



THE ROLE OF TIME SERIES IN THE ANALYSIS OF THE MASS SOCIAL AND ECONOMIC PHENOMENA. THEORETICAL CONSIDERATIONS

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Abstract

The evolution of any phenomenon in time is the result of certain systematic influences as well as of others regardless their type. An indicator increases or decreases in the long run. These developments are analyzed according to the specialty literature using chronological series, also known as time series. The chronological series indicators, such as indices (fixed or mobile), the dynamics rhythm (fixed or mobile) measures the change of an indicator presently as compared to the basic period.

Keywords

Time series,
chronological series,
indicators,
homogeneity

1. Introduction

The concept of time series appears with the advent of modern statistics term and essentially defines the effort and effect indicators in time. Time series consist of two data rows, the former showing the time variation and the latter comprising the values of the economic phenomenon or process analyzed in the respective time intervals (Secareanu, 2010). They are also called dynamic series and highlight temporal feature of the phenomena, thus being an important element in the macroeconomic analyses (Anghelache, 2008).

In other words, chronological series study the evolution of certain indicators (productivity, profit, turnover, costs, revenues, sold products, number of employees) over time. Their use is imperative in the context of a market economy which attracts traders into a genuine struggle for survival. In case of a steadily changing market, influenced by many factors and increasingly demanding needs, the time series are imperative for the economic agents. Moreover we can take into account the current resources worldwide related to the number of inhabitants. Once again considering Michel Didier's idea (Didier, 1999) about the way people nowadays consume three times more resources than the previous generation, we need a strict control of resources and of their development in different time intervals. Hence, we really need chronological (time) series, i.e. an effective monitoring method.

2. The Role of Time Series in the Analysis of the Mass Social and Economic Phenomena

In nowadays economic practice, the time series cover a wide range of indicators: GDP, profits, losses, income,

expenses, number of employees, salaries, fees, number of branches etc. They are useful both for the economic agent while studying the way different indicators influence his business and for the ordinary man who analyses these phenomena making surveys or comparing the results provided by various institutions or specialists (Ministry of Finance, specialty magazines, TV shows, consultancy companies, business sites and blogs).

Why are the time series important? Without counting certain indicators for a while a trader does not have a guideline in this respect, therefore he cannot continue his work in the context of profitability; for example, monitoring the number of cars sold by a company. Without a clear overview per months, quarters or years regarding the number and type of the sold cars, the company cannot estimate the necessary stock, the yield for certain models, the returns, the number of employees necessary for carrying out the optimum activity and so on. Such analyzes are essential, without them an economic agent's activity cannot go on. What happens if he runs out a particular model highly demanded in a specific period of time? What if the employees' number is too small and unable to meet sales? What if the sales of particular product have been decreasing for while or the turnover has been going down for two years? The answer to all these questions is the following one: without the time series, the agent's activity would no longer be balanced and he should therefore rely only on his instinct, without taking into account his own business harmonization and streamlining.

As the time series are made up of many factors they get certain features due to the way the way these

factors work. They may be both casual and essential (Secareanu, 2010) and hence we deal with a wide range of influences on the series.

The first feature given to the dynamic series is the variability due to the different way the above mentioned factors work. The variability differs due to the force of the deviations caused by the factors and, on the other hand, due to systemic factors that impose the variation tendency.

Another property is the homogeneity of the time series, due to the similarities of the factors that compose them. A time series pursues one or more indicators of joint order (either the economic indicator or the social one). A series cannot track, for example, the time course of business turnover in X company considering the average of age and social habits. Homogeneity endows it with a logical character, so the final result should belong to the real environment.

Although variability and homogeneity are common features of all statistical series, periodicity is specific only to the chronological ones. The specific feature of periodicity is given precisely by the long lasting data continuity, namely the pursuit of a particular indicator for a long time.

One last feature of them is the interdependence given by the way the series was constructed. The time series are made up of factors pursuing the development in time of particular indicator successive levels, using only one type of statistical unit (area, company employee, person). In this respect any term making up the series depends on the previous levels and influences in its turn the following sizes.

Considering the four properties of the time series they must be checked for the compatibility of the values recording a particular phenomenon. In order to provide the expected result, the data must meet the following conditions:

- they should be assessed in the same currency (if we study the costs);
- they should be expressed in the same measurement unit;
- they should reflect the same phenomenon;
- they should be obtained through the same calculation methodology.

A series of phenomena affect the way dynamic series allow the factors insertion and that changes the final output. These differences occur in the data recording time, depending on the nature of the analyzed phenomenon, on the indicators expressing method as well as on the differences among the terms that make up the series (Anghelache, 2008).

Depending on the time factor and how the series pursues the indicators, we distinguish two types: time series of flows and stock time series. The time series of

flows pursue a specific indicator on a time interval (an agent's sales per month, an employee's calls per day).

The flow series are common in business and they represent a guideline for the companies to get a clear image of a specific indicator within a specific period time. Any profitable business keeps the statistics relying on the flow time series so that the necessary indicators could be tracked any time (per hour, per day, per month, per year and so on).

Stock time series analyze the indicators development during a specific time (for the products on sale at the beginning of the month). Thus the economic agent can manage the stock supplies more efficiently. If he used a time series of flow, the result would be different.

However by using a calculation based on the dynamic range of the stock, the agent perceives strictly the t_0 as the moment of interest for his business.

With the image a particular phenomenon only at one point, the agent can predict certain operations, such as: stock supply, budgeting, marketing campaigns to sell the left stock and so on.

Depending on the indicators used in expressing the phenomenon, the time series are divided into the following categories:

- series consisting of relative indicators,
- series consisting medium size indicators,
- series consisting of absolute indicators.

The series made up of relative indicators are expressed either as coefficient or as a percentage containing relative values of structure, coordination and dynamics (Anghelache, 2008). Examples of such series are found both in the social and economic environment: the number of the employed people in the mountain regions or the day currency of the euro (RON/EUR).

3. Conclusions

The time series using average indicators have the terms calculated as average values. Using average values we can present moment indicators in the long run (average labor productivity, average stocks of materials, the average success rate in sales, the average wages). The series consisting of absolute indicators represent the most frequent calculation method in the business environment. The terms are absolute values and provide an overview of a particular indicator (a month sales, the daily productivity, the daily receipts, a month calls).

A final series classification is based on the number of terms they are made up of, hence we deal with small, medium and large series.

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