

## AN ECONOMETRIC EVALUTION OF FIIs IN INDIA

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### Abstract:

*Foreign institutional investments have been a major driving force of movements in the stock markets for all those economies that have been encouraging (through “external coercive forces” or otherwise) an exposure to this “Brave new world”. These have been so important that any government which wishes to survive a full tenure of parliamentary life cannot afford to ignore this eccentric part of the economy continuously “tweaking” with policies which are meant to attract them into our lives. This paper tries to explain the factors affecting FII through econometric model. We try to forecast the future FII to check the accuracy of our model.*

### KEYWORDS:

FII, OLS, Market stock volatility, P/E ratio, Libor.

### INTRODUCTION

Foreign Institutional Investors (FIIs) registered with SEBI are eligible to purchase shares and convertible debentures under the Portfolio Investment Scheme. The FII should apply to the designated AD for opening a foreign currency account and/or a Non Resident Rupee Account. Investment by FIIs is regulated under SEBI (FII) Regulations, 1995 and Regulation 5(2) of FEMA Notification No. 20 dated May 3, 2000. SEBI acts as the nodal point in the entire process of FII registration. FIIs are required to apply to SEBI in a common application form in duplicate. RBI approval is also required under FEMA to enable an FII to buy/sell securities on Stock Exchanges and open foreign currency and Indian Rupee accounts with a designated bank branch.

### FOREIGN INSTITUTIONAL INVESTORS (FIIs)

FIIs include Asset Management Companies, Pension Funds, Mutual Funds, Investment, Trusts as Nominee Companies, Incorporated/Institutional Portfolio Managers or their Power of Attorney holders, University Funds, Endowment Foundations, Charitable Trusts and Charitable Societies.

### REVIEW OF LITERATURE

In the paper, Determinants of Foreign Institutional Investment in India: The role of Return, Risk and Inflation by Kulwant Rai & N R Bhanumurthy(2004), examines the determinants of Foreign Institutional Investments (FII) in India. The paper shows that, the equity return in India is the main driving force for foreign institutional investment, which is significant at all levels. Returns in foreign market have the expected negative sign and is significant at 5 percent level. Domestic inflation rate has the hypothesized negative sign and is significant at all levels. Inflation rate in US has positive sign and is highly significant. Ex ante risk in domestic stock market adversely affects the inflow of FII to India and is highly significant. Predictable risk in foreign market adversely affects FII flow to India and is highly significant in the model.

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Ex post risk for Indian stock market and for US stock market are insignificant in the model (with a lag), i.e. it does not seem to be affecting foreign institutional investment flowing to India.

### OBJECTIVE OF THE STUDY

1. To explain the determinates and factors, domestic and international, which effects and explain the FIIs
2. To test the accuracy of model by forecasting the future values of FIIs

### DATA

The period of estimation for our models is 2002:01 - 2005:12. The “ex-post” forecast period which is also the period when we test our model is 2006:01 - 2006:12. We select this particular time period because it is safest period without any major structural changes – politically, economically or in any other way.

### RESEARCH METHODOLOGY

#### Ordinary Least Square Regression Method

The estimation technique we used is Ordinary Least Squares (OLS) regression of the net foreign institutional investment coming to India on integration with world, BSE Sensex growth rate, volatility of the stock markets, labor, p/e ratio, Index of Industrial production, exchange rates, the foreign exchange reserves and WPI inflation the nine independent variables initially. The forecasts are calculated after correcting for serial correlation and heteroscedasticity (White's robust measure). Note that the period of formulating the model was from 2002:01 to 2005:12. The out-of-sample forecasts were done for the period 2006.

#### Model 1: The “Initial” model:

In the following model, we have essentially used all the nine variables that we have listed above. This model basically is the first step which would help us to identify insignificant variables. The following is the equation that we had started with:

$$FII_t = \beta_0 + \beta_1 bse\_sensex\_growt + \beta_2 stock\_market\_v + \beta_3\_month\_libor\_US0 + \beta_4 integration\_with + \beta_5 P\_E\_ratio + \beta_6 wpi\_Inflation01 + \beta_7 exch\_rate + \beta_8 IIP + \beta_9 foreign\_exchang + \epsilon_t$$

where,

**bse\_sensex\_growt** = monthly growth rate of BSE Sensex index

**stock\_market\_v** = stock market volatility of BSE Sensex as a measure for risk

**\_month\_libor\_US0** = Libor (London Interbank Offered Rate) three months as a proxy for world interest rate

**integration\_with** = integration with the world { measured by (imports+exports)/GDP }

**P\_E\_ratio** = price to earnings ratio for the BSE

**wpi\_Inflation01** = monthly wpi inflation calculated year on year

**exch\_rate** = exchange rate of the rupee vis-à-vis the dollar

**IIP** = Index of Industrial production of India

**foreign\_exchang** = foreign exchange reserves of India

#### Theoretically their expected impact on FII as follows:

**bse\_sensex\_growt** - We expect this to have a positive sign. An increase in bse sensex growth rate would

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attract more investments in the secondary market from outside investors.

**stock\_market\_v** - We expect it to have a negative sign. Higher the volatility, higher is the risk in the market and hence lower will be the net FII.

**\_month\_labor\_US0** - It is used as a proxy for foreign rate of interest. We expect it to have a negative sign; higher foreign interest rate will lead to outflow of capital.

**integration\_with** - We expect higher integration with the world will lead to higher net FII as higher integration with the world is a measure of openness of the economy. The more open the economy, the easier it is to invest in the economy and take money out of the economy.

**P\_E\_ratio** - Price to earnings ratio is a measure of the price of investing. PE ratio has two effects. Firstly, cost effect, higher the PE ratio, higher is the cost and lower is the net FII. Second, price effect, FII investors are interested in short run capital gains, so higher the price of share higher FII will come. So it can have any sign depending on the strength of the effect.

**wpi\_Inflation01**-the expected impact of this variable is negative. A higher inflation number usually creates a negative sentiment in the market as it often leads to tighter monetary and credit policies by the government, thus affecting the real investments in the economy and future growth prospects.

**exch\_rate** -a higher exchange rate value means that the rupee has depreciated further vis-à-vis the dollar. This means that for each dollar that the investor invests in India, he/she receives more rupees. However, the foreign investor is interested in returns in terms of dollars. This means that he would receive lesser dollars for the amount that he earns in terms of rupees. Hence a depreciation of the rupee should discourage FIIs entering into the economy.

**IIP** – a higher IIP index provides a signal that the economy is generally doing well. Hence a higher value must attract more FIIs into the economy.

**foreign\_exchang** – large foreign exchange reserves means that the investors are confident about the strength of the economy to return their money invested whenever they wish to exit out of the markets. This means that it would have a positive impact on the FIIs.

The following is the result that we obtained from carrying out the regression analysis

Dependent Variable: NET\_FII\_\_THE\_Y\_0

Method: Least Squares

Date: 05/02/14 Time: 09:45

Sample: 2002:01 2005:12

Included observations: 48

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-39481.84	45240.77	-0.872705	0.3883
INTEGRATION_WIT	313586.6	112858.0	2.778593	0.0084
H				
IIP	-50.13608	80.62497	-0.621843	0.5378
FOREIGN_EXCHAN	-0.003193	0.053922	-0.059221	0.9531
GE				
STOCK__MARKET__	-1687.787	634.1089	-2.661667	0.0113
VO				
WPI_INFLATION01	2.186007	382.8568	0.005710	0.9955
P_E_RATIO01	732.5626	166.5565	4.398281	0.0001
BSE_SENSEX_GRO	271.2487	79.58250	3.408396	0.0016
WT				

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_MONTH_LIBOR_US	-1398.074	1122.580	-1.245412	0.2206
0				
EXCHANGE_RATES	512.2945	826.7044	0.619683	0.5392
01				
R-squared	0.655881	Mean dependent var	2504.790	
Adjusted R-squared	0.574379	S.D. dependent var	3036.129	
S.E. of regression	1980.759	Akaike info criterion	18.20340	
Sum squared resid	1.49E+08	Schwarz criterion	18.59323	
Log likelihood	-426.8816	F-statistic	8.047441	
Durbin-Watson stat	1.624244	Prob(F-statistic)	0.000001	

If we note, there are several variables that have not provided us with significant coefficients. For instance, inflation, IIP, foreign exchange reserves, exchange rates and for that matter even Libor. In fact excluding Libor the other four also gave us signs that were to the contrary of what we expected. Hence we decided to carry out regression with another combination of variables as below:

**Model 2: The “Intermediate” model:**

$$FII_t = \beta_0 + \beta_1 \text{integration\_with} + \beta_2 \text{bse\_sensex\_growt} + \beta_3 \text{month\_libor\_US0} + \beta_4 \text{stock\_market\_v} + \beta_5 \text{P\_E\_ratio} + \beta_6 \text{wpi\_inflation01} + \beta_7 \text{exchang\_rate} + \epsilon_t$$

Essentially, we dropped foreign exchange reserves and IIP. During this process of dropping variable, we also took care of the fact whether applying lags benefitted us. We did not find any significant result by applying lags. We however continued with keeping the other two insignificant variables – Libor, exchange rates and inflation with the hope that these might improve in explaining the model. The following results were obtained (corrected for heteroscedasticity and serial correlation):

Dependent Variable: NET\_FII\_\_THE\_Y\_0  
 Method: Least Squares  
 Date: 05/02/14 Time: 10:11  
 Sample: 2002:01 2005:12  
 Included observations: 48

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-42709.58	31352.74	-1.362228	0.1807
INTEGRATION_WIT	279540.4	94363.41	2.962382	0.0051
H				
STOCK__MARKET__VO	-1718.084	594.8521	-2.888253	0.0062
WPI_INFLATION01	-97.02820	209.2653	-0.463661	0.6454
P_E_RATIO01	664.9959	182.6343	3.641134	0.0008
BSE_SENSEX_GRO	258.5615	71.00085	3.641668	0.0008
WT				
_MONTH_LIBOR_US	-1577.953	853.3942	-1.849032	0.0719
0				
EXCHANGE_RATES	528.3169	532.4514	0.992235	0.3270
01				
R-squared	0.652623	Mean dependent var	2504.790	
Adjusted R-squared	0.591832	S.D. dependent var	3036.129	
S.E. of regression	1939.724	Akaike info criterion	18.12949	
Sum squared resid	1.51E+08	Schwarz criterion	18.44136	
Log likelihood	-427.1078	F-statistic	10.73551	
Durbin-Watson stat	1.637553	Prob(F-statistic)	0.000000	

The F-statistic marginally improved whereas the R-squared almost remained the same. This means that not considering the two variables does not have an impact on the model explanation. We also

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notice that Durbin-Watson statistic is around 1.64. By adding an AR(1) term, we found that the regression did not seem to provide a significant coefficient for the same. The same was true even for our “Initial” model.

Exchange rates and inflation continued to remain insignificant and continued to provide us with signs contrary to our theoretical understanding. We finally decided to drop these two as well and ran the following regression:

**Model 3: The “final” model:**

$$FII_t = \beta_0 + \beta_1 \text{integration\_with} + \beta_2 \text{bse\_sensex\_growt} + \beta_3 \text{month\_libor\_US0} + \beta_4 \text{stock\_market\_v} + \beta_5 \text{P\_E\_ratio} + \epsilon_t$$

Let's briefly look at the expected signs:

Dependent Variable: NET\_FII\_\_THE\_Y\_0

Method: Least Squares

Date: 05/02/14 Time: 12:31

Sample: 2002:01 2005:12

Included observations: 48

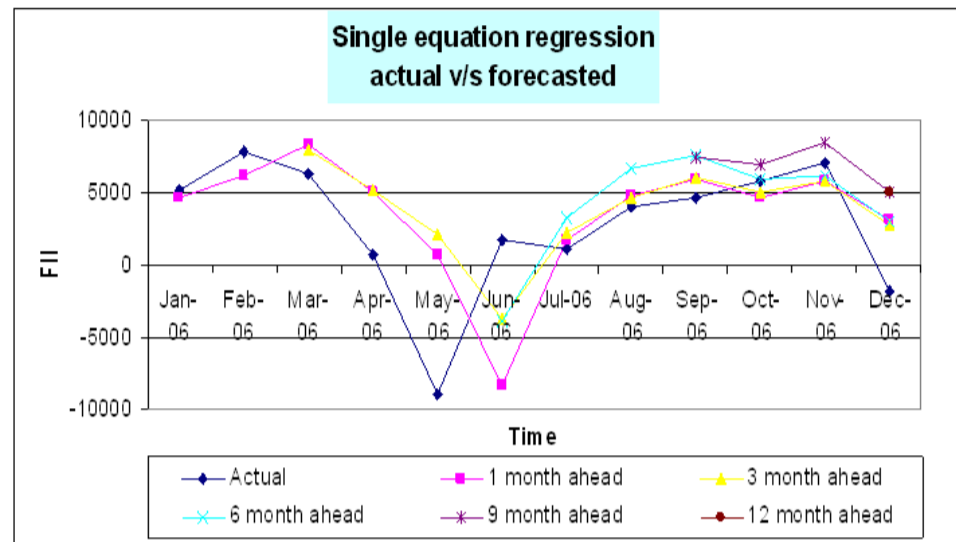
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-13105.65	2751.569	-4.762973	0.0000
INTEGRATION_WIT	170710.7	42130.34	4.051965	0.0002
H				
STOCK__MARKET__VO	-1946.056	542.8502	-3.584885	0.0009
P_E_RATIO01	650.4291	169.8426	3.829600	0.0004
BSE_SENSEX_GRO	206.2105	56.77577	3.632017	0.0008
WT				
_MONTH_LIBOR_US	-1155.080	711.0786	-1.624406	0.1118
0				
R-squared	0.630945	Mean dependent var	2504.790	
Adjusted R-squared	0.587009	S.D. dependent var	3036.129	
S.E. of regression	1951.148	Akaike info criterion	18.10669	
Sum squared resid	1.60E+08	Schwarz criterion	18.34059	
Log likelihood	-428.5606	F-statistic	14.36081	
Durbin-Watson stat	1.650196	Prob(F-statistic)	0.000000	

As expected theoretically, we found that all the independent variables as listed above have the right signs and F-statistic (probability) is also fine. So this is our final model.

**Testing our Model and Hypothesis**

A good economic model is the one which passes the test of reality. Next we try to compare the trend in actual FII and what our model predicts. Our forecast period is 2006:01 to 2006:12 and we evaluate forecasts for four horizons: 1 month ahead, 3 months ahead, 6 months ahead, 9 month ahead and 12 months ahead. A comparison of actual and forecasted values are given below. It shows that our model fairly predicts the trend of FII.



### CONCLUSION

FIIs being one of important factor in today's globalised world. Our model explains what determines and effect FII. Domestic variables which influence it are BSE Sensex growth rate, volatility of the stock markets and P/E ratio, on the other hand international variables which influence FII are world interest rate(libor) and openness of the economy (integration with the world).One interesting aspect that we should consider is that throughout, the coefficient of the P/E ratio in terms of affecting the FIIs is positive. This seems to support our belief that indeed, the initial periods of FII inflow must be in-sync with a positive correlation because of price

**Hence the final equation that we concluded with is as follows:**

$$FII = f(\text{integration with world, bse sensex growth, labor, stock market volatility, P/E ratio})$$

### POLICY RECOMMENDATION

To promote FIIs in India Govt. should increase its openness with the rest of the world. It should provide flexible rules for investment, less requirements of paper work and friendly environment to investors. The more our country known at global forum it will boost the investor's confidence which increases the volume and stability of FIIs. The volatility of stock exchange hurts the investor's confidence. SEBI should monitor the stock market activities more closely to stop malpractices. By increasing international investor confidence we can ensure greater amount and stability of FIIs.

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