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# THE APPLICATION OF TIME SERIES ANALYSIS TO FORECASTING BAGHDAD'S ELECTRICAL ENERGY PRODUCTION: AN EMPIRICAL STUDY

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**ABSTRACT**. The behavior of time series is a significant issue in statistical sciences. Thus, forecasting power output is critical, given that energy is the lifeblood of life. Two approaches for prediction were chosen in this study: ARIMA-Box-Jenkins and Exponential Smoothing, and the two methods were compared to determine which way is the best for prediction. The actual production and predicted values were calculated using the standard of the root mean square error (RMSE). This research aims to evaluate the two approaches MAPE and MAE, and determine which one is the best for forecasting using the time series method. The findings indicate that the firm cannot produce and create power due to wars and sieges before 2003, terrorist attacks after 2003, and a lack of development plans. Additionally, the rise in population, which increases electricity demand, all of these factors contributed to a growing disparity between supply and consumption.

***JEL Classification***: C22, J22, L94

***Keywords***: time series, electrical energy, energy conservation

## Introduction

The introduction should situate the study within a broader context and emphasize its significance. It should define the work's purpose and importance. The present condition of the research area should be thoroughly evaluated, and significant publications should be acknowledged. When appropriate, please emphasize contentious and divergent hypotheses. Finally, briefly summarize the work's primary objective and critical conclusions. Please make your introduction as understandable as possible to scientists who are not specialists in your field of research.

## 1. Literature review

According to several non-economic metrics, these three nations are small and underdeveloped in terms of geography and population, geopolitical significance, market size and aggregate demand, production, investment, export, and technical potential. Political stability, democracy, liberalization, the institutionalization of society, law, infrastructure development, safety, security, investment, adherence to environmental and social standards, legal system efficiency, and respect for human rights are such indicators. In contrast, economic variables such as buying power, economic growth rate, and current account balance are included.

## 2. Methodological approach

Materials and Methods should be given sufficient detail to enable others to reproduce and expand on previously published findings. Please keep in mind that posting your work implies that you must make available to readers any materials, data, computer code, and procedures involved with the publication. Would you please mention any limits on the availability of materials or information during the submission stage? While novel techniques and protocols should be presented in-depth, well-established methods can be described quickly and correctly cited.

## 3. Conducting research and results

The quantitative component of the research placed a premium on data collection, processing, and analysis. In a survey conducted during the research, a nine-level Likert scale was used to assess respondents' perceptions and assessments of the dependent variable (transitional crisis), as well as the independent variables (heritage of socialism, geopolitics, nomenclature authorities, deficit of institutional changes, and neoliberal ideology). The dependent variable (transitional crisis) was quantified using a scale ranging from lowest (1) to most significant (5). (5). Concerning the independent factors, the negative influence on the dependent variable was quantified from a minimum of (1) to a maximum of (5). The study required respondents to complete 500 questions for each nation (Iraq, Syria, and Egypt), totaling 1,500 respondents. SPSS software was used to process the data collected for this investigation. For data analysis, correlation analysis, and multi-correlation, descriptive statistics were employed under the goal specified in the working hypothesis. Following that, a multiple linear regression model was used (using the least-squares approach) and a hierarchical multiple regression model.

### *3.1. Application of multiple linear regression analysis*

Before the regression analysis, descriptive statistics were performed. From the obtained results, the relevant results were singled out in *Table 1*.

Table 1. Means end standard deviation

| Variables | Iraq | | Syria | | Egypt | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Mean | Standard dev. | Mean | Standard dev | Mean | Standard dev. | Mean | Standard dev. |
| Crisis | 2.7590 | .73655 | 3.2590 | .73655 | 3.7515 | .72212 | 3.2560 | .83582 |
| Path depends. | 2.8679 | 1.07412 | 3.8120 | 1.09666 | 3.8610 | 1.07260 | 3.5154 | 1.17298 |
| Globalization | 3.8940 | .67652 | 4.3060 | .52241 | 4.0560 | .61776 | 4.0853 | .63165 |
| Politics | 2.6320 | 1.28720 | 3.1120 | 1.25363 | 3.5431 | 1.15498 | 3.0953 | 1.28699 |
| Institutions | 3.5990 | .78161 | 4.0870 | .76229 | 4.5020 | .49849 | 4.0613 | .78485 |
| Neoliberalideo. | 3.3236 | .88945 | 4.4260 | .53861 | 3.9279 | .53755 | 4.1278 | .76309 |

Source: *own compilation*

For all three countries:

$$\overline{Y} = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5$$

Za$X_1$ =3.51. $X_2$=4.08. $X_3$=3.09. $X_4$=4.08 $X_5$=4.12

$$\overline{Y} = 4.63 - 0{,}21X_1 - 0.23X_2 - 0.03X_3 - 0.31X_4 - 0.26X_5$$

$$\overline{Y} = 3{,}25$$

The level of transitional crisis is the largest in Egypt (mean is 3.75), then in Syria (mean is 3.25), and the lowest is in Iraq (2.75). A comparison of means by variables is shown in *Figure 1*.

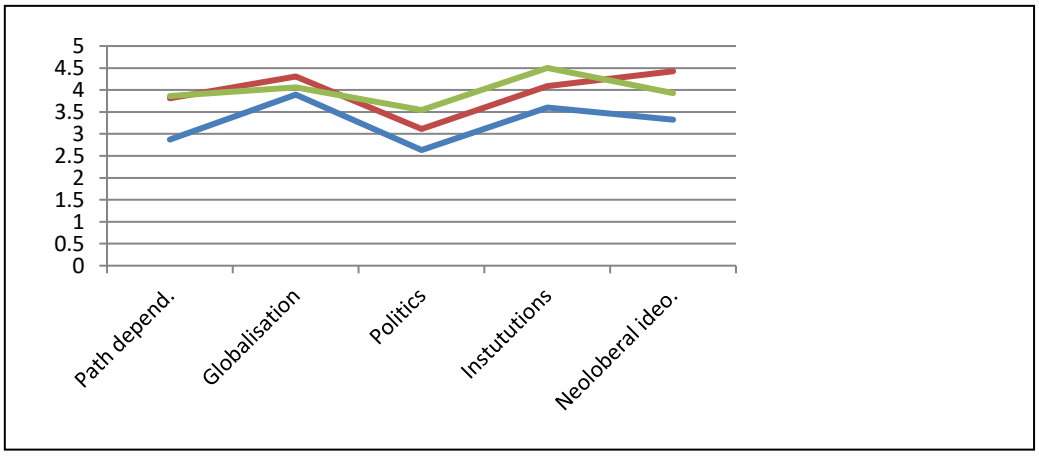


Figure 1. Comparative data by countries
Source: *own data*

Figure 1 illustrates the degree to which various countries see independent variables differently. Egypt, in terms of transition crisis severity, is in a worse condition than Syria and Iraq. Additionally, the negative effect of independent factors is most significant in Egypt, followed by Syria and Iraq. Iraq is in a better position than other countries in all of the areas

studied. Differences are expected as significant economic, political, institutional, and social developments occurred throughout the preceding transition period. Additionally, there are additional aspects that have been overlooked in this research. Nonetheless, the provided results demonstrate a significant resemblance between influence and functional dependence models based on common elements of influence research.

## Conclusion

The theoretical section shows how the transitional crises are impacted by a variety of institutional, economic, political, and cultural elements, including tensions between formal and alternative institutions, global processes, economic liberalization, and political dominance. They had distinctive characteristics in that they exerted a multiplicity of effects via various independent factors that we examined in three transitional nations (Iraq, Syria, and Egypt). These nations have centrally planned economies, regional economic development, and spiral replication of crises during the communist era. They are, nevertheless, a representative sample of the broader condition in Eastern Europe. As a result, the findings of this study are likely to aid in the comprehension of the transitional crises afflicting the majority of Eastern European nations. Apart from some positive developments and improvements (in the business environment, tourism, liberalization, civil society, civil and political rights, democracy, media freedom, the result of a knowledge society, and the investment climate, for example), the observed countries have seen the social, political, and economic crisis intensify over the last 25 years. Empirical study has confirmed it. A variety of unfavorable causes precipitated the transitional crisis. The most critical of them (in my opinion) are recognized and examined in this research.

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