

# Deductive and Inductive Methods of Economics (Merits and Demerits)

by Smriti Chand Economics

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## ***The Deductive Method:***

Deduction Means reasoning or inference from the general to the particular or from the universal to the individual. The deductive method derives new conclusions from fundamental assumptions or from truth established by other methods. It involves the process of reasoning from certain laws or principles, which are assumed to be true, to the analysis of facts.

Then inferences are drawn which are verified against observed facts. Bacon described deduction as a “descending process” in which we proceed from a general principle to its consequences. Mill characterised it as a priori method, while others called it abstract and analytical.

Deduction involves four steps: (1) Selecting the problem. (2) The formulation of assumptions on the basis of which the problem is to be explored. (3) The formulation of hypothesis through the process of

logical reasoning whereby inferences are drawn. (4) Verifying the hypothesis. These steps are discussed as under.

### **(1) Selecting the problem:**

The problem which an investigator selects for enquiry must be stated clearly. It may be very wide like poverty, unemployment, inflation, etc. or narrow relating to an industry. The narrower the problem the better it would be to conduct the enquiry.

### **(2) Formulating Assumptions:**

The next step in deduction is the framing of assumptions which are the basis of hypothesis. To be fruitful for enquiry, the assumption must be general. In any economic enquiry, more than one set of assumptions should be made in terms of which a hypothesis may be formulated.

### **(3) Formulating Hypothesis:**

The next step is to formulate a hypothesis on the basis of logical reasoning whereby conclusions are drawn from the propositions. This is done in two ways: First, through logical deduction. If and because relationships (p) and (q) all exist, then this necessarily implies that relationship (r) exists as well. Mathematics is mostly used in these methods of logical deduction.

### **(4) Testing and Verifying the Hypothesis:**

The final step in the deductive method is to test and verify the hypothesis. For this purpose, economists now use statistical and econometric methods. Verification consists in confirming whether the hypothesis is in agreement with facts. A hypothesis is true or not can be verified by observation and experiment. Since economics is concerned with human behaviour, there are problems in making observation and testing a hypothesis.

For example, the hypothesis that firms always attempt to maximise profits, rests upon the observation that some firms do behave in this way. This premise is based on a priori knowledge which will continue to be accepted so long as conclusions deduced from it are consistent with the facts. So the hypothesis stands verified. If the hypothesis is not confirmed, it can be argued that the hypothesis was correct but the results are contradictory due to special circumstances.

Under these conditions, the hypothesis may turn out to be wrong. In economics, most hypotheses remain unverified because of the complexity of factors involved in human behaviour which, in turn, depend upon social, political and economic factors. Moreover, controlled experiments in a laboratory are not possible in economics. So the majority of hypotheses remain untested and unverified in economics.

## ***Merits of Deductive Method:***

The deductive method has many advantages.

### **(1) Real:**

It is the method of “intellectual experiment,” according to Boulding.

Since the actual world is very complicated, “what we do is to postulate in our own minds economic systems which are simpler than reality but more easy to grasp. We then work out the relationship in these simplified systems and by introducing more and more complete assumptions, finally work up to the consideration of reality itself.”

Thus, this method is nearer to reality.

### **(2) Simple:**

The deductive method is simple because it is analytical. It involves abstraction and simplifies a complex problem by dividing it into component parts. Further, the hypothetical conditions are so chosen as to make the problem very simple, and then inferences are deduced from them.

### **(3) Powerful:**

It is a powerful method of analysis for deducing conclusions from certain facts. As pointed out by Cairnes, The method of deduction is incomparably, when conducted under proper checks, the most powerful instrument of discovery ever wielded by human intelligence.

### **(4) Exact:**

The use of statistics, mathematics and econometrics in deduction brings exactness and clarity in economic analysis. The mathematically trained economist is able to deduce inferences in a short time and make analogies with other generalisations and theories. Further, the use of the mathematical-deductive method helps in revealing inconsistencies in economic analysis.

#### **(5) Indispensable:**

The use of deductive method is indispensable in sciences like economics where experimentation is not possible. As pointed out by Gide and Rist, "In a science like political economy, where experiment is practically impossible, abstraction and analysis afford the only means of escape from those other influences which complicate the problem so much."

#### **(6) Universal:**

The deductive method helps in drawing inferences which are of universal validity because they are based on general principles, such as the law of diminishing returns.

### ***Demerits of Deductive Method:***

Despite these merits, much criticism has been levelled against this method by the Historical School which flourished in Germany.

#### **1 .Unrealistic Assumption:**

Every hypothesis is based on a set of assumptions. When a hypothesis is tested, assumptions are indirectly tested by comparing their implications with facts. But when facts refute the theory based on the tested hypothesis, the assumptions are also indirectly refuted. So deduction depends upon the nature of assumptions. If they are unrealistic, in this method, economists use the *ceteris paribus* assumption. But other things seldom remain the same which tend to refute theories.

## **2. Not Universally Applicable:**

Often the conclusions derived from deductive reasoning are not applicable universally because the premises from which they are deduced may not hold good at all time and places. For instance, the classicists assumed in their reasoning that particular conditions prevailing in England of their times were valid universally. This supposition was wrong. Prof. Lerner, therefore, points out that the deductive method is simply “armchair analysis” which cannot be regarded as universal.

## **3. Incorrect Verification:**

The verification of theories, generalisations or laws in economics is based on observation. And right observation depends upon data which must be correct and adequate. If a hypothesis is deduced from wrong or inadequate data, the theory will not correspond with facts and will be refuted. For instance, the generalisations of the classicists

were based on inadequate data and their theories were refuted. As pointed out by ircholson, “the great danger of the deductive method lies in the natural aversion to the labour of verification.”

#### **4. Abstract Method:**

The deductive method is highly abstract and requires great skill in drawing inferences for various premises. Due to the complexity of certain economic problems, it becomes difficult to apply this method even at the hands of an expert researcher. More so, when he uses mathematics or econometrics.

#### **5. Static Method:**

This method of analysis is based on the assumption that economic conditions remain constant. But economic conditions are continuously changing. Thus this is a static method which fails to make correct analysis.

#### **6. Intellectually:**

The chief defect of the deductive method “lies in the fact that those who follow this method may be absorbed in the framing of intellectual toys and the real world may be forgotten in the intellectual gymnastics and mathematical treatment.”

#### ***The Inductive Method:***

Induction “is the process of reasoning from a part to the whole, from particulars to generals or from the individual to the universal.” Bacon

described it as “an ascending process” in which facts are collected, arranged and then general conclusions are drawn.

The inductive method was employed in economics by the German Historical School which sought to develop economics wholly from historical research. The historical or inductive method expects the economist to be primarily an economic historian who should first collect material, draw generalisations, and verify the conclusions by applying them to subsequent events. For this, it uses statistical methods. The Engel’s Law of Family Expenditure and the Malthusian Theory of Population have been derived from inductive reasoning.

The inductive method involves the following steps:

### **1. The Problem:**

In order to arrive at a generalisation concerning an economic phenomenon, the problem should be properly selected and clearly stated.

### **2. Data:**

The second step is the collection, enumeration, classification and analysis of data by using appropriate statistical techniques.

### **3. Observation:**

Data are used to make observation about particular facts concerning the problem.



#### **4. Generalisation:**

On the basis of observation, generalisation is logically derived which establishes a general truth from particular facts.

Thus induction is the process in which we arrive at a generalisation on the basis of particular observed facts.

The best example of inductive reasoning in economics is the formulation of the generalisation of diminishing returns. When a Scottish farmer found that in the cultivation of his field an increase in the amount of labour and capital spent on it was bringing in less than proportionate returns year after year, an economist observed such instances in the case of a number of other farms, and then he arrived at the generalisation that is known as the Law of Diminishing Returns.

#### ***Merits of Inductive Method:***

The chief merits of this method are as follows:

##### **(1) Realistic:**

The inductive method is realistic because it is based on facts and explains them as they actually are. It is concrete and synthetic because it deals with the subject as a whole and does not divide it into component parts artificially

##### **(2) Future Enquiries:**

Induction helps in future enquiries. By discovering and providing general principles, induction helps future investigations. Once a generalisation is established, it becomes the starting point of future enquiries.

### **(3) Statistical Method:**

The inductive method makes use of the statistical method. This has made significant improvements in the application of induction for analysing economic problems of wide range. In particular, the collection of data by governmental and private agencies or macro variables, like national income, general prices, consumption, saving, total employment, etc., has increased the value of this method and helped governments to formulate economic policies pertaining to the removal of poverty, inequalities, underdevelopment, etc.

### **(4) Dynamic:**

The inductive method is dynamic. In this, changing economic phenomena can be analysed on the basis of experiences, conclusions can be drawn, and appropriate remedial measures can be taken. Thus, induction suggests new problems to pure theory for their solution from time to time.

### **(5) Histrico-Relative:**

A generalisation drawn under the inductive method is often histrico-relative in economics. Since it is drawn from a particular historical

situation, it cannot be applied to all situations unless they are exactly similar. For instance, India and America differ in their factor endowments. Therefore, it would be wrong to apply the industrial policy which was followed in America in the late nineteenth century to present day India. Thus, the inductive method has the merit of applying generalisations only to related situations or phenomena.

### ***Demerits of Inductive Method:***

However, the inductive method is not without its weaknesses which are discussed below.

#### **(1) Misinterpretation of Data:**

Induction relies on statistical numbers for analysis that “can be misused and misinterpreted when the assumptions which are required for their use are forgotten.”

#### **(2) Uncertain Conclusions:**

Boulding points out that “statistical information can only give us propositions whose truth is more or less probable it can never give us certainty.”

#### **(3) Lacks Concreteness:**

Definitions, sources and methods used in statistical analysis differ from investigator to investigator even for the same problem, as for instance in the case of national income accounts. Thus, statistical techniques lack concreteness.

#### **(4) Costly Method:**

The inductive method is not only time-consuming but also costly. It involves detailed and painstaking processes of collection, classification, analyses and interpretation of data on the part of trained and expert investigators and analysts

#### **(5) Difficult to Prove Hypothesis:**

Again the use of statistics in induction cannot prove a hypothesis. It can only show that the hypothesis is not inconsistent with the known facts. In reality, collection of data is not illuminating unless it is related to a hypothesis.

#### **(6) Controlled Experimentation not Possible in Economics:**

Besides the statistical method, the other method used in induction is of controlled experimentation. This method is extremely useful in natural and physical sciences which deal with matter. But unlike the natural sciences, there is little scope for experimentation in economics because economics deals with human behaviour which differs from person to person and from place to place.

Further, economic phenomena are very complex as they relate to man who does not act rationally. Some of his actions are also bound by the legal and social institutions of the society in which he lives. Thus, the scope for controlled experiments in inductive economics is very little. As pointed Out by Friendman, “The absence of controlled experiments

in economics renders the weeding out of unsuccessful hypo-these slow and difficult.”

### ***Conclusion:***

The above analysis reveals that independently neither deduction nor induction is helpful in scientific enquiry. In reality, both deduction and induction are related to each other because of some facts. They are the two forms of logic that are complementary and co-relative and help establish the truth.

Marshall also supported the complementary nature of the two methods when he quoted Schmoller: “Induction and deduction are both needed for scientific thought as the right and left foot are needed for walking.” And then Marshall stressed the need and use of integrating these methods.

Now-a-days, economists are combining induction and deduction in their studies of economic phenomena in various fields for arriving at generalisations from observed facts and for the indirect verification of hypotheses. They are using the two methods to confirm the conclusions drawn through deduction by inductive reasoning and vice versa. Thus true progress in economic enquiries can be made by a wise combination of deduction and induction.

# Methods of Economic Analysis: Deductive Method and Inductive Method

by Supriya Guru **Economics**

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Some of the most important methods of economic analysis are as follows: 1. Deductive Method 2. Inductive Method.

Economic generalisations describe the laws or statements of tendencies in various branches of economics such as production, consumption, exchange and distribution of income. In the view of Robbins, economic generalisations or laws are statements of uniformities which describe human behaviour in the allocation of scarce resources between alternative ends.

The generalisations of economics like the laws of other sciences, state cause and effect relationships between variables and describe those economic hypotheses which have been found consistent with facts or, in other words, have been found to be true by empirical evidence. But a distinction may be drawn between a generalisation (law) and a theory.

A law or generalisation just describes the relationship between variables; it does not provide any explanation of the described relation. On the other hand, a theory provides an explanation of the stated relation between the variables, that is, it brings out the logical basis of the generalisation. An economic theory or a model derives a generalisation through process of logical reasoning and explains the conditions under which the stated generalisation will hold true.

## **1. Deductive Method:**

**Generalisations in economics have been derived in two ways:**

(1) Deductive Method,

(2) Inductive Method.

We shall first explain the deductive method of deriving economic generalisations. The deductive method is also called abstract, analytical and a priori method and represents an abstract approach to the derivation of economic generalisations and theories.

**The principal steps in the process of deriving economic generalisations through deductive logic are:**

(a) Perception of the problem to be enquired into;

(b) Defining precisely the technical terms and making appropriate assumptions, often called postulates or premises;

(c) Deducing hypotheses, that is, deriving conclusions from the premises through the process of logical reasoning; and

(d) Testing of hypothesis deduced.

### ***(a) Perception of the Problem:***

In any scientific enquiry, the analyst or theorist must have a clear idea of the problem to be enquired into. He must know the significant variables regarding whose behaviour and interrelationship he wants to derive generalisations. The perception of the problem is by no means an easy task.

### ***(b) Definition of Technical Terms and Making of Assumptions:***

The next step in the process of deriving economic generalisations is to define precisely and unambiguously the various technical terms to be used in the analysis as well as to state clearly the assumptions he makes to derive generalisations.

As mentioned above, assumptions may be behavioural pertaining to the behaviour of the economic variables or they may be technological relating to the state of technology and the factor endowments. The crucial assumptions are made on the basis of observations or introspection.

A crucial assumption that has been taken in economics is that consumers try to maximise their satisfaction and producers try to



maximise their profits. Likewise, it is assumed that investors try to minimise their risk and maximise the expected rate of their profits. Some of the assumptions are made merely to simplify the analysis and may not be quite realistic.

The actual economic world is quite complex and full of details in which numerous factors play a part and act and interact on each other. The introduction of simplifying assumptions is quite necessary in order to bring out the importance of really significant factors having a bearing on the problem under investigation.

According to Prof. Boulding, economic theory represents just a 'map' of real world phenomenon and not a perfect picture of it. To quote him, "Just as we do not expect a map to show every tree, every blade of grass in a landscape, so we should not expect economic analysis to take into account every detail and quirk of real economic behaviour."

It, therefore, follows that each and every assumption made by a theory may not be realistic. The crucial factor in building up a valid theory is whether its predictions are corroborated by the facts in the world. A correct scientific theory or generalisation must be expressed in the form of a hypothesis that is conceivably refutable.

As mentioned above, Professor Friedman in his now well-known article, "The Methodology of Positive Economics" has expressed the view that undue importance should not be given to the 'realism' of

assumptions. What matters most from the viewpoint of scientific theory, according to him, is whether it enables us to predict things accurately.

### ***(c) Deducing Hypotheses through Logical Deduction:***

The next step in deriving generalisations through deductive logic is deducing hypotheses from the assumptions or premises taken. A hypothesis describes relationship between factors affecting a phenomenon; it establishes the cause and effect relationship between the variables having a bearing on the phenomenon.

Then, through logical process, hypothesis is deduced from the assumptions made. This logical reasoning may be carried out verbally or it may be conducted in symbolic terms using the language of what is known as symbolic logic.

The geometric or graphic technique is also usually employed to deduce the hypotheses about the relationship between factors.

Besides, the process of logical deduction may be done with the help of more formal mathematics.

These days in almost all branches of modern economics, mathematics as tool of analysis for deriving economic theories and generalisations is being increasingly used. The use of mathematics in economic analysis proves extremely useful where geometrical methods make

the analysis more complicated to comprehend. Besides, the use of mathematical method makes the derivation of economic hypotheses more rigorous and exact.

It is worthwhile to note that in deriving analytically sound hypotheses, one should guard against committing logical fallacy in the process of logical deduction. For instance, it is inappropriate to conclude that A must be the cause of B, if A happens to precede B.

Further, it is logically fallacious to argue that since there exists a high degree of correlation between the two factors, say between the supply of money and the general price level, the former must be the cause of the latter, unless the causation must be logically developed.

#### ***(d) Testing or Verification of Hypotheses:***

Hypotheses obtained above have to be verified before they are established as generalisations or principles of economics. For the verification of hypotheses, economists cannot make controlled experiments, because they have to discover uniformities in behaviour patterns of man.

We cannot make experiments with man under controlled conditions, such as in laboratories as physical scientists make experiments with inanimate objects of nature and biologists make these with animals and plants. Therefore, economists have to rely on uncontrolled experience and observations.

The information regarding uncontrolled experience about the behaviour patterns concerning variables about man and the economy are quite amply available. The reliance by economists on uncontrolled experiences, however, does increase the number of observations required to verify the hypotheses or to establish the generalisations.

Besides, the need to rely on uncontrolled experiences complicates the analysis and requires that facts must be carefully interpreted to discover successfully the significant relationship between relevant economic variables. Prof. Baur rightly remarks, “The need to rely on uncontrolled experiences does, however, increase the number of observations required, and also complicates their successful analysis and interpretation, before we can discern successfully the significant uniformities and ascertain their limits.”

It may, however, be pointed out that in spite of the complexities and difficulties involved in verifying economic hypotheses through successful analysis and proper interpretation of uncontrolled experiences and observations, several useful and significant generalisations have been established in economics.

In the field of microeconomics, the well-established generalisations relate to the inverse relationship between price and quantity demanded, the direct relation between price and quantity supplied, the tendency of the price of the product to be equal to the marginal cost

under conditions of perfect competition, and the tendency for the wages to be equal to the value of marginal product under conditions of perfect competition and several others.

In the field of macro-economics, established generalisations relate to the determination of the level of national income by aggregate demand and aggregate supply in a capitalist economy, the multiple increase in income and employment as a result of a given initial increase in investment depending upon the size of marginal propensity to consume, the dependence of the amount of investment on the marginal efficiency of capital and the rate of interest and several others.

It is worth noting that the absence of controlled experiments in economics affects the exactness of economic laws and generalisations.' This means that the generalisations in economics are not as exact as those of physical sciences and they are therefore not universally applicable under all circumstances. Because of the absence of controlled experiments economic generalisations lack in firmness, they are not easily accepted by all and even generalisations that are refuted by empirical evidence are not abandoned for good by all.

Prof. Baur rightly points out, the absence of the vivid and dramatic evidence provided by the controlled experiments adds greatly to the

difficulty of securing acceptance for generalisations which are amply justified by the analysis of the available evidence.” Likewise, absence of controlled experiments, according to Friedman, renders the weeding out of unsuccessful hypotheses slow and difficult. They are seldom downed for good and are always cropping up again.

In regard to framing and testing of economic generalisations, two related distinctions must be borne in mind. First, functional relationship between economic variables and a historical sequence of events must be distinguished.

For instance, the law of demand stating inverse relationship between price and quantity demanded does not become invalid in view of the fact that both prices and quantities sold of many commodities increase during boom periods. This is because certain other forces such as a rise in aggregate investment demand operates which causes increase in both the price and quantity sold during a boom period.

Second, prediction of a generalisation to show its validity must be carefully differentiated from the forecasting of future events; actual events may not exactly come about as predicted by a generalisation and yet that generalisation may be correct. This is because, as mentioned above, the actual course of events is governed by several other factors assumed by a generalisation which remains constant under the qualification “other things remaining the same”.

Thus, “even if the prediction that producers of a particular crop respond to a higher price by producing more is correct, this prediction does not enable us to forecast accurately next year’s output (still less the harvest in the more distant future) which in the event will be affected by many factors besides changes in price.”

In the absence of controlled experiments, for the verification of their theories economists have to rely on the direct observations of events in the real world. By direct observations we mean “gathering of information personally or reliance on comparatively unprocessed material such as files of business firms and government departments, locally published reports, proceedings of representative assemblies, newspapers, advertisements, market reports, auction notices and the like.”

In order to prove the validity of hypotheses and therefore to establish laws or generalisations, importance of direct observations cannot be underrated. Thus Prof. Baur correctly asserts, “The depth and significance of economic generalisations depend on the quality of the underlying observations and analysis.”

### **Testing of Economic Hypotheses through Statistical Methods:**

In recent years a very useful method to test economic hypothesis has been developed. This is the statistical method or what is now popularly called econometric method. The statistical or econometric

method to verify and establish the theoretical generalisations occupies an important place because of the limited applicability of controlled experimentation in economics.

The various statistical methods such as regression analysis have been developed to empirically test the economic hypotheses on the basis of collected economic data. The merit of econometrics is that the degree of functional relationship between relevant economic variables in precise quantitative terms is obtained by it and also the level of significance of the results can also be estimated.

Recently, econometric method has been used to establish the precise relationships between money supply and the price level, quantity of money and the national income, consumption and income, capital accumulation and rate of economic growth and so forth.

It may, however, be pointed out that statistical analysis or econometrics alone cannot be used to derive and establish economic principles and theories. Economic hypotheses or theories must be developed logically before we can meaningfully use statistical analysis to test and verify them.

Indeed, a theory or hypothesis is needed beforehand for selecting the relevant facts and data regarding relevant variables which can be subjected to empirical testing through the methods of econometrics



Prof. Myrdal is quite right, when he says, “theory, therefore, must always be a prior to the empirical observation of facts.

Facts come to mean something only as ascertained and organised in the frame of a theory. Indeed, facts as part of scientific knowledge have no existence outside such a frame Questions must be asked before answers can be obtained and, in order to make sense, the questions must be part of a logical coordinated attempt to understand social reality as a whole. A non- theoretical approach is, in strict logic, unthinkable.” Principal steps followed in formulation of economic theories and generalisations through deductive method can be summarised as given below.

### **Various Steps in Deductive Method**

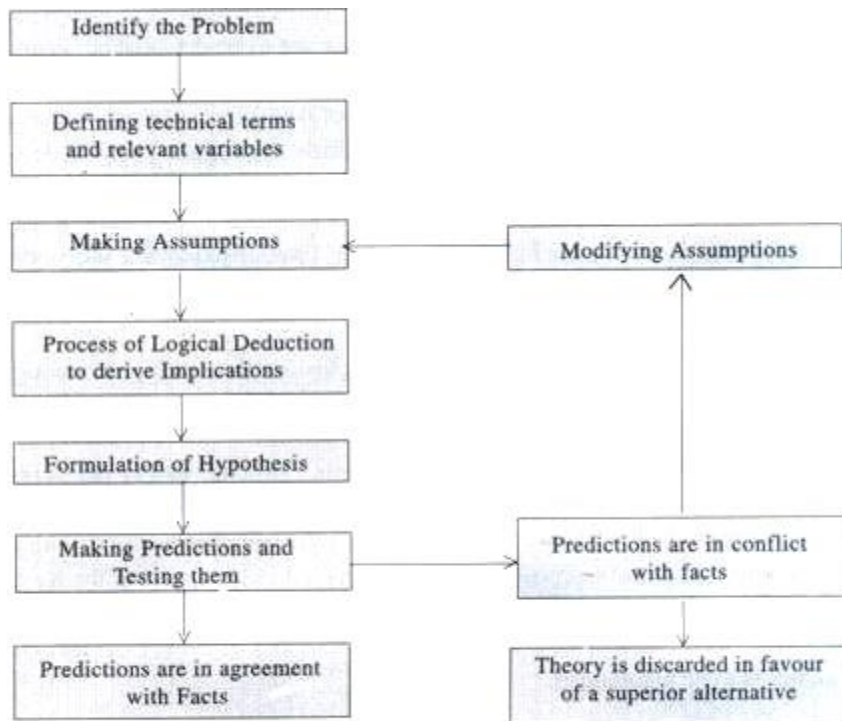


Fig. 1.

### Merits and Demerits of Deductive Method:

The deductive approach to establish economic generalisations was extensively used by Classical and Neo-Classical economists such as Ricardo, Malthus, Senior, J. S. Mill, Marx, Marshall and Pigou. It still remains popular with modern economists as it has several merits.

First, useful mathematical techniques can be employed to derive laws and theories of economics.

With the aid of rigorous mathematical logic, economic theories can be developed through the process of deduction which can successfully explain economic phenomena. Secondly, through deductive logic useful economic theories can be derived without the tenuous and

detailed collection and analysis of data which are required under the inductive method.

Thus, as compared to inductive method, deduction is less time-consuming and less expensive. Thirdly, in view of the limited scope for controlled experimentation in economics, the method of deduction is extremely useful method of constructing economic theories. This is because several forces act simultaneously on an economic phenomenon and it is not possible to eliminate some of these by means of a controlled experiment.

This indicates the crucial importance of deductive logic for building up economic principles or theories. Fourthly, the use of sophisticated mathematical methods in the deductive approach enables the economists to introduce accuracy and exactness in economic principles and theories.

In spite of the above-mentioned merits, shortcomings of the deductive approach should not be overlooked. The use of deductive method in deriving economic generalisations requires the use of a high-level competence in logic and theoretical abstraction.

A good deal of care and objectivity is needed to avoid bad logic or faulty economic reasoning. Prof. Blaug rightly opines, “It is perfectly true that economists have often deceived themselves and their readers by engaging in what Leontief once called “implicit theorising”

presenting tautologies in the guise of substantive contributions to economic knowledge.”

Besides, most economists have preconceived notions or biases on several economic issues. If sound and valid economic generalisations are to be established, economists must dissociate themselves from normative preconceptions and biases in their logical process of deducing economic generalisations.

Further, a great demerit of deductive approach is that with it highly sophisticated theoretical models based on highly unrealistic assumptions may be developed which do not have any operational significance. Indeed, such highly irrelevant analytical models with little empirical content and incapable of being used for policy formulation have in fact been developed by economists. Such models are no more than mere “intellectual toys”. If economics is to serve as an instrument of social betterment, building of such theoretical models having no operational use should be avoided.

Lastly, in the derivation of economic hypotheses and conclusions through deductive logic, assumptions play a crucial role. If the assumptions made are such that when on removing them, economic hypothesis based on them is refuted, then making of these assumptions is not valid.

Thus, one who uses deductive approach should always keep in mind to what extent the validity of generalisations derived depends on the assumptions made. For instance, the Keynesian macroeconomic analysis is based upon the assumption of a depression-ridden capitalist economy with a lot of excess productive capacity.

Therefore, a positive harm has been done in applying the Keynesian theories in the context of developing countries such as ours where the assumptions made by Keynes do not hold good. Hence, mere “deductive arm-chair analysis” should be avoided, if the scientific character of economics is to be maintained.

## **2. Inductive Method:**

The inductive method which is also called empirical method derives economic generalisations on the basis of experience and observations. In this method detailed data are collected with regard to a certain economic phenomenon and effort is then made to arrive at certain generalisations which follow from the observations collected.

But, it is worth mentioning that the number of observations has to be large if it can yield a valid economic generalisation. One should not generalise on the basis of a very few observations. There are three ways which can be used for deriving economic principles and theories.

**They are:**

(a) Experimentation,

(b) observations,

(c) statistical or econometric method.

As has been mentioned above, the experimentation, that is, the use of contrived experiments is of limited applicability in economics. First, unlike natural sciences which are concerned with analysing the behaviour of either inanimate objects or obedient animals such as rats and rabbits under the influence of chloroform, economics deals with the behaviour of man who is quite fickle, wayward and unmanageable.

Besides, man cannot tolerate the idea of being experimented upon, either individually or collectively. Secondly, an economic phenomenon is the result of multiplicity of factors and causes acting and interacting upon each other.

Therefore, economic phenomenon does not repeat itself in the same uniform pattern. Numerous factors acting on an economic phenomenon 'disturb' it and make its exact repetition unlikely. Thus, as compared with the natural phenomena, economic phenomena are of less uniform pattern, less repetitive and more variable.

Thirdly, economists study the economic phenomena in which pressure groups such as employers' associations, trade unions, farming lobby, political parties with their different ideologies play a crucial part and their activities render it difficult to make controlled experiments in the

economic world. However, in spite of these difficulties, experimental method can be used in some fields.

For instance, experiments have been conducted to find out which law of production is valid, that is, whether law of diminishing returns, law of constant returns or law of increasing returns operates in the real world. Besides, public undertakings or big industrial firms often try to assess the effect of the changes in the prices of their products on the demand for it and thus find out the demand elasticity of their products.

### ***Various Steps in Inductive Method:***

Various steps are gone through in developing economic theories through inductive method. The first step, as in the deductive approach, is to identify the problem. The second step is defining technical terms and variables related to the problem.

It is the next step which is peculiar to the inductive method, namely, the collection of data about the variables related to the problem and doing some preliminary thinking about the possible functional relationships between the relevant variables.

The next important step in the construction of economic theories in this method is the processing of data collected and finding out what relations between the variables actually hold good. From this, a theory is developed which can be further refined and tested through statistical methods.

Once the theory has been developed one can make predictions on its basis, as is done in the deductive approach. If predictions of theory are in agreement with the facts and actual behaviour of the economy, then a new reliable theory has been developed. If a new theory explains “how things work” better than the existing ones, it replaces them.

However, if predictions are in conflict with actual facts and behaviour of the economy, either the theory is discarded or fresh efforts are made to modify and refine it by collecting more data and processing them. The various steps in the construction and development of economic theories through inductive method are illustrated in Figure 2.

### Various Steps in Inductive Method:

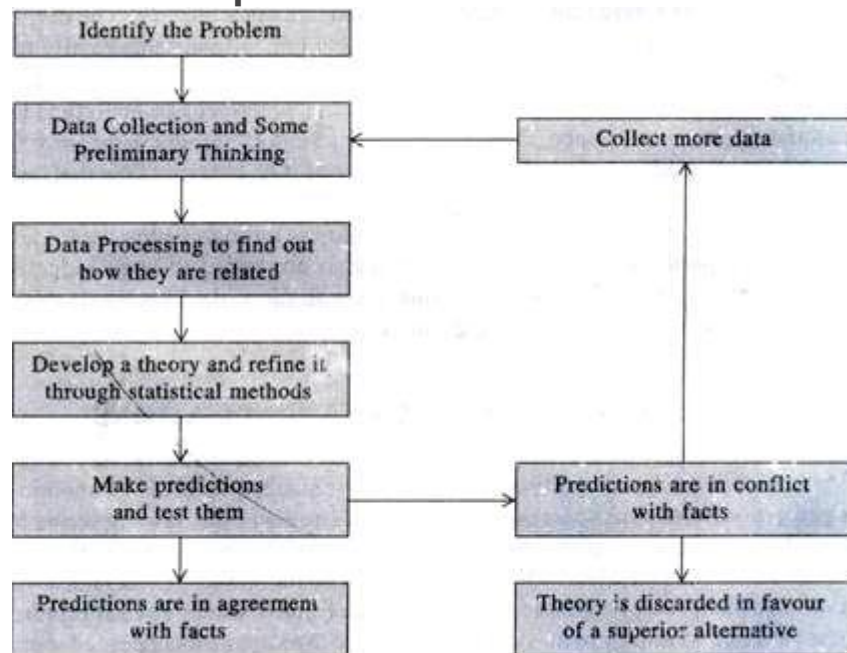


Fig. 2



### ***Evaluation of Inductive Method:***

As has been explained above, observations of facts through collection of detailed data and the use of statistical methods to arrive at economic generalisations establishing relationship between facts are being increasingly made.

Some of the recent researches in the field of macroeconomics, such as the nature of consumption function describing the relation between income and consumption, the principle of acceleration describing the factors which determine investment in the economy have been obtained through the use of mainly inductive method.

However, it needs to be emphasised again that the use of induction or empirical method is not of much value if it is not supported by the economic hypothesis or theory developed by deductive logic. The inductive method can at best be used to empirically test the theory or hypothesis as to whether it is consistent with or refuted by facts.

The inductive method has another limitation in that there is a great risk of conclusions being drawn from insufficient data. To obtain generalisations through inductive method, one should take care that sufficient number of observations or data has been taken into account.

Besides, the collection of data itself is also not an easy task. And a researcher who wants to employ the inductive method to arrive at generalisations must have good knowledge of statistical methods, that

is, he must know the art of collecting, processing and interpreting data. It is obvious that as compared with the deductive method, the inductive method is time-consuming and expensive.

### ***Conclusion: Integration of Two Methods:***

Now, the controversy which existed among the earlier economists as to whether deductive or inductive approach is more appropriate in developing economic theories and principles has been resolved. The modern viewpoint in this regard is that both are needed for the proper development of scientific economic theories. Indeed, the two are complementary rather than competitive.

The modern economists first derive economic hypotheses through the process of logical deduction and then empirically test them through statistical or econometric methods. Marshall rightly pointed out, “induction and deduction are both needed for scientific thought as the right and left foot are both needed for walking.”

Empirical studies made through statistical or inductive method without a theoretical hypothesis to serve as a guide for the selection of data are quite useless. The derivation of economic generalisations through the approach of deductive logic without empirically testing them through inductive method is also not quite proper.

Empirical studies made in inductive approach also bring to light significant economic facts or phenomena which require analytical

explanation through deductive logic. For instance. Farm Management Studies in India in the mid- fifties led to the discovery of a fact that output per acre on the small-sized farms is higher than that on large farms.

This led to the various theoretical explanations of the phenomenon observed in the empirical studies. On the other hand, a theory or hypothesis is first developed through deductive logic from some assumptions and then predictions based on the hypothesis are tested through inductive or statistical method. If the predictions are found to be constant with facts, the hypothesis or theory stands proved and if the predictions of the theory are found to be inconsistent with facts, it stands rejected.