THE STRUCTURE OF ECONOMIC AND STATISTICAL MODELS IN (ECONOMETRICS)

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ABSTRACT

Since contemporary trends in economics are among the tools of economic modeling, it began to create macroeconomic models that represent the appropriate scientific framework for policy analysis and prediction of the course of economic variables by proposing new techniques in characterization, forecasting, testing, forecasting and policy evaluation. Assist decision-makers, policy and plan makers in the government sector and NGOs with important information and data on inputs and proposed plans to be made, expected results and returns from policies, laws and decisions.

Keywords: Contemporary Trends in Economics, Macroeconomics, Statistical Standards, Econometrics

Introduction:

Since contemporary trends in economics are among the tools of economic modeling, it began to create macroeconomic models that represent the appropriate scientific framework for policy analysis and prediction of the course of economic variables by proposing new techniques in characterization, forecasting, testing, forecasting and policy evaluation. Assist decision-makers, policy and plan makers in the government sector and NGOs with important information and data on inputs and proposed plans to be made, expected results and returns from policies and laws and decisions.

It is applied where a model is adopted to represent the real system, problem or economic problem, and this may be administrative or scientific, so the model is formulated in mathematical formulas that take the form of equations, inequalities or dependencies to serve as a summary. A simplified and simplified form of the reality of the problem and represents the relationship that can be quantified of different factors and surrounding conditions in such a way that we can find a solution to a problem or issue in a known mathematical way and thus make ideal decisions. In terms of understanding and using the relationship between the dependent variable and the independent variables, economic events are reduced by models consisting of equations that take some formulas in matchmaking using the multiple linear regression model. Weakness. The credibility of some economic and standard models, including the linear regression model, in reconciling most contemporary problems characterized by nonlinear and

the presence of interactions between variables by group.

Big Data: This research aims to describe these methods, whether barometric, non-laboratory or semi-laboratory, and to identify modern applications in which these methods were used successfully.The concept of economic modeling and its development, as well as the types and forms of economic models through different schools of economics, later the structure of statistical and economic models, including statistical and economic models, the distinction between them, the structure of macroeconomic models, and finally. Time series models, simultaneous equations, estimation methods, and simultaneous structural and short equation formats.

Statistical models are a special case for macroeconomic models because macroeconomic models are characterized by comprehensiveness in describing economic phenomena but suffer from deficiencies in explaining these phenomena in certain situations. Elements of economic cycles and statistical criteria In particular, it is necessary to control the relationships between the variables of economic studies, and this is what we try to highlight in this section by studying the structure of economic models, how to build the standard model, and models based on causal factors. In Establish relationships between variables such as optimization, simulation and dynamic models[1]

The importance of research:

Econometrics is considered one of the modern economics sciences compared to other economics, and this branch of the branches depends on a set of statistical and mathematical scientific hypotheses to reach the required scientific results, as the great development in the field of electronic computers led to the expansion of the field of economic models to reach many variables, as it became easy to work on estimating many constants of equations, as well as the ability to test the validity of economic models.

Search problem:

The problem of research in the study of the structure of economic and statistical models in econometrics is how and the process that the models will enter the calculations of econometrics and what are the economic and arithmetic goals that the econometrics will play.

Objective of the research:

The first objective of studying these models is to show the arithmetic work that the models will do within the econometric economy and how it will be the nature of the work and the second goal is to increase accounting knowledge and see the work of economic models within the econometrics and the third goal is to provide students in the field of accounting with some of the information employed by the researcher in this field.

Research hypothesis:

To formulate a hypothesis that suits the title presented, we must rely on some scientific questions that we relied on in formulating our research, namely: 1- How can economic and statistical models work within the econometrics 2- What is the structure of economic models and what is the nature of the work they will do 3- Will these models achieve high degrees of

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[1]- Research presented by Saleh Toumi, Introduction to the Theory of Economic Measurement (Part One), University Publications Office in Algeria, 1999

development in the field of econometrics.

Research Methodology:

In the research methodology, we relied on the theoretical method in interpreting the structure of economic and statistical models, and the reliance was on the theoretical deductive approach and the descriptive approach in formulating the structure of these models

1.   **The first topic: statistical models:**

2.   *The first requirement: economic and statistical models:*

The statistical economic model adds to other sciences: economic theory, mathematics and statistical methods where we can test the model to perform other steps such as policy-making and construction. They are two processes that are not fully included in the economic model. It is known in terms of random variables that lead to observed data as opposed to the economic model. Given in a given mathematical formula is a certain deterministic expression of an economic phenomenon consisting of several variables. Economics is based on a set of hypotheses that roughly explain the behavior of a state economy. The statistical model is independent of theoretical considerations and gives relevant information and assumptions. The desired parameters (parameters), the characteristics of the studied random variables and their probability distributions.

Three basic conditions must be met:

1.   Behavioral or technical equations derived from the economic model are represented. Equations for some observed variables and others that are not observed are written as random variables. Error limit.

2.   It should be checked whether there are measurement errors in the model that lead to the presence of the random element.

3.   The random element must have a probabilistic nature (subject to one of the probability distributions, such as a normal distribution).

We find among the statistical models:

1.   Estimable Model:

This model is directly derived from the statistical model, the difference I have referred to between them is that the model statistics have a statistical explanation, while the predictable model has statistical and theoretical explanations in addition. That is, at this stage, error identification tests should be carried out for statistical model assumptions[).2   2]

2.   For the microeconomic econometric model:

This model represents the end result of the modeling process, derived from predicted model predictions, but after screening and diagnostic tests were performed, tests were applied to ensure that the model was of statistically relevant theoretical significance and consistent with an empirical standard. As long as there are many empirical economic models that are compatible with a particular statistical model, it is possible to choose between alternative

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[2]- Tariq Mohammed Al-Rasheed, Guide in Applied Econometrics, Khartoum, G-Town, First Edition, 2005

models that use several criteria, including:
1.   Theoretical consistency
2.   Quality matching.
3.   Predictability.
4.   Strength and sophistication

The second requirement: the causal feature (effect and mutual effect) in economic models:
The concept of causation:

The concept of causality is a deep philosophical issue around which various debates take place. They think that everything causes On the other hand, people who deny the existence of causation of another special event and it happens anyway.? The concept refers to the situation in which an informational event is always followed. This sequence of events occurs over a certain period of time and the first event is called cause and the second is called cause or effect. Many causal tests are used to determine the nature of the relationship between these economic variables may not move in the same direction to reach equilibrium because they are affected by various factors that indicate the presence of periods. Time regression refers to the time difference in the response of the dependent variable to the effect of change in independent variables, and vice versa. The importance of this idea increases if it is arranged in the chronological order required by causality based on two principles: the first is the composition, that is, each value has a cause associated with it, and the second is the chronological order, that is, the variables are formed according to it. The law of correlation between cause and effect However, correlation coefficients do not provide sufficient economic explanation because they do not appear. Always determine the direction of influence and the significant highs of these trades in no way imply a reciprocal relationship. Therefore, causality is used to determine the type and direction of the relationship between variables. Causality and variables may be economically interrelated: It is considered one of the most important axes in determining the equations of economic models, as it aims to investigate the causes of phenomena. It is scientific to distinguish between the dependent phenomenon and the independent phenomenon that explains it[).3]

The phenomenon and relationship are formulated in the form of a predictable mathematical model, for example, the interpretation of household consumption of a particular C commodity with the income of those households and the price of commodity P. Demand theory is formulated as a model cap + by + a = C and then the parameters of the model C, b, a are estimated   using available statistical methods (such as the least squares method). Among the most important causal models are:

The third requirement: economic causal models:
1.   Econometric models:

These models are based on measuring and interpreting the relationship between variables

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[3]- Abdul Hamid Abdul Badawi, Statistics and Administrative and Applied Sciences, (Amman: Dar Al-Shotoku for Publishing and Distribution, (1997)

based on economic theory in relation to variables that can go into interpreting the behavior of the dependent variable, for example: Interpreting the consumption function through the current income with the other. income. Constant factor: U + by + a = C, where C is consumption and Y is disposable income, $^{\text{U is 4a random element}}$).4

These models require:

1.   Determines the economic theory of the research subject.
2.   Formulate the model mathematically.
3.   Collect data about model variables.
4.   Predict the model.
5.   - Test the model.
6.   Use the model in forecasting.
7.   Input and output models:

The interrelationship between different economic sectors in the production process appears in the input and output tables for a certain period of time (years), by clarifying the inputs of each sector, the production requirements of all other sectors, inputs and outputs. Output models are used in the planning and forecasting process.

8.   Examples and linear programming:

Linear programming is one of the most important models of improvement and is performed using available resources to explain the relationship between two or more variables by maximizing or minimizing the target function that contains structural variables whose levels are determined. Reaches the largest (smallest) value of the target function.

1.   Simulation models:

It is used for this purpose in order to avoid problems that the researcher may encounter during the experiment on any real system. Simulation models are mathematical models that represent and reflect all the properties and behavior of a real system and are also used to compare a set of variables in order to determine the potential effects of certain economic decisions and policies that may affect the future course of some variables. Economic policies that achieve the desired goal.

2.   Nonlinear dynamic models:

In recent years, new types of nonlinear deterministic models have been emphasized, as they have been shown to characterize the behavior of a large number of time series that traditional models cannot explain. These models include chaos models, disaster models, and others. The roots of chaos and disaster theory

Mathematics and physics. Its applications in economics are still few and sporadic. One of the most important contributions of chaos theory is that time paths are often complex and can be represented by simplified deterministic dynamic models. There is also another type of behavior

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[4]- Book, Abdel Qader Mohamed Abdel Qader Attia, "Econometrics between Theory and Practice", 2nd Edition, (Alexandria: University House, 2000)

that can be thought to be random and beyond the ability to model. They can only be represented by models[).5]

Chaos. There are also other nonlinear models such as:

1. SETAR models: This system is represented in the form of AR autoregression that converts between two systems according to the value of the variable in question.

2. STAR models: Similar to SETAR models except for the animation formula where the logistics function takes K.

Fourth requirement: non-causal models:

These models are based on the historical values of the variable whose future value will be estimated and do not need to specify the variables; this explains its behavior. One of the most important non-causal models.

1. General trend projections[):6]

General trend forecasts are one of the most common ways to predict long-term economic variables, and the general trend of the series is defined as the general pattern of change in the values of this variable while ignoring others. seasonal, cyclical or random variables, fluctuations in time series occur about the following components:

1. - General direction, which is the general movement in the long term.

2. - Seasonal fluctuations, regular fluctuations that repeat themselves according to a period of time.

3. - Cyclical fluctuations that are according to the economic cycle.

4. - Random fluctuations, due to natural and other factors.

5. Statistical models for time series:

These models focus on the random aspect of the time series and are divided into:

1. AR autoregression models wrote the current value as a linear function in the previous values of the same previous variable.

2. - MAs Moving Average Models:

Here the value of the variable is written as a linear function on the value of the operation of the random error element and the number of its previous values.

Box and Sackins models, can work to reconcile the AR and MA models with the ARMA model, Where this method passes through many stages before making any prediction:

Discriminatory during the determination of AR and MA grade.

- Test for mischaracterization, ensure the accuracy of models. [)7)]

[5]- Master Thesis, Abdel Qader Mohamed Abdel Qader, "Methods of Measuring Economic Relations with Electronic Computer Applications, Alexandria: University Circles. Egyptian, 1990

[6]- One of the writings, Essam Aziz Sharif, Introduction to Economic Measurement, University Press Office, Algeria, 1981.

[7] - Ezzedine Malik Al-Tayeb Mohamed, Introduction to Econometrics, Part One, The Single Equation Model and Measurement Problems, G-Town Press, Khartoum 2008. Hussein, Afaf Saeed, previous reference, p. 32

- Forecasting.

D- Autoregression vector models, namely VAR

It is used in simultaneous models in which there are reciprocal relationships between variables.

1.   **The second topic: forecasting in economic models:**

Econometrics deals with measuring the relationship between different economic variables in order to prepare economic and social policies and predict the future values of the phenomenon in question. Econometrics also focuses on economic theory, mathematical economics, and the application of statistical methods. It can be divided into two groups: qualitative methods and the other is quantitative.

1.   **The first requirement: qualitative forecasting methods:**

A set of objective methods used to forecast demand when historical data is not available on demand, based on methods that invest in the wisdom and experience of management, in addition to a number of other factors and knowledge that individuals possess. Such as intuition, personal experience and expectations:

1.   **Sales forecast:**

This method is characterized by accuracy as sales representatives are in constant contact with customers because they are in contact and sellers spread out in geographical areas, which facilitates the distribution of demand by region, and this method allows the aggregation of demand at all levels. Company wishes. The disadvantages include the possibility of personal bias on the part of sales representatives and the inability of sellers to sometimes distinguish between needs or customers required and customer needs, wishes, or wish lists. Probability of purchase and sales reps to give low estimates of future demand volume to look good for the company when actual sales exceed the lowest estimates they previously provided. - Team Experts Method This method is sometimes used to modify estimates in exceptional circumstances such as the introduction of new products or the occurrence of a global event that shakes the estimates made by the company and the high cost associated with it. The possibility of overestimating or underestimating appreciation and experience thanks to expert experts.

2.   **Marketing Research:**

It requires a systematic approach to formulating and testing hypotheses about the short, medium and long-term, but correct in the short term, and requires the following steps:

1.   Questionnaire design, which works to collect the necessary data research.

2.   Decide how the resolution will be managed.

3.   Choose a representative sample in the research plan.

4.   Analysis of the results of the questionnaire that we learned about.

1.   **The second requirement: quantitative methods:**

2.   Analysis of time baskets[):8]

A time series represents a set of observations arranged chronologically by occurrence, and a

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[8]Mouloud Hach mane, Short-Term Forecasting Models and Techniques (OPU), Algeria, 2001.

time series may contain one or more of the following elements: average, trend, seasonal effect, cyclical effect, random factors, and possibly autocorrelation: Okay. The purpose of time series analysis is to identify and isolate each of the previous elements. On this basis, expectations for a certain period as a function of the previous factors are expressed as follows:

$$Y1 = T \times C \times S \times R$$

1.   Moving averages method:

It represents one of the methods used to determine the trend in the series and is also one of the quantitative measurement methods used to forecast the demand for obtaining products. Under the latter, the expected demand for a future period is equal to the sum of the demand for a certain number of past periods divided by those periods. This method assumes that the demand is derivative to some extent and does not include seasonal factors. One of the advantages of the method is that it is easy to understand and apply and does not require a lot of historical data. The disadvantages of this method are that the results of The estimate depend on the length of the average, so an appropriate period of time should be chosen to calculate the estimate. The greater the average duration, the more it helps eliminate the influence of random factors.
 One of the disadvantages of this method is that it requires storing all historical data, which leads to high costs and inflation in recording and retrieving data, whether manually or by computer. Weight or importance All data that goes into the calculation of the forecast The weight or importance here is divided by the length of time.
To solve this problem, it is possible to change the relative weights or relative importance of each observation according to the personal effort of the person looking at the previous application, provided that the sum of the weights is equal to the correct value. For example, there are many examples, if very recent observations of the future are given too much weight, it means that demand expectations are directly affected by what has happened in the recent past.[9]

1.   Third Requirement: Causal Methods:

   This includes linear regression and multiple regression, which are two of the most effective methods of forecasting demand and are used when there is a lot of information about the relationship between demand and a range of internal and external factors that can affect demand.

1.   Linear regression:

   This method assumes that demand is caused by one or more variables, called the dependent variable, and the factors that cause demand are called the independent variable, and the following equation is used to explain the relationship between the two variables: one independent and the other dependent.

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[9]- Harry Kalian, Wallace Watts, translated by: Al-Marsa Al-Sayyid Hajari, Muhammad Abdul Qadir Attia, Introduction to Econometrics: Principles and Applications, Scientific Publishing and Printing Presses, Saudi Arabia, 2001

1. **The third topic: the structure of economic models:**

2. The first requirement: the stages of building economic models:

The standard model consists of a series of stages that can be summarized as follows:

3. **Model Description:**

The process of characterizing or defining the model is aimed at formulating the economic relations in question in a mathematical way so that their processing can be measured using the so-called standard methods. As for mathematics, in addition to various arithmetic operations for investigating the properties of the model, it helps to formulate the theory within the framework of mathematical operations in the form of equations, and statistics uses field data through it. The stage includes:

1. Define model variables:

While studying a particular economic phenomenon, the researcher can identify variables in the model in different ways.

Resources-:

1 / Sources of economic theory.

2 / Information available on previous standard studies.

3 / Especially available information about the phenomenon.

Econometrics at this stage is based on the economic theory or knowledge available for the phenomenon under study, derived from applied research and studies, from the experience of experts, or from the characteristics of the phenomenon to be studied.

2. Determine the mathematical shape of the model[):10]

The mathematical form of the model indicates the number of equations included in this model can be one or several equations, the degree of linear of the model can be a linear model and be non-linear, and the degree. The homogeneity of each equation (it can be homogeneous or heterogeneous to a certain degree, so economic theory does not show a mathematical form.

1. **Sources of data collection:**

The process of collecting data from statistical sources classified as two primary sources: primary (historical) sources, which are data that are prepared and disseminated by some local, central or non-governmental governmental institutions and organizations, and secondary sources, if cited by others., fake published by the parties referred to in the primary sources. is the data.

2. **Data types:**

A- Time data series: (The time series contains a series of observations for a variable. Examples of inflation at different points in time include observations of inflation in the period (1980-

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[10]- Walid Ismail Al-Sifu and Faisal Muftah Salifu, Saeb Jawad Ibrahim, Fundamentals of Analytical Economics Dar Al-Ahlia for Publishing and Distribution, Jordan, 2006

2000)

B- Total data section: (This type of data shows the notes received. Data on the introduction of a variable, for example, a sample, relative to a sample at a given time consumers at a given time.

C. Intersecting data series: (containing a combination of time series data. Cross-sectional data and sample data on the entry of an individual sample over a period of time.

D- Data experimentation: (which is the data obtained through some operations. For example, experiments are experiments conducted in supermarkets to find out the effect of changing the price of a commodity on quantities. Necessary of them.

1.   **Testing phase and evaluation of model parameters:**

At this stage, the researcher may encounter many problems such as instability of variance, heterogeneity, autocorrelation or collinearity, in which case the researcher must address these problems before starting the evaluation process, and then evaluate the estimated parameters, that is, whether they are statistically acceptable and whether the values of these parameters are economically significant or not, and determine whether they have significance or meaning based on the following criteria:

1.   For economic criteria:

It concerns the size and representation of the expected parameters, if the magnitude and representation of the parameters do not correspond to economic theory, then this is a sufficient reason to reject the model and is based on a certain logic. Strong rationale is one that leads to the recognition of the validity of predictions and the rejection of what the theory decides.

2.   Statistical Criteria:

These criteria are among the important criteria in the study of the measurement of economic relations in order to determine the importance of predictions, the degree of compatibility with the logic of economic theory and the degree of representation of the society to which they belong. They are called first-degree tests, which aim to test the quality of compatibility and the degree of statistical confidence in parameter estimates, and statistical standards are divided into two types of tests:

1.   Conformity quality tests.

2.   Morale tests.

- Quality Conformity Tests.

The quality of the suitability test is a measure of the explanatory power of the model and this test reflects the degree of deviations. It shows the difference between the expected values and the observed values, and shows how much the expected values deviate from the observed values of the variable. Dependent is the lower the quality of consensus and therefore the lower the explanatory power of the model, that is, the higher the unexplained ratio. And vice versa and this is done using the coefficient of determination R^2. The higher the value of the coefficient of determination, the greater and this is evidence of the strength of the relationship and vice versa but always one of the disadvantages of the coefficient of determination is that it

exaggerates the effect of independent variables on the variable. Thus, modulus of determination adjusted only possible treatment was used in degrees of freedom free of errors, the modulus of determination is usually less than or equal to the coefficient of determination.

--Moral tests[),11]

To reach the moral tests by testing the extent of statistical blame using moral tests and there are three tests that can be used for this purpose:

1.   Tasttine T-test –t
2.   Normal Distribution Test Z-test –z
3.   Fisher Test F-test –f

 When we independently test the estimated parameters using the student test or the normal Z test and find them to be significant, they will be statistically significant in most cases when testing their significance with the F test. Each of the parameters estimated independently by the Z or t test may prove insignificant, but will prove statistically significant when the significance of the regression as a whole is tested by the F test. Explanatory variables are strongly correlated and, in some cases, each predicted parameter is statistically significant when tested independently, but it has been proven by testing the regression equation as a whole that it is not statistically significant.

1.   Standard Standards:

   For the purpose of these standards, they are also called diagnostic tests in other standardized studies. Ensure that the assumptions on which statistical standards are based are applicable to reality, including: correlation tests Self-tests, error variance stability tests, and multi-step tests. Forecasting is based on the model that emerges from the forecasting process and means obtaining future levels of the phenomenon. This is done by changing the default values of the explanatory variables in the form and then calculating the value of the phenomenon. Future period This future value is usually given as an average value on a given scale. Guess the following hypotheses:

- The adopted model largely matches reality.

- The general conditions and conditions surrounding the studied phenomenon will remain the same in the future period.
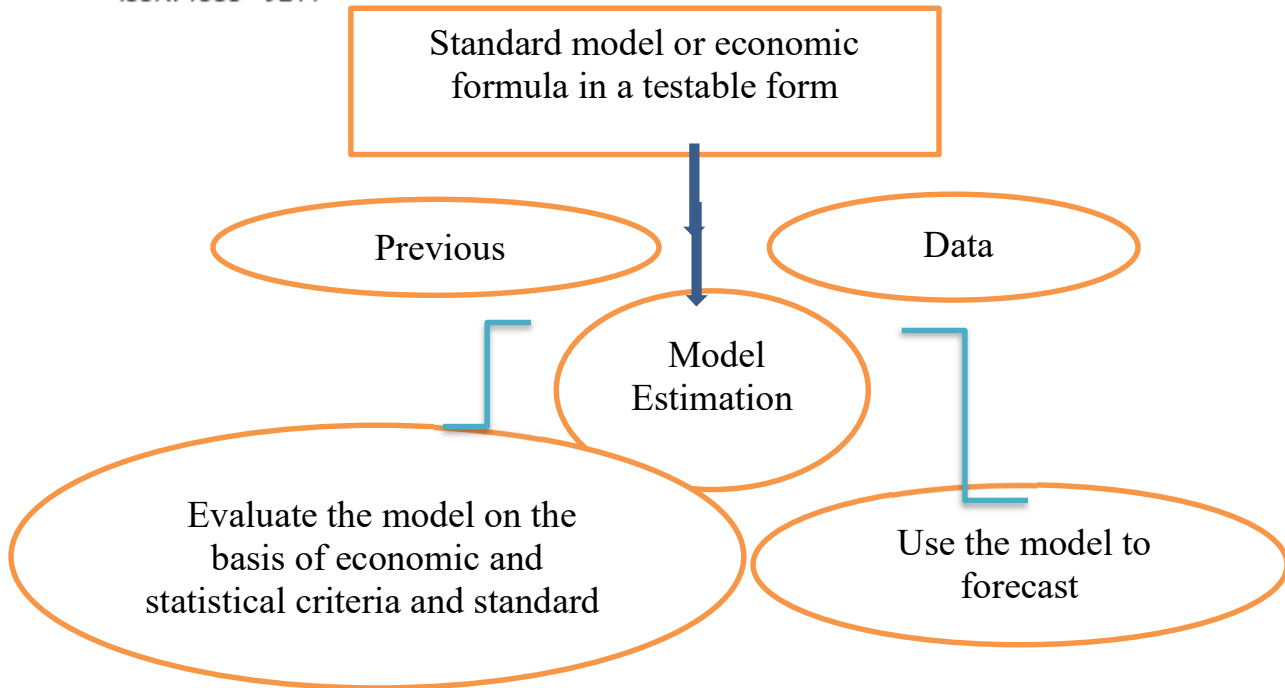
1.   Application and forecasting phase of the model[):12]

 This marks the final stage of the research methodology in econometrics and the future values of the dependent variable are predicted based on the future values of the independent variable(s).

   However, before using the predictive model in forecasting, it is necessary to determine the overall performance quality of the expected model and then apply the results to reality and use them in the forecasting process for policymaking. Don't decide.

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[11]--A. Kutanis, The Theory Of Economitrics, Second Edition 1977, The Macmillan Press Ltd, London

[12]-- BERNARD PAULRE, "La Causalité en économie, signification et portée de la modélisation structural" (Lyon: Presse universitaire, 1985Bourbonnais R, Econométrie, 9emeEdition, Dunod, Paris, 2015.

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┌──────────────────────────────┐
│   Standard model or economic  │
│   formula in a testable form  │
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Previous

Data

Model Estimation

Evaluate the model on the basis of economic and statistical criteria and standard

Use the model to forecast

\# The form is higher than the preparation of the researcher depending on the previous explanations \#

The end:

An economic model is a theoretical framework that does not need to be a mathematical model, but if it is a mathematical model, it will give a translation of theoretical relations between a set of variables in the form of mathematical relations, thus the model consists of equations that describe the structure of the model and connect the variables. What is known as model construction or specification is how economic theory or economic relations are expressed in the form of a set of equations or inequality.

The economic models that the decision-maker can rely on differ in the nature of building mathematical and economic models and the definition of the model, and what we mean here is to identify mathematical economic models and how to define them. And determine what kind of model we are going to build, is it dynamic or static, specific or undefined? As we know, the models used to make management decisions in companies are either mathematical programming models, simulation models, or I/O models. Therefore, these models are improvement models, exploratory models, or descriptive models, respectively. Here's how we'll discuss how to build a mathematical model:

The first stage: the formulation of the problem: the formulation of the problem means identifying the studied problem in order to develop a model for its solution, as well as defining it clearly, accurately and concisely. In this context, since the questionnaire requires a clear and definite answer and the answer here is the purpose of the study, it is useful to formulate the problem in the form of a question to make it look clearer. When defining the research problem,

it should be noted that the terms and concepts used in the formulation of the problem must be accurately and clearly defined, and accuracy and care in identifying the problem should be avoided by excluding unspecified elements. For vague and unclear phrases covered by the work and not included in the form formulate the question in the form of a question that requires a specific and clear answer.

For the second stage: Formulation of objectives: - Defining the problem leads to a similar definition of goals, where it is necessary to find this criterion by which one of the alternatives and the best is chosen among the many available alternatives. This definition of alternatives falls within the scope of what is known as decision theory, and accordingly the problem under study is solved. The goals set by any project and desired to achieve do not deviate from two main types of goals:

Disciplined goals: Refers to goals that aim to conserve resources (such as energy, time, volume, and cash) that have a certain value. These goals are model inputs.

Acquired Goals: The problem of setting a goal or choosing the criterion used here, which is expressed as decision outputs, is one of the most important problems facing decision makers. The criterion may be short-term profit maximization, long-term profit maximization, revenue increase, or other criteria that the organization can target. Goal setting and formulation is defined as goal function generation in a linear programming model. [13)

The third stage: data collection: The third step in building the mathematical model is to collect the necessary data for the model, which varies according to the nature of the problem at hand. The data needed to study the demand for a commodity differs from that required to analyze consumption patterns, the market or the doing of a particular commodity, and the data varies from problem to problem. After we complete the goal preparation, the type of data that needs to be collected about the variables in the model becomes clear to us, then we need to make a plan for collecting, organizing and scheduling the data. Is it time series data that describes variable behavior over time, as well as describing what data is? Or is it cross-sectional data that gives the values that the variable must take at a given moment in time! Or even dummy variables that are supposed to have random values. After determining the appropriate data type for the problem under study, the data sources must be determined. That is, can the necessary data be obtained from secondary sources? Is this a statistic or published by official institutions and organizations, or will the researcher obtain the data by his own efforts? In other words, if there is an inability to obtain the necessary data from secondary sources for any reason, they are sources known as primary or field sources. And when relying on some field resources, it is necessary to decide which method to follow in obtaining them, the method of complete counting? Or sample method? In addition to all of the above, the data collection process includes the process of indexing and organizing data in a way that serves the problem and facilitates the application of the model to its variables.

Fourth Stage: Determining Variables, Constants and Coefficients: Those responsible for building economic models are interested in determining the type of variables that the model includes. A variable is an economic phenomenon that takes different values (variable) and is

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[13]- Bourbonnais R., Econométrie, 3rd edition, Dunod, Paris, 2003

intended to measure them. Therefore, a variable is defined as "something whose value can change, that is, it can take on different values" and is therefore represented by symbols instead. Variables from a given number are generally divided into internal and external. Internal variables are those that operate within the economic range and are Determine their values within the model by knowing the values of coefficients and the values of external variables. Internal variables are known as dependent variables and are affected by external variables. On the other hand, external variables are those that operate outside the economic range and their values are determined by forces outside the model. Exogenous variables are known as independent variables because they affect and are not affected by internal economic variables. In addition to these two types of variables, there are other variables that are subject to different sections. For example, base variables, non-core variables, empty variables, additional variables, etc. In addition to determining variables, constants are defined, that is, constant quantities whose value does not change, and the constant is the opposite of a variable. And this constant, if we don't give it a specific value, can take any numerical value and then become a parameter, so the parameter is called a variable constant. In linear programming models, variables impose certain constraints on the solution. Accordingly, after determining the variables, the necessary constraints are determined and presented as solvable equations)[14)

Fifth stage: model construction: - At this stage, the problem under study is formulated mathematical template by creating the function and determining the mathematical form of the model, so that the researcher decides whether the problem can be explained by a model. It consists of one or several relationships that interact together to create the phenomenon. At this stage, the objective function and its limitations are determined in linear programming situations, or the functional relationship is formulated in standard studies and specific assumptions are made about the parameters of the model.

Sixth stage: Determining the method of solution: - This is considered the stage at which the appropriate method and algorithm for solving the mathematical model is chosen, since each problem has a suitable mathematical program to solve it. In linear programming, the objective function must be linear. And the optimal solution in this case is the best value that the objective function should take in view of the constraints applied to it, so that the objective function and the applied constraints take the form of a linear relationship, that is, equations or inequalities. First-class, otherwise resort to nonlinear programming. There is also integer programming, linear programming where its variables must be integers, that is, variables or outputs are indivisible and fractions are practically irrational. When problem variables undergo changes from one period of time to another, that is, one of the variables in the model is time, dynamic programming is the most appropriate way to solve the problem. When using the standard method, the most appropriate measurement method is selected depending on the nature of the model and the relationships it contains, the statistical characteristics of the estimates that can be obtained from each method. A suitable method is one that gives many desirable characteristics, such as objectivity, consistency and efficiency.

14-- Engle, Robert Fandt C.W.J Ganger, "Co integration and Error Correction: Representation Estimation and Testing " Econometrical ,1987.

Seventh stage: problem solving on the computer: Before using a computer or electronic brain, it was very difficult to solve complex problems and mathematical models with a large number of equations and parameters. Undoubtedly, it takes a long time to complete these processes manually. The greatest development in the circulation of data and information in the twentieth century was the use of electronic computers, computers were used in economic and official units, and their use spread in all institutions and commercial units., even at very high rates in schools and houses. This development has had a significant impact on the use of computers with high speed and performance as an important tool in collecting data, doing work, and solving various mathematical models with high efficiency. In the field of management and economic studies, computers play an important role in the development of the concept of management and operation of facilities, raising the level of efficiency and economic performance and supporting the ability of their users to make effective decisions. There are also many ready-made programs available for planners and decision-makers that enable them to plan, solve administrative problems and make decisions. On the contrary, it can be said that there are more than a hundred different programs covering different and varied areas, and researchers in this field have to choose the one that best suits each situation and the administrative problems they face. At this stage, computer programs are used to solve the studied problem. By solving the problem, extracting data and analyzing the results, creating a business plan according to each situation, making the most appropriate decision, demand, profit, etc. It is possible to predict and predict[15].

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