CHAPTER III
NATURE AND IMPORTANCE OF INCREASING RETURNS

In literature, there are studies which view increasing returns as a normal feature of manufacturing industries and maintain them to be a reflection of technical change, i.e., increase in productivity which accompanied increase in production, which is endogenous to the economic system. Further, these studies maintain that the presence of increasing returns implies that investments in industries create further investment opportunities and second, the rate of return on capital may increase rather than decrease with increases in capital stock. Thereby, the presence of increasing return not only signifies increases in productivity of resources but also leads to increases in stocks of productive inputs, and therefore, to growth of income. In fact, following Adam Smith and Young (1928), papers of Kaldor (1966, 1972, 1977), Currie (1981), Majumdar and Mitra (1982), Dechert and Nishimura (1983), Romer (1986, 1987), Prescott and Boyd (1987), and Reid (1989) exemplify the resurgence of interest in growth models which maintain growth process in an economy to be mainly driven by increasing returns.

It should be pointed out that though on an empirical level the potential magnitude of increasing returns and
their probable actual importance was recognised, growth theory proper, following the publication of Harrod-Domar growth model, tried to ignore the phenomenon of increasing returns. These growth theories recognised that increases in productivity are an importance source of growth of output, but maintained them to be a reflection of a Harrod-neutral technical progress which proceeds at an exogenous rate in time, and not a reflection of increasing returns which is endogenous to the economic system. However, as pointed out by Hicks (1960), Eltis (1973), Kaldor (1966, 1972 and 1977) and Romer (1986), most of the growth theories ignored the importance of increasing returns because it was difficult to reconcile the phenomenon of increasing returns with the theoretical apparatus of equilibrium theory, and by the same token, with the growth theories that analyse the conditions under which a steady-state equilibrium growth is achieved in an economy.

In the context of modern growth theories, the basic interest in models of growth driven by increasing returns was sparked by studies by Arrow (1962), Schmookler (1966) and Hirschman (1958). All these studies illuminated the different ways in which investment creates and reveals further investment opportunities.
Following there studies, the recent research efforts with the interest in growth driven by increasing returns have headed in several directions. Romer (1986) and Lucas (1988) have come forward with models in which the phenomenon of increasing returns which is reflected by endogenous technical change, coupled with a aggregate production function, is consistent with equilibrium growth capable of an increase in the rate of growth in the long-run. On the other hand, Scott (1989) has rejected the framework of an aggregate production function to analyse growth with features of increasing returns. According to Scott (1989), gross investment is capable of creating further investment opportunities and the experience of most economies shows that the real rate of return has a tendency to rise with increases in capital stock. Once these efficiency features of aggregate investment behaviour reflecting increasing return are accounted for, an increase in rate of investment, in general, is capable of increasing the rate of growth in the long-run. Similarly, studies by Kaldor emphasise the dominant role of increasing returns in explaining the slow rate of growth of the United Kingdom (Kaldor, 1966); the divergences paths of developed and developing countries (Kaldor 1967), and of different regions in a single country (Kaldor, 1970). However the studies of Kaldor avoided the formal modelling of the importance of
increasing returns in the growth process, and emphasised that growth driven by increasing return is basically a disequilibrium form of growth.

It should be emphasised that the present study, following earlier studied by Young (1928), Myrdal (1963), Kaldor (1966, 1972 and 1977), Richardson (1975) and Reid (1989), maintains that growth driven by increasing returns is essentially a disequilibrium form of growth - growth progresses at rate which is neither uniform over time nor uniform across sectors of the economy. More precisely, it is postulated that the presence of increasing returns in industries signifies disequilibrium conditions in an economy. This disequilibrium condition not only is endogenous to the economic system, but also is capable of cumulative changes in the economy. However, it should be noted that the present study is basically empirical in nature and the importance of increasing returns in a disequilibrium growth process is discussed mainly in terms of an efficient investment behaviour in industry which has two crucial features. First, investment which is industry-specific should be associated with an increase in productivity. Second, in the growth process increases in investment in industries are induced by technological progress.
In literature, there are many empirical studies which view increasing returns as the main engine of fast economic growth. However, in these studies the role of increasing returns in the disequilibrium growth process is not discussed in terms of efficient investment behaviour in industries. It is maintained that increasing returns is a macro-phenomenon and is empirically established in terms of an increase in productivity, which is the by-product of an increase in output in the manufacturing sector. This productivity growth in the manufacturing sector in an economy in turn is responsible for the faster growth of output in the economy. However, it should be noted that these studies do not altogether deny the significance of investment behaviour as such. For example, in the study by Kaldor (1966), it has empirically emerged that performance of manufacturing sector reflecting productivity growth is closely related to investment behaviour in the manufacturing sector. Furthermore, Kaldor (1972) also mentions embodied technical progress in industries as the main factor which is responsible for the gain in productivity in the economy. In fact, Young's study of increasing returns is based upon data reflecting an economy undergoing rapid change. Growth in productivity in this economy is highly correlated with capital investment which is also associated with changes in industrial structure and product differentiation. As
Blitch (1983) rightly pointed out, increasing returns reflecting extension of division of labour required additional capital investment in a large scale and the investment is treated is its cost reducing sense, which is proper for the problem of growth and change. However, Young (1928) also emphasised that increasing returns cannot be discerned adequately by observing the effects of variations in the size of an individual firm or of a particular industry. It is primarily the result of industrial operation which is seen as an interrelated whole. Moreover, it is maintained that increasing returns implies increased differentiation, emergence of new processes and specialised industries in which industry loses its identity. In this context, therefore, increasing returns which is discussed in terms of investment behaviour in specific industries, and not in terms of a macro-phenomenon, requires close inspection and is discussed below in the following.

The concept of industry is usually used only in the context of perfect competition, where industry is defined to be a passive agent and the equilibrium level of output and price in the industry is determined by market forces of demand and supply. This static-equilibrium concept of industry comprises many firms producing identical products and the size of an industrial firm is small in relation to
the size of the industry. New supply in the industry implies an increase in number of similar establishments and there is a limit to increase in the size of an individual establishment.27.

The static-equilibrium concept of industry is necessarily inconsistent with increasing returns because the conditions of equilibrium implies that increases in supply must always be associated with increases in costs.28 A decrease in costs as supply is increased is possible in static-equilibrium case only when the industry is characterised as a monopoly, i.e., an individual firm enlarges its size to produce the industry's output. But according to Young (1928) this benefits of a monopolist reflecting increasing returns is not proper for the analysis of growth and cumulative change.29

Increasing returns which is proper for the analysis of growth implies investment and increased in supply in response to an increase in demand. This investment not only implies establishment of highly specialised firms but also involve supply of differentiated products which have specialised uses. Increasing returns come with an increase in output in the industry and to quote Young". "An increased output means more plants, of course, but the important thing is that they are not "similar establishments" but in general, more highly specialised establishments".30
It can therefore be maintained that in the context of increasing returns, the notion of "industry" which is consistent with static-equilibrium losses its identity. Industry in the context of increasing returns mainly refers to an empirical entity and can be loosely defined to be imperfectly competitive.31

It should be pointed out that investment in an imperfectly competitive industry takes the form of embodied technical progress reflecting increasing returns only in the context of a general economic progress in the economy. This is because increasing returns in an industry not only depends upon an increased demand for the product in question but also dependent on favourable supply responses in terms of supply of technologically superior inputs from allied industries in the economy.32 In other words, increasing returns in any particular industry reflects greater specialisation and interdependence of industries in an economy where the rate at which one industry grows is conditioned by the rate at which others grow.33

The present discussion on the interdependence of industries which secures efficient investment behaviour in industries highlights the significance of an expansion of market which facilitate large investment in industries and the scope of development of other industries which is generated by large investment in any particular industry. In
literature, the balanced growth strategy advocated by Nurkse (1953) and the unbalanced growth strategy put forward by Hirschman (1958) admit the relevance of these effects of interdependence of industries in the development process of developing economies. Though unbalance growth strategy can be maintained to be similar to the ideas developed in the present framework in an important respect, i.e., the possibility of profitable investment in disequilibrium conditions in a developing economy which achieves long-term economic development, balanced growth is sometimes put forward as a distinct and separate strategy of development which questions the relevance of the present framework with its emphasis on efficient investment behaviour in industries in a developing economy. The present study, however, does not discuss balanced growth as a distinct strategy to achieve economic development, independent of efficient investment behaviour in industries, but views it as integral to the strategy which removes supply and demand bottlenecks to bring forth efficient investment behaviour in a few industries in an economy. This is in line with strategy of "balance within imbalance" advocated by Mathur (1966) where the emphasis is to ensure that supply and demand bottlenecks do not hold back growth of few strategic industries in an economy. It is in this broader framework of the strategy of "balance within imbalance" that the focus
of the present study is on the role of interdependence of industries which removes supply and demand bottlenecks to permit efficient investment behaviour in few industries in the economy.

The interdependence of industries which secures increasing returns in any particular industry is studied in detail in the following sections of this chapter.

**SECTION 3.1: FACTORS RESPONSIBLE FOR INCREASING RETURNS**

Following Young (1928) and Kaldor (1966), "increasing returns" is explained partly by demand factors and partly by supply factors. Increasing returns, according to Kaldor, is in the context of an intermediate stage of economic development, and is a result of a complex process of interaction between increases of demand induced by increases in supply and of increases in supply generated in response to increases in demand.

In the present study, it is maintained that the favourable supply and demand conditions which secure increasing returns in a particular industry is the result of interdependence of different sectors in the economy. In other words, under conditions of disequilibrium, investment in an industry, both its rate and efficiency, has to take into account the interdependence of sectors in an economy. The interdependence of sectors in an economy refers to the
fact that production process in an industry is influenced by the rate at which other industries in the economy grow. For example, production process in an industry has to take into account the rise in factor prices where a greater demand for them is forthcoming from other sectors, changes in relative prices of products, fall or rise to the prices of capital goods due to overall capital accumulation, external economies or diseconomies to investment due to sectors linked on the supply side, etc. It is maintained here that the sum total of all these effects refer to the macroeconomic environment in which the industry operates.

The macro-impacts at an industry level are maintained here to be the sum total of effects that investments elsewhere in the economy have on the production process in an industry, i.e., these effects are reflected by the change in the supply and demand conditions that determine the flow of inputs and outputs in an industry. One can define 'investment elsewhere' as the investment expenditure that is external to calculation of an investment carried forward by a private firm. They can be either in the nature of public expenditure on infrastructures (effected by the government policy), or in the category of investment expenditure of other industries (carried out by private firms).

In this perspective, the focus is on the role of a macroeconomic environment in securing increasing returns in
an industry as reflected by the efficiency of investment in the industry. In the following pages, the nature of the macroeconomic environment is studied with a view to bringing out the main effects of macroeconomic environment on the production process in an industry; section 3.2 analyzes the conditions under which there is embodied technological progress in an industry which is endogenous to the economic system; section 3.3 studies the nature of investment behaviour in an industry which is induced by technological progress.

**Effects of Macro-Economic Environment**

Following Stigler (1963) one can discuss the effects of macroeconomic environment with reference to investment in an industry as follows:

"No industry is wholly sheltered from the impact of a major war or even a moderate depression, but these fortunately infrequent events are almost the least of the forces for change with which an industry has to cope. The market for its goods is in constant flux growing with consumer incomes, gaining or loosing from its shifting competition with foreign producers or with new kinds of goods designed to satisfy the same consumer desires. Its organisation of production must continually adapt to changes
in prices of inputs, the (westward) migration of population, the discovery of new resources or production techniques.”

Obviously, in the economy the impacts that different industries have to face are different depending upon the context. In the event that there is perfect foresight (anticipation of future), pure competition and full employment, capital stock in an industry is adaptable to the changing needs of production in conformity with the saving and working behaviour of the population; the changes in relative prices are in line with the changes in capital-labour ratio; In this case, macro-economic impacts are instantaneously adjusted, and are registered in shifting rates of investment of various industries to maintain a uniform rate of return on investment in all industries.

And in the opposite scenario when no change would ever be expected the immediate impact of these changes would be reflected by industry specific data other than its rate of investment: every surge of demand would find the industry unprepared, and its prices and profit rates would rise; every cessation of demand would find overexpanded industries with falling rate of profit. These impacts, moreover, are different in various industries in the economy. Secondly, the adjustment of the rate of investment in response to a change in these macro-economic impacts is incomplete and is different in different industries.
To study the nature of these impacts at an industry level, it can be further assumed that without any change in the former, the industry in question would be in a state of inertia without any need for further investment, or that it is in a steady state that propagates itself in its important characteristics. Here taking the most important characteristics to be the investment (i.e. individual investment in an industry) in a 'given' state of efficiency, the model stated below captures the important changes that macro-impact on an industry generates.

**model specification**

This model does not try to explain the initial investment and the resultant level of output, but takes the initial condition as a datum. It analyzes therefrom, the conditions under which there is an increase in rate of investment which would be associated with an increase in rate of output. The following assumptions are made to specify the initial conditions.

1. The engineering specification of an investment variant is such that for the given life time of the project, the flow of inputs to be exactly matched by the outflow of output is specified for the project, i.e., the physical deterioration of the plant and machinery during the life time is already taken into account in
the flow of input-output accounts of the project. The specified flow of input/output can be maintained by a specified expenditure on repairs and maintenance.

(2) The maintenance charges are so rationalised that there is no X-inefficiency or Penrose effect, i.e., there is no physical deterioration of the assets due to organisational mismanagement.

(3) The representative firm gets assets, organisation and labour force to convert purchased inputs into outputs such that for a particular flow of inputs, there is an equivalent flow of output. The volume of investment per year, as given by assets in combination with the labour force has the twin characteristics of a flow of inputs and flow of output to be evaluated by value-added.

Here the investment is justified if it is profitable enough to keep or maintain a return to the owners. Once this investment is made and the returns are justified, it is not possible to change the arrangement, other things external to the firm i.e. macro economic environment, remaining the same. Any departure from the supposed wage bill or maintenance charges or gross profit is counter effective by bringing down labour productivity, efficiency of organisation and inducement to invest in that industry, respectively.
Second, the depreciation fund accumulated is sufficient to replace the capital stock after its life time, i.e., depreciation fund accumulated is the replacement investment such that the representative firm, with its given level of efficiency, reproduces itself over time by reduplication of capacity.

Given the structure of this model, the factors that affect the efficiency of a particular investment are the exogenous factors in relation to the particular industry. The latter is the same thing as the macro-economic changes in the economic set up.

By definition then, the changes in gross investment elsewhere, under the conditions of disequilibrium, do bring about a change in the production process that underlie investment in the industry. Moreover, it also affects the relative prices for an industry in question such that either the wage rate or the raw material prices or the prices of other goods in relation to the prices of the product of the industry, given a income elasticity of demand, changes as a response. Each of the individual responses viz. change in the wage rate by changing the gross profit per value added (namely wage-bill constraint); change in the raw material prices by changing the value added per output (namely, raw material constraint); change in relative prices of goods by changing the scope of realized profits
(by enlarging or reducing the size of the market or namely market constraint) to name a few instances of influences, bring about a change in the industry's efficiency with respect to its level of investment. For the sake of convenience, one can hold that the increase in the gross investment elsewhere is such that the particular industry is subjected to a combination of wage bill constraint/raw material constraint/market constraint. These impacts can be formalised into two distinct groups.

First, given a level of investment (and the underlying production process) in an industry, the relative prices corresponding to the capital-labour ratio change; this is when the profitability (i.e., gross profit per unit of investment) takes a new value. Moreover, these effects are independent of the capital-labour ratio, and are applicable in short-run context. For example, a spurt of demand for investment elsewhere may change the price of capital in an industry relative to the price of its final product; the instances of a change in the wage-goods prices not offset by the output prices so as to bring about a change in the labour-cost; fluctuations in capacity utilisation in terms of supply of critical inputs can also reflect incomplete adjustment of prices. These instances refer to cases when change in the relative prices are independent of the capital-labour ratio so that there is a
corresponding change in profitability. These macro-economic impacts (or, effects) are defined to be the demand-shocks that the industry has to face, i.e., these are independent of a change in the supply conditions underlying the production process in an industry.

The second group of effects refer to macro-economic impacts that bring about a change in the production process in an industry. In the long run, the industry adapts by changing its capital-labour ratio given a specific change in its relative prices. This is obviously the case if the change in profitability reflects a permanent change in the cost conditions facing the industry. For example, a change in wage-rate can be adjusted by a change in the capital-labour ratio that optimizes profitability.48

In the long-run, however, the macro-economic impacts may be such as to bring about a change in the flow of output in relation to a given flow of inputs, which may accompany the adjustment of capital-labour ratio.49 This effect, in the long run, show the macro-economic effects which have a bearing upon the production process in an industry. This amounts to supply-shocks that the industry faces, and the net effect is a change in total factor productivity over a period of time to signify a change in the methods of production in the industry50.
This foregoing analysis shows that the nature of macro-economic effects at an industry level has two aspects. First, the demand-shocks that is due to change in relative prices in an industry independent of its capital-labour ratio, and which is felt at the industry level rate of return. Second, the impacts in the long run that generate supply-shocks in the form of a change in productivity at the industry level. Moreover, it is also assumed that the changes in rate of return and productivity in so far as they reflect the macro-economic impacts at an industry level imply that they are not caused by investment in the industry but that they accompany it.

In the literature, the consensus over the ability of gross investment in generating demand shocks\textsuperscript{51} can be put against the controversies that surround the question whether gross investment elsewhere can generate supply shocks. This study tries to locate the relationship by relying on earlier studies by Arrow (1962), Romer (1986), Lucas (1988), to name a few path breaking contributions.\textsuperscript{52}

Here, it can be held that supply shocks are generated when there is a case of increase in the marginal productivity of investment in the specific industry.\textsuperscript{53} Following Arrow (1962), such cases of productivity growth are external to the firm but are brought about by gross investment elsewhere that changes the level of knowledge by
which production is organized in an industry. In this framework, knowledge itself is a productive factor that benefits the specific industry. It is available to the industry since knowledge is a public knowledge, which is a spill over effect of gross investment elsewhere, and is formalised as the effect of 'learning by doing'. Lucas (1988) and Romer (1986, 1990), on the other hand, identify a sector specializing in the production of ideas, which is available to other sectors at virtually zero marginal cost as the source of supply shocks to an industry. Here productivity growth or the possibility of it, lies not exactly in gross investment elsewhere but specifically in gross investment in sector producing ideas or knowledge.

SECTION 3.2 : SIGNIFICANCE AND NATURE OF SUPPLY SHOCKS

In the literature, there are different ways of accounting for the sources of supply shocks: it may be embodied in capital, or in labour, or it might enter the production process as an independent input. In this work, the nature of supply shocks are studied which are of the type of embodied technological progress, i.e., it signifies that capital is a vehicle of technological progress. This is because it is maintained that embodied technological progress is an important feature of investment efficiency.
For purposes of exposition one can view an industry being confronted with a set of technological possibilities that are available both domestically and internationally. Further, these techniques can be ranked in descending order according to their productive efficiency - be it measured in terms of output per labour, or output per capital, or more generally, output per unit of a combination of factor inputs. The firms that constitute the industry, however, may not be applying the technique that yields the highest output per unit of inputs but a lower ranked project. This is when the latter project is more profitable than other higher ranking projects in a situation which is characterized by certain supply-bottlenecks, i.e., non-availability of superior intermediate inputs, skilled labour management, etc., and also the particular set of relative prices of inputs that enter the specified production process.54

In this case, investment elsewhere is important when it is responsible for removing the supply bottlenecks that the industry faces, e.g., by changing the industry specific relative prices, supply of technologically superior raw materials, skilled labour etc. The end result is that a higher ranked project or a technique that yields a higher productive efficiency is made more profitable as compared to other techniques. Accordingly, new investment following
this opportunity created by investment elsewhere, is associated with an increase in profitability that reflects an increase in productive efficiency.\textsuperscript{55}

It should be emphasized that the increase in productive efficiency reflects a type of technical change that increases the flow of output without increasing the costs proportionately or that the technical change is output augmenting.\textsuperscript{56} This kind of technical change presupposes that there is a corresponding increase in rate of growth of demand for the industrial product. In other words, there may be a market-constraint, independent of any favourable supply response that makes a lower ranked project more profitable as compared to other alternatives.\textsuperscript{57} It can therefore be maintained that where there is no market-constraint the increase in productive efficiency is entirely due to better supply response.

There are two different approaches that deal with the issue of the size of the market or the growth of demand in the literature. One approach, which, in line with neo-classical theories, maintains that an increase in productive efficiency itself influences demand through the change in competitiveness which is induced by it. In other words, an increase in productive efficiency being output augmenting tends to be associated with falling relative costs and thereby falling relative prices causing a demand towards the
industrial product in question. On the other hand, the second approach, in line with the thesis of Young (1928), elaborated further by Kaldor (1972 and 1975), maintains that increases in productive efficiency are mainly due to an increase in demand (size of the market) which is exogenous to the industry in question. In other words, favourable supply responses that remove resource-constraints, to increase productive efficiency, are induced by an increase in the size of the market. Moreover, introduction of a technique which is cost-reducing itself depends upon the nature of market that the industry is facing. Studies show that if the industry in question produces price-elastic products then there is a tendency towards technological efforts that reduce costs; on the other hand, if the products are income-elastic then the effort is towards increasing the quality and differentiation of the product rather than towards reducing its costs.

The issue of whether primacy should be given to favourable supply responses or to favourable demand responses to induce an increase in productive efficiency is beyond the scope of this study. It is maintained that an increase in productive efficiency as new investment takes place in an industry i.e., favourable supply-shocks, is due to removal of both resource-constraint and demand-constraints, which is dependent on investment elsewhere, and
the whole process of interdependence of industries which is capable of embodied technical progress is endogenous to the economic system.

However, in discussion of the effects of investment elsewhere, one should bear in mind the distinction between demand shocks which change profitability without an increase in productive efficiency and the growth of demand which is responsible for favourable supply-shocks so that profitability increases which is reflected in an increase in productive efficiency. This distinction between the two is brought out clearly in the following discussions.

First, in the model taken up in the earlier section the macro-economic impact is mainly in terms of demand-shocks in the short-run context. In this case, it disturbs the investment in its given state of efficiency and is reflected by a change in the rate of return to the owner(s) of the firm(s). This can be studied in two ways. First, the demand-shock may entail a reduction in the rate of return. In this case if the rate of investment is maintained by maintaining the depreciation fund, then the returns to the owners indicating the desire to remain in the business declines; if the firm is induced to maintain the same gross profit, or the rate of return to the owners, then the fund to maintain a specific depreciation declines, and thereby, reduces the level of investment. The exact response of the industry is
either reflected by a diversion of investment elsewhere, or by an adjustment of the capital-labour ratio in line with the change in the relative prices.\textsuperscript{61} Secondly, demand-shocks can be in terms of a higher rate of return. Here the firms can either choose to maintain the same capital-labour ratio with a higher mark-up, or it adjusts its capital-labour ratio to bring about a higher rate of investment.\textsuperscript{62}

Since the primary focus is on the rate of investment in a state of disequilibrium (caused by the demand-shocks), the inquiry pertains to the response of the industry in terms of an adjustment of its capital-labour ratio. Typically, this adjustment would be associated with a higher rate of investment (more than exactly its depreciation) to realise a higher rate of return, i.e., investment in this instance would offset the forces making for a fall in profits.\textsuperscript{63} Accordingly, the increase in investment should bring forth an increase in the level of output which would yield the additional profit to underwrite the additional investment.\textsuperscript{64} It is therefore maintained that the industry should be in a position to invest by replacing earlier capacity by better and more efficient capacity so as to realise the higher rate of return. This is to say that the industry, in the long run, is also subjected to a favorable supply-shock that ensures productivity growth to be associated with a higher rate of investment. In other words the industry's response
to adjust its capital-labour ratio is crucially dependent upon whether there is a favorable supply-shock as well.

**SECTION 3.3: RESPONSE OF INVESTMENT**

It should be emphasized that favourable supply-shocks are important for efficiency of investment when investment responds positively to these supply-shocks. In other words an increase in productive efficiency should lead to (i) an increase in the rate of investment and (ii) a further increase in productive efficiency as the rate of investment is increased, so that the process is a cumulative one and the industry in question is subjected to increasing returns. In this instance, rate of investment being positively associated with productivity growth reflects an increase in rate of growth of output.

This section studies the condition under which investment responds positively to an increase in productive growth so that there is efficiency of investment. Moreover, since an increase in productivity is also associated with an increase in profitability, the issue is to study the conditions under which the resultant reinvestment surplus leads to a higher rate of investment and further increase in productivity.

First, one may point towards the possibility of efficiency of investment where investment brings forth
further investment in the industry in the presence of favourable supply-shocks. The process is characterised by a self-perpetuating endogenous growth path, where investment is associated with productivity growth, and the latter constitutes an important determinant of further investment in the industry.\(^65\) Malinvaud, speaking of the self-sustained growth, or the growth process when it is virtuous, has a similar argument as follows: Macro-economic impact in terms of a good profitability stimulates additional level of investment and latter to productivity and competitiveness, this in turn is responsible for high profits and high productivity, and so on.\(^66\)

To summarize, the representation of investment in a growth process that is progressive and propagates itself in a cumulative manner is two fold. One, it is associated with productivity growth and second, productivity growth associated with a higher rate of investment creates impetus for further investment in the industry.

This aspect of the investment efficiency, which maintains productivity to be an important determinant of investment decision in the market economy is taken up below.

Investment decisions are basically driven by profit expectations. Profits expected from investment are, however, not directly observable. In neo-classical 'efficient-market' standards, past profits are the basis
upon which future expectations are formed. This is true only if there is perfect tranquillity, such that investment decisions reflect entrepreneurs' rationally formed expectations.\textsuperscript{67} As against this, Keynes ascribed decision to invest mainly to psychological factors ("a result of animal spirits"), suggesting a high degree of irrationality.\textsuperscript{68}

The debate over the theoretical derivation of an appropriate investment function therefore is basically to approximate profit expectations by variables thought to affect them. Empirical studies have converged on a limited set of explanatory variables that influence profit expectations and explain investment expenditure. Foremost among these are measures of profitability, the level of economic activity and the cost of capital.

It should be emphasized that even though profitability is an important determinant, the exact role of profitability cannot be approximated by the level of current profits; the current rate of profit is a reasonable candidate if and only if lagged rate of profits explains current rate of profit.\textsuperscript{69}

There are instances, when the factors that define current rate of profit may not guide investment expenditure. This is the case when investment entails an increase in output requiring an increase in market size, or that the industry requires to sell the increased output at a price
that exceeds its cost of production, i.e., at a rate of return higher than the current rate of profit to take into account capital selling expenditure in the form of advertising campaigns or new selling outlets.\textsuperscript{70} In these instances, the level of economic activity may provide the information about the future expectations of profit from investment.\textsuperscript{71} The level of economic activity, in line with accelerator models of investment behaviour, may be approximated by changes in output, or change in capacity utilisation. The explanatory value of these variables lies in their capacity to describe the expected future size of the market. These variables are included to reflect the level of economic activity in line with future income growth that affects future profitability.\textsuperscript{72} This line of reasoning is best exemplified in the work of Malinvaud (1983). He maintains that current rate of profit reflects future profitability when the economy is characterised by a balanced growth of the Solow type; in the event of a departure from the balanced growth path into a world of an uncertain future, the current profit rate along with a measure of excess capacity should enter the investment equation. The measure of excess capacity approximates future income growth in line with future market expectations.\textsuperscript{73}

We could thus conclude that an increase in productive efficiency being in the nature of supply-shocks defines the
level of economic activity in line with future market expectations. This productivity growth when it reflects a departure from equilibrium growth path, is tantamount to a case of cost reductions as output increases, and thereby, eases the output constraints faced by the producers. This is because the sum total of the effects of supply-shocks is a shift of the demand curve for the industry to define an increase in the size of the market. This is either because of a price reduction in line with cost reduction being passed on to the market by the producers, or that the industry at the same price meets the bulge in the capital requirement to finance various kinds of capital selling expenditure, e.g., mainly in the form of market investment. In other words, a supply shock is an important factor that influences market expectations and thereby induces further investment in the industry.

It should be pointed out that in Youngian framework, productivity growth facilitates competition and thereby brings forth expansion of market. This competition for market expansion which is induced by productivity growth, takes two dominant forms: First, productivity growth or cost reductions reflect themselves in lower prices that has an expansionary effect on demand. Second, cost reduction also allow industry to incur advertisement and related "selling expenditures" that facilitates marxist expansion of the
specific industry vis-a-vis other industries in the economy. 77

Kaldor (1966), on the other hand has cautioned against the role of productivity growth as having an expansionary effect on demand, working through price reduction and the resultant substitution effect. This is because price reductions may have an expansionary effect on demand only if the price elasticity of demand for the product in question is greater than unity 78 - a position that is known to be empirically not valid universally for much of industries in the economy. 79

However, Kaldor is not against an investment behaviour which is guided by productivity growth. In fact according to him, induced investment in general is in response to either a shift in demand or a shift in supply in terms of technical change. 80 Technical change reflecting increasing returns implies a production process where production rises faster than the capital stock. 81 This increase in output capital ratio, is maintained to be a proxy for an increase in prospective rate of profit which in turn is responsible for further investment. 82

In this perspective, the present study, while hypothesising a induced investment which is in response to productivity growth, maintains two basic roles of productivity growth. They are given below:
(a) Productivity growth stimulates market expectations - either by substitution effect working through price-elasticity of demand for the product in question or by market expenditure that raises the individual market share of the industry.

(b) Productivity growth is a proxy for an increase expected future profitability when it is discussed in terms of an increase in output-capital ratio.

Furthermore, in the context of a particular industry in an economy, growth under increasing returns implies not only that productivity growth induces further investment but also that the induced investment takes the form of embodied technical change. The latter presuppose a faster increase in demand for the product in question. In this perspective, the present study does not downplay the role of substitution effect of a price reduction or the role of market-related expenditure brought about by productivity growth in an industry.83

SECTION 3.4: POSSIBILITY OF DYNAMIC EFFICIENCY OF INVESTMENT: SOME EXPLANATORY HYPOTHESES

It should be pointed out that the issue of whether efficiency of investment is primarily due to better supply response or better demand response, as also pointed out earlier in this chapter (section 3.2), is beyond the scope
of this study. It is maintained that in the absence of supply response an increased demand or alternatively a better supply response without the corresponding increased demand, an increase in rate of investment would not reflect efficiency of investment. However, the discussions earlier point to the possibility of efficiency of investment for the following reasons.

(a) A favourable supply-shock and the resultant increase in demand that is induced by better competitiveness.

(b) Since favourable supply-shock is associated with an increase in profitability, it may induce investment elsewhere and thereby change the nature of macro-economic investment that the industry has to face. In this case, the industry has to continuously adjust its production process to bring about a higher rate of investment associated with higher productivity growth. This defines a symbiotic relationship between investment in an industry and investment elsewhere.

(c) Given an investment surplus due to favourable supply-shocks, investment elsewhere, independent of investment in the industry, say due to public policy, may lead to further improvement in supply responses and growth of demand and the process leads to efficiency of investment.
It should be pointed out that rate of investment shows efficiency of investment when there is an increase in rate of investment positively associated with growth of productivity and where investment is self-generating so that it is in response to an increase in productivity.

These aspects of investment behaviour in a specified industry is studied empirically in the following chapters.
NOTES:

1. Refer to Young (1928); N. Kaldor (1972, 1977); P.M. Romer (1986); M.Fg. Scott (1991, 1992); G.C. Reid (1989), chapter 4 and 5. For a discussion of increasing returns in terms of technical change which is endogenous to the economic system, refer to G.C. Reid (1989), Chapter 4.

2. P.M. Romer (1986), pp.1002-1003; M. Fg. Scott (1992) pp.624-626. In fact, Kaldor (1977) emphasising the dominant role of increasing returns, analyses the growth process in terms of increases in capital which is mainly accumulated out of re-investment profits in accordance with investment opportunities created by previous investment (pp. 424-425).

3. For an excellent review, refer to G.C. Reid (1989); P.M. Romer (1986); also see C. P. Blitch (1983); N. Kaldor (1966, 1972).

4. Growth theories proper are identified as the growth theories in the tradition Neo-classical growth models or in general, steady state equilibrium growth models. For an excellent review of these theories, refer to M.F. Scott (1989), chapter 3; P.M. Romer (1986); Kaldor (1972, 1977). According to Kaldor, conventional growth theories tries to reconcile the empirical support in favour of increasing returns by introducing the Harrod-Neutral technical progress which proceeds at an exogenous rate in time. See Kaldor 1977, p.426. This is discussed below in the following pages in this chapter.

5. The initial spark was provided by the study by Solow (1956 and 1957). The mushrooming of studies that followed the publication in 1957 is documented in I.J. Ahluwalia (1991).

6. For a critique, see N. Kaldor (1977), p.426; also see N.Kaldor (1972).


8. For a critique see P.M. Romer (1986); N. Kaldor (1972-1977).
9. For an excellent review of these studies in these lines refer to M.Fg. Scott (1989), Chapter 4 and 5.


14. On the other hand, there are studies which view disequilibrium situations as forms of market distortion and maintain that the basis of economic growth is the removal of these distortions, and the tendency towards equilibrium. For a review of literature, see B. Balassa (1982).

15. These features of investment behaviour are discussed in detail in chapter I of this thesis. It is interesting to note that both the studies by Romer (1986) and M. Fg. Scott (1989), have these two features of investment behaviour, signifying role of increasing returns in the growth process. The difference is that the present study discusses these features in terms of investment behaviour which is industry specific and in the context of a disequilibrium growth process while the other studies (Romer, 1986; Scott, 1989) discuss them in an aggregative framework. See, P.M. Romer (1986), p.1003; M.Fg. Scott (1992), pp. 624-626.

16. See n.24 in chapter I.


26. Refer to A. Koutsoyiannis (1979), pp. 7-12.
28. C. P. Blitch (1983), p.362. In literature, it also maintained that presence of increasing returns implies increased concentration and monopolisation of an industry (See Stigler, 1951; Prendergast, 1992). However, for a critique of this implication of the static - equilibrium theories, see G.C. Reid (1989), pp. 100-101.
29. A. Young (1928), p. 539. What is maintained is that this kind of economies are exhausted at a small scale which is equivalent to the total output of the industry. Also see, C.P. Blitch (1983), pp.361-364.
32. C.P. Blitch (1983), p.366. This is also discussed in detail in section 3.1.
34. For a useful survey of these strategies, refer to Ashok Mathur (1966).
35. However, according to Myint (1987), balanced growth strategy also cannot be considered independent of efficient investment behaviour as discussed in this work. See, H. Myint (1987), pp. 91-94.
36. See Ashok Mathur (1966), pp. 150-155. However, an essential difference between the strategy of 'balance within imbalance' (BWI) and the present framework of study should be noted. In the BWI strategy the few strategic industries refers to a set of industries where the network of input-output relationship is the thickest, i.e., industries which buy the largest part of their inputs from other industries, or sell the largest part of their output to other industries (as distinct from consumers), or both. The present framework of study, on the other hand, concentrates on the industries where investment is associated with technical progress. This point of departure is also noted by Mathur (1966). According to Mathur (1966), the order of priority for the few strategic industries in the strategy of "balance within imbalance" depends not upon the relative pace of technical progress in the different industries, but upon considerations of development strategy to create a deliberate imbalance in favour of producer goods industries (Ashok Mathur, 1966, pp. 151-153, esp. n.1 in p. 153). Moreover, Thirlwall (1989) also notes that the BWI strategy is not consistent with a concentration of resources in industries, according to comparative advantage or the existence of increasing returns (p. 195).


39. See Chapter I, n.35. For a similar analysis of interdependence of sectors which secures increasing returns refer to N. Kaldor (1977), pp.416-421.

40. G.J. Stigler (1963), pp 3-4


43. This case is also analogous to an economy in a static equilibrium. For an excellent discussion refer to, M.Fg. Scott (1989), pp. 149-151.

44. For a description of the model refer to, M.Fg. Scott (1989), chapter 6, pp.147-152.

46. Refer to M.Fg.Scott (1989), pp. 149-150

47. For a discussion of short run impacts in terms of relative prices, refer to, T.E.Weisskopf (1979), p.345; and also E.Malinvaud (1983).

48. The underlying rationale is discussed in details in, A.K. Sen (1960), chapter 2.

49. It amounts to an increase in productivity which is independent of investment in an industry. For a critique of the literature, see G.K. Shaw (1992).

50. This is measured by a productivity index known as the Solow residue to reflect 'technical progress' in the broadest sense. Refer to R.M. Solow (1957).

51. For a general discussions on demand shocks, as discussed here, refer to G.J. Stigler (1963); T.E. Weisskopf (1979).

52. For a critique of these studies refer to, G.K. Shaw (1992)


54. A.K. Sen (1975), pp. 13-14 for a discussion along these lines. For a similar analysis to illuminate increasing returns refer to N. Kaldor (1972), p.397-8.

55. The increase in profitability is maintained to be an important source of incentive which induces firms to carry out the embodied technical change. For a related discussion, refer to G.C. Reid (1989) pp. 80-81.

56. Output augmenting simply means that there is an expansion of capacity in output terms. In this study this expansion of output is accompanied by cost reduction so that the technical change is associated with an increase in productive efficiency.

57. A.K. Sen (1975), pp. 13-14. In the literature on technical change, it is pointed out that any discovery or invention which is cost-reducing and capacity-extending is not sufficient by itself for it to be adopted; innovation takes place only if the invention would lead to an increase in gross profits. For a
discussion along these lines, refer to, G.C. Reid, (1989), pp. 80-81.


60. M.Fg. Scott (1989), pp. 149-151

61. M.Fg. Scott (1989), pp. 149-151

62. This requires a case of perfect competition to assume away the higher mark-up in an industry.


64. This is the variant used by Kalecki (1971) to establish the macro-economic stability, refer to, C. Kurdas (1991), pp. 212-213.

65. For a discussion on the implication of endogenous growth of investment to bring about industrial growth, refer to, A. Bhaduri (1986), pp. 171-181; also see, A. Bhaduri (1990).


68. J.M. Keynes (1936), pp. 149-150.

69. For a review of the literature on productive investment refer to, T. Koechlin (1992), pp. 66-68.

70. T. Koechlin (1992), p. 68


74. Refer to, R.F. Rowthorn (1975), pp. 898-899. He maintains that this observation is true only in cases of individual industries, rather than in cases of aggregate growth; also see, M. Fg. Scott (1989), p. 390.

75. M.Fg. Scott (1989) has noted that Solow, among other economists, was prepared to assume that
selling costs could shift the firms' demand curve to the right at a greater or lesser speed, but was not prepared to to assume that a price cut could do the same except temporarily. However, Scott argues that price cut can effect new market penetration (i.e., shift of demand curve), not in a steady state economy, but in the event of a departure from the steady state growth path. see. M.Fg. Scott (1989), pp. 261-263.

76. C.P. Blitch (1983), N.1, P.367. To quote, "It is obvious from these remarks that Young is not considering competition in the sense of "perfect competition". Instead he is harking back to a version of competition used by Adam Smith. G.B. Richardson (1975) recently argued that Smith used two functions of competition. On the one hand, competition acted as an ordering and leveling device leading toward the establishment of market equilibrium. On the other hand, it stimulated market expansion by undermining that tendency toward equilibrium. It was competition in the form of free entry and the exploitation of additional opportunities for the division of labour (1975, pp.350-51). It was this latter role of competition that both Smith and Young thought vastly more important.


78. N. Kaldor (1966), p.291; also see N. Kaldor (1972), pp.386 to 387.

79. There is a lively discussion on this issue in literature. Refer to, N. Kaldor (1975); R. Rowthorn (1975).


82. For the underlying rationale, N. Kaldor (1961), pp.213-214. Also see, M. Kalecki (1965), P.158.

83. For a discussion on the significance of these issues in the context of developing economies, refer to H. Myint (1987), pp.93-94.