Chapter 6

Profit Hypothesis: An Empirical Analysis in the context of India for the Post Liberalization Period

CHAPTER 6: PROFIT HYPOTHESIS: AN EMPIRICAL ANALYSIS IN THE CONTEXT OF INDIA FOR THE POST LIBERALIZATION PERIOD

6.1: FIRMS' PROFIT AS AN INDICATOR OF ITS INVESTMENT BEHAVIOUR

According to the profit hypothesis, the firm's profit serves as an important indicator of its investment behaviour. In a capitalist economy, the investment decisions are inspired by the entrepreneurial visions of profits in the medium term, which are not governed by a probability distribution that can be taken to be known or given. Among the many works in this area, the most pioneering work has been done by Kalecki and Jan Tinbergen.

Kalecki suggests that the crucial determinant of the level of investment is the principle of increasing risk, i.e., the increase of marginal risk with the amount invested. According to him, the level of investment is determined at the point where the MEC is equal to the sum of the market rate of interest and the marginal risk premium.

Tinbergen suggests that the firms' investment behaviour is regulated by its profits. In fact, Jan Tinbergen once remarked that *"it is almost a tautology to say that investment is governed by profit expectations."* However, for the purpose of our study we have followed Kalecki's theory of investment.

6.2: REGRESSION ANALYSIS OF FIRMS' PROFITS AND INVESTMENT ON THE BASIS OF THEIR CAPITAL EMPLOYED

We now examine whether the level of profit after tax earned by the firms significantly affects the firms' level of investment in the context of India. For that we have taken as the dependent variable the firms' investment as a ratio of their capital employed, while the independent variable is the ratio of the firm's profit after tax to its capital employed. In the present analysis, we assume that the firm's investment expenditure is based on the amount of profits earned by them in the same period. We estimate the following equation:

$$(\frac{I}{K})_i = \alpha + \beta(\frac{\pi}{K})_i \qquad \text{for all i = 1, 2,...9600}$$

where, I is the level of investment by the firm i, π is the level of profit earned by the firm i, and K is the capital employed by the firm i. The estimated equation is shown below, where the figures in the parentheses show the estimates of the Standard Error.

$$(I/K)_i = 0.03367 + 0.01259\ (\pi/K)_i$$
$$(0.00015) \quad (0.07099)$$

The results obtained from the above regression analysis are quite significant at 95% level of confidence. In other words, the investment expenditure of firms is significantly affected by the profits earned by them. The regression results are shown in Table 6.1 below.

Table 6.1: Regression results for firms' investment and profits (all firms)

Number of observations						76703
F(1, 76701)						6834.06
Prob > F						0.0000
R-squared						0.0818
Adjusted R-squared						0.0818
Root MSE						19.658
C	Coeff.	Std Error	t-statistic	P > |t|	[95% Confidence Interval]	
(π/K)	0.0126	0.0002	82.6680	0.0000	0.0123	0.0129
Constant	0.0337	0.0709	0.4740	0.6350	-0.1055	0.1728

6.3: RELATION BETWEEN FIRM'S PROFITS AND INVESTMENT – AN ALTERNATIVE PERSPECTIVE

The investment expenditure of a firm in the current period however, is based on the decisions taken in the previous period. Following Kalecki's theory, this is based on the profits earned by the firms in the previous period. So, the analysis of firm's investment decisions based on the profit hypothesis should be presented with a time lag, which we have introduced in our study here.

In the present section, we have tried to analyze whether the Real Profits (Profit after tax) as ratio of the GFCS [51] explains the movement in real investment. Since our panel data contains both large and small firms, we have limited our study to only the top 100 firms to avoid any aggregation effect. Moreover, we have also introduced dummy variables for the 100 firms in order to negotiate the random effect from our analysis. We have calculated the real

[51] The mode of calculation of calculation of GFCS is already explained in Chapter 5

profit after tax (P_{real}) by deflating the profit after tax (PAT) of the firms by the price index of capital goods[52] (p_t). So,

$$(P_{real})_t^i = \frac{PAT_t^i}{p_t} \qquad \text{for all i = 1,2,...100.}$$

In this case the explanatory variable is the Real PAT as a ratio of the GFCS (in real terms) of the firms. Therefore the relevant equation for our panel estimation is as follows:

$$(\frac{I_{real}}{GFCS})_t^i = \alpha + \beta(\frac{P_{real}}{GFCS})_{t-1}^i + \lambda F_i + \varepsilon$$

where, I_{real} is the real investment of the firm i,

$GFCS$ is the Gross Fixed Capital Stock of the firm i,

P_{real} is the real profit after tax of the firm i,

ε is the error term, and

F_i is the firm dummy variable, which is $F_i = 1$, for i=1

$F_i = 0$ for i=2,3,...100.

In the case of the regression between Real Investment of the firm as a ratio of their GFCS and Real Profits after tax of the firm as a ratio of their GFCS, the results obtained are quite significant at 95% level of confidence. The t-statistic is 4.08 at 95% level of confidence. The regression results are shown in Table 6.2 below.

[52] The price index of capital goods is obtained as the ratio of capital formation of the private corporate sector at current prices to the same at constant prices. (Source: RBI).

Table 6.2: Regression results for firms' investment and profits (100 firms)

Number of observations						1500
F(100, 1399)						2.92
Prob > F						0.0000
R-squared						0.1727
Adjusted R-squared						0.1136
Root MSE						46.16
C	Coeff.	Std. Error	t-statistic	P > |t|	[95% Confidence Interval]	
P_{real}	0.0803	0.0197	4.082	0.000	0.04172	0.11891
Constant	1.2390	11.9185	0.104	0.917	-22.1409	24.6193

In other words, in the context of India, profits earned by the firms serve as a much better indicator for firms' investment decisions as compared to the Tobin's 'q' measure.

We have also investigated the link between the increase in stock market valuation and its impact on the investment decisions of firms using both Tobin's 'q' and Real Profits after tax of the firm as a ratio of their GFCS, as the explanatory variables in the same regression equation. For that the relevant regression equation for estimation is as follows:

$$(\frac{I_{real}}{GFCS})_t^i = \alpha + \beta(\frac{P_{real}}{GFCS})_{t-1}^i + \gamma q_{t-1}^i + \lambda F_i + \varepsilon$$

where, I_{real} is the real investment of the firm i,

$GFCS$ is the Gross Fixed Capital Stock of the the firm i,

P_{real} is the real profit after tax of the firm i,

q is the Tobin's q of the firm i,

ε is the error term, and

F_i is the firm dummy variable, which is $F_i = 1$, for i=1

$F_i = 0$ for i=2,3,...100.

Now we undertake a panel regression between the Real Investment of the firms as a proportion of the GFCS with the lagged values of Tobin's q for the selected Top 100 firms, for the period 1990-91 to 2004-05. Though we have a panel data of 9,600 firms for the years 1990-91 to 2004-05, we have limited our study to only top 100 firms (on the basis of their capital employed at the BSE). This is to avoid any aggregation effect as the list of firms contained both large as well as small firms, where the financial position of the firms varied widely. Moreover, to negotiate the random effect from the analysis, we introduce dummy variables for the 100 firms. So the relevant equation for our estimation is as follows:

$$(\frac{I_{real}}{GFCS})_t^i = \alpha + \beta q_{t-1}^i + \lambda F_i + \varepsilon$$

where, I_{real} is the real investment of the firm i,

GFCS is the Gross Fixed Capital Stock of the the firm i,

q is the Tobin's q of the firm i,

ε is the error term, and

F_i is the firm dummy variable, which is $F_i = 1$, for i=1

$F_i = 0$ for i=2,3,...100.

However, as in the other cases, the regression results obtained here are statistically insignificant, which are shown in Table 5.5.

From the results of the above regression analysis it becomes very clear that the firms' profit rates turns out to be a significant factor in explaining the firms' investment behaviour in the context of India, while Tobin's q of firms turns out to be quite insignificant. While the profits earned by the firms over the years are more closely related to the decisions of the firms to undertake investment, the same cannot be said of Tobin's q in the context of India. The regression results are shown in Table 6.3.

Table 6.3: Regression results using Tobin's q and firms' profits in same regression equation

Number of observations						1173
F(100, 1072)						10.28
Prob > F						0.0000
R-squared						0.4922
Adjusted R-squared						0.4443
Root MSE						0.0880
C	Coeff.	Std. Err	t-statistic	P > |t|	[95% Confidence Interval]	
P_{real}	0.0946	0.0333	2.841	0.005	0.0293	0.1599
q	0.0043	0.0030	1.475	0.141	-0.0014	0.0099
Constant	0.0215	0.0390	0.551	0.582	-0.0550	0.0980

6.4: REGRESSION OF PROFITS EARNED BY THE FIRMS AS A RATIO OF THEIR CAPITAL EMPLOYED AND THE TOBIN's q RATIO

Though the Tobin's theory is about q determining investment, our analysis in the context of India did not substantiate this relationship. Therefore, if q does not turn out to be a significant factor in explaining the firm's investment behaviour in India, then it may be the case that it explains some other variable. With this in mind, in this section we have tried to analyse whether q significantly affects the level of profit earned by the firms in the context of India. The dependent variable is the ratio of firms' profits to the capital employed. For that we estimate the following equation:

$$(\frac{\pi}{K})_i = \alpha + \beta q_i \qquad \text{for all i = 1, 2,...9600}$$

where, π is the level of profit earned by the firm i, K is the capital employed by the firm i, and q_i is the Tobin's q ratio of firm i.

The estimated equation is shown below, where the figures in the parentheses show the estimates of the Standard Error.

$$(\pi/K)_i = 5.73357 + (0.08954) q_i$$
$$\qquad\quad (1.70295) \qquad (0.25873)$$

Though the results obtained are not that significant, it can be safely concluded that the results obtained here are much better than the case where Tobin's q ratio was used as an explanatory variable for Investment as a ratio of capital employed by the firms (which we have shown in Chapter 5). The regression results are shown in Table 6.4 below.

Table 6.4: Regression results for Tobin's q as an indicator for firms' profits

Number of observations						76693
F(1, 76691)						0.1200
Prob > F						0.7292
R-squared						0.0000
Adjusted R-squared						0.0000
Root MSE						466.010
C	Coeff.	Std. Error	t-statistic	P > |t|	[95% Confidence Interval]	
q	0.0895	0.2587	0.3460	0.72900	-0.4176	0.5967
Constant	5.7336	1.7029	3.3670	0.00100	2.3958	9.0713

So, it can be stated that, in the context of India, the Tobin's q ratio shows some link with firm profits as compared to the level of firm's investment. However, it may also be the case that it is due to some spurious correlation among the variables and they are both related to something else, where both move up in a period of boom and fall in a situation of slump in the economy. Thus, this issue is a matter of further investigation.

6.5: ANALYSIS OF CAPITALIZED VALUE OF FIRMS AND INVESTMENT

In the last 15 years (1991-2005), we have witnessed rapid stock market development in India, following the various measures undertaken by the Government of India under the aegis of financial liberalization,. This has resulted in rapid increase in the stock market valuation, where we have witnessed the Sensex attaining record levels to touch 14,000 points in a very short span of time. But this development has not affected the level of real investment is any significant manner. Our preceding analysis confirms this.

The conclusion that the stock market as such has no effect on the real economy in the context of India, can be further confirmed by examining whether growth in the stock market, in terms of capitalized values of firms has any effect on the rate of investment. Marjit (2005) has claimed that the level of investment would depend on the behaviour of the stock market provided that financing of investment is the real issue. We examine this assertion for the stock markets in the post liberalization period in India.

Table 6.5 Capitalized value of firms in the post-liberalization period

Year	(I_{pvt}/GDP)	V_K (in Rs Crore)	ΔV_K	$\Delta V_K/V_K$
1991-92	5.25	6193.1	-	-
1992-93	6.46	19803.4	13610.3	0.69
1993-94	5.61	19330.3	-473.1	-0.02
1994-95	6.91	26416.7	7086.4	0.27
1995-96	9.58	16074.7	-10342	-0.64
1996-97	8.05	10409.5	-5665.2	-0.54
1997-98	7.97	3138.3	-7271.2	-2.31
1998-99	6.39	5013.1	1874.8	0.37
1999-00	7.23	5153.3	140.2	0.03
2000-01	5.74	4889.8	-263.5	-0.05
2001-02	5.59	5692.4	802.6	0.14
2002-03	5.75	1877.66	-3814.74	-2.03
2003-04	6.84	3675.41	1797.75	0.49
2004-05	8.25	13482.4	9806.99	0.73

Source: Handbook of Statistics of the Indian Economy, RBI

In Table 6.5 above, the growth of the equity market in India is illustrated. We have presented the capitalized value of firms for the post-liberalization period (1991-92 to 2004-2005), which is the total value of capital issues by non-government public limited companies (V_K). The table also depicts the corresponding data on the rate of private investment, which is the ratio of the private corporate investment (I_{pvt}) to the Gross Domestic Product (GDP). To begin with, we calculate the correlation coefficient between the above two variables, viz. (I_{pvt}/GDP) and V_K, which turns out to be -0.21. This exercise however, is not an appropriate one since it correlates a level with a ratio.

Next we test the hypothesis – whether stock market acts as an impetus for private investment for the post-liberalization period in India. Through a more appropriate specification, we apply simple ordinary least squares regression analysis to test the above hypothesis. The relevant equation for the above estimation is as follows.

$$(\frac{I_{pvt}}{GDP}) = \alpha + \beta(\Delta V_K / V_K) + \varepsilon$$

The results obtained from the above analysis also indicate that there is hardly any reason to see the stock market as providing any impetus for the higher economic growth of the Indian economy. In other words, it will not be effective to trace the movement of private investment to changes in the stock market. The regression results are shown in Table 6.6 below.

Table 6.6: Regression results for capitalized value of firms and the rate of private investment in the post liberalization period

Number of observations						1500
F(100, 1399)						0.5587
Prob > F						0.4692
R-squared						0.0445
Adjusted R-squared						-0.0351
Root MSE						1.2851
C	Coeff.	Std. Error	t-statistic	P > |t|	95% Confidence Interval	
$\Delta V_K/V_K$	0.0000	0.0000	0.7474	0.4692	-0.0000	0.0001
Constant	6.4729	0.5815	11.1418	1.1005	5.2122	7.7463

6.6: CAPITAL FORMATION OF PRIVATE CORPORATE SECTOR AND BSE SENSITIVE INDEX

We have tried to study the impact of financial liberalization on the firms' investment behaviour in another way by using the Combined Balance Sheet data of selected 1927 Public Limited Companies provided by the RBI. Our objective is to find out whether the Capital formation of these firms is significantly influenced by the BSE Sensitive Index. We have analysed it in two ways. First we have done the regression analysis of the Change in the Gross Fixed Assets of the selected 1927 Public Limited Companies, deflated by the price index of capital goods, with the BSE Sensitive Index also deflated by the price index of capital goods. The relevant equation for the estimation of the above relation is given below:

$(\Delta GFA/\ p_k) = a + \beta\ (S/p_k)$

where ΔGFA is the Change in the Gross Fixed Assets of the selected 1927 Public Limited Companies, p_k is the price index of capital goods, and S/p_k is the BSE Sensitive Index deflated by the price index of capital goods.

The estimated equation is as follows (the figures in the parentheses show the estimates of the Standard Error):

$$(\Delta GFA/\ p_k) = 7008.9837 + 4.4617\ (S/p_k)$$
$$(35327.3366) \qquad (15.8114)$$

The results so obtained are quite significant at 95% level of confidence. The t-statistic is quite robust indicating the significance of the results. However, the R^2 and adjusted R^2 are quite low. The regression results for the above analysis are shown in Table 6.7 below.

Table 6.7: Regression results for Capitalized value of firms and BSE Sensex in the post liberalization period

Number of observations						12
F(1,10)						0.0796
Prob > F						0.7836
R-squared						0.0079
Adjusted R-squared						-0.0913
C	Coeff.	Std. Error	t-statistic	P > |t|	[95% Confidence Interval]	
S/p_k	4.4617	15.8114	0.2822	0.7836	-30.77	39.69
Constant	7008.9837	35327.3366	0.1449	0.8877	-100803.60	114821.60

To study the impact of BSE Sensitive Index on the capital formation of the private corporate sector, we have also estimated the following equation:

$$CF_{pvt} = a + \beta\,(S/p_k)$$

where CF_{pvt} is the capital formation of the private corporate sector at constant prices, and S/p_k is the BSE Sensitive Index deflated by the price index of capital goods.

In this case, too the results obtained are quite significant at 95% level of confidence, which are shown in Table 6.11 below. The t-statistic is quite robust indicating the significance of the results. However, the R^2 and adjusted R^2 are quite low as in the previous case.

The estimated equation can be written as follows (the figures in the parentheses show the estimates of the Standard Error):

$$CF_{pvt} = 73046.6687 + 3.4255\,(S/p_k)$$

$$(35327.3366) \qquad (11.6073)$$

Table 6.8: Regression results for capital formation by the private corporate sector and BSE Sensex

Number of observations						11
F(1,9)						0.0871
Prob > F						0.7746
R-squared						0.0096
Adjusted R-squared						-0.1005
C	Coeff.	Std. Error	t-statistic	P > |t|	[95% Confidence Interval]	
S/p_k	3.4255	11.6073	0.2951	0.7746	-22.83	29.68
constant	73046.67	35327.34	2.0677	0.0686	-6869.32	152962.66

Given the fact that capital inflows, especially FII (in the form of portfolio flows) are of short maturities, investments takes place in the stock market rather than in real capital formation. We have witnessed precisely this phenomenon in the Indian context, where the rapid increase of the market capitalization of the BSE did not have any effect on the real capital formation.

Dutt (2006) suggests that the precise effects depend on the exchange rate regime. If the country has a flexible exchange rate, during the period when there is an influx of portfolio flows, its currency will appreciate and this can affect growth adversely in a number of ways. If the economy is supply constrained, the decline in the profitability of the traded goods sector will shift resources to the non-traded sector. This could slow down technological change if the traded goods sector has greater scope for learning by doing and has more technological externalities for other sectors. If the economy is aggregate demand-constrained, the reduction in net exports will result in a decline in aggregate demand, and hence output and investment and consequently, technological change driven by growth and investment. In either case, the result will be lower growth of the economy. The inflow of foreign capital is more likely to finance investments in stock markets and real estate than real capital formation, and the resultant asset price bubbles would make real investment less attractive.

So the question that arises is whether there is really any need to project the stock market as a new engine of growth as has been done by some economists as well as several governments in the developing countries. This issue is all the more relevant in the context of India as the government is in the process of establishing full CAC. A committee, chaired by the former deputy

governor of RBI, S. S. Tarapore, has already drawn up a roadmap to move to a regime of full CAC in a phased manner over the next 3 years. This implies that in the near future we will witness a huge influx of foreign investment, especially portfolio investment rather than FDI into India, when we are presently having a current account surplus. This would lead to more addition to foreign exchange reserves, which are already a whopping $200 billion. This entails a huge fiscal cost on the economy and undermines the profitability of the RBI. Moreover, when inflow of foreign investment has entailed only an increase in the stock market valuation without any concomitant effect on the real investment in the economy, then the need for more foreign investment, especially portfolio flows is questionable. We will discuss these issues in the next part of our thesis, with particular emphasis on the issue of CAC in the context of India.