# An Analytical Study of the Collisions of Macroeconomic Variables on Indian Economy and Stock Market

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**Abstract**

The present paper is an endeavour to highlight the impacts of foreign exchange reserves, current account, and capital account on GDP, Sensex, Nifty and fiscal deficit. The study is purely based on secondary data the analysis of which was made through the application of Karl Pearson's coefficient of Correlation and Multi Regression OLS model (Ordinary Least Square). The study found that the current account (CAD)is the most important predictor of GDP, BSE, NSE and fiscal deficit with R square values of .861, .506, .685 and .887 respectively; and coefficient of correlation (-ve) of -.928, -.711, -.828, and -.942 respectively. Though, the current account is a significant factor for all outcome variables yet its impact on GDP and fiscal deficit has been greater than other two outcomes; and the aggregate impact of all the predictors jointly showed more impact on BSE (R2change= 22.6 per cent)than other outcome variables. It was further indicated through the results that if all the three selected independent factors remain constant, then also there are other factors as well which explain GDP, BSE, NSE, and fiscal deficit up to 21103.16, 2704.8, 99.341, and 1113.4 units.

**Keywords:**

Foreign Exchange Reserves, Current Account Deficit, Capital Account, GDP at factor cost, Fiscal Deficit, BSE Sensex, and NSE CNX Nifty

**Introduction**

Globalisation in consonance with financial sector reforms in India has escorted the economy substantially as far as the financial architecture is concerned; the financial sector reforms commenced in the beginning of 1990's, and the implementation of various measures including a number of structural and institutional changes in the different segments of the financial markets, particularly since 1997, brought dramatic changes in the functioning of the financial sector of the economy (**Agrawalla, 2006).** The economic growth and prosperity of an economy depends on the efficient functioning of capital market up to great extent, to speed up economic growth through increasing liquidity of financial assets and diversification of global risk easier for investors to make wiser investment decisions. The international capital markets integrated rapidly during post globalisation period but contraction in demand for exports (both merchandise and services) and the hike in fuel and gold imports resulted into a record-high current

account deficit during 2012 in India. The exports registered a growth from $18.5 billion to $309.7 billion between 1990-91 and 2011-12; the average annual growth rate of merchandise exports doubled during the last two decades, from 9 per cent in 1991-92 to 1999-2000 to 20 per cent during 2000-01 to 2011-12; though, exports grew during the last two decades, they were not in line with the growth in imports (export/GDP increased 11 percentage points between 1990-191 and 2011-12 whereas imports/GDP increased by 18 percentage points over the same period); the growth in imports of oil as a proportion of GDP doubled between 2004-05 and 2011-12; non-oil imports increased from 14.4 per cent to 18.5 per cent of GDP, specifically the gold has been an important contributor (increasing from 1.5 per cent to 2.5 per cent of GDP between 2004-05 and2011-12).**;** the import of oil and gold registered a sharp increment during 2011-12 with growth rates of 45per cent and 40per cent respectively (relative to 22 per cent and 18per cent in the previous year); consequently, the merchandise trade balance aggravated significantly over the last two decades (from 2.9 per cent (-ve) of GDP in 1990-91 to an estimated 10.2 per cent (-ve) of GDP in 2011-12) and the CAD went up to an all time high of 4.8 per cent last year on account of a heavy trade deficit and higher gold imports. The soaring CAD along with fears of tapering caused for the rupee touching a life time low of 68.85 against the US dollar on 28th August, 2013. Though rupee improved since then but still seems to be strongly to attain its previous position. The Government of India acted on multiple fronts, curbing gold imports, opening currency swap windows to get fresh dollar flows, and increasing money market rates to reduce speculation, resulting into CAD coming down to 1.2 per cent of GDP in Q2 and the foreign exchange reserves were at over US $295 billion as of December, 2013. The drastic fall in gold imports and an amount of US $ 34 billion procured by RBI through swap windows proved to be the best lenders.

**Review of Literature**

**Keshava, S. R. (2008)** analyzed the impact of FDI on economic growth of India, exports, GDI, FOREX and other macro variables and compared India's FDI with Chinese FDI. The results of the study showed that India is far behind China in becoming an attractive FDI destination as it still suffers from power shortage, poor infrastructure, security consideration and the lack of an exit policy. Further, it was suggested that if India has to reach its target of attracting more FDI for its development, aggressive third generation reforms are needed along with good planning and intentions.

**Robert D. Gay, Jr. (2008)** appraised the association among stock prices and macro economics variables in cases of China, India, Brazil and Russia which are emerging economies of the world by using oil price, exchange rate, as explanatory variables employing Moving Average method with OLS (Ordinary least square) and found insignificant results which postulate inefficiency in market. It was concluded that in emerging economies the domestic factors persuaded more than external factors i.e. exchange rate and oil prices.

**Akmal, Muhammad Shahbaz (2007)** scrutinized the relationship between stock prices and rate of inflation using ARDL approach for the period 1971-2006.The result of the study depicted that stock hedges are not in favour of inflation in long run as well as in short run and found that black economy effects long run and short run prices of the stock.

**Nishat and Shaheen (2004)** evaluated association among macroeconomic variables, stock prices and money supply, CPI, IPI, and foreign exchange rate for the period of 30 years from 1974 to 2004.The findings of the study showed that there are causal relationships among the stock price and macroeconomics variables, and the interest rate is not granger cause by stock price.

**Shahid (2008)** studied the nature of the causal relationships between stock prices and the macro economic variables (index of industrial production, exports, foreign direct investment, money supply, exchange rate, interest rate) expressing real and financial sector of the Indian economy. The study point out that stock price in India escort economic activities except movement in interest rate which seems to lead the stock prices.

**Sangmi, Mohi-u-Din and Hassan, Mohd. Mubasher (2013)** examined the impact of macroeconomic variables (inflation, exchange rate, Industrial production, Money Supply, Gold price, interest rate) on Indian stock market for the period of 2008 to 2012 with the help of multiple regression analysis. The result of the study exhibited significant relationship between macroeconomics variables and stock price in India and further, it was observed that increase in inflation lead to higher stock price and in comparison to this, increase in exchange rate cause lower price of stock which result in lower return.

**Haque, Abdul and Sarwar, Suleman (2012)** explored the association among macro-determinants and stock returns by using panel data of 394 listed companies listed in the Karachi Stock Exchange over the period of 1998-2009. The results of the study revealed that volatility and gross domestic product has a significant positive effect on individual equity return, although, inflation, interest rate, money supply and budget deficit confirm a significant negative association. The findings also highlighted a significant positive effect of exchange rate on equity return of textile sector.

## Objectives of The Study

The present study was attempted to attain the following objectives:

1. To analyze the trends and patterns of flows of foreign exchange reserves, current account, capital account, net fiscal deficit, GDP at factor cost, Sensex, and CNX Nifty in India.

2. To study the impact of foreign exchange reserves, current account, capital account on net fiscal deficit, GDP at factor cost, Sensex, and CNX Nifty.

## Hypotheses of The Study

The hypotheses are developed on the basis of literature review and objectives of the study. The null hypotheses framed under the study are stated below:

1. $H_{01}$: There is no significant impact of foreign exchange reserves on the movements of Sensex, Nifty, fiscal deficit and GDP.

2. $H_{02}$: There is no significant impact of current account on the movements of Sensex, Nifty, fiscal deficit and GDP.

3. $H_{03}$: There is no significant impact of capital account on the movements of Sensex, Nifty, fiscal deficit and GDP.

## Research Methodology

### Data Collection

The present study is purely based on secondary data covering 13 financial years from 2000-01 to 2012-13.The requisite data related to foreign exchange reserves, current account, capital account, GDP at factor cost, and net fiscal deficit have been collected from various sources i.e. Hand Book of Statistics and Bulletin of Reserve Bank of India and the data of BSE Sensex and CNX Nifty have been taken from the websites of BSE (www.bseindia) and NSE (www.nseindia) respectively.

## Statistical Tools & Techniques

In order to analyze the collected data, the statistical tools such as Karl Pearson's coefficient of Correlation and Multi Regression OLS model (Ordinary Least Square) is used. Correlation coefficient is a statistical measure that determines the degree to which the movements of variables are associated. In the present study, the linear relationship between Independent Variables- foreign exchange reserves, current account, and capital account, and dependent variables- GDP at factor cost, Sensex, CNX Nifty, and net fiscal deficit is established. The multiple regression analysis is a technique used to evaluate the effects of two or more independent variables on a single dependent variable. Here, an attempt is made to study the impact of Independent Variables- foreign exchange reserves, current account, capital account on dependent variables- GDP at factor cost, Sensex and Nifty and net fiscal deficit.

### Average Compound Growth Rate

The average compound growth rate is calculated by employing formula

**Y = ab**

By using logarithm, it may be written as:

**Log y = log a + t log b**

**Y\* = a\* + t.b\* (where log y= y\*, log a= a\* and b= b\*)**

The value of b* is computed by using OLS method. Further, the value of ACGR can be calculated by followed method:

**ACGR = (Antilog b\*-1) × 100**

### Analysis and Interpretation

The analytical Table 1 exhibits the amount of flow of foreign exchange reserves, current account, capital account, and fiscal deficit, GDP at factor cost, Sensex, and CNX Nifty in India in terms of Rs Billions.

### TABLE 1
#### Flow of Foreign Exchange Reserves, Current Account, Capital Account, Net Fiscal Deficit, GDP at factor cost, Sensex, and CNX Nifty

Amount in Rs. Billions

| Year | Foreign Exchange Reserves | Current Account | Capital Account | Net Fiscal Deficit | GDP at factor cost(constant prices) | Sensex (BSE) | CNX Nifty (NSE) |
|---|---|---|---|---|---|---|---|
| 2000-01 | 1972.04 | -115.98 | 392.41 | 1078 | 23484.81 | 3262.33 | 1334.76 |
| 2001-02 | 2640.36 | 164.26 | 401.67 | 1230 | 24749.62 | 3377.28 | 1077.02 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2002-03 | 3614.7 | 306.6 | 513.77 | 1338.29 | 25709.35 | 5838.96 | 1037.22 |
| 2003-04 | 4901.29 | 639.83 | 800.1 | 1155.58 | 27757.49 | 6602.69 | 1427.50 |
| 2004-05 | 6191.16 | -121.74 | 1280.81 | 1262.52 | 29714.64 | 9397.93 | 1805.26 |
| 2005-06 | 6763.87 | -437.37 | 1096.33 | 1457.43 | 32530.73 | 13786.91 | 2513.44 |
| 2006-07 | 8682.22 | -443.83 | 2080.17 | 1512.45 | 35643.64 | 20286.99 | 3572.44 |
| 2007-08 | 12379.65 | -634.78 | 4331.67 | 1207.14 | 38966.36 | 9647.31 | 4896.59 |
| 2008-09 | 12838.65 | -1276 | 305 | 3290.24 | 41586.76 | 17464.81 | 3731.02 |
| 2009-10 | 12596.65 | -1797 | 2384 | 4114.48 | 45161 | 20509.09 | 4657.76 |
| 2010-11 | 13610.13 | -2196 | 2792 | 3610.26 | 49370 | 15454.92 | 5583.54 |
| 2011-12 | 15061.3 | -3760 | 3074 | 5141.03 | 52435.82 | 18842.08 | 5295.55 |
| 2012-13 | 15884.2 | -4796 | 5003 | 5136.6 | 55054.37 | 19621.3 | 5520.34 |
| Mean | 9010.4785 | -1112.9238 | 1881.1485 | 2425.6938 | 37089.5838 | 12622.5077 | 3265.5723 |
| S.D. | 4942.21242 | 1634.70401 | 1559.92003 | 1591.00841 | 10913.17912 | 6557.60700 | 1803.86280 |
| ACGR | 18.99per cent | 36.37per cent | 23.63per cent | 13.90 | 7.36per cent | 16.13per cent | 12.56per cent |

*Source: Foreign Exchange reserves, Current Account, Capital Account, Net fiscal deficit, GDP from Hand Book of Statistics and BSE and NSE from bseindia and nseindia websites*

The foreign exchange reserves of the country have increased at a rate of 18.99 per cent (ACGR) with a standard deviation of 4942 approximately and the mean score depicted is Rs. 9010 billion. They show a continuous rise year over year except in 2009-10 where there was a slight fall in them. It indicates towards a steady economic development. The Current Account balance of the country has been increasing negatively throughout (except in 2001-02 to 2003-04) with ACGR of 36.37 per cent and with standard deviation of 1635 approximately. The mean score of the current account balance is negative of Rs. 1113 billion (approximately) and has been a cause of concern for the policymakers and the government of the country. The capital account balance surged continuously from 2000-01 to 2004-05, decreased in next year, increased further for next two years but touched the ground in 2008-09 due to recession from US and showed the signs of improvement in after years . The mean score of it had been Rs. 1881.14 billion and its growth had been with ACGR of 23.63 per cent. The fiscal deficit of the country generally has been on rise and grew at the rate of 13.9 per cent (ACGR) and with a standard deviation of 1591 and on an average its balance has been Rs. 2426 billion approximately during the period under study. It is clear from the table that ACGR of GDP has been lowest at 7.36 per cent only among all the factors considered for the study. But the economy is at the right path and making satisfactory progress year over year. The stock market of the country also indicates towards a growth pattern by showing 16.13 and 12.56 per cent increase in BSE and NSE respectively during the period under study, though it showed a slump during the recession period in 2007-08.
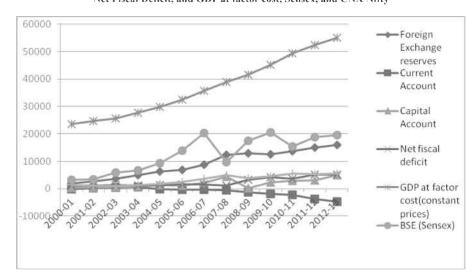
Figure 1: Flow of Foreign Exchange Reserves, Current Account, Capital Account,

Net Fiscal Deficit, and GDP at factor cost, Sensex, and CNX Nifty



A. Correlation between Foreign Exchange Reserves, Current Account, Capital

Account, Net Fiscal Deficit, GDP at factor cost, Sensex, and CNX Nifty

Table 2: Correlation Coefficients

| Variables | Foreign Exchange Reserves | Current Account | Capital Account | Net Fiscal Deficit | GDP at Factor cost | Sensex | CNX Nifty |
|---|---|---|---|---|---|---|---|
| Foreign Exchange Reserves | 1 | -.849** | .778** | .845** | .975** | .837** | .968** |
| Current Account | -.849** | 1 | -.744** | -.942** | -.928** | -.711** | -.828** |
| Capital Account | .778** | -.744** | 1 | .577* | .778** | .544* | .835** |
| Net Fiscal Deficit | .845** | -.942** | .577* | 1 | .975** | .756** | .792** |
| GDP at Factor cost | .975** | -.928** | .778** | .975** | 1 | .836** | .957** |
| Sensex | .837** | -.711** | .544** | .756** | .836** | 1 | .803** |
| CNX Nifty | .968** | -.828** | .835** | .792** | .957** | .803** | 1 |

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (1-tailed)

Source: Authors' calculations through SPSS

Karl Pearson's Coefficient of Correlation was applied to study the statistical relationship among the independent variables - foreign exchange reserves, current account, capital account, and dependent variables- GDP at factor cost, Sensex, CNX Nifty, and fiscal deficit, for 13 years and the output are expressed through Table 2. A strong and very high positive correlation between foreign exchange reserves & Sensex (r = 0.837), foreign exchange reserves & Nifty (r=0.968), foreign exchange reserves & GDP at factor cost (r=0.975), and foreign exchange reserves & fiscal deficit (r=0.845) was observed which is found to be significant at 1 per cent level of significance. Hence, it can safely be concluded that the foreign reserves of our country have a direct impact on share markets and the GDP of the nation and therefore, it is advised that the Government of India must take serious steps for their improvement and a permanent policy must be framed in this regard. Further, it was found that there is negative correlation between current

account and all the independent variables {Sensex (r= -.711), Nifty (r= -.828), GDP (r=-.928), and fiscal deficit (r=-.942)}**;** and a moderate correlation between capital account & fiscal deficit (r=0.577), and between capital account and Sensex (r=.544) but it is not significant at 1 per cent level of significance. If we look only at the outcome (ignore independent variables) then the highest correlation is found between the dependent variables GDP and net fiscal deficit (r=0.975 and p< 0.001) which is significant at 1 per cent level of significance. Further, we can also observe that among all the predictors, foreign exchange reserves, correlates best with the capital account (r=0.778, p<.001) and current account showed negative correlation with the other two dependent variables{foreign exchange reserves (r=-.849, p<.001), capital account (r=-.744, p<.001)}. The current account balance is an important measure of the economic health of a country, as far as the international business is concerned and has a strong bearing on the international relations of a country. But interestingly, it was found through the study that the current account balance has high degree of negative (-ve) correlation with Sensex, Nifty, GDP and fiscal deficit signifying there to that whenever, the balance of current account improves it affects adversely the

independent factors and vice versa. It is possible and permissible only within the prescribed limits under international standards, as it was felt during the presentation of Union Budget for 2013-14 by the finance minister where he stressed to keep the current account balance only up to 4.5 per cent, under the pressure of international agencies. The negative balance of current account helps to grow the economy within specified parameters and hence, the proper and timely measures are required to be made to keep it at an optimal level and to boost the economy.

**Regression analysis of Foreign Exchange Reserves, Current Account, Capital Account, Net Fiscal Deficit, GDP at factor cost, Sensex, and CNX Nifty**

*B. Impact of flow of Foreign Exchange Reserves, Current Account, and Capital Account on GDP at Factor Cost, Sensex (BSE), CNX Nifty, and Fiscal Deficit*

*Independent Variables***:** Foreign Exchange Reserves, Current Account, and Capital Account.

*Dependent Variables***:** GDP at Factor cost, Sensex (BSE), CNX Nifty (NSE), and Fiscal Deficit.

### Table 3(a) Model Summary of GDP at factor cost

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .928[a] | .861 | .848 | 4250.23474 | .861 | 68.115 | 1 | 11 | .000 | |
| 2 | .937[b] | .878 | .854 | 4168.46065 | .017 | 1.436 | 1 | 10 | .258 | |
| 3 | .993[c] | .986 | .982 | 1465.34652 | .108 | 71.923 | 1 | 9 | .000 | 1.733 |

a. Predictors: (Constant)CurrentAccount

b. Predictors: (Constant), CurrentAccount, CapitalAccount

c. Predictors: (Constant), CurrentAccount, CapitalAccount, Foreignexchangereserves

d. Dependent Variable: GDP
Source: Authors' calculations through SPSS

### Table 3(b) Model Summary of Sensex (BSE)

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .711[a] | .506 | .461 | 4813.27131 | .506 | 11.274 | 1 | 11 | .006 | |
| 2 | .712[b] | .507 | .408 | 5045.51180 | .001 | .011 | 1 | 10 | .920 | |
| 3 | .856[c] | .732 | .643 | 3918.01295 | .226 | 7.584 | 1 | 9 | .022 | 2.057 |

a. Predictors: (Constant), CurrentAccount

b. Predictors: (Constant), CurrentAccount, CapitalAccount

c. Predictors: (Constant), CurrentAccount, CapitalAccount, Foreignexchangereserves

d. Dependent Variable: Sensex

**Source: Authors' calculations through SPSS**

Table 3(c) Model Summary of CNX Nifty (NSE)

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .828ᵃ | .685 | .657 | 1057.00023 | .685 | 23.949 | 1 | 11 | .000 | |
| 2 | .891ᵇ | .793 | .752 | 898.32946 | .108 | 5.229 | 1 | 10 | .045 | |
| 3 | .977ᶜ | .954 | .939 | 446.18648 | .161 | 31.536 | 1 | 9 | .000 | 1.265 |

a. Predictors: (Constant), CurrentAccount

b. Predictors: (Constant), CurrentAccount, CapitalAccount

c. Predictors: (Constant), CurrentAccount, CapitalAccount, Foreignexchangereserves

d. Dependent Variable: CNXNifty

Source: Authors' calculations through SPSS

Table 3(d) Model Summary of Fiscal Deficit

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .942ᵃ | .887 | .877 | 558.77343 | .887 | 86.287 | 1 | 11 | .000 | |
| 2 | .960ᵇ | .921 | .905 | 490.25860 | .034 | 4.289 | 1 | 10 | .065 | |
| 3 | .976ᶜ | .953 | .937 | 400.03824 | .032 | 6.019 | 1 | 9 | .037 | 1.949 |

a. Predictors: (Constant), CurrentAccount

b. Predictors: (Constant), CurrentAccount, CapitalAccount

c. Predictors: (Constant), CurrentAccount, CapitalAccount, Foreignexchangereserves

d. Dependent Variable: FiscalDeficit

**Source: Authors' calculations through SPSS**

The **Table 3(a), 3(b), 3(c) & 3(d)** exposed the strength of relationship between the model and the dependent variables. The values of R depict the multiple correlation coefficients between the predictors (independent variables) and the outcome (dependent variable). When only current account was used as predictor, a strong correlation (r=.928) between current account and GDP at factor cost was observed. The next column gives the value of $R^2$, which tells us a measure of how much of the variability in the outcome (Sensex) is accounted for the predictors (Foreign Exchange Reserves, Current Account, and Capital Account). For the first model its value is .861 {Table 3(a)}, which means that current account accounts for 86.1 per cent variation in GDP at factor cost. However, when the other two predictors (Capital Account and foreign exchange reserves) are included as well, the value increases to .986 or 98.6 per cent and .986 or 98.6 per cent of the variance in GDP at factor cost respectively. Therefore, if current account accounts for 86.1 per cent variations, we can say that foreign exchange reserves and capital account accounts for an additional 12.5 per cent variance in the outcome variable and surprisingly only 1.7 per cent variations take place in the outcome variables due to capital account**.** So, the inclusion of the two

new predictors has explained quite a low amount of variation in GDP. Table 3(b) exposed the value of $R^2$ for Sensex, which expresses a measure of how much of the variability in the outcome (Sensex) is accounted for the predictors (current account, capital account, and foreign exchange reserves). For the first model its value is .506, which means that current account accounts for 50.6 per cent of variations in Sensex. However, when the other two predictors (capital account and foreign exchange reserves) are included as well, the value increases to .507 or 50.7 per cent and .732 or 73.2 per cent of the variance in Sensex respectively. Therefore, if current account accounts for 50.6 per cent, we can say that capital account and foreign exchange reserves accounts for an additional 22.6 per cent variance in the outcome. So, the inclusion of the predictor capital account has explained only 1 per cent of variation in Sensex. In addition to this, Table 3(c) exhibits the value of $R^2$ for Nifty, and for the current account its value is .685 which shows that current account accounts for 68.5 per cent of variations in Nifty, and when the other two predictors included as well the value increases to .954 or 95.4 per cent which means that inclusion of other two variables accounts for 26.9 per cent of variations in Nifty. Table 3(d) explicate

the value of $R^2$ for fiscal deficit and for current account its value is .887 which means that current account accounts for 88.7 per cent variations in fiscal deficit, and when capital account and foreign exchange reserves are also taken into consideration with current account the value increases to .953 means 95.3 per cent of variations take place in fiscal deficit due to current account, capital account, and foreign exchange reserves.

The above discussion shows that current account has a greater relationship and impact on GDP, Sensex, Nifty, and Fiscal deficit in comparison to capital account and foreign exchange reserves but all the three predictors taken together have shown more impact on GDP and fiscal deficit than other outcome variables.

Table 4: ANOVA (GDP, Sensex, CNX Nifty, and Fiscal Deficit)

| Model | GDP | | Sensex | | CNX Nifty | | Fiscal Deficit | |
|---|---|---|---|---|---|---|---|---|
| | F | Sig. | F | Sig. | F | Sig. | F | Sig. |
| a. | 68.115 | .000$^a$ | 11.274 | .000$^a$ | 23.949 | .000$^a$ | 86.287 | .000$^a$ |
| b. | 36.125 | .000$^b$ | 5.135 | .002$^b$ | 19.193 | .000$^b$ | 58.190 | .000$^b$ |
| c. | 218.861 | .000$^c$ | 8.205 | .006$^c$ | 62.378 | .000$^c$ | 60.271 | .000$^c$ |

a. Predictors: (Constant), CurrentAccount
b. Predictors: (Constant), CurrentAccount, CapitalAccount
c. Predictors: (Constant), CurrentAccount, CapitalAccount, Foreignexchangereserves
d. Dependent Variable: FiscalDeficit
**Source: Authors' calculations through SPSS**

Table 4 presents the ANOVA analysis; exhibits the acceptability of the model from a statistical perspective. The F-ratio related to GDP for model 'a' 'b' and 'c' are 68.115, 36.125 and 218.861 respectively which are significant at 0.05 per cent level of significant( p < 0.05), but the F- ratio for model 'c' is more than other two models. So, we can safely conclude that the model 'c' is more significant in predicting the outcome variable (GDP). Further, the table revealed that the F-ratio Sensex for model 'a', 'b', and 'c' is 11.274, 5.135, and 8.205 respectively which are significant, since the p values are less than 0.05 but the F- ratio for model 'a' is more than the other two models. So, we can safely conclude that the model 'a' is more significant in predicting

the outcome variable. In case of CNX Nifty the F-ratio for model 'a', 'b', and 'c' are 23.949, 19.193, and 62.378 respectively which are significant (p< 0.05) but the F- ratio for model 'c' is more than the other two models. So, we can safely conclude that the model 'c' is more significant in predicting the outcome variable (CNX Nifty). In case of fiscal deficit the F-ratio related to the model 'a', 'b', and 'c' are 86.287, 58.190, and 60.271 respectively which are significant at 0.05 per cent level of significance, and F- ratio for model 'c' is more than the other two models. So, we can safely conclude that the model 'c' is more significant in predicting the outcome variable (fiscal deficit).

Table 5(a): Coefficient (GDP at factor cost)

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 30195.612 | 1444.757 | | 20.900 | .000 | | |
| | CurrentAccount | -6.194 | .751 | -.928 | -8.253 | .000 | 1.000 | 1.000 |
| 2 | (Constant) | 28686.590 | 1895.715 | | 15.132 | .000 | | |
| | CurrentAccount | -5.213 | 1.101 | -.781 | -4.734 | .001 | .447 | 2.238 |
| | CapitalAccount | 1.383 | 1.154 | .198 | 1.198 | .258 | .447 | 2.238 |
| 3 | (Constant) | 21103.161 | 1115.204 | | 18.923 | .000 | | |
| | CurrentAccount | -2.449 | .506 | -.367 | -4.839 | .001 | .261 | 3.824 |
| | CapitalAccount | -.190 | .446 | -.027 | -.425 | .021 | .370 | 2.705 |
| | Foreignexchangereserves | 1.511 | .178 | .684 | 8.481 | .000 | .231 | 4.335 |

a. Dependent Variable: GDP,
Source : Authors'
Calculations through SPSS

### Table 5(b): Coefficient (Sensex)

| Model | Unstandardized Coefficients | | Standardized Coefficient | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|
| | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 (Constant) | 9446.305 | 1636.147 | | 5.774 | .000 | 1.00 | 1.000 |
| Current Account | -2.854 | .850 | .711 | 3.358 | .006 | | |
| 2 (Constant) | 9288.888 | 2294.577 | | 4.048 | .002 | | |
| Current Account | -2.752 | 1.333 | -.686 | -2.064 | .066 | .447 | 2.238 |
| Capital Account | .144 | 1.397 | .034 | .103 | .920 | .447 | 2.238 |
| 3 (Constant) | 2704.801 | 2981.809 | | .907 | .388 | | |
| Current Account | -.352 | 1.353 | -0.88 | -.260 | .001 | .261 | 3.824 |
| Capital Account | -1.221 | 1.193 | -.280 | -1.024 | .003 | .370 | 2.705 |
| Foreign exchange-reserves | 1.312 | .476 | .989 | 2.754 | .022 | .231 | 4.335 |

Dependent Variable: Sensex.   Source: Authors' Calculations through SPSS

### Table 5(C): Coefficient (CNX Nifty)

| Model | Unstandardized Coefficients | | Standardized Coefficient | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|
| | B | Srd. Error | Beta | | | Tolerance | VIF |
| 1 (Constant) | 2248.956 | 359.3 | | 6.259 | .000 | | |
| Current Account | -.913 | .187 | -.828 | -4.894 | .000 | 1.000 | 1.000 |
| 2 (Constant) | 1628.351 | 408.539 | | 3.986 | .003 | | |
| Current Account | -.510 | .237 | -.462 | -2.148 | .057 | .447 | 2.238 |
| Capital Account | .569 | .249 | .492 | 2.287 | .045 | .447 | 2.238 |
| 3 (Constant) | 99.341 | 339.571 | | .293 | .776 | | |
| Current Account | .047 | .157 | .043 | .308 | .055 | .261 | 3.824 |
| Capital Account | .252 | .136 | .218 | 1.853 | .047 | .370 | 2.705 |
| Foreign exchange-reserves | .305 | .054 | .835 | 5.616 | .000 | .231 | 4.335 |

Dependent Variable: Nifty,   Source: Authors' Calculations through SPSS

### Table 5(d): Coefficient (Fiscal Deficit)

| Model | Unstandardized Coefficients | | Standardized Coefficient | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|
| | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 (Constant) | 1405.591 | 189.941 | | 7.4 | .000 | 1.00 | 1.000 |
| Current Account | -.917 | .099 | -.942 | -9.289 | .000 | | |
| 2 (Constant) | 1712.347 | 222.958 | | 7.680 | .000 | | |
| Current Account | -1.116 | .130 | -1.147 | -8.617 | .000 | .447 | 2.238 |
| Capital Account | -.281 | .136 | -.276 | -2.071 | .065 | .447 | 2.238 |
| 3 (Constant) | 1113.434 | 304.450 | | 3.657 | .005 | | |
| Current Account | -.898 | .138 | -.922 | -6.499 | .000 | .261 | 3.824 |
| Capital Account | -.405 | .122 | -.397 | -3.328 | .009 | .370 | 2.705 |
| Foreign exchange-reserves | .119 | .049 | .371 | 2.453 | .037 | .231 | 4.335 |

Dependent Variable: Fiscal Deficit,   Source: Authors' Calculations through SPSS

The analytical Tables 5(a), 5(b), 5(c), and 5(d) exhibit the estimates of b-values (Unstandardized coefficients) which explicate the individual contribution of each independent (predictors) variable to the model. The positive value depicts positive relationship between the predictors and outcome variable and vice-versa. The b-values also explain to what degree each predictor affects the outcome variable if the effects of the other predictors are held constant. If we replace the b-values in equation, we can define the models as follows:

*Model A: $GDP_i = b_0 + b_1$ Foreign Exchange Reserves$_{i} + b_2$ Current Account$_{i} + b_3$ Capital Acconts$_i$*

$= 21103.161 + (1.511$ *Foreign Exchange Reserves$_i$) + (-2.449 Current Account$_i$) + (-.190 Capital Acconts$_i$)*

*Model B: Sensex$_i = b_0 + b_1$ Foreign Exchange Reserves$_{i} + b_2$ Current Account$_{i} + b_3$ Capital Acconts$_i$*

$= 2704.801 + (1.312$ *Foreign Exchange Reserves$_i$) + (-.352 Current Account$_i$) + (-1.221 Capital Acconts$_i$)*

*Model C: Nifty$_i$ = b$_0$ + b$_1$ Foreign Exchange Reserves$_i$ + b$_2$ Current Account$_i$ + b$_3$ Capital Acconts$_i$*

*=99.341+ (.305 Foreign Exchange Reserves$_i$) + (.047 Current Account$_i$) + (.252 Capital Acconts$_i$)*

*Model D: Fiscal Deficit$_i$ = b$_0$ + b$_1$ Foreign Exchange Reserves$_i$ + b$_2$ Current Account$_i$ + b$_3$ Capital Acconts$_i$*

*=1113.434+ (.119 Foreign Exchange Reserves$_i$) + (-.898 Current Account$_i$) + (-.405 Capital Acconts$_i$)*

Unstandardized coefficients (b-values) for Model A, Model B, Model C, and Model D exhibit through Table 5(a), 5(b), 5(c), and 5(d) respectively.

- **Foreign Exchange Reserves** (b$_{5a}$= 1.511, b$_{5b}$= 1.312, b$_{5c}$= .305, and b$_{5d}$= .119): These values indicate that as foreign exchange reserve increases by one unit (1 billion), GDP, Sensex, Nifty, and fiscal deficit increase by 1.511{Table 5 (a)}, 1.312 {Table 5 (b)}, .305 {Table 5 (c)}, and .119 units {Table 5 (d)}respectively. Therefore, every additional unit (1 billion) of foreign exchange reserve is associated with an extra 1.511, 1.312, .305, and .119 units increment in GDP, Sensex, Nifty, and fiscal deficit respectively. This interpretation is true only if the effects of current account & capital account are held constant.

- **Current Account** (b$_{5a}$= -2.449, b$_{5b}$= -.352, b$_{5c}$= .047, and b$_{5d}$= -.898): These values indicate that as current account balance increases by one unit (1 billion), GDP, Sensex, and fiscal deficit decrease by -2.449{Table 5 (a)}, -.352 {Table 5 (b)},and .-898 {Table 5 (d)}respectively , and Nifty increases by .047 units {Table 5 (c). Therefore, every additional unit (1 billion) of current account is associated with an extra -2.449, -.352, and -.898 units decrement in GDP, Sensex, and fiscal deficit respectively and .047 units increment in Nifty. This interpretation is true only if the effects of foreign exchange reserves & capital account are held constant.

- **Capital Account** (b$_{5a}$= -.190, b$_{5b}$= -1.221, b$_{5c}$= .252, and b$_{5d}$= -.405): These values indicate that as capital account increases by one unit (1 billion), GDP, Sensex, and fiscal deficit decrease by -.190{Table 5 (a)}, -1.221{Table 5 (b)},and .-405 {Table 5 (d)}respectively , and Nifty increases by .252 units {Table 5 (c). Therefore, every additional unit (1 billion) of capital account is associated with an extra -.190, -1.221, -.405 decrement in GDP, Sensex, and fiscal deficit respectively and .252 units increment in Nifty. This interpretation is true only if the effects of foreign exchange reserves & current account are held constant.

The **standardized beta values** (labelled as Beta =**β**) exposed through the Table 5(a) & 5(b) indicate the volume of change in standard deviation outcome (dependent variable) due to one standard deviation change in the predictor (independent variable).

- **Foreign Exchange Reserves** (β$_{5a}$= .684, β$_{5b}$=.989, β$_{5c}$= .835, and β$_{5d}$= .371 ): These values observe that as foreign exchange reserves increases by one standard deviation (4942.21242), GDP, Sensex and Nifty, and fiscal deficit increase by .684{Table 5 (a)} and .989 {Table 5 (b)}, .835 {Table 5 (c)}, .371{Table 5 (d)},standard deviation. The S.D for GDP is 10913.17912 and so, this constitutes a change of 7464.615 (10913.17912 X .684) and S.D for Sensex is 6557.60700 so, this constitutes a change of 6485.47 (6557.60700 X .989) and S.D for Nifty is 1803.86280 so, this constitutes a change of 1506.225 (1803.86280 X .835), and S.D for fiscal deficit is 1591.00841 so, this constitutes a change of 590.264 (1591.00841 X .371). This interpretation is true only if the effects of current account and capital account are held constant.

- **Current Account** (β$_{5a}$= -.367, β$_{5b}$=.-.088, β$_{5c}$= .043, and β$_{5d}$= -.922): These values observe that as current account increases by one standard deviation (1634.70401), GDP, Sensex and fiscal deficit decrease by -.367{Table 5 (a)} and -.088 {Table 5 (b)}, -.922 {Table 5 (d)}, and Nifty increases by .043{Table 5 (c)},standard deviation. The S.D for GDP is 10913.17912 and so, this constitutes a change of 4005.137 (10913.17912 X - .367) and S.D for Sensex is 6557.60700 so, this constitutes a change of 577.069 (6557.60700 X -.088) and S.D for Nifty is 1803.86280 so, this constitutes a change of 77.566 (1803.86280 X .043), and S.D for fiscal deficit is 1591.00841 so, this constitutes a change of 1466.909 (1591.00841 X -.922). This interpretation is true only if the effects of current foreign exchange reserves and capital account are held constant.

- **Capital Account** (β$_{5a}$= -.027, β$_{5b}$=-.290, β$_{5c}$= .218, and β$_{5d}$= -.397): These values observe that as current account increases by one standard deviation (1559.92003), GDP, Sensex, and fiscal deficit decrease by -.027{Table 5 (a)} and -.290 {Table 5 (b)}, -.397 {Table 5 (d)}, and Nifty increases by .218{Table 5 (c)}standard deviation. The S.D for GDP is 10913.17912 and so, this constitutes a change of 294.65 (10913.17912 X -.027) and S.D for Sensex is 6557.60700 so, this constitutes a change of 1901.70603 (6557.60700 X -.290) and S.D for Nifty is 1803.86280 so, this constitutes a change of 393.242 (1803.86280 X .218), and S.D for fiscal deficit is 1591.00841 so, this constitutes a change of 631.63 (1591.00841 X -.397).

This interpretation is true only if the effects of current account and foreign exchange reserves are held constant.

**Testing of Hypotheses**

1. $H_{01}$: There is no significant impact of foreign exchange reserves on the movements of Sensex and Nifty, fiscal deficit and GDP.

   The p-value related to foreign exchange reserves in Tables 5(a), 5(b), 5(c), and 5(d) are less than 0.05 so null hypotheses $H_{01}$ is not accepted. Hence, it is concluded that trends of foreign exchange reserves, fiscal deficit, GDP, indices of BSE and NSE are dependent and foreign exchange reserves have significant impact on GDP, fiscal deficit and indices of BSE and NSE.

2. $H_{02}$: There is no significant impact of current account on the movements of Sensex, Nifty, fiscal deficit and GDP.

The p-value related to foreign exchange reserves in Tables 5(a), 5(b), 5(c), and 5(d)      are less than 0.05 so null hypotheses $H_{01}$ is not accepted. Hence, it is concluded that trends of current account, GDP, indices of BSE and NSE are dependent and current account have significant impact on fiscal deficit, GDP and indices of BSE and NSE.

3. $H_{03}$: There is no significant impact of capital account on the movements of Sensex, Nifty. Fiscal deficit and GDP.

   The p-value related to capital account in Tables 5(a), 5(b), 5(c), and 5(d) are less than 0.05 so null hypotheses $H_{01}$ is not accepted. Hence, it is concluded that trends of capital account, GDP, indices of BSE and NSE are dependent and capital account have significant impact on fiscal deficit, GDP and indices of BSE and NSE.

### Summary of MODELS developed

| Dependent Variables | R square | Independent Variables | B |
|---|---|---|---|
| GDP at factor cost | .861 | Current Account | -2.449 |
| | .878 | Current Account & Capital Account | -.190 |
| | .986 | Current Account, Capital Account & Foreign Exchange Reserves | 1.511 |
| Sensex | .711 | Current Account | -.352 |
| | .712 | Current Account & Capital Account | -1.221 |
| | .856 | Current Account, Capital Account & Foreign Exchange Reserves | 1.312 |
| CNX Nifty | .826 | Current Account | .047 |
| | .891 | Current Account & Capital Account | .252 |
| | .977 | Current Account, Capital Account & Foreign Exchange Reserves | .305 |
| Fiscal Deficit | .887 | Current Account | -.898 |
| | .921 | Current Account & Capital Account | -.405 |
| | .953 | Current Account, Capital Account & Foreign Exchange Reserves | .119 |

**Conclusion and Suggestions**

The study which was conducted to assess the impact of foreign exchange reserves, current account balance, and capital account on GDP at factor cost, fiscal deficit and Indian stock market (BSE and NSE) found that the current account (CAD) is the most important predictor of GDP, BSE, NSE and fiscal deficit with R square values of .861, .506, .685 and .887 respectively; and coefficient of correlation (-ve) of -.928, -.711, -.828, and -.942 respectively. Though, the current account is a significant factor for all outcome variables yet its impact on GDP and fiscal deficit has been greater than other two outcomes; and when all the predictors (foreign exchange reserves and capital account) taken together they showed more impact on BSE ($R^2$change= 22.6 per cent) than other outcome variables (GDP, fiscal deficit and NSE). It was further indicated through the results that if three selected independent factors remain constant, then there are other factors which are explaining GDP, BSE, NSE, and fiscal deficit up to 21103.16, 2704.8, 99.341, and 1113.4 units. By keeping in view the above results it is suggested that the Government of India should strive to frame such policies which are capable of attracting more and more foreign capital up to the optimum limit which may trigger the

process of more infrastructural development of the nation and paves way to fast economic development leading towards transforming India into an economic power of the globe capable of rendering the desired level of economic and social services to its people in particular and to the people of globe in general, and entail curtail on imports to deal with the widening current account deficit. The previous studies showed that the variables like investments, GDP, consumption and stock prices have a significant impact on the stock market prices; and the present study takes one step ahead by involving more number of independent and dependent factors though it also confirms the results of the earlier studies (**Ahmed, 2003, Nishant, 2004, Ali and Ahmed, 2008, and Shahid, 2008**). The size of foreign exchange reserves could be a restraining factor in checking depreciation of local currency in the event of external shock and reversal of capital. It is therefore imperative that during times of surge in capital flows, when currency is under pressure to appreciate, measures should be taken to build up reserve levels. The results of the present study may work as benchmarks for the policy implementing authorities and guidelines for the policy makers of the country for bringing upward the standards in the field of the economy.

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