An Empirical Analysis of Economic Indicators: An Indian Perspective

Dr. Shuchi Singhal

Associate Professor, International
School of Informatics and Management
Jaipur (Raj.)

Introduction

India is witnessing a massive shift in the various economic parameters contributing to the country's growth and development. In the post liberalization period, there was a shift in the government's attitude towards foreign direct investment (FDI), one of the key economic indicators.

The Indian economy had faced global slowdown in 2007-2009, and again rejuvenating in 2010-11. Managing growth and price stability are the most critical challenges for the Indian economy. Inflation was high in the past decade, although food inflation was almost negligible. The monetary policy was tightened by the central bank (Reserve Bank of India) in order to curb inflation.

The decision taken in favour of FDI in retail is also likely to affect the growth indicators of the country. India being the second most populous country in the world, offers an attractive venue for global retail chains. Indian retail industry is likely to grow to 18,812 billion by the end of the first quarter of 2013. AT Kearney has rated the most attractive nation for retail investment as India.

The objective of this paper is to certify the following objectives:

1. To analyze the various economic indicators of India.

2. To find correlation among the economic indicators and analyze their relationship.

3. To develop a regression model based on the correlation analysis to find the impact of FDI on other economic indicators.

Economic Indicators

Economic indicators represent the statistics about an economy which indicates in which direction the economy is moving. They are used to assess the present economic performance and make predictions about the future performance. The economic indicators may be categorized into three broad categories: leading indicators, co-incidental indicators and lagging indicators. The lagging indicators may be easily forecasted on the basis of leading indicators. A regression model may be formulated by taking leading indicators as independent variables and lagging indicators as dependent variables.

In this paper, the following economic indicators are analyzed:

1. Total FDI Inflows

2. Real GDP Growth rate

3. Inflation

4. Foreign Exchange Reserves

5. Fiscal Deficit

Statistical Analysis

The above five variables are analyzed with respect to different aspects of descriptive statistics namely minimum value, maximum value, mean and standard deviation.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Total FDI	12	4.00	37.80	18.4917	14.05143
Real GDP Growth rate	12	3.84	9.60	7.3758	1.94930
Inflation Rate	12	3.40	8.80	5.9000	1.97069
Gross Fiscal Deficit (% of GDP)	12	4.10	9.60	7.8083	1.70745
Foreign Exchange Reserves	12	197204.00	1580460.00	849961.0000	478893.91805
Valid N (listwise)	12				

The measure of dispersion, standard deviation, depicts that Total FDI value is more prone to fluctuations as it has the highest standard deviation. Thus, correlation analysis should be carried out for each variable with Total FDI and whichever variable is closely correlated with it, whether positively or negatively, should be used to construct the regression model.

Correlation Analysis

There are five variables under study. The correlation analysis is conducted among these variables, taking two variables at a time. Thus, ten combination of variables were studied using SPSS as shown below:

Karl Pearson's Coefficient of Correlation Analysis

S.No.		Pearson Correlation	Significance Level	Type of Correlation	Significant/Not Significant
1.	Total FDI Inflows and Real GDP Growth rate	.394	.01	Low degree of positive correlation	Not Significant
2.	Total FDI Inflows and Inflation	.284	.01	Low degree of positive correlation	Not Significant
3.	**Total FDI Inflows and foreign exchange reserves**	**.899**	**.01**	**High degree of positive correlation**	**Significant**
4.	Total FDI Inflows and fiscal deficit	-.215	.01	Low degree of negative correlation	Not Significant
5.	Real GDP Growth rate and foreign exchange reserves	.447	.01	Low degree of positive correlation	Not Significant
6.	Real GDP Growth rate and Inflation	.023	.01	No correlation	Not Significant
7.	**Real GDP Growth rate and fiscal deficit**	**-.676**	**.01**	**High degree of negative correlation**	**Significant**
8.	Foreign exchange reserves and Inflation	.492	.01	Low degree of positive correlation	Not Significant
9.	Foreign exchange reserves and fiscal deficit	-.224	.01	Low degree of negative correlation	Not Significant
10.	Inflation and fiscal deficit	-.035	.01	No correlation	Not Significant

The above ten combinations of variables depict close association between the following economic indicators showing significant correlation:

• Total FDI Inflows and Foreign Exchange Reserves

• Real GDP Growth Rate and Fiscal Deficit

Developing Regression Model

Regression model is based on correlation analysis. The variables having significant correlation are further used to develop a regression model. Regression model is used to establish the nature of relationship among the variables under study wherein one variable is to be specified as independent variable and the other as dependent variable. The following two models are developed using SPSS:

I. Total FDI Inflows and Foreign Exchange Reserves

Total FDI Inflows is taken as independent variable and foreign exchange reserves as dependent variable.

Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	283160.533	107751.308		2.628	.025
	Total FDI	30651.670	4711.947	.899	6.505	.000

$Y = a + b\,X$

$Y = 283160.533 + 30651.670\,X$

II. Real GDP Growth Rate and Fiscal Deficit

Total Real GDP Growth Rate is taken as independent variable (X) and Fiscal Deficit as dependent variable (Y).

Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.178	1.552		7.845	.000
	Real GDP Growth rate	-.592	.204	-.676	-2.904	.016

$Y = a + b\,X$

$Y = 12.178 - 0.592\,X$

Testing model fit using coefficient of determination (R Square)

Model I

Total FDI Inflows and Foreign Exchange Reserves

The value of R Square is 0.809 which means that 80.9% variation in the dependent variable can be considered as explained variation due to changes in independent variable.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.899[a]	.809	.790	219592.37415

a. Predictors: (Constant), Total FDI

Model II

Real GDP Growth Rate and Fiscal Deficit

The value of R Square is 0.457 which means that 45.7% variation in the dependent variable can be considered as explained variation due to changes in independent variable.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.676[a]	.457	.403	1.31909

a. Predictors: (Constant), Real GDP Growth rate

Discussion and Conclusion

This study pertains to determine the relationship and the direction of the various economic indicators specifically total FDI inflows, real GDP growth rate, inflation, foreign exchange reserves and fiscal deficit, by using correlation and regression analysis. The results of the study indicate that total FDI inflows and foreign exchange reserves have close positive association. On the other hand, the real GDP growth rate and fiscal deficit were found to have high degree of negative correlation. On the basis of these results, regression models have been developed. Model I is appropriate fit for regression analysis as the value of R Square is almost double than the Model II. Thus, the first regression model, in which Total FDI Inflows is an independent variable and foreign exchange reserves as dependent variable, can be considered for forecasting of dependent variable. The economic indicators may be further classified to analyze the impact on other key indicators as well as on economic and financial growth.

References

Ali Imran et. al. (2010), "Causal Relationship between Macro-Economic Indicators and Stock Exchange Prices", African Journal of Business Management, Volume 4, pp 312-319.

Jayachandran G. and Seilan A. (2010), "A Causal Relationship between Trade, Foreign Direct Investment and Economic Growth for India", International Research Journal of Finance and Economics, EuroJournals Publishing, Issue 42, pp 74-88.

Reyadh Y. Faras & Khalifa H. Ghali (2009), "Foreign Direct Investment and Economic Growth: The Case of the GCC Countries" International Research Journal of Finance and Economics, Issue 29.

Martin Falk and Mariya Hake (2007), "A Panel Data Analysis on FDI and Exports", Austrian Institute of Economic Research (WIFO).

Muharrem Afsar (2002), "The Causality Relationship Between Economic Growth And Foreign Direct Investment in Turkety".

Annexure

India – Macro-economic Summary : 1999-2000 to 2012-13 (E) (as on 1st December, 2012)

Indicators	1999-2K	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
India's Real GDP Growth Rates (Factor Cost)	**6.04**	**4.35**	**5.81**	**3.84**	**8.52**	**7.60**	**9.49**	**9.60**	**9.30**	**6.70**	**8.40**	**8.37**	**6.53**
Agriculture growth (%)	0.5	-0.2	6.3	-7.2	10.0	1.6	5.1	4.2	5.8	0.1	1.0	7.0	2.8
Industry growth (%)	4.6	6.4	2.7	7.1	7.4	9.4	9.7	12.2	9.7	4.4	8.4	7.2	3.4
Services growth (%)	9.5	5.7	7.2	7.5	8.5	9.4	10.9	10.1	10.3	10.0	10.5	9.3	8.9
By Demand (%YoY)													
Consumption	7.2	3.0	5.3	2.3	5.4	2.3	8.6	7.9	9.3	7.6	8.1	8.1	5.4
Private Consumption	6.1	3.4	6.0	2.9	5.9	2.1	8.5	8.7	9.2	7.1	7.0	8.1	5.5
Public Consumption	13.2	0.9	2.3	-0.4	2.6	3.4	8.9	3.8	9.6	10.4	14.3	7.8	5.1
Gross Fixed Capital Formation	11.2	0.0	7.4	6.8	13.6	20.7	16.2	13.8	16.2	3.5	6.8	7.5	5.5
Consumption; Investments, Savings (%GDP)													
Consumption	79.4	78.5	78.9	77.2	75.0	70.3	69.3	68.3	67.4	68.8	69.4	68.4	67.7
Capital Formation	25.3	23.8	22.3	24.6	26.9	32.8	34.7	35.7	38.1	34.3	36.1	35.8	35.5
Gross Domestic Savings	24.2	23.2	22.9	25.7	29.1	32.4	33.4	34.6	36.8	32.0	33.8	32.3	32.0
Money Supply	**14.6**	**16.8**	**14.1**	**14.7**	**16.8**	**12.0**	**21.4**	**21.3**	**22.1**	**20.5**	**19.2**	**16.0**	**16.0**
Bank Credit growth	18.2	17.3	15.3	23.7	15.3	30.9	37.0	28.1	22.3	17.5	16.9	21.5	17.0
Deposit growth	13.9	18.4	14.6	16.1	17.5	13.0	24.0	23.8	22.4	19.9	17.0	16.0	16.0
Fiscal Indicators (% GDP)													
Centre's Fiscal Deficit	-5.2	-5.4	-6.0	-5.7	-4.3	-3.9	-4.0	-3.3	-2.5	-6.0	-6.5	-4.9	-5.9
State Fiscal Deficit	-4.5	-4.0	-4.1	-3.9	-4.2	-3.3	-2.4	-1.8	-1.5	-2.4	-2.9	-2.7	-2.5
Combined Deficit (Centre+State)	-9.0	-9.1	-9.5	-9.1	-8.1	-7.2	-6.5	-5.4	-4.1	-8.4	-9.6	-8.3	-8.4
Inflation - WPI (Average)	3.3	7.1	3.6	3.4	5.5	6.5	4.4	6.5	4.8	8.0	3.6	8.6	8.8
CPI (Average)	3.4	3.7	4.3	4.1	3.8	3.9	4.2	6.8	6.2	9.1	13.0	9.5	9.0
Exports (US$bn)	37.5	45.5	44.7	53.8	66.3	85.2	105.2	128.9	166.2	189.0	182.4	250.5	309.8
% YoY	9.5	21.1	-1.6	20.3	23.3	28.5	23.4	22.6	28.9	13.7	-3.5	37.3	23.7
Imports (US$bn)	55.4	57.9	56.3	64.5	80.0	118.9	157.1	190.7	257.6	308.5	300.6	381.1	499.5
%YoY	16.5	4.6	-2.8	14.5	24.1	48.6	32.1	21.4	35.1	19.8	-2.6	26.7	31.1
Trade deficit (US$bn)	-17.8	-12.5	-11.6	-10.7	-13.7	-33.7	-51.9	-61.8	-91.5	-119.5	-118.2	-130.6	-189.8
Invisibles (US$bn)	13.7	9.8	15.0	17.0	27.8	31.2	42.0	52.2	75.7	91.6	80.0	84.6	111.6
Current Account Deficit (US$bn)	-4.1	-2.7	3.4	6.3	14.1	-2.5	-9.9	-9.6	-15.7	-27.9	-38.2	-45.9	-78.2
% to GDP	-0.9	-0.6	0.7	1.2	2.3	-0.3	-1.2	-1.0	-1.3	-2.3	-2.8	-2.7	-4.2
Capital Account (US$bn)	9.5	8.8	8.6	10.8	16.7	28.0	25.5	45.2	106.6	6.8	51.6	62.0	67.8
% GDP	2.0	1.9	1.7	2.1	2.7	3.9	3.1	4.8	8.6	0.6	3.8	3.7	3.7
Forex Assets (exc. gold)(US$bn)	35.1	39.6	51.0	71.9	106.1	135.1	145.1	191.9	299.1	241.6	252.8	273.7	260.9
External Debt (US$bn)	98.3	101.3	98.8	104.9	112.7	134.0	139.1	172.4	224.4	224.5	261.0	305.9	345.7
Short Term Debt	3.9	3.6	2.7	4.7	4.4	17.7	19.5	28.1	45.7	43.3	52.3	65.0	78.2

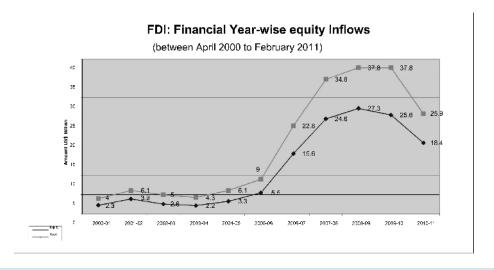*Source: CSO, RBI, Ministry of Finance, 1st December, 2012*

Foreign Exchange Reserves from 1990-91 ($ million)
(as at the end of 31st March each year)

Financial Year	Foreign Exchange Reserves (in Rs. Crore)	Foreign Exchange Reserves (in US $ million)
1990-91	11,416	5,834
1991-92	23,850	9,220
1992-93	30,744	9,832
1993-94	60,420	19,254
1994-95	79,780	25,186
1995-96	74,384	21,687
1996-97	94,932	26,423
1997-98	115,905	29,367
1998-99	138,005	32,490
1999-00	165,913	38,036
2000-01	197,204	42,281
2001-02	264,036	54,106
2002-03	361,470	76,100
2003-04	490,129	112,959
2004-05	619,116	141,514
2005-06	676,387	151,622
2006-07	868,222	199,179
2007-08	1,237,965	309,723
2008-09	1,283,865	251,985
2009-10	1,259,665	279,057
2010-11	1,361,013	274,330
2011-12 (P) on 31/12/11	1,580,460	296,689

Source : Bulletin Reserve Bank of India (Table 45); Economic Survey 2011-12

* As on March 31, 2011 (including gold, SDRs and ReserveTranche Position at IMF)
Excludes US$250.00 million (as also its equivalent value in Indian Rupee) invested in foreign currency denominated bonds issued by IIFC (UK) since March 20, 2009 and include US$ 6699 million reflecting the purchase of 200MT of gold from IMF on Nov.3, 2009

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FDI: Financial Year-wise equity Inflows
(between April 2000 to February 2011)