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Diagnosing Cross-Sectional Time Series Models of Money Supply For Arab Countries

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Abstract

Using cross-sectional time series models, the study concludes by determining the extent of development of trends in fiscal policy tools and money supply in the narrow sense for three countries (Iraq, Jordan, and Algeria). It also suggests a statistical model to analyze the study data and determines the extent of the impact and effectiveness of fiscal policy tools on money supply through its financial tools represented by public spending and tax revenues. Eviews10, a statistical tool, was used to handle annual data for the years 1993–2023. The cumulative regression model is the best model, according to the results of the Fisher statistical test. The money supply in the countries under investigation has a substantial positive relationship with tax revenues, whereas public spending has a non-significant positive relationship. The estimated parameters of the suggested model are consistent with both practical reality and economic theory presumptions.

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1. Introduction

Fiscal policy occupies an important position among the policies adopted by the state in managing its economic affairs and driving the wheel in many economic, social, political and cultural aspects, relying on its specialized tools in the field of finance, which is a science in itself and which carries within it public expenditures and public revenues. One of the contemporary techniques in quantitative standard analysis is the use of cross-sectional time series models. These models, which simultaneously combine the features of time series and cross-sectional data, have attracted a lot of attention lately, particularly in economic studies, because they equally consider the effects of time change and the change in the difference between cross-sectional units. We discover that cross-sectional data explains the behavior of several objects (countries, businesses, and goods) at a single point in time, whereas time series data shows the behavior of a single item over a given period of time. The behavior of several items over a given period of time is described by cross-sectional time series data. (Haydier et al. , 2023). Using the panel data approach, the study attempts to quantify the relationship between the variables under investigation, which are represented by fiscal policy tools (tax revenues and public spending), and the money supply. Additionally, to determine how to select and balance the three cross-sectional time series models the random effects model, the fixed effects model, and the cumulative regression model.

2. Concept Time Series

Currently, time series analysis and study are very important since they show the changes and the variables that create them. The goal of researching them is to uncover these shifts that take place in the phenomenon under study throughout a specific time frame and what affects them in terms of growth or atrophy to know their types and separate them from each other and measure the effect of each of them in addition to predicting the behavior of the phenomenon in the future using statistical data available in the past (Box et al., 2016)(Wei , 2006). One of the most important conditions that must be available in time series data is stability, which can be conceived as a form of probable equilibrium. Probable characteristics such as the arithmetic mean and variance for a stable process must not depend on time, as they are constant with the change in time (Mahmood and Ahmed, 2023)(Sobhi and Hayawi, 2021). Making ensuring the time series utilized in the model is stable is the first step. The use of these series in estimation can produce inaccurate and misleading findings if they are not stable. This purpose, we will use the following tests and apply them to each of the study variables: the LLC test proposed by (Levin, Lin and Chu) in (2002) (Arabi, 2005) , the PP test proposed by (Phillips-Perron 1986), and Dickey and Fuller (1981) discussed the Fisher-ADF test. The existence of a unit root, or that the time series is not stable, is the null hypothesis for the three tests (LLC, PP, and ADF). The absence of a unit root, or the time series' stability, is the alternative theory. We reject the null hypothesis, which states that the time series is stable, if the P-value is less than the designated significance level of 0.05.

3. Panel Data Model

Cross-sectional time series data is characterized by the combination of the features of cross-sectional data, which describe the behavior of several cross-sectional units at a single time period at a time, and time series data, which describe the behavior of a single unit during a specific time period (Baltagi, 2021). Several names are given to this type of data, including integrated data or longitudinal data, and it can be defined as data that can be obtained through repeated observations of a phenomenon around (N) cross-sections during a specific time series and is characterized by changing at two levels: change at the width level represented by cross-sectional data and change at the length level, which includes time series data. Longitudinal data models have many advantages in their use compared to using time series data models alone or cross-sectional data models alone, the most important of which are: (Hsiao, 2014)(William, 2012)

1. Since panel data relates to companies, individuals, countries, etc., the presence of heterogeneity in these units over time is a natural phenomenon. Panel data estimation techniques can take this heterogeneity into account by allowing the introduction of individual-specific variables.
2. Longitudinal data provides more useful efficiency, increased degrees of freedom, more information content, and less multicollinearity between variables.
3. Effects that are difficult to identify and quantify in time series or cross-sectional data can be more effectively detected and measured using longitudinal data.
4. We can investigate more intricate behavioral patterns with longitudinal data. For instance, longitudinal data is more appropriate for addressing issues like technological change than cross-sectional or time series data.
5. Perhaps if we put people or businesses into big groups, longitudinal data can lessen bias by providing data for numerous units.

The basic formulation of longitudinal data models includes three possible models depending on the individual effect of each cross-sectional unit, This is thought to be unique to each cross-sectional unit and consistent across time. The following formula defines the longitudinal data model if we have N cross-sectional observations measured over T time intervals (Eon et al. 2008):

$$Z_{it} = \alpha_{0,i} + \sum_{j=1}^{k} \alpha_j Y_{j(i,t)} + u_{i,t} \quad (1)$$

Where: Z_{it} : denotes the dependent variable's value in observation i at time t. $\alpha_{0,i}$: symbolizes the intersection point in ith observation, which is the constant term parameter. α_j : stands for the regression line parameter. $Y_{j(i,t)}$: the independent variable j's value in observation i at time t. $u_{i,t}$: is the phrase for random error in observation I at time t. With a variance σ_u^2 and a mean zero, it has a normal distribution. There are three primary types of longitudinal data models:

I) Model of Pooled Regression (PRM)

Because it assumes that the individual effect in every cross-sectional unit is constant—that is, that all coefficients are constant for every time period—this model is regarded as one of the most basic longitudinal data models (Hammodat et al. 2022). The parameters of this model are estimated using the ordinary least squares (OLS) approach. By rewriting equation (1), we obtain the pooled regression model as follows(William, 2012):

$$Z_{it} = \alpha_0 + \sum_{j=1}^{k} \alpha_j Y_{j(i,t)} + u_{i,t} \quad (2)$$

II) Model of Fixed Effects (FEM)

According to this concept, the cross-sectional units' individual effects differ from one another. By varying the fixed limit parameter from one group to another while maintaining the slope parameter of the regression line constant for each group of cross-sectional data sets, it seeks to understand the behavior of each group of data sets independently. Thus, the fixed effects model takes the following shape (Eon et al. 2008) (Muhammad, 2014):

$$Z_{it} = \alpha_{0,i} + \sum_{j=1}^{k} \alpha_j Y_{j(i,t)} + u_{i,t} \quad (3)$$

III) Model of Random Effects (REM)

Cross-sectional or temporal impacts are treated as random features rather than fixed ones in the random effects paradigm. As a result, the temporal and cross-sectional effects are regarded as independent random variables that are included as random elements in the model's random error term. The fundamental premise of this model is that the random effects are unrelated to the explanatory factors; that is, that the random term varies by nation or year. Because the random effects are included in the random error term, the random effects model is commonly referred to as the error components model or variance components when both temporal and cross-sectional effects are present. Consequently, there are three parts to the mistake word. The individual effect is the first component a_i; ν_t the time dimension's features are the second; and $\eta_{i,t}$ the remaining disregarded variables in the model that vary over time and between cross-sectional units are represented by the third component. The general formula for the random effects model is as follows since it considers the constant parameter (cutoff coefficient) to be a random variable with a rate of:

$$Z_{it} = \mu + e_i + \sum_{j=1}^{k} \alpha_j Y_{j(i,t)} + a_i + \nu_t + \eta_{i,t} \quad (4)$$

4. Tests to Determine the Best Model for Panel Data

To ascertain which of the three panel data models is the most effective, we must conduct two tests: -

i) Fisher's restricted statistic test: -

The Fisher test is important to know the fundamental difference among the PRM and FEM. The foundation of this test is comparing the alternative hypothesis—that the fixed effects model is the best—with the null hypothesis, which is that the pooled regression model is the best.. The Fisher statistic is calculated according to the following formula (Ali and Ali, 2019):

$$\mathrm{F} = \frac{(\mathrm{R}^2_{\mathrm{FEM}} - \mathrm{R}^2_{\mathrm{PM}})/(N-1)}{(1-\mathrm{R}^2_{\mathrm{FEM}})/(\mathrm{NT}-\mathrm{N}-\mathrm{k})} \quad (5)$$

Where:- $(\mathrm{R}^2_{\mathrm{PM}})$ is used to estimate the PRM coefficient of determination. $(\mathrm{R}^2_{\mathrm{FEM}})$ is used to estimate the FEM coefficient of determination.(N) quantity of sections.(T) number of years. (k) quantity of estimated parameters.

When the above formula is compared to the tabular value F(∝,N-1,NT-N-k), if the tabular value (F) is less than the calculated value (F), we reject the H0, which states that the PRM is the best, and accept the H1, which states that the FEM is the best and most appropriate for the study. This means that the P-Value is significant, or less than the significance level specified for the study, which in this case is 0.05.

If the calculated (F) value is less than the tabular (F) value, (indicating that the P-Value is not significant), that is, greater than the significance level (0.05), this signifies that the alternative hypothesis is rejected and the null hypothesis—that the PRM is the best and most appropriate for the study—is accepted. We finish at this point and the PRM is deemed the most suitable for the study if the Fisher test shows that the PRM is suitable for the data. However, we proceed to the second test, the Housman test, if the Fisher test shows that the FEM is appropriate.

i) Housman test:-

A comparison between FEM and REM is made in the Housman test. It is the degree to which each effect is connected to the variables in order to determine which effect—FEM or REM—is more suited for model estimation(Housman, 1978). The null hypothesis, which is based on the lack of a relationship between the independent variables and the individual effect, is used to determine which of the two models is superior and ought to be employed in the study. As a result, the estimates of the fixed and random effects are consistent, but the estimates of the random effects are more effective. Regarding the alternative hypothesis, it is predicated on the idea that there is a connection between the independent factors and the individual effect, and the independent variables, and as a result, the fixed effects estimates are more accurate and consistent. The following is the statistical formulation of the theory: - H_0: The model of random effects is suitable. H_1: The model of fixed effects is suitable The statistical test (H), which is based on the following formula and has a chi-square distribution with a degree of freedom of k, is employed:

$$H = (\widehat{\boldsymbol{\alpha}}_{\mathbf{FEM}} - \widehat{\boldsymbol{\alpha}}_{\mathbf{REM}})'[\boldsymbol{Var}(\widehat{\boldsymbol{\alpha}}_{\mathbf{FEM}}) - \mathbf{Var}(\widehat{\boldsymbol{\alpha}}_{\mathbf{REM}})]^{-1}(\widehat{\boldsymbol{\alpha}}_{\mathbf{FEM}} - \widehat{\boldsymbol{\alpha}}_{\mathbf{REM}}) \quad (6)$$

Where:- $(\widehat{\boldsymbol{\alpha}}_{\mathbf{FEM}})$ symbolizes FEM estimated parameter vector. $(\widehat{\boldsymbol{\alpha}}_{\mathbf{REM}})$ symbolizes REM estimated parameter vector. $(\boldsymbol{Var}(\widehat{\boldsymbol{\alpha}}_{\mathbf{FEM}}))$ shows the variance and covariance matrix for the FEM estimated parameters. The variance and covariance matrix for the estimated parameters for REM is denoted by $(\mathbf{Var}(\widehat{\boldsymbol{\alpha}}_{\mathbf{REM}}))$.

The statistical decision is among one of the two possibilities:-

i) If the P-Value is significant, that is, less than the significance level (0.05), we reject the hypothesis that the REM model is the best model and accept the hypothesis that the FEM model is the best model. The estimation in this instance is based on the generalized least squares (GLS) approach.

ii) We accept the hypothesis that (REM) is the proper model and reject the hypothesis that (FEM) is the proper model. The (OLS) approach is used in the estimation when the P-Value is not significant, that is, more than the (0.05) level.

5. The applied framework

The stages of the analysis methodology referred to in the previous paragraphs will be followed to estimate and analyze longitudinal panel models that reflect the relationships between some fiscal policy variables and money supply for a sample that included three Arab countries (Iraq, Algeria and Jordan). These countries were selected according to the criterion of data availability for the variables under study for all years of the period (1993-2023) with a sample size of 93 observations. In order to measure and analyze money supply in Arab countries (Iraq, Jordan and Algeria), panel models will be used, which can be formulated in the following form:

$$NM = F(PE\,;TR)$$

$$NM = \alpha_{0i} + \alpha_{1i}PE_{it} + \alpha_{2i}TR_{it} + u_{it} \quad (7)$$

Whereas: NM: represents the dependent variable (internal) which is money supply (money supply) meaning (Narrow Money) as a percentage of gross domestic product (GDP). PE_{it}: represents the first independent variable (external) which is tax revenues (Public Expenditure) as a percentage of GDP. TR_{it}: represents the second independent variable (external) which is public or government spending (Tax Revenue) as a percentage of GDP.

The study included three countries as cross-sectional data (N=3) and the data were obtained for the period (1993-2023) i.e. (T=31) for the study variables with a sample size of (k=93) observations. The variables were obtained from the official websites of the International Monetary Fund (https://www.imf.org/ar/home/) and the World Bank (https://data.albankaldawli.org/).The most significant descriptive statistics for the study variables are displayed in the following table.

Table 1: The most significant descriptive statistics for the variables under research.

Variables	NM	PE	ER
Mean	33.44344	32.21441	10.13699
Median	33.3100	34.25	11.29
Maximum	64.13000	60.33	24.69000
Minimum	3.440000	2.980000	0.100000
Std. Dev.	13.17312	10.68977	7.404778
Observations	93	93	93

The average ratio is displayed in the table above of (money supply, tax revenues and public spending) throughout the study period amounted to approximately (33.44%, 32.21%, 10.14%) of the GDP, respectively. The standard deviation values (13.17%, 10.69%, 7.40%) indicate fluctuations in the ratios of (money supply, tax revenues and public spending) respectively of the GDP throughout the study period. The highest ratio of money supply, amounting to (64.13%) of the GDP, was recorded for the year (2023) for the State of Algeria, while the highest ratio of tax revenues, amounting to (60.33%) of the GDP, was recorded for the year (2007) for the State of Iraq, while the highest ratio of public spending, amounting to (24.69%) of the GDP, was recorded for the year (2010) for the State of Jordan. The lowest percentage of money supply, which was (3.44%) of the GDP, was recorded in the year (2003) for the State of Iraq. As for tax revenues, the lowest percentage, which was (2.98%) of the GDP, was recorded in the year (2003) for the State of Iraq. As for public spending, the lowest percentage, which was (0.1%) of the GDP, was recorded in the year (2006) for the State of Iraq.

6. **Diagnosing Panel Models**

Stage One: Multicollinearity Tests

To make certain that the explanatory variables being examined do not exhibit multicollinearity. the correlation matrix test between the variables was used by observing the non-diagonal elements in the correlation matrix, which, given how much these elements' values deviate from zero, is one of the simplest and most straightforward indications to determine whether relationships exist between the independent variables. the more it indicates the existence of relationships between those variables, whether those relationships are direct or inverse. Some researchers, such as Green and Tull (1978), showed that the correlation coefficient between the variables, which can reveal whether a linear link exists, is between 0.8 and 0.9(Alsharabi et al. 2022)(Hayawi, and Alsharabi, 2022). The following table shows the results of the correlation matrix.

Table 2: Correlation matrix between the independent variables.

Variables	PE	ER
PE	1	0.285
ER	0.285	1

As we can see from the above table, there is no linear correlation issue between the PE and ER because the correlation coefficient value reached (0.285), which is very near to zero. For the PE & ER, the Variance Inflation Factor (VIF) was also computed and was as follows in Table (3). If it turns out that the value (VIF<2.5), then the null hypothesis is accepted, which states that there is no linear correlation problem between the two variables.

Table 3: VIF for the PE & ER Variables.

Variable	VIF
PE	1.08837
ER	1.08837

Stage Two: Testing the Stability of Variables

The stability of the time series used in the model must be ensured by studying the unit root using statistical tests (ADF, LLC, PP). The following tab.4 shows the results of the statistical tests in the case of the presence and absence of the constant for both the money supply and the tax revenues and public spending are unstable because the P-value > 0.05 and stability was achieved after the first difference.

Table 4: Outcomes of the study variables' unit root test.

		None			Individual intercept		
Variable		**ADF**	**LLC**	**PP**	**ADF**	**LLC**	**PP**
(NM)	**Original**	7.62257 (0.2671)	-0.5974 (0.2751)	4.68185 (0.5852)	11.7264 (0.0684)	-0.23463 (0.4072)	5.23282 (0.5143)
	After the difference	27.6781 (0.0001)	-4.49973 (0.0000)	73.0503 (0.0000)	14.6451 (0.0232)	1.23851 (0.8922)	53.0993 (0.0000)
(PE)	**Original**	7.41314 (0.2843)	-1.54131 (0.0616)	4.39494 (0.6234)	9.10738 (0.1676)	-1.08455 (0.1391)	7.85135 (0.2492)
	After the difference	62.8477 (0.0000)	-8.27008 (0.0000)	117.082 (0.0000)	42.4962 (0.0000)	-2.88401 (0.0020)	80.7449 (0.0000)
(ER)	**Original**	3.58205 (0.7330)	-0.28461 (0.3880)	5.81391 (0.4444)	5.04796 (0.5377)	-0.04823 (0.4808)	8.41278 (0.2094)
	After the difference	58.1232 (0.0000)	-7.54594 (0.0000)	110.005 (0.0000)	40.0414 (0.0000)	-4.57817 (0.0000)	71.0528 (0.0000)

Stage Three: Estimating Panel Models and Choosing the Best Model

The PRM, FEM, and REM were all estimated at this point. Initially, the Likelihood Ratio test is used to compare the PRM and FEM. The Housman test is used to compare the FEM effects models in order to determine which model is best if FEM is the best. The estimation of tax revenues and public spending on the money supply using the three models is displayed in the following table.

Table 5: Results of estimating the Panel data model.

Variable	PRM	FEM	REM
C	0.266319 (0.6466)	0.266924 (0.6478)	0.266319 (0.6957)
DPE	0.340447 (0.0000)	0.336671 (0.0000)	0.340447 (0.0000)
DER	0.182386 (0.6539)	0.168298 (0.6811)	0.182386 (0.6558)
R^2	0.189374	0.198683	0.189374
Durbin-Watson stat	1.783039	1.799373	1.783039
F-statistic	10.16221	5.268849	10.16221
Prob. F	0.000108	0.000771	0.000108

We notice from the table above that the three models are statistically significant, which is proven by the probability value of the statistic, which indicates that it is less than the significance level of 0.05. The following table shows the results of the (Likelihood Ratio) test to compare between PRM and the FEM.

Table 6: The Likelihood Ratio test.

Test	Stat.	D.F.	Prob.
F	0.493754	(2,85)	0.6121
Chi-square	1.039570	2	0.5946

As we can see from the above table, the cumulative regression model is the best fit for the data because each test's probability value is higher than the significance level of 0.05, which supports the null hypothesis.

Fourth stage: Analyzing the model from an economic and statistical standpoint

The findings of the cumulative regression model's estimation, which are displayed in Tab. 5, make it evident that:

1) The tax revenue coefficient has a positive sign, meaning that the money supply and tax revenue have a direct and significant relationship at a significance level of 0.05, which is in line with economic theory. Accordingly, a 1% rise in the tax revenue to GDP ratio results in a 0.340447 increase in the money supply to GDP ratio.
2) The public spending coefficient has a positive sign, meaning that the money supply and public spending have a direct and significant link at a significance threshold of 0.05 which is in line with economic theory. This means that when the ratio of public spending to GDP increases by (1%), this leads to an increase in the ratio of money supply to GDP by (0.182386).
3) According to the results, the model is significant overall because the Fisher's statistic (F-statistic) value reached (10.16221) with a probability of (0.000108), which is below the significance level of 0.05.
4) It is clear from the fig.1 which shows the drawing of each of the money supply values after taking the difference between them, which is symbolized by (DNM) and the corresponding predictive values, which is symbolized by (DNMF) that the actual and predicted values are close which indicates the suitability of the model to the data.

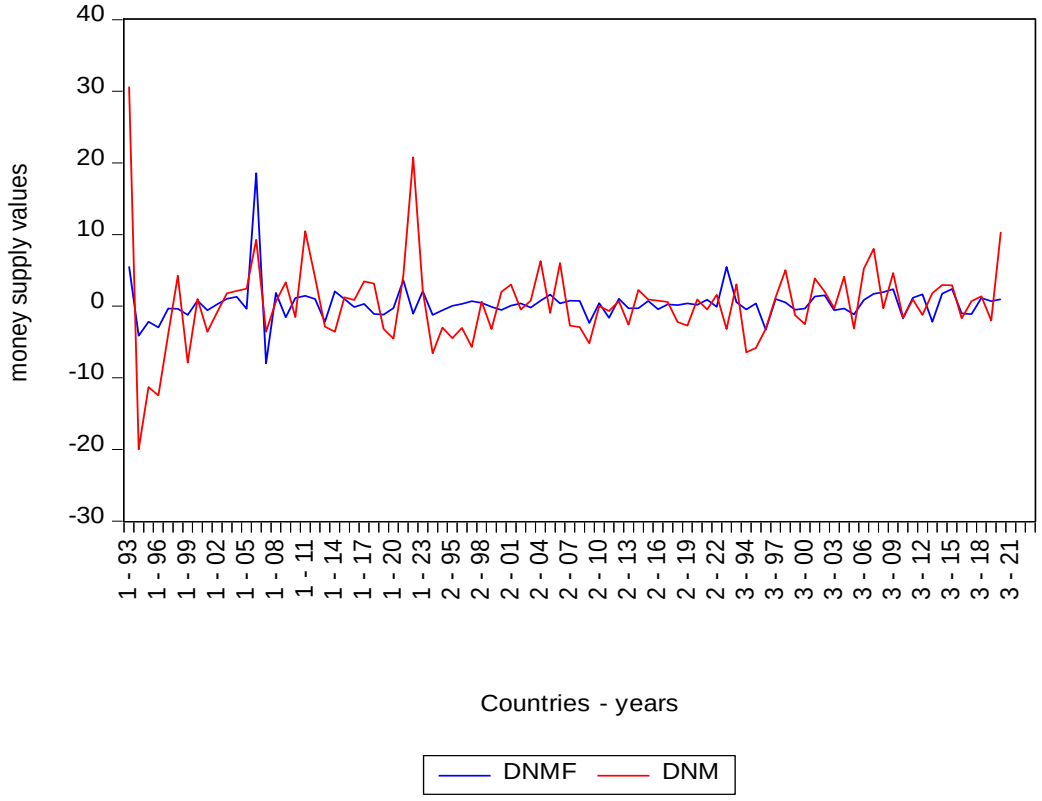

Figure1: shows a plot of both the money supply values and the predictive values of the ensemble regression model.

7. Conclusions

1. The real-world findings demonstrated that combining cross-sectional and time series data to generate longitudinal data and represent it in one of its three models provides a more thorough analysis than utilizing only one model.
2. The variance inflation factor (VIF) and the correlation matrix test demonstrated that there is no issue with multicollinearity between the two explanatory variables, public spending and tax revenues.
3. Using stability tests, it was demonstrated that public spending, tax revenues, and the money supply are all unstable. Stability was attained following the first difference.
4. The probability value of the Fisher statistic, which is below the significance level, indicates that the Fisher statistic for the three Panel models is significant.
5. It was demonstrated that the cumulative regression model is the best model to represent the research data when the restricted Fisher statistic was used to compare it to the fixed effects model.

References

1. Ali, T.H. and Ali, M.S.(2019)." Analysis of Some Linear Dynamic Systems with Bivariate Wavelets". Iraqi Journal of Statistical Science (30). http://creativecommons.org/licenses/by/4.0/
2. Alsharabi, N., Al-Mola, R., Yonan, R., and Algamal, Z. (2022)," Employing Several Methods to Estimate the Generalized Liu Parameter in Multiple Linear Regression Model", IJASEIT, Vol.12 ,No. 6. https://doi.org/10.18517/ijaseit.12.6.14789
3. Arabi , K. A., (2005), "Advanced Econometrics", Town Press, Khartoum.
4. Baltagi, B. H. (2005). "Econometric Analysis of Panel Data (3rd ed.)". Wiley.
5. Box, G., Jenkins, G., Reinsel ,G. and Ljung G., (2016)," Time Series Analysis Forecasting and control", John wiley & Sons , Inc . Hoboken, New Jersey.
6. Dickey ,David . A ,and Fuller ,W. A., (1981), "likelihood ratio statistics for autoregressive time series with a unit root", Econometrica ,Vol. 49,No.4.DOI:10.2307/191257.
7. Eon, T. H., Lee, S. H., & Xu, H. (2008). "Introduction to Panel Data Analysis: Concept and Practices". (K. Yang, & G. J.Miller, Éds.) U.S.A: Taylor & Francis Group. https://www.researchgate.net/publication/299629608
8. Hayawi, H.A. and Alsharabi, N. (2022)." Comparison of prediction using Matching Pattern and state space models". Iraqi Journal of Statistical Science (35). http://creativecommons.org/licenses/by/4.0/.
9. Haydier, E.A., Albarwari, N.H and Ali ,T.H.(2023)." The Comparison Between VAR and ARIMAX Time Series Models in Forecasting". Iraqi Journal of Statistical Science Vol. 20, No. 2. http://creativecommons.org/licenses/by/4.0/
10. Hammodat, A. A., Dawood, H.S. and Algamal, Z. Y. (2022)." Two-parameter estimator for the Tobit regression model". Mathematical Statistician and Engineering Applications, Vol. 71, No. 3s2. http://philstat.org.ph.
11. Housman, J. A. (1978). "Specification in Tests in Econometrics", Econometrica , Vol. 46, PP: 12-51. https://doi.org/10.2307/1913827.
12. Hsiao, C. (2014). "Analysis of Panel Data (3rd ed.)". Cambridge University Press.
13. Muhammad, R.,(2014)," Using Panel Data Models in Estimating the Economic Growth Function in Arab Countries", Algerian Journal of Economics and Finance, Vol 2, Issue 2. https://www.researchgate.net/publication/388631099
14. Mahmood, S.H. and Ahmed, M.M.(2023)." Application of Elman Neural Network and SARIMA Model to Modeling Road Traffic Accident in the Kurdistan Region of Iraq". Iraqi Journal of Statistical Sciences, Vol.20 , No. 2. DOI: 10.33899/IQJOSS.2023.0181152
15. Phillips- Perron, (1986) ,"testing For à Unit roots in time series Regression" , Biometrica, Vol. 75.NO.2 https://users.ssc.wisc.edu/~bhansen/718/PhillipsPerron1988.pdf.
16. Sobhi, F. S. and Hayawi, H. A. (2021)." Comparison of the prediction of transfer function models and state space models using the fuzzy method". Iraqi Journal of Statistical Sciences, Vol. 18, No. 2. DOI: 10.33899/IQJOSS.2021.169968
17. Wei, W.W., (2006),"Time series analysis: univariate and multivariate. Methods". Boston, MA: Pearson Addison Wesley.
18. William, G. (2012). "Econometric Analysis", Hand -PEARSON Education Inc, Boston.

تشخيص نماذج السلاسل الزمنية المقطعية لعرض النقد للدول العربية

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الخلاصة :باستخدام نماذج السلاسل الزمنية المقطعية، توصلت الدراسة إلى تحديد مدى تطور اتجاهات أدوات السياسة المالية والمعروض النقدي بالمعنى الضيق لثلاث دول (العراق والأردن والجزائر). كما اقترحت نموذجاً إحصائياً لتحليل بيانات الدراسة وتحديد مدى تأثير وفعالية أدوات السياسة المالية على المعروض النقدي من خلال أدواتها المالية المتمثلة في الإنفاق العام والإيرادات الضريبية. وتم استخدام أداة إحصائية **Eviews10** للتعامل مع البيانات السنوية للسنوات 1993−2023. ويعد نموذج الانحدار التراكمي هو النموذج الأفضل، وفقاً لنتائج اختبار فيشر الإحصائي. كما أن المعروض النقدي في الدول محل الدراسة له علاقة إيجابية معنوية بالإيرادات الضريبية، في حين أن الإنفاق العام له علاقة إيجابية غير معنوية. وان تقديرات معالم النموذج المقترح لا تخالف فروض النظرية الاقتصادية ولا تخالف الواقع العملي.

الكلمات المفتاحية: الانحدار التجميعي , المعروض النقدي, السلسلة الزمنية, اختبار هاوسمان.