СЕКЦІЯ 1

СУЧАСНІ ТЕНДЕНЦІЇ РОЗВИТКУ МЕНЕДЖМЕНТУ ЗОВНІШНЬОЕКОНОМІЧНОЇ ДІЯЛЬНОСТІ

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THE IMPACT OF FIXED ASSET VALUE ON EXPORT VOLUMES IN UKRAINE: AN ECONOMETRIC ANALYSIS WITH AUTOCORRELATION CORRECTION

In the contemporary global economy, export activity is a cornerstone of national economic development. It enables businesses to diversify their market reach, reducing reliance on domestic demand and bolstering resilience against economic fluctuations. Moreover, robust export sectors are vital for generating employment and fostering technological advancement. The value of fixed assets, representing the productive capacity of enterprises, is a crucial determinant of their ability to produce goods and services for export. Understanding the interplay between fixed asset value and export volumes is essential for formulating evidence-based economic policies that promote sustainable export-led growth. This paper aims to quantify the impact of fixed asset value on Ukraine's export performance, focusing on the methodological challenges posed by autocorrelation in time-series analysis.

The scientists employ a variety of quantitative methods to analyze the Ukrainian economy and macroeconomy. Structural modeling is used to assess GDP and industrial output interactions [1], while comparative analysis examines service exports during distinct economic periods [2]. The nexus of circular economy and resilience is explored through integrated economic and ecological indicators is investigated with simultaneous models [3]. Time-series analysis, including autoregressive models and vector autoregressive models, is applied to forecast wheat and food prices [4, 5]. A multidimensional ranking approach assesses regional labor market disparities [6]. These studies collectively utilize diverse econometric and statistical techniques to identify economic trends and relationships.

This study investigates the dynamic relationship between the value of fixed assets and export volumes in Ukraine, utilizing annual data from 2000 to 2021 [7]. Employing correlation and regression analysis, the research quantifies the extent to which changes in fixed asset value influence export performance. Particular attention

is paid to the identification and correction of autocorrelation, a common issue in time-series data. The analysis utilizes the runs test and the Swed-Eisenhart test to detect autocorrelation, subsequently applying a first-order Markov model to mitigate its effects. The findings reveal a moderate positive correlation between fixed asset value and export volumes, highlighting the importance of strategic asset investment in enhancing export capabilities and the necessity of robust econometric methodologies to account for temporal dependencies.

This study adopts a quantitative research design to assess the impact of fixed asset value on export volumes in Ukraine. Annual data on the value of fixed assets (independent variable, x) and export volumes (dependent variable, y) for the period 2000 to 2021 were obtained from the State Statistics Service of Ukraine [7].

The analytical approach involves several stages:

- Correlation Analysis: To determine the strength and direction of the linear relationship between fixed asset value and export volumes.
- Regression Analysis: To estimate the parameters of the linear regression model and quantify the impact of fixed asset value on export volumes.
- Autocorrelation Testing: To detect the presence of autocorrelation in the residuals using the runs test and the Swed-Eisenhart test.
- Autocorrelation Correction: To apply a first-order Markov model to mitigate the effects of autocorrelation and obtain unbiased parameter estimates.

The data were processed using statistical software to perform these analyses.

The initial model is a simple linear regression:

$$y_t = \beta_0 + \beta_1 x_t + \varepsilon_t$$

where y_t represents export volume at time t, x_t is fixed asset value at time t, β_0 and β_1 are regression coefficients, and ε_t is the error term at time t.

To correct for autocorrelation, a first-order Markov model is applied, which accounts for the temporal dependence in the residuals:

$$y_t = \beta_0^* + \beta_1 x_t + \rho\, \varepsilon_{t-1}$$

where ρ is the autocorrelation coefficient, estimated using the Durbin-Watson statistic, and ε_{t-1} is the error term from the previous period.

The correlation analysis revealed a moderate positive correlation coefficient of 0.67 between fixed asset value and export volumes. This indicates that as the value of fixed assets increases, export volumes tend to increase as well. The coefficient of determination (R^2) for the initial regression model was 0.452, suggesting that approximately 45.2% of the variation in export volumes can be explained by changes in fixed asset value.

The runs test and the Swed-Eisenhart test both confirmed the presence of significant positive autocorrelation in the residuals of the initial regression model. The Durbin-Watson statistic was calculated to be 0.719, which is indicative of positive

autocorrelation. Based on this statistic, the estimated autocorrelation coefficient (ρ) was determined to be 0.641.

After correcting for autocorrelation using the Markov model, the revised regression equation was:

$$y_t = 35798.5 + 0.002x_t,$$

where y_t represents export volume at time t, x_t is fixed asset value at time t.

The correlation coefficient for the corrected model was 0.54, slightly lower than the initial correlation.

The findings of this study provide empirical evidence of a moderate positive relationship between fixed asset value and export volumes in Ukraine. This suggests that investments in fixed assets, such as machinery, equipment, and infrastructure, are important drivers of export performance. However, the moderate correlation and R^2 values indicate that other factors, not included in the model, also significantly influence export volumes.

The presence of autocorrelation in the initial model underscores the importance of conducting thorough diagnostic tests and applying appropriate correction methods in time-series analysis. Autocorrelation can lead to biased and inefficient parameter estimates, affecting the reliability of the results. The successful application of the Markov model demonstrates the effectiveness of this technique in mitigating the effects of autocorrelation.

The slight decrease in the correlation coefficient after correcting for autocorrelation suggests that the initial model may have overestimated the strength of the relationship due to the presence of temporal dependencies. This highlights the importance of accounting for autocorrelation to obtain more accurate and reliable estimates.

This study has demonstrated a moderate positive correlation between fixed asset value and export volumes in Ukraine, highlighting the importance of strategic asset investment in enhancing export capabilities. The presence of autocorrelation in the initial model was identified and corrected using a first-order Markov model, demonstrating the necessity of robust econometric methodologies in time-series analysis.

Future research should consider expanding the model to include other relevant factors, such as labor productivity, technological innovation, and external demand, to provide a more comprehensive understanding of the determinants of export performance. Additionally, exploring alternative methods for correcting autocorrelation, such as the Cochrane-Orcutt procedure or generalized least squares, could provide further insights and enhance the robustness of the results.

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