domestic monetary and fiscal policy and not fiscal profligacy with the financial repression approach in the pre-nineties vis-à-vis financial deepening growth strategy of post-nineties

## 1.4. RESEARCH QUESTIONS

### PRINCIPAL RESEARCH QUESTIONS:

This study during its overall course raises the following research questions examined:

1. Were the macroeconomic crises precipitated both episodes of recession in the Indian economy during the 1960s and 1990s qualitatively similar or had they resulted from similar failures in macroeconomic management?
2. Has macroeconomic policy coordination been pro-cyclical or coun.
3. ter-cyclical in the face of internal and exogenous shocks to ensure sustainable economic growth without rising inflation or increased current account deficit or growth spurt to be fragile and volatile considering short-term factors and long-run policy effects?
4. Had the devaluations in the 1960s and 199os with the transition of exchange rate from par value system to market determined regime through the liberalization of India's external sector reforms followed by BOP crises been adequate and mutually compatible to bring about significant gains putting the BoP on a sustainable path by exports promotions and imports restrictions recognizing that domestic macroeconomic policies and structural factors were in order and not in misalignments?
5. Were slowdown economic growth both in the 1960s and 1990s due to enduring problem of the fiscal deficit particularly due to the problem of debt sustainability or rather debt crises along with confronting inflation spiralling?
6. Has started substantial fiscal consolidation in 1991 achieved significantly to improve the worsened fiscal deficits and debt situations due to unfavourable interest rate dynamics resulting in deteriorating primary deficits in order to reduce the ratio of public debt to national income so as to avoid macroeconomic instability?

### OTHER RESEARCH QUESTIONS:

1. Have the effects of public investment been either crowding - in (promoting) or crowding – out (displacing) private investment in the Indian economy?
2. Does the economic analysis of twin-deficits adequately capture the crowding-out or crowding-in effects of private sector investments during different macroeconomic sub-periods?

3. How have sectoral savings and investment behaviour, their fluctuations, volatility, divergence and disjunction been important in explaining the Indian macroeconomic growth process to capture short-run and long-run policy effects?
4. Has the policy reforms of the financial markets initiated in India been effective in improving the efficiency of macroeconomic management?
5. Have the inflows of FDI resulting from external sector liberalisation initiated in 1991been proved completely crisis preventive with no sign of external instability or rather been adequate to stabilise the Indian economy? Has the increased inflow of purely 'financial capital', either through domestic capital issues or through foreign institutional investment [FII], have resulted any impact on real output and real capital formation, or its nature being purely speculative?
6. Did India's external sector reforms in the 1990s following the BOP crisis with further reduction of tariff protection and liberalization of capital flows enhance the efficiency of the economy along with reform of domestic policies in stimulating investment and growth?
7. Has sectoral instability led macroeconomic instability? Are macroeconomic aggregates pro-cyclical in nature? Is gdp more volatile than exports?
8. Has there been an indication of existence of political business cycle in the Indian economy?

## 1.5. LIST OF RESEARCH HYPOTHESES

Based on the Indian varied macroeconomic experiences in the changing policy context and previously reviewed literatures, the present research validates the following falsifiable hypotheses:

1. The macroeconomic crises imminent both episodes of recessions in the 1960s and 1990s were qualitatively similar in terms of their origin, nature, degree of seriousness and macroeconomic policies responded to them.
2. The macroeconomic policies pursued to maintain economic stability in the wake of domestic and external shocks have been successful to adjust the period of difficulties

and the resumption of growth and to stabilise the Indian economy with a reasonable steady-state equilibrium solution.

3. The expenditure switching policies contingent on nominal devaluations adopted in 1966 and 1991 are contractionary to protract recessions. The exchange rate adjustments either through explicit devaluation or managed currency float were by themselves adequate to bring about substantial increased export earnings. Devaluation in the pre- and post-reform periods has had significant impact on either exports or imports and created additional capacity in the context of debt repayment burden.

4. There exist causations between Indian deficit measures (such as fiscal deficit, current account deficit and trade deficit) and policy variables (like sectoral consumption, savings and investment; money supply, interest rate, exchange rate) and macroeconomic outcomes (for example, growth rate, inflation rate, and foreign exchange reserves) and the nature of the relationships are either long-run equilibrium or short-run disequilibrium in nature.

5. Savings, investment and their sectoral behaviour are co-integrated and thereby the channels of transmission mechanism in the conduct of macroeconomic policies are in consonance with the evidence of stable macroeconomic growth process and disequilibrium in the pre- and post liberalization are due to exogenous impacts.

6. Money supply, prices, output, interest rate and exchange rate are co-integrated. Both interest rate and exchange rate were weakly exogenous in the pre-liberalisation era and are related endogenously in the post liberalization period in the Indian economy confirming the belief that the financial markets are getting increasingly integrated with domestic monetary policy in the post-reform period.

7. Deteriorating fiscal deficit or unsustainable fiscal situation combined with domestic creeping inflation and unfavourable interest rate structure are likely to worsen the debt problem which has been a fundamental grave threat to slowing Indian economic growth for unbroken period of 53 years since 1950-51.

8. There exist two-way causality between gross fiscal deficit and the real interest rate and the likely crowding out of private investment would have been avoided by an accommodating monetary policy or consistent increase in capital inflows.

9. The twin-deficit perspective of fiscal adjustment has become a pertinent issue in India to recognise that fiscal deficit can affect external balance. Fiscal deficit causes current account deficit to increase.

10. Changes in the savings rate are captured primarily in investment levels or in the external balance. The interrelationships between sectoral savings and investment are the key determinants in the context of the Indian underlying short-run and long-run macroeconomic growth prospects with policy impacts.

11. Misallocation of resources across sectors has been the main challenges for sluggish economic growth. Domestic macroeconomic policies directed towards the generation and absorption of domestic savings into productive investment through an appropriate envelope of pricing and interest controls continues to play an important role in macroeconomic management in India.

12. The movements in the debt-gdp ratio and its cumulative departure away from its target have been due to continued primary deficits and the sign reversal in the growth – interest rate differential because of financial repression in the pre-nineties vis-à-vis financial deepening growth strategy of post-nineties.

13. Structural and trade policy reforms instead of being directed towards the promotion of FDI and FII inflows needs to be devoted to pay significant attention towards the tuning of monetary and fiscal policy to achieve efficient economic growth additive to moderate rates of inflation.

14. Consumption and investment are pro-cyclical. Investment and external balances are more volatile than output. Periodic trade-offs between economic growth and inflation in India have been mirrored with pro-cyclic trade-offs between the rates of economic growth and the BoP situation.

## 1.6. DATA SOURCES & METHODOLOGY OF RESEARCH

Following enumeration of databases used in this research, the rest of the sub-section is organised by explaining the concepts of unit root and co-integration, their testing, and their relation to postulate the theoretical and methodological perspective of linkage in order to

contextualise the present research. As stated earlier, the major objective of this present research has been to compare the Indian twin-recessions in the 1960s and 1990s along with offering other interim growth phases tracing out the actually adjusted moving path involving disequilibrium dynamics in the short-run towards long-run equilibrium growth path by abstracting the policy analysis with historical antecedents for which the studied sample period has been from 1950-51 to 2003-04.

**Dataset**

An array of integrated macro-economic time-series dataset obtained from standard official sources utilising rigorous time-series analysis [TSA] would explain the Indian lurched out growth process and its trading out-of-path determinacy equilibrium situation in the policy context. The integrated time-series aggregates that link macroeconomic identities of five accounts comprise: (1) the national accounts, (2) the government sector, (3) the non-financial private sector, (4) the balance of payments sector (external sector), and (5) the monetary system. These individual basic time-series depicts the growth of both the real and financial sectors of the Indian economy and also its structural changes, over the entire sample period, in general, and between the pre- and post-liberalisation phases, in particular. Moreover, the detection of certain empirical patterns and (ir) regularities should facilitate translation of certain important theoretical constructs on structural adjustment problems into various policy relevant solutions and interrelationships. Most of the data series utilised in this research have directly been obtained or compiled from the following specialised statistical publications: (i) national accounts statistics of the Central Statistical Organisation (CSO); (ii) balance of payments accounts of the Reserve Bank of India (RBI) and monetary accounts of the Currency and Finance (CF) of the RBI; (iii) fiscal accounts pertaining to budget financing operations of the Ministry of Finance (MoE), Government of India (GoI). However, the choice of data series for compilation and construction of some variables used in the empirical investigation went by in accordance with the need. It is important to note that the data-series used in this research revised based on 1993-94 base-year series (prices), fallen in the post-reform period, leading to conceptual and methodological improvements. Though base changed and methodological revisions adopted, every effort has been made to make the present dataset comparable particularly to preserve continuity with the earlier time-series data. However, there may be few problems involved in data gathering process in estimating wide variety of macroeconomic

time-series due to conflicting methodologies in different accounting. However, efforts have been made to compute residuals to absorb automatically the measurement errors and methodological inconsistencies in the accounts in order to keep inter-sectoral consistency, leaving their corresponding 'discrepancies' or 'errors or omissions' to lay within the ranges, thereby testified the overall robustness of the data set of the underlying methodology. The list of time-series includes the macroeconomic variables economy - wide, sector-wise and economic activity-wise at current and constant prices both. It covers macroeconomic statistics related with components of GDP expenditure, components of national disposable income, absorption and reserves, sources and disposition of government sector income and private sector income, financing current account deficits, financing public sector investment, gross fiscal deficit, interest payments and the primary deficit, exchange rates, exports and imports of goods and services, interest rates, debt-income ratio, inflation, growth, etc.

## NATURE OF THE RESEARCH

This research is based on realization of a time-series process characterized by the presence of a unit root and a possibly non-zero drift, in which the analytical approach is generalized to allow the changes in the structure occurring what the dataset reveals that may be due to both the changes in endogenous and exogenous factors (a one-time change at a particular point of time, may however, appear overly restrictive). The structural changes to the trend function occur due to some kind of endogenous or exogenous shocks (infrequent events) that may have permanent effects on the level of the series. Thus, it is important to take into consideration the way how these shocks affect the level of the variables, i.e., the way how the transition to a new trend path occurs [ Perron, P, 1993]. Thus it is essential to understand the macroeconomic different policy implications with respect to transition effects. This research allows describing different growth path followed stemmed from either sudden changes or without, revealing changes in both the intercept and slope of the trend function or any, along with short-run and long-run macro-policy impacts.

## RATIONALE BEHIND METHODOLOGIES ADOPTED

To avoid excessive length, this section has been selective in choice of methodologies applied. The methodology adopted for this research seems to require an explanation as to why and how the Indian economy had to adjust its macro-dynamics to the desired level and how it followed.

The issue of lagged functional relationships among macroeconomic variables is also another important problem in adjustment to desired level. An important issue in this research is the need to integrate short-run dynamics with long-run equilibria, as the Indian economy deviates from its long-run growth path. Thus this research involves a methodological problem of isolating (or identifying) the separate effects of these two sources. The traditional approach to study short-run disequilibria is the partial adjustment approach, criticised as was based on some optimisation rule and then the adjustment equation tagged on to it and barely incorporate the optimisation rule the situation of being in disequilibrium; moreover, they are criticised as being ad hoc. Despite there have been many attempts along these lines they failed to result in any tractable equations due to the existing methodological conflicts between the equilibrium framework of the theory and the disequilibrium environment from which data gathered, which is resolved by extending the equilibrium specifications including disequilibrium adjustment mechanisms as is captured by the concept 'co-integration' [ Rao, B B, 1997].

## CORRELOGRAM & UNIT ROOT TESTS FOR CO-INTEGRATION

A time-series is said to be weakly stationary when its mean, variance and auto-covariance are all time-invariant i.e., independent of time and these kind of series are denoted by I(0), which means integrated of order zero and there would be no problem for ordinary least square (OLS) to be using. But, if a time series requires first order differencing to be stationary, then it is said to be I(1), which means integrated of order one. The mean, variance and auto-covariance of I(1) series are time-variant i.e., they vary with time. These I(1) series are also called non-stationary as having the presence of unit roots[ Gujarati, D N, 1995]. Visual inspection of time-series plots of macroeconomic aggregates are performed to suggest whether exhibiting linearly trended or not. When variables are found whether trended or not is much less clear appeared to have a non-constant mean that they are not stationary at levels. Given that the variables, plots of their first difference, in contrast, neither exhibit evidence of changing means nor of changing variances. This is consistent with the variables being integrated of order one i.e., the variables are said to be non-stationary or having presence of unit root. Such a view is supported by one simple test of stationarity is based on the graphical evidence of autocorrelation function, which is popularly known as 'correlogram'. A time-series graphically may appear as non-stationary if correlogram starts at a very high value and tapers off very gradually with the increase of lag-length or the estimated autocorrelations only slowly at their level values and that for their first

differences damp very quickly and then appear to fluctuate in a non-systematic manner way around close to zero and the tentative conclusion that the variables are non-stationary and contain drift components generating stochastic process. The methods of Box –Pierce Q – statistic and Ljung Box (LB) statistic are also useful in this context by concluding that if a stochastic process is purely random, its autocorrelation at any lag greater than zero is greater than zero for seemingly non-stationary variable.

However, the use of graphical and correlogram evidence may be unreliable to make inference about the presence of unit roots. However, as far as formal testing methods for unit root is concerned, focus is placed on the use of the Dickey Fuller (DF) / Augmented Dickey – Fuller (ADF) sequential search procedure, which has been used in this research testing for unit roots of adopted macroeconomic time-series. In view of the size-power trade-off, it has selected the order of the ADF regression through a two-step procedure. First, the length of the lag is chosen using the appropriate model selection criteria of maximising the Akaike Information Criterion (AIC) and Schwarz Bayesian criterion (SBC). As different model selection criterion can lead to different models and, in particular when there is a conflict among the two criteria, the SBC dominates over AIC since SBC leads to a parsimonious model [ Rath, D P, 1999]. At the second stage, ADF test is carried out with this optimal order of augmentation. Using this procedure, the order of integration of each series has been carried out using ADF/ Phillips – Perron test statistics.

## ERROR CORRECTION MODEL (ECM) & CO-INTEGRATION

The concept of co-integration analyses the existence of equilibrium relationships between two or more non-stationary macroeconomic time-series variables. If, two non-stationary time-series are individually integrated at the same order then the two time-series are said to be cointegrated and two variables would share a long-run equilibrium (stable) relation. Again, if two non-stationary time-series are individually integrated at the same order and in addition to, there is linear relationship between these two variables, then also the two time-series are said to be cointegrated and would share a long-run equilibrium (stable) relation and the residual (or error term) or the difference between the fitted linear combination of these two variables would become stationary or I(0) and they do not drift too far apart from each other over time. This is another way of saying that for the non-stationary series (or, for unit-root test), the hypothesis

tested is that the 'error' term (the difference between the fitted linear combination of two variables) is not I(1). On the other hand, If two non-stationary variables are not cointegrated when the residual(the difference between the fitted linear combination of two variables) becomes non-stationary or I(1) and they can drift apart from each other more and more as time goes on[ Doganlar, M. 1999]. Just by seeing if two time-series individually integrated at the same order then, it can best be said the two series are co-integrated. By asking the question of whether two non-stationary time-series are cointegrated means whether there is any long-run relationship between their trends. In the case of two non-stationary time-series, the differencing operation eliminates the trend or long-term movements in the series and running regression considering these difference series one on the other would not make any sense if long-run relationship does not exist. One important drawback of the procedure of differencing is that it results in a loss of valuable contents of 'long-run information' in the data. And the concept of co-integrated series has been one solution to this problem.

Two time-series variables may reflect common trend present in them and not the true degree of association between them. To avoid such a spurious association, the common practice is to regress time-series variables introducing, 't', the trend variable, having removed the trend effect. To understand common trends, it needs to distinguish between 'deterministic' and 'stochastic' trends. It also needs to understand the distinction between trend stationary process (TSP) and difference stationary process (DSP). Alternatively speaking, the explicit introduction of the trend variable in the regression has the effect of de-trending i.e., removing the influence of trend from time-series variables. However, the standard practice in time-series econometrics which may be acceptable is that if the trend variable is deterministic (i.e., perfectly predictable and not variable) and not stochastic. If a time-series is found non-stationary (or, having presence of unit-root), then the time-series is called would exhibit a stochastic trend. On the other hand, if it does not have a unit root would exhibit a deterministic trend. Thus de-trending (by running a regression on time) assumes the presence of a deterministic trend, and differencing assumes the presence of a stochastic trend. The concept of co-integration refers to the idea of 'common stochastic trends'. But this is not only the kind of common trend as 'common deterministic trends' may also be the case. In practice, a time-series variable may have both 'deterministic' and 'stochastic' components. If the presence of 'deterministic trend components' is ignored that may lead to some misleading inferences on co-

integration. This research while undertook the issues of co-integration assumes that there are no deterministic elements in the Indian macroeconomic time-series datasets.

An extension and a more generalised version of the partial adjustment model is the ECM (error correction model), which also incorporates past period's disequilibrium [ Maddala, G S, 2001]. In the short-run, there may be disequilibrium in an economy and ECM is used to correct for disequilibrium in every period particularly to tie the short-run behaviour to its long-run value. The analysis of short-run dynamics is often done by first eliminating trends in the variables, usually by differencing in ECM mechanisms. This procedure, however, remains far from being adequate to throw light about potential valuable information about long-run relationships about which economic theories have a lot to deal. The theory of co-integration was developed in Granger (1981) and was elaborated in Engle and Granger (1987) addresses this issue of integrating short-run dynamics with long-run equilibria and is discussed in detail in the following research methodology chapter in this research. Based on the conceptual analogy between cointegration and the economic concept of equilibrium, Engle and Granger propose a consecutive two-stage approach to modeling economic relationships entailing non-stationary variables, subject to the variables are integrated of the same order. The first stage captures modeling the long-run or cointegrating the relationship. The short-run dynamic disequilibrium relationship among the variables is estimated at the second stage. The second stage disequilibrium relationship can best be represented with an error correction mechanism. It proves that if the variables of same order are cointegrated i.e., if there exists an equilibrium relationship, then the short-run disequilibrium relationship between them can be captured by the ECM. This mechanism is referred to as the Granger representation theorem. There are number of reasons as is why the ECM is generally much more preferred over the other formulations: first, the ECM has a first-differenced dependent variable and not a typical trending variable; second, it provides the model is correctly specified and the disequilibrium error of the specification would also be stationary, which can therefore be estimated by standard classical estimation methods such as OLS; third, an ECM involves parameterisation that clearly distinguishes between long- and short-run effects and this separation between long-and short-run parameters in an ECM makes possible to assess for either the validity of the long-run implications of theory or of incorporating them into the estimation process.

The extended equation is then estimated from which estimates of the long-run or equilibrium parameters are derived by imposing equilibrium conditions, which are then used to test the underlying theory. The short-run or the dynamic disequilibrium relationships are estimated utilising the estimates of the long-run parameters of cointegration techniques within the error correction framework. In other words, cointegration facilitates utilisation of the estimated long-run parameters into the estimation of the short-run disequilibrium relationships, as there is a trade-off. Finally, the robustness of the estimated dynamic disequilibrium relationships is determined by subjecting them to the post-regression standard diagnostic test statistics. And thus the traditional approach can be criticised as it neglects the problems caused by the presence of the unit root variables while the main advantage of co-integration is that it being capable directly to test or falsify the underlying theory. The merit of co-integration techniques is that it can accommodate the relationship being investigated within a reasonable complex dynamic specification, including lagged dependent and independent variables so that a parsimonious specification of the model can be captured [Hendry, Pagan and Sargan 1985]. The other important advantage is that it yields equations with first-differenced and stationary dependent variables unlike simple first-differenced equations and makes use of long-run information in the data appropriately [Wickens and Breucsh 1988].

Thus, it is advisable for the theoretical framework of this present research to apply essentially estimation methods of cointegrating regressions and joint estimation of both the long and short-run specifications that are computationally demanding. It has thus necessarily paid partcularly more attention to the time-series underlying theoretical insights to test for unit roots, estimate cointegrating regressions and error correction specifications. Together unit roots, co-integration, cointegrating regression and causality tests have important implications for the specification and estimations of dynamic macroeconomic study.

With regard to co-integration, this research has used the Johansen procedure for identifying the number of cointegrating relationships between a set of policy variables studied, and estimating the parameters of the potential long-run relationships. This research has also compared these estimates with those from the approach suggested by Engle and Granger (1987) – residual based co-integration test is the application of ADF test on residuals of the co-integrating regression. Consideration of the short-run dynamics is undertaken on the presence of co-integration that analyses the short-run dynamics with long-run equilibrium approach. Failure to

find a co-integrating vector in ADF test means that the error correction procedure cannot be carried out and interpretation of coefficients would be wrong because it is a spurious regression.

It is argued in Enders (1995) that Engle and Granger methodology has been having important shortcomings. Choice of the dependent variable can generate reverse results. It is practically possible to obtain that one equilibrium regression indicates the variables are co-integrated, but the reverse regression may indicate that the variables are not co-integrated. Another demerit of the Engle-Granger approach is that the test can result into bias with small samples. However, the methodology developed by Johansen (1988) and Johansen and Juselius (1990) have made an attempt to overcome this problem.

## NON-STATIONARY & VECTOR AUTO REGRESSIVE (VAR) MODEL

It is important to note that the rank in the long-run impact matrix determines the number of co-integrating vectors in the VAR (vector auto-regression). If the rank is zero then there is no co-integrating vector[ Johansen, 1988; Johansen and Juselius, 1990]. This method uses maximum likelihood procedures to determine the number of co-integrating vectors among a vector of time-series. There are two types of likelihood ratio tests in order to determine the value of rank in the long-run impact matrix. These tests are maximum eigen-value ($\lambda_{max}$) and trace ($\lambda_{trace}$). If all the variables are found non-stationary, the next step is to determine the appropriate lag length in the VAR. Akaike's information criterion (AIC) and Schwarz' Bayesian information criterion (SBIC) are specified the lag structures of the equations in the VARs. The estimated lag lengths are used if the residuals are white noise. The lag-lengths are increased until the serial correlation in the residuals is removed. The residuals are tested for serial correlation by using the Breusch –Godfrey (BG) test.

The present study used VAR models separately for the pre-reform and the post-reform period to test for block exogeniety for lead values of exchange rates in both these periods. Block exogeniety test was proposed by Sims (1980) as a multivariate approach of the Granger's causality test, and tests in a way whether omitting a particular variable from a system leads to any loss of information by restricting or dropping from the VAR. This test is popularly known as Granger Block Non-causality in VAR framework[ Ray P, Hoshi H and Saggar, M 1998].

However, VAR models do not explicitly give an empirical description of the economy; they can be used to investigate interactions among several macroeconomic variables in their impulse response function. Again, using VAR model for non-stationary data could result in unstable econometric relationships as it is estimated using either first differenced variable or by including deterministic trend terms into the model [ Gill, D B S and Kumar K, 1998]. Again scope of using VAR model in this research has been limited because of the degrees of freedom problem.

## CAUSALITY

It is assumed that macroeconomic outcomes depend on past macroeconomic policies or exogenous supply shocks. Running Granger-causality test has been useful to examine the direction of causality whether unidirectional or bidirectional or instantaneous among the policy variables, instability indicators and macroeconomic outcomes in the Indian economy. The statistical inference in many empirical works has been made under the assumption that both the instability indicators and variables contain deterministic trends. But recent studies raised questions against these assumptions because the trend components of several time-series might contain stochastic elements [Nelson and Plosser (1982); Stock and Watson (1988)]. They showed that how a misspecification of trend components may lead for incorrect tests of hypotheses. This research has utilized some of these recent techniques in order to investigate the nature of trends in the macroeconomic time-series to examine whether the long-run movements in macroeconomic instability indicators are related to the long-run movements in the candidate macroeconomic policy variables. It is shown that when macroeconomic variables are measured in terms of rate of growth they do not include deterministic trends but instead share a common stochastic trend. This implies that these variables are cointegrated in the sense of Engle and Granger [ Apte, P G, 1997]. However, the presence of the common stochastic trend in the rates of change in macro variables seems to be constant with Granger-causality, running from the reverse, but not vice-versa as suggested by Mehra (1977) and Gordon (1988).

## METHODOLOGY OF ADEQUACY TESTING

Both the numerical tools and statistical methods have been used to analyse this study. Some preliminary algebraic numerical tools like rates, proportion, and percentage, log-transformation have been applied in data compilation. Diagnostic or specification tests are essentially used as a

means of predicting strong evidence of model inadequacy or failure. For example, in the case of linear regression estimation based on ordinary least square method with classical assumptions, a battery of diagnostic tests could be used before predicting to be the best linear unbiased estimator (BLUE). The misspecification testing plays a crucial role in the specified and estimated model evaluation stage of applied macro-econometric studies. These diagnostic tests include testing for residual serial correlation, heteroscedasticity, weak exogeniety of the regressors, functional form misspecification and parameter stability.

The short-run disequilibrium dynamics and long-run growth approach of this research suggest using together with the unit root tests, co-integrating regression, ECM, co-integration tests and causality test.

## 1.7 PROPOSED CHAPTERISATION

The thesis is structured in the following ten separate chapters and each of them starts with a comprehensive introduction and ends with summary and conclusions and intends to be adequately interconnected.

**CHAPTER 1** is essentially introductory that outlines its various sub-sections to profile the historical and development background, dealing with statements of problem issues and their locations against theoretical, policy, empirical, methodological, and analytical frameworks to set out the tone to place the present research in the correct perspective, particularly to unfold a comparative recessionary study between the 1960s and the 1990s in the Indian economy.

**CHAPTER 2** is a broad and fairly comprehensive survey of the entire field of Indian macroeconomic instability literature. It also provides a precise survey of theoretical and applied macro-econometric literatures with reference to selected developing and developed countries regarding disequilibrium dynamic analysis to macroeconomic management problems, gaining the chronological development of the conceptual framework since the first metaphorical instability character capturing wide spectrum of emerging macroeconomic instability issues, policy debate and the consensus from the disequilibrium perspective. This is followed by four surveys of particular areas: literatures on structural adjustment, fiscal

adjustment, external sector adjustment, and political economy of adjustment. Bringing out explicitly these different perspectives, it purports to throw light on the relevance of instability issues.

**CHAPTER 3** is an account of India's macroeconomic history at the backdrop of development planning discourse, supplementing successive budgetary exercises together with a sketch of macroeconomic events and changing political economy over the entire period to understand the Indian macroeconomic management records utilising Indian annual macroeconomic time-series datasets to figure out the simple dynamics of the Indian macroeconomic adjustment and instability approximation by emphasising the need for and to provide the shifts in policy reliance in the face of the challenges of those eventful times which policy makers had to contend within guiding the course of the economy with factual antecedents briefly focussing the trials and tribulations with a view to explore comparative macroeconomic scenarios as would greatly enhance to analyse the ensuing study. It has also made an attempt to review the chronological development of the concept of dynamic disequilibrium and recession since the first writings on macroeconomic character, themes, events and facts in a historical perspective over the entire sample period from 1950-51 to 2003-04. It in a sub-section has also made an attempt to discuss PBC approach for studying dynamic disequilibrium problem and macroeconomic management and their potential applications to India.

**CHAPTER 4** outlines an historical account of the evolution of macroeconomic policy trends prevailing in India since independence to understand the changes in emphasis placed on different elements of the overall policy regime over time intending to highlight the features of the policy regime that could be argued to have had an impact on Indian macroeconomic growth and adjustment process and the mechanism by which they did so. It also gives some relevant history and describes the changing role of the public sector pertinent to understanding the responses of the economy to the instruments of economic policy. The main policy areas such as fiscal, monetary, external sector, foreign trade and payments, exchange rate, capital management, financial sector, and investment are presented separately in different sub-sections in order to set the stage for rest of the analysis of this research.

**CHAPTER 5** deals with the theoretical framework revolved around the problems of macroeconomic management covering both the aggregate demand- and supply-sides to scrutinise short-run and long-run policy implications on the role of real and financial factors in economic development. This framework facilitates to understand theoretically the channels of instability influences and their transmission mechanisms by translating certain important theoretical constructs on macroeconomic adjustment problems into various policy relevant solutions and interrelationships for the formulations of issues in the role and conduct of macroeconomic stabilisation policy with particular emphasis is placed in order to set the stage for the empirical analysis in this ensuing research.

**CHAPTER 6** provides a simple exposition of time-series econometrics tools like unit root tests using the Dickey-Fuller (DF) and the Augmented Dickey-Fuller (ADF) tests, error correction method (ECM), co-integrating regressions, co-integration tests, causality tests, and exogeniety tests as research methodologies in regard to minimising the risk of uncovering spurious relations, to suggest which set of variables should enter either into disequilibrium short-run or stable long-run (dynamic or static) economic relationships ascertained stationarity of data whether with same order or not and their direction, to spotting complex simultaneous links establishing the degree of endogeneity or exogeneity of the interdependence of series behaviour to rule out the possibility of the bias and give more consistent results and ensure the smooth running of recursive estimation whereby findings would remain robust in the process of specification or diagnostic search.

**CHAPTER 7** in phase analysis approach tracks stages of Indian macroeconomic instability experiences and evaluates each sub-episodic stage on comparative basis in the context of policy analysis and presence of exogenous shocks, explaining antecedents, consequences and policy responses of each sub-periodic crises. It also extends the analysis to an instability indicator approach based on volatility and correlation matrix observing trade-offs among sectoral macroeconomic basic time-series on national accounts with related aggregates, in contributing policy information and related shocks, particularly to make decadal comparison of

macroeconomic instability dips in order to set the stage for the further econometrics analysis in this ensuing research.

**CHAPTER 8** examines the empirical validity of macroeconomic instability extensively by undertaking rigorous econometric investigations together with unit root tests, co-integrating regression, co-integration tests within error correction framework and causality run on Indian annual macroeconomic time-series in multivariate framework with full sample and non-overlapping sub-samples. This would, in turn, help to assess how policies had direct bearing upon the short-run, medium-run and long-run macroeconomic impacts in mediating the underlying macroeconomic growth implications in delineating macroeconomic adjustment problems into various policy relevant solutions and implied interrelationships in the face of internal and external shocks as surfaced in the Indian economy from time to time linking the translation of certain important theoretical constructs on by understanding the effects of policy-relevant variables such as interest rates, exchange rates, capital inflows, amongst others, on key macroeconomic outcomes such as inflation, international reserves, savings, investment, fiscal deficits, BoP, income distribution and, above all, economic growth, particularly in order to facilitate the presentation of the comparative perspective of macroeconomic recessions of the 1960s and the 1990s in the Indian economy.

**CHAPTER 9** summarizes the key findings and draws upon policy lessons to provide a comparative picture of macroeconomic instability scenes along with growth phases that have occurred in the real and financial sectors of the Indian economy over the entire sample period, in general and between the pre-and post-1990s, in particular with more focus on twin recessionary sub-periods in the 1960s and 1990s with emphasis on the response to the key policy shifts in the wake of economic and political shocks particularly to account the differences in contemporary macro-economic management and policy issues. It discusses the policy environment and recessionary situation in India during the post-reforms period in the 1990s, particularly in the aftermath of the Asian economic crisis (1997). While analysing thoroughly macroeconomic instability, recession and their possible causes during this period, differences, if any, in management approach have carefully been noted.

**CHAPTER 10** has made an attempt to synthesise and present the summary of the thesis, and to trace the inferences, conclusions and recommendations from the analysis as well. These seem to prove useful to both practitioners and scholars of Indian development and macroeconomic management as well as to policy planners and professional organisations. It has also made an attempt to venture avenues for further future research so as to make it more compact linked to the existing theories and methodologies emphasising more on the tool of analysis that can revitalise the subject in the context of planning, policy analysis and forecasting before drawn concluding remarks.

The table of contents seem to have been exhaustive and would help to quickly locate where a topic of interest related with this research is discussed. For its own sake, chapter numbers are pre-fixed to the section and sub-section numbers. For example, 1.2.3 means that it is subsection 3 of section 2 of chapter 1. Similarly, all the tables and figures have been with the relevant chapter number. For example, Table 1.2 is Table 2 in chapter 1. Similarly, all the tables and figures start with the respective chapter number. However, chapter numbers are not pre-fixed to equations as none of the chapters refer to the equation in another chapter. The reference and bibliography section has been thorough but by no means exhaustive, as it is impossible to list every citation. Nonetheless an attempt has been made to include all the important concepts and contributions relating to this research.

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