CHAPTER XI

SUMMARY AND CONCLUDING REMARKS

In policy debates on industrial growth, growth of capital was assigned a crucial role because it was perceived that growth of output proceeds pari passu with capital accumulation. One of the key issues that arises in making any assessment of the role of capital accumulation is that investment is important only when it is associated with a growth process which is characterised by movement from a lower rate of industrial growth to a higher rate of industrial growth. No doubt investment spending has come under increasing criticism on the ground that it is often wastefully applied and does more harm than good. And if capital accumulation is high, it does not necessarily follow that it leads to higher economic growth. This study, on the otherhand maintains that higher investment, if efficiently applied can lead to higher growth. In this perspective the aim of the thesis is to provide a statistical framework to show the major determinants of the investment behaviour in industries and to examine whether this investment behaviour is efficient or not. In doing so, it maintains that if investment is efficient then a higher rate of investment shall be associated with an increase in the rate of growth of output.
Chapter-I of this thesis studies the importance of investment behaviour in an industry and brings out the conditions under which this investment behaviour would be compatible with industrial growth that reflects efficient investment in this industry. It is maintained that any increase in investment is efficient and necessarily lead to industrial growth, when the accompanied increase in rate of return reflects embodied technological progress. The embodied technological progress is discussed mainly in terms of a positive and significant association between investment and productivity growth. Second, the increase in productivity in the industry should also constitute an important determinant of investment that induces further investment in the industry.

Furthermore, as discussed in Chapter - III, the outcome of efficiency of investment is not guided by the rate of investment in the industry but is due to the adjustment that investment in the industry makes with investment elsewhere. The relevance of investment elsewhere is that it brings about macro-impacts in terms of demand shocks and supply shocks that the industry has to face.

It is maintained that in the short run, investment elsewhere generates demand shocks which are in the nature of a change in relative prices independent of the capital labour ratio in the industry. This is reflected by a change
in the rate of return in the industry. However, in the long run the industry not only adjusts its capital-labour ratio in line with the changes in its relative prices but also is subject to supply shocks in terms of a change in the flow of output in relation to a given flow of inputs. This supply shock is independent of the capital-labour ratio in the industry and is dependent upon the nature of investment elsewhere. A favourable supply shock is given by an increase in the rate of productivity growth which is crucial since it entails an increase in the rate of return as capital-labour is changed. This means that the technological progress due to favourable supply shocks generates the additional profit to underwrite the additional investment embodied in the change in capital-labour ratio in the industry. Here the increase in the rate of return is a reflection of technological progress so that as investment is increased there is an increase in the output without any proportionate increase in costs of production. This is also reflection of the fact that the industry replaces its earlier capacity by new and more efficient capacity.

In this background, the chapter V of this study analyses the behaviour of investment in cement industry in India. It is seen that this industry underwent a series of structural changes during the period from early 1970’s to 1989. The main features of this structural reforms were (i)
a change in methods of production from wet method to dry method (or semi-dry method) to make the production process more energy-efficient, (ii) an increasing tendency to move away from a lower scale of production to a higher scale of production to avail the economies of scale and (iii) a tendency towards product diversification to bring about a greater mix of end products to meet the demand more efficiently. Needless to say that these structural changes were accompanied by coming up of new cement plants as well as modernisation of existing plants in the industry. Earlier, from its inception (1920’s) to earlier 1970’s this industry was mainly characterised by a growth process that entailed appearance of excess capacity and wastage of capital, i.e., a higher output without any proportionate decline in costs, as investment was increased. In this background, the study takes up the period from 1974 to 1989 to analyse whether the structural changes during this period amount to a case of an increase in productive efficiency.

The importance of the period 1974 to 1989 lies in the fact that, more than the structural changes that the industry witnessed, this period saw the government policy towards this industry changed in an important way. Earlier the cement industry was mainly dependent on the government as the main market for its products. The government off-take of this industry’s product was in line with the requirement
of cement as a basic material in the economy which was characterised by planned industrialisation programme. This was reflected by the government's cement price policy that regulated the price of cement so as to meet the twin demands of (i) the government off-take of cement for public investment at a regularised price and (ii) fair return to the investors to induce them to invest further in the industry. Consequently, the main feature of the industry was to expand output at a given rate of return (guaranteed by the government's price policy). However, during the period 1974 to 1989, the government policy towards the industry changed perceptibly to bring about the decontrol of the industry so as to make the firms constituting the industry rely more on the market forces, rather than on the government, to grow. In this background the investment in the industry during the period 1974 to 1989 can be seen as being directed towards the market to augment the surplus and using it to sustain renewed capital accumulation in the industry. In this perspective, it can be maintained that this study's focus has been on the investment behaviour which was guided primarily by the market forces operating in the industry and to see whether this investment was efficient.

Chapter-VI of the thesis is directed towards compilation of data on investment, rate of return and
technological progress with 1973-74 as the base period. The
results are given in chapter VII, chapter VIII and chapter
IX. The results in chapter VII and VIII show that there have
been increases in both the rate of return and productivity
in the industry. However, these increases do not reflect an
increase in true productivity growth which is due to
favourable supply shocks. The main findings of these
chapters are given below for an easy exposition.

(1) The increase in the rate of profit, \( r_t \) in the cement
industry, is primarily due to an increase in market-
power in the industry, i.e., the rate of profit
contains returns to market-power.

(2) To highlight the rate of return that reflects return to
technological progress associated with investment, the
measure of total factor productivity growth in an index
form is used in this study.

(3) The measure of productivity growth(Alt), based upon the
measure of real value-added(Ylt) which is calculated by
deflating nominal value added by the price of the
industry's product is shown to be containing returns to
market power. In this instance, this measure of total
factor productivity growth is highly (positively)
correlated with the measured gross profit margin in the
industry; the measure of true productivity growth, i.e.
the measure that reflects only the returns from
technological progress, is obtained by using a measure of real value added calculated by a division index based on the double deflation method \( (Y_{2t}) \). In this work, the measure of productivity growth which is based on \( Y_2 \), \( A_2 \) and its dual measure \( F_2 \), are taken to measure productivity growth that mainly contains returns to technological progress in broadest sense.

(4) It is maintained that the change in the production process in the industry, associated with an investment, is affected both by short-run and long-run impacts, and these are reflected in terms of a change in a return to market power and returns to technological progress, respectively. In this event, the rate of profit, which is affected both by the short-run and the long-run factors, contains both the above-mentioned returns. The data on rate of profit in chapter-VII show that the return to market power exceed considerably the returns to technological progress) and the true productivity growth, reflecting the changes in long-run adjustment, contains only the return to technological progress. It is, therefore, maintained that true productivity growth reflects the returns brought about by cost-reductions as output is increased, due to an increase in investment in the industry.
The above-mentioned findings suggest that there is divergence between the measured rate of profit and rate of true productivity growth of the industry, in the time period taken up in this study.

It is therefore maintained that to study responsiveness of investment there should be a distinction between profitability as is indicated by an increase in true productivity and profitability that increases independent of productivity. The latter may be changing due to the fact that the industry is comprised of few firms that enjoy market power, and are in a position to influence the share of profit in the total value-added that increases the rate of profit. In these instances further investment is discouraged that spoils these gains from market power, and is encouraged if they entail a change in the capital-labour ratio that further consolidates the market-power. In these instances the rate of investment can hardly be viewed efficient, from the point of view of this study.

The results to establish a relationship of these variables with the pattern of investment show that only the rate of profit or the equivalent measure of productivity growth, i.e., Alt are positively and significantly associated with the pattern of investment. This association is studied with the help of the relevant correlation coefficient. On the other hand, it is found that the
The correlation coefficient between investment and the measure of true productivity growth is not significant. These findings suggest that the increase in rate of investment in the industry does not reflect embodied technological progress. These results point to the fact that investment is mainly responsive to changes in returns that entail an increase in market power (e.g., indicating successful exploitation of monopoly power enjoyed by firms constituting the industry) and do not entail a higher rate of return which is due to cost-reductions for a given increase in output. Thus, it can be maintained that investment is not associated with technological progress that reflects a replacement of earlier capacity by new efficient capacity. Further, the results show that the rate of profit, \( \pi \), or equivalently, the measure of productivity growth, is not determined by technological progress in the broadest sense, but rather by returns to market power, \( \pi L \), according to the framework developed in Chapter I of this study, that an increase in investment does not signify a growth process characterised by a transition from a lower rate of growth to a higher rate of growth.
Moreover, it is maintained that when an increase in rate of profit due to technological progress $A_2t$ or $F_2t$ is not an important variable in the planning investment in the industry, and the market that the industry faces entails return to market power, the major determinant of investment should be an expansion of output, i.e., along the lines indicated by the acceleration principle. This is borne out by the results of chapter-IX to explain investment behaviour in the cement industry. The growth of value-added, measured by $Y_{1t}$, is found to be the most significant determinant of investment; though the growth of $Y_{2t}$ (the other measure of value-added obtained by the Divisia index method) is also found to be an important determinant of investment pattern, it is seen that in relation to the capital stock, i.e., $Y_{2t}/K_{t-1}$, it is not significant in explaining the rate of investment, as compared to $Y_{1t}/K_{t-1}$. Given that $Y_{1t}$ is a measure of value-added that contains returns to market-power, and $Y_{2t}$ reflects only changes in marginal cost conditions in the industry, the results show that the growth of the real value-added, which mainly reflects returns to market-power, is the most important determinant of investment behaviour in the industry. In other words, it can be inferred that investment in the cement industry is mainly associated with a higher return to market-power, as output increases, and is reflected in an increase in the
rate of profit and the measure of productivity growth ($A_{1t}$). These variables, are also important in explaining investment in the industry. This means that investment behaviour in cement industry in India, according to the major hypotheses developed in this study, is not efficient.

The last chapter of the thesis, i.e., chapter X, studies investment behaviour in an industry in a spatial perspective that provides valuable insight into the dynamics of the industrial sector. It is maintained that industrial growth at the aggregate level is the outcome of the performance of constituent plants/firms operating in various regions in a country. In this case, the growth path and performance of an industry at the aggregate level would be described primarily by the performance at the regional level. The implication for investment behaviour is that the inter-regional flow of investment would be governed by the regions' relative performance in applying the investment efficiently, in a multi-regional set up. An improvement, or deterioration in a region's performance with respect to an industrial investment would be matched by a corresponding inflow, or outflow, of investment in the region. This aspect of investment behaviour is discussed in this study by taking up the case of Orissa as a region in India and the results of the regional analysis are summarised below.
The findings point to the fact that the regional flow of investment in terms of a shift of capital stock away from Orissa is consistent with the relative performance of the region as compared to other regions in India, i.e., the relative performance of Orissa has decreased over the period of time under study. This is when the relative attractiveness is given by the relative true productivity performance of the region.

However, this study does not enquire into the factors that underlie the above-mentioned trend of regional shift, and the region's capacity to apply the investment efficiently. The region reveals a better position when the return to market power is also taken into account, to measure relative performance. However, it is of no importance for the regional flow of investment. The overall growth performance of the region, especially the growth performance of the secondary sector, that generates favourable supply shocks can be taken as a factor. Moreover, there may be other interactive influences, say - regional policy of the government that has a bias towards a particular region, that could cause a regional shift of investment and thereby a change in the share of investment. But these issues are not taken up in this study.