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Empirical Study on the Determinants of Unemployment Rate in Algeria

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Abstract:
The purpose of this empirical study is to analyze the impact of specific variables on Algeria's unemployment rate between 1995 and 2021. To achieve this, we utilized the Vector Auto Regressive (VAR) model. The variables considered in our analysis encompass the unemployment rate, economic growth rate, entrepreneurial activity, Human Development Index, and the number of internet users.
This paper is structured into two principal sections. The first section provides a literature review concerning the factors influencing the unemployment rate. In the second section, we present our empiricalstudy to establish the relationship between the unemployment rate andthe other variables.
The main results of this study demonstrate that economic growth rate, entrepreneurial activity, and the Human Development Index contributeto a reduction in Algeria's unemployment rate. However, the variable related to internet usage intensity was not included in the final equationof the VAR3 model. Even in Granger causality tests, its impact was found to be statistically insignificant.

Keywords: Unemployment rate, explanatory variables, Algeria

JEL Classication : E24, J60, C54

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1. Introduction

Algeria, situated at the crossroads of North Africa, has witnessed diverse phases of economic and social evolution throughout its history. Among the paramount issues confronting the country, unemployment looms large. The unemployment rate in Algeria stands as a pivotal barometer of the nation's economic vitality and societal advancement. This comprehensive analysis delves into the intricate landscape of Algeria's unemployment rate, scrutinizing its underlying factors and far-reaching repercussions. (**BENKILA & BOUDEFA, 2021**)

The scourge of unemployment, notably among the country's youth, warrants profound contemplation, shedding light on its profoundeconomic and societal implications and charting a course for policies aimed at fostering job creation and kindling economic growth. (**MOKRANI, 2022**)

1.1 Study issue:

Algeria, in the midst of a rapid economic and societal transformation, grapples with a pivotal challenge that profoundly affects the livelihoods of its citizens, molds the contours of social equilibrium, and exerts a substantial influence on its developmental trajectory: unemployment. While the unemployment rate in Algeria serves as a crucial gauge ofthe nation's economic well-being, a comprehensive understanding of the multifaceted origins of this issue necessitates an examination of the foundational factors. This research endeavor is geared towards delving deeply into the elements that underpin the unemployment rate in Algeria. Through the identification of these determinants, it becomes possible to formulate well-informed policies and efficacious solutions aimed at mitigating unemployment and fostering a sustainable framework for economic advancement. Thus, the pivotal query at the heart of our investigation is:

What are the determinants of the unemployment rate in Algeria?

1.2 Hypotheses:

To answer our question, we put forward the following hypotheses:

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H1: Algeria's unemployment rate is influenced by a multitude ofvariables.

H2: Enhanced economic growth correlates with a decrease in theunemployment rate.

H3: An elevated degree of entrepreneurship is instrumental in diminishing the unemployment rate.

H4: The attributes of the human capital in Algeria play a significantrole in ameliorating the unemployment rate.

H5: The widespread use of the internet, among various technologicaltools, has an impact on the unemployment rate.

1.3 Purpose of research:

The primary objective of conducting research to scrutinize the unemployment rate in Algeria is to attain a global or wide comprehension of the origins and repercussions of unemployment within the Algerian context. In a more focused manner, the aims of this research is entended to discerning the principal factors influencing the unemployment rate in Algeria, accentuating the economic, social, and structural elements that underlie this issue.

The variable under investigation is the unemployment rate in Algeria, which is being examined in relation to other variables that are presumed to exert a detrimental impact. The study spans a period of **27 years**, from **1995 to 2021**. It's worth noting that the selection of variables hinges on two pivotal considerations: the research goals andthe accessibility of data.

1.4 Methodology of the study:

In pursuit of our goal, we have compiled a dataset comprising five distinct variables. In the scope of our study, our intention is to analyzethe factors influencing the unemployment rate in Algeria, while duly considering the unique characteristics of the Algerian economy. Themacroeconomic data we have gathered have been sourced from the World Outlook Database. These annual data series, spanning from **1995 to 2021,** will be subjected to analysis and processing through the utilization of EViews software**.**

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2. The unemployment rate: the causes and challenges associated with unemployment in Algeria

2.1 Definition of the unemployment:

The unemployment rate in Algeria, similar to numerous other nations,is shaped by a multifaceted array of economic, social, and political factors (**LEBED & BECHERAIR, 2021**). Below is an examination of the factors contributing to unemployment and the challenges associated with it in Algeria.

The definition of unemployment has a global standard (**BENYAHIA, 2018)**, but the practical interpretation and measurement vary from one country to another, contingent on two principal criteria: status, which indicates not having a job, and conduct, which implies actively seekingan employment. Different institutions rely on diverse data sources and adapt the International Labour Office (ILO) definition to suit their specific circumstances. Consequently, making comparisons between countries can be challenging. This is due to variations in socio-cultural factors unique to each country, as well as differences in the definition and methodologies used to measure unemployment.

For instance, Algeria's national statistics office follows the ILO's definition **(The economically active population, employment, unemployment and underemployment, 13th ICLS, 1982).**According to this definition, the unemployed are individuals over a certain age who, during a specific reference period, meet the following criteria:

- They are strictly unemployed, meaning they are not engaged inpaid employment or self-employment.
- They are entirely available for paid or unpaid work during thereference period.
- They are actively searching for work, which involves making specific arrangements, such as registering with employment agencies, applying to employers, or responding to job advertisements through various means like personal contacts or property acquisition for starting a business.

Based on the informations provided, an individual can be classified as unemployed

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under the following conditions:

- He is currently not engaged in work, either on a temporary orpermanent basis.
- He is physically and mentally capable and willing to participatein the workforce.
- He has actively sought employment opportunities within thepast four weeks.

Unemployment is a socio-economic issue that affects both developed and developing nations. Consequently, it leads to significant economic challenges such as poverty and income inequality. As a result, the levelof unemployment serves as an indicator of the overall economic well- being.

This can be quantified by calculating the Unemployment Rate, which is determined by the following formula:

$$\textit{Unemployment Rate} = (\textit{Unemployed Workers/Total Work Force}) \times 100$$

The causes of unemployment are manifold, and can be summarised in the figure below:

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Fig.1: Causes of Unemployment

Source: https://theinvestorsbook.com

2.2 Particularities of unemployment in Algeria

Based on the most recent statistical information for the year 2022*, the unemployment rate in Algeria decreased to 11.55 percent. However, the last two years have witnessed a significantly higher unemployment rate compared to prior years.

Davide Furceri (2012), in the IMF Working Paper, had examined the state of unemployment and labor market trends in Algeria andevaluated the obstacles that could impede the generation of employment opportunities. The results of this study indicate that the primary factors contributing to the persistent high unemployment rates, especially among the youth, are the relatively low output-employment elasticities and the inflexible labor market. When conducting simulation analyses, which rely on the insights regarding the link between labor market institutions and unemployment, it becomes evident that enhancing labor market conditions in Algeria would be a crucial

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step in reducing unemployment levels in both the short and medium term. It's important to clarify that the unemployment rate pertains to the percentage of the economically active population who are currently without a job but actively seeking employment. This rate does not encompass individuals who are economically inactive, such as long-term unemployed individuals, children, or retirees.

The unemployment situation in Algeria has specific characteristicsand factors that contribute to its unique nature. Some of the particularities of unemployment in Algeria include:

Youth Unemployment: Algeria has a notably high youth unemployment rate. A significant portion of the unemployed population consists of young people, particularly recent graduates. This creates a challenge for the government in providing opportunities for the country's youth.

Gender Disparities: There are gender disparities in unemployment, with women experiencing higher rates of joblessness compared to men. This disparity is often associated with cultural and societal factors that affect women's participation in the labor force.

Regional Disparities: Unemployment rates vary significantly between regions in Algeria. Urban areas tend to have lower unemployment rates compared to rural regions. The government faces the challenge of addressing these regional disparities in employmentopportunities.

Education and Skills Gap: The education system in Algeria faces challenges in preparing graduates with the necessary skills for the job market. This leads to a significant gap between educational qualifications and the requirements of available jobs.

Informal Economy: A substantial portion of Algeria's workforce is engaged in the informal economy, where workers often lack job security and benefits. This makes it challenging to track and address unemployment in the informal sector.

Resource Dependency: Algeria's economy has been heavily relianton oil and gas revenues, which can create vulnerabilities to global energy price fluctuations.

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Economic diversification is crucial to reduceunemployment tied to fluctuations in the energy sector.

Emigration and Brain Drain: Skilled workers often seek job opportunities abroad due to the limited job market at home. This emigration of talent contributes to a brain drain, which can hinder economic development.

Labor Market Regulations: Certain labor market regulations may deter businesses from creating jobs, making it difficult to reduce unemployment. These regulations may need to be reviewed and adapted.

Youth Entrepreneurship: Encouraging youth entrepreneurship and small business development could be a strategy to address youth unemployment and promote economic growth.

These specific characteristics highlight the complex and multifaceted nature of unemployment in Algeria. Addressing these particularities requires a comprehensive approach that takes into account the unique challenges and opportunities within the country.

3. Empirical study

In our empirical research, we establish a connection between theunemployment rate in Algeria and various other factors presumed to exert a negative influence. The examination spans a **27-years** period, covering the years from **1995 to 2021**. Our data compilation involvedthe utilization of data from the World Perspective and World Bankdatabases. The variables incorporated in our analysis are as follows:

The unemployment rate (UR) : It can be defined as per the guidelines of the International Labour Organization (ILO), which characterizes it as the condition of the labor force ready and willing to work but actively seeking employment without success.

Economic growth rate (AG): This variable measures the annualchange in gross domestic product (GDP) expressed as a percentage (%).

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The Degree of entrepreneurial freedom (FU) : It is a metric introduced in collaboration between the Heritage Foundation and the Wall Street Journal. The Heritage Foundation, established in 1973, is a research and educational organization dedicated to developing and advocating for conservative policies rooted in the principles of free enterprise. According to the Heritage Foundation, a score nearing 100 signifies a high level of liberty for businesses, indicating minimal legislative or regulatory impediments in terms of business inception,license acquisition, or closure.

The Human Development Index (HDI) : It is grounded in the concept that human development is an ongoing process that continually broadens the array of possibilities accessible to each person. These prospects are theoretically boundless and can expand over time. However, regardless of the stage of development, they encompass the fulfillment of three fundamental prerequisites: enjoying a lengthy and healthy life, acquiring knowledge, and having access to the essential resources that facilitate a reasonable standard of living. When theseconditions are unmet, numerous opportunities remain beyond reach **(Garabedian & Hoarau, 2011, p. 6).** The computation of this index revolves around three pivotal dimensions of human development: maintaining a healthy and extended life, attaining knowledge, and sustaining a reasonable standard of living. This indicator affords us the means to gauge how the spectrum of opportunities contributes to the reduction of the unemployment rate in Algeria.

Internet users (IU): This metric quantifies the proportion of individuals who utilize the Internet in some capacity, expressed as the number of Internet users per 100 residents.

We have opted for the Vector Autoregressive (**VAR**) model to examine the interplay between the unemployment rate in Algeria and the other variables under consideration. In this model, all the variablesare considered endogenous, with each variable's value is being influenced by its own past values as well as those of the other variables. To conduct our empirical investigation, we adhere to the following procedural steps:

In the initial phase: which focuses on assessing the stationarity of the series, we

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employ the **Augmented Fuller Dickey** test (**ADF**). The outcomes of this test reveal that all the variables exhibit stationarity, both in their original form and when taking their first difference, except for the IU variable, which shows stationarity only when its second difference is considered, at a significance level of less than **5%**. Consequently, this enables us to transition to the VAR model, as there is no evidence of a co-integration relationship among the variables examined.

Table N°01: Stationarity of series

	In level		
	Critical values	t-Statistic	Prob. p
UR	-2.981038	-2.039866	0.2691
AG_	-2.981038	-3.556867	0.0143
FU	-2.981038	-1.398967	0.5671
HDI	-2.981038	-4.411219	0.0019
IU	-2.981038	3.180615	1.0000
	In 1st difference		
	Critical values	t-Statistic	p
UR	-2.986225	-3.697253	0.0106
AG_			
FU	-3.724070	-6.596385	0.0000
HDI			
IU	-2.986225	-2.489116	0.1299
	In 2nd difference		
	Critical values	t-Statistic	p
UR			
AG_			
FU			
HDI			

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IU	-2.986225	-3.370799	0.0265

Source: Compiled by the author from EVIEWS10 results

Phase Two: Identifying the Optimal Lag Order - In order to ascertain the most suitable number of delays, denoted as "P," for the VAR model, we applied two information criteria: the Akaike Information Criterion (AIC) and the Schwarz Criterion. Based on the assessment using these two criteria, the preferred number of delays to be retained is found to be P=3 (refer to Table 2).

Table N°02 : Determination of the optimal number of delays

Lag	AIC	SIC
0	16.39565	16.64108
1	7.235833	8.708400
2	6.617099	9.316806
3	3.667931*	7.594777*

AIC: Akaike information criterion SC: Schwarz information criterion

Source: Compiled by the author from EVIEWS10 results

4. Estimating the VAR Model:

4.1 Equation Specification - Employing the VAR3 model for modeling, we acquired the initial estimation outcomes (**refer to Appendix 01**).

These initial results demonstrate a notably high coefficient of determination, reaching 0.98. However, there is a notable presence of non-significant coefficients at the 5% significance level. To derive an optimal model that comprises solely significant coefficients, we applied the WALD test and the Least Squares Method (LSM). The ultimate findings are summarized as follows:

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Equation: UR = C(1)*UR(-1) + C(3)*UR(-3) + C(4)*AG(-1) + C(7)*FU(-1) + C(9)*FU(-3) + C(12)*HDI(-3) + C(16)

Equation: AG = C(19)*UR(-3) + C(20)*AG(-1) + C(22)*AG(-3) +C(26)*HDI(-1) + C(27)*HDI(-2) + C(28)*HDI(-3) + C(29)*IU(-1) +C(30)*IU(-2) + C(32)

Equation: FU = C(34)*UR(-2) + C(38)*AG(-3) + C(39)*FU(-1) +C(41)*FU(-3) + C(42)*HDI(-1) + C(43)*HDI(-2)

Equation: IU = C(65)*UR(-1) + C(66)*UR(-2) + C(67)*UR(-3) +C(68)*AG(-1) + C(69)*AG(-2) + C(70)*AG(-3) + C(72)*FU(-2) +C(73)*FU(-3) + C(77) *IU(-1) + C(80)

In our research, our primary focus centers on understanding the determinants of the variable, which is the "unemployment rate." In the following sections, we present our findings pertaining to this variable. Throughout the examined period in Algeria, we observed that the unemployment rate is positively influenced by the one-period lag of the unemployment rate. Conversely, the unemployment rate in Algeria experiences a negative impact from the three-period lag of theunemployment rate, suggesting that effective measures taken by the Algerian government have yielded a negative effect on future unemployment rates.

Moreover, our analysis reveals that the variable under investigation exhibits adverse effects in response to an increase in several factors. These factors include the one-period lag of the economic growth rate,as well as the one and three-period lags of the degree of entrepreneurial freedom. Additionally, the human development index, with a three- period lag, contributes to a negative impact on the variable. It's worth noting that our model demonstrates an exceptionally high coefficient of determination, reaching **98%**. These outcomes align with our initial hypotheses.

It's noteworthy that the variable representing the number of Internet users is notably

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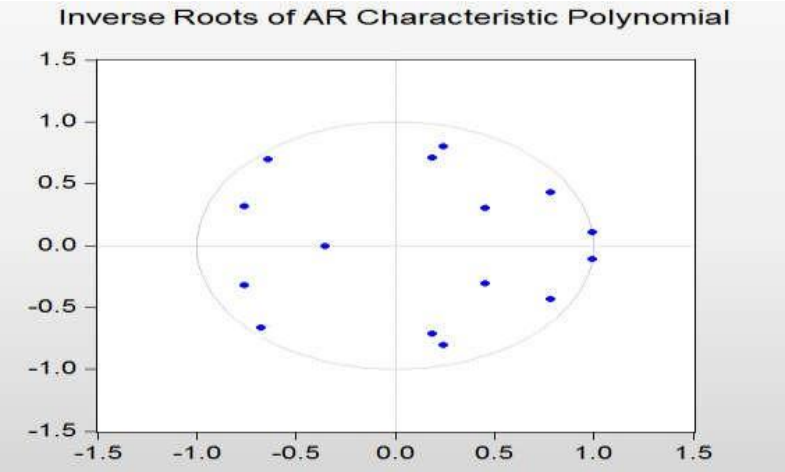
absent from the final equation. This absence suggests that digital development in Algeria may not hold significant importance in positively influencing the unemployment rate.

4.2 Validation of the Model: In order to validate the findings and verify the stationarity of a VAR(3) model, it is imperative to ensure thatall eigenvalues remain below the value of 1 and remain within the unit circle.

Figure No. 02: Eigenvalues of the characteristic polynomial



Source: Compiled by the author from EVIEWS10 results

The depicted figure serves as confirmation that our VAR(3) model maintains stationarity, as evidenced by the eigenvalues remaining within the unit circle.

4.3 Assessment of Residual Normality: In order to assess the quality of our estimates, we conducted a normality test to evaluate whether the data yield the most accurate results. The test employed is the Jarque-Bera test, which enables us to determine if the errors conform to a normal distribution. The outcomes of this test affirm thatall the errors exhibit a normal distribution, with a significance level of**5%.**

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Table 03 displays the results from the Jarque-Bera normality test.

VAR Residual Normality Tests Orthogonalization: Cholesky (Lutkepohl)

Null Hypothesis: Residuals are multivariate normalDate: 05/24/23 Time: 18:11

Sample: 1995 2021

Included observations: 24

Component	Jarque-Bera	Df	Prob.
1	0.317184	2	0.8533
2	1.191415	2	0.5512
3	0.320126	2	0.8521
4	0.554429	2	0.7579
5	4.495148	2	0.1057
Joint	6.878303	10	0.7369

Source: Compiled by the author from EVIEWS10 results

5. Causality Analysis: The GRANGER Test

In our pursuit to examine the factors influencing the unemploymentrate in Algeria and to elucidate the causal links among the variables featured in our VAR3 model, we employ the GRANGER causality test. This test helps us discern the direction of the relationship between the phenomenon under scrutiny and the variables we have put forth. As per Granger (1969), a variable X is considered to cause another variable Y if the past values of X offer a more accurate prediction of Y.

Table 04 presents the results of the GRANGER causality test.

Pairwise Granger Causality Tests

Date: 05/25/23 Time: 17:56

Sample: 1995 2021

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Lags: 3

Null Hypothesis:	Obs	F-Statistic	Prob.
AG does not Granger Cause UR	24	3.82511	0.0292
UR does not Granger Cause AG		2.65331	0.0817
FU does not Granger Cause UR	24	0.08360	0.0387
UR does not Granger Cause FU		3.49214	
HDI does not Granger Cause UR	24	2.86090	0.0676
UR does not Granger Cause HDI		0.73035	0.5480
IU does not Granger Cause UR	24	0.60059	0.6234
UR does not Granger Cause IU		1.12378	0.3672

Source: Compiled by the author from EVIEWS10 results

Regarding the economic growth rate variable (AG): In the Granger sense, AG influences the UR variable at the 5% significance level, and UR influences AG at the 10% significance level.

As for the entrepreneurial freedom variable (FU), FU does not exhibit Granger causality on the UR variable, as the probability valueexceeds 5%. However, UR influences FU in the Granger sense at the 10% significance level.

For the Human Development Index (HDI) variable, HDI influencesthe UR variable at the 10% significance level, but UR does not exert Granger causality on HDI because the probability exceeds 5%.

Regarding the variable measuring the number of internet users per 100 inhabitants (IU), neither IU influences UR at the 5% significance level nor does UR influence IU at the 5% significance level.

The analysis of the causality relationship indicates that the economic growth rate and

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the Human Development Index significantly affect the unemployment rate in Algeria, at the 5% and 10% significance levels, respectively. This suggests that investing in human capital development in Algeria as a means to stimulate economic growth can make a significant contribution to reducing the unemployment rate.

6. Conclusion

This econometric investigation underscores that the unemployment rate is influenced by a multitude of factors. Notably, the economic growth rate and the human development index emerge as the primary drivers in diminishing the unemployment rate, as indicated by the VAR(3) model and the causality relationships.

These findings serve to substantiate the initial hypothesis. While the remaining variables exhibit effects, albeit non-significant, it is evident that Algeria's abundant natural resources have facilitated substantial economic growth. Furthermore, our results emphasize that human capital, as a valuable economic resource, significantly contributes tomitigating unemployment in Algeria.

In light of these insights, we recommend that the Algerian authorities:

- Emphasize support for economic development initiatives.
- Place greater emphasis on the cultivation of human capital.
- Advocate for reforms that enhance entrepreneurial freedom.
- Address digital illiteracy to invigorate the Algerian job market.

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APPENDICES

AppendiceN°1. VAR 3 model results

System: UNTITLED

Estimation Method: Least Squares

Date: 05/22/23 Time: 18:37

Sample: 1998 2021

Included observations: 24

Total system (balanced) observations 120

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.643496	0.309523	2.078996	0.0441
C(2)	-0.067412	0.415857	-0.162104	0.8720
C(3)	-0.155230	0.368991	-0.420689	0.6762
C(4)	-0.649159	0.454948	-1.426888	0.1614
C(5)	-0.350729	0.330552	-1.061039	0.2950

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C(6)	-0.445093	0.330323	-1.347449	0.1854
C(7)	-0.201473	0.188038	-1.071447	0.2904
C(8)	-0.225590	0.193356	-1.166705	0.2502
C(9)	-0.291986	0.240399	-1.214589	0.2316
C(10)	68.02954	151.3199	0.449574	0.6554
C(11)	-9.634330	217.8468	-0.044225	0.9649
C(12)	-151.9760	183.0018	-0.830462	0.4112
C(13)	0.186584	0.353143	0.528354	0.6002
C(14)	-0.209624	0.490978	-0.426952	0.6717
C(15)	-0.049720	0.365637	-0.135982	0.8925
C(16)	127.9745	49.15506	2.603485	0.0129
C(17)	-0.034903	0.158195	-0.220634	0.8265
C(18)	0.149433	0.212541	0.703079	0.4861
C(19)	0.353172	0.188589	1.872711	0.0684
C(20)	-0.418866	0.232520	-1.801418	0.0792
C(21)	-0.218631	0.168943	-1.294113	0.2030
C(22)	-0.467996	0.168825	-2.772072	0.0084
C(23)	0.059456	0.096105	0.618654	0.5397
C(24)	-0.140201	0.098823	-1.418706	0.1637
C(25)	0.124258	0.122866	1.011328	0.3179
C(26)	267.9269	77.33841	3.464345	0.0013
C(27)	-298.2774	111.3398	-2.678982	0.0107
C(28)	100.5075	93.53081	1.074593	0.2890
C(29)	0.509363	0.180489	2.822137	0.0074
C(30)	-0.621900	0.250935	-2.478329	0.0175
C(31)	-0.008979	0.186874	-0.048049	0.9619
C(32)	-53.71009	25.12277	-2.137905	0.0387
C(33)	0.458823	0.530103	0.865536	0.3919

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C(34)	-0.880080	0.712216	-1.235694	0.2238
C(35)	0.732783	0.631951	1.159555	0.2531
C(36)	-0.244025	0.779164	-0.313188	0.7558
C(37)	0.394043	0.566119	0.696043	0.4904
C(38)	0.719689	0.565725	1.272152	0.2107
C(39)	0.483979	0.322042	1.502842	0.1407
C(40)	-0.102286	0.331151	-0.308880	0.7590
C(41)	0.677165	0.411719	1.644727	0.1079
C(42)	-399.6056	259.1574	-1.541942	0.1310
C(43)	504.9281	373.0945	1.353352	0.1835
C(44)	-70.13964	313.4173	-0.223790	0.8241
C(45)	-0.239465	0.604809	-0.395935	0.6943
C(46)	0.188130	0.840872	0.223732	0.8241
C(47)	0.040009	0.626207	0.063891	0.9494
C(48)	-35.05162	84.18521	-0.416363	0.6794
C(49)	0.000244	0.000681	0.358731	0.7217
C(50)	-7.36E-05	0.000915	-0.080406	0.9363
C(51)	0.000584	0.000812	0.719002	0.4763
C(52)	-0.000584	0.001001	-0.583222	0.5630
C(53)	0.000158	0.000727	0.216929	0.8294
C(54)	-3.61E-05	0.000727	-0.049725	0.9606
C(55)	0.000162	0.000414	0.390673	0.6981
C(56)	-2.91E-05	0.000425	-0.068449	0.9458
C(57)	0.001531	0.000529	2.894807	0.0061
C(58)	0.884018	0.332852	2.655885	0.0113
C(59)	0.443924	0.479189	0.926407	0.3598
C(60)	-0.294373	0.402542	-0.731285	0.4689
C(61)	0.001148	0.000777	1.478067	0.1472

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C(62)	-0.000857	0.001080	-0.793955	0.4319
C(63)	-0.000284	0.000804	-0.352727	0.7261
C(64)	-0.149535	0.108124	-1.382987	0.1743
C(65)	-0.696323	0.236182	-2.948254	0.0053
C(66)	0.600583	0.317320	1.892672	0.0657
C(67)	-0.421437	0.281559	-1.496797	0.1423
C(68)	0.423158	0.347148	1.218953	0.2300
C(69)	-0.568553	0.252229	-2.254118	0.0297
C(70)	-0.603554	0.252053	-2.394551	0.0214
C(71)	-0.252766	0.143483	-1.761646	0.0858
C(72)	-0.301029	0.147541	-2.040311	0.0480
C(73)	-1.163043	0.183437	-6.340286	0.0000
C(74)	-84.06800	115.4648	-0.728083	0.4708
C(75)	-118.3178	166.2283	-0.711779	0.4807
C(76)	217.1325	139.6398	1.554947	0.1278
C(77)	0.397900	0.269466	1.476624	0.1476
C(78)	0.252316	0.374642	0.673486	0.5045
C(79)	0.002629	0.279000	0.009423	0.9925
C(80)	131.0658	37.50784	3.494358	0.0012
Determinant residual covariance		3.43E-08		

Equation: UR = C(1)*UR(-1) + C(2)*UR(-2) + C(3)*UR(-3) + C(4)*AG(-1) + C(5)*AG(-2) + C(6)*AG(-3) + C(7)*FU(-1) + C(8)*FU(-2) + C(9)*FU(-3) + C(10)*HDI(-1) + C(11)*HDI(-2) + C(12)*HDI(-3) +C(13)*IU(-1) + C(14) *IU(-2) + C(15)*IU(-3) + C(16)

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Observations: 24

R-squared	0.988838	Mean dependent var	15.40308
Adjusted R-squared	0.967909	S.D. dependent var	7.105554
S.E. of regression	1.272880	Sum squared resid	12.96180
Durbin-Watson stat	2.623719		

Equation: AG = C(17)*UR(-1) + C(18)*UR(-2) + C(19)*UR(-3) +C(20)*AG(-1) + C(21)*AG(-2) + C(22)*AG(-3) + C(23)*FU(-1) +C(24)*FU(-2) + C(25)*FU(-3) + C(26)*HDI(-1) + C(27)*HDI(-2) +C(28)*HDI(-3) + C(29) *IU(-1) + C(30)*IU(-2) + C(31)*IU(-3) + C(32)

Observations: 24

R-squared	0.946705	Mean dependent var	3.229167
Adjusted R-squared	0.846776	S.D. dependent var	1.661973
S.E. of regression	0.650559	Sum squared resid	3.385819
Durbin-Watson stat	2.538868		

Equation: FU = C(33)*UR(-1) + C(34)*UR(-2) + C(35)*UR(-3) +C(36)*AG(-1) + C(37)*AG(-2) + C(38)*AG(-3) + C(39)*FU(-1) +C(40)*FU(-2) + C(41)*FU(-3) + C(42)*HDI(-1) + C(43)*HDI(-2) +C(44)*HDI(-3) + C(45) *IU(-1) + C(46)*IU(-2) + C(47)*IU(-3) + C(48)

Observations: 24

R-squared	0.889252	Mean dependent var	68.33334
Adjusted R-squared	0.681600	S.D. dependent var	3.863392
S.E. of regression	2.179993	Sum squared resid	38.01897
Durbin-Watson stat	2.227000		

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Equation: HDI = C(49)*UR(-1) + C(50)*UR(-2) + C(51)*UR(-3) +C(52)*AG(-1) + C(53)*AG(-2) + C(54)*AG(-3) + C(55)*FU(-1) +C(56)*FU(-2) + C(57)*FU(-3) + C(58)*HDI(-1) + C(59)*HDI(-2) +C(60)*HDI(-3) + C(61) *IU(-1) + C(62)*IU(-2) + C(63)*IU(-3) + C(64)

Observations: 24

R-squared	0.998477	Mean dependent var	0.710958
Adjusted R-squared	0.995620	S.D. dependent var	0.042306
S.E. of regression	0.002800	Sum squared resid	6.27E-05
Durbin-Watson stat	2.187159		

Equation: IU = C(65)*UR(-1) + C(66)*UR(-2) + C(67)*UR(-3) +C(68)*AG(-1) + C(69)*AG(-2) + C(70)*AG(-3) + C(71)*FU(-1) +C(72)*FU(-2) + C(73) *FU(-3) + C(74)*HDI(-1) + C(75)*HDI(-2) + C(76)*HDI(-3) + C(77)*IU(-1) + C(78)*IU(-2) + C(79)*IU(-3) + C(80)

Observations: 24

R-squared	0.999301	Mean dependent var	21.37646
Adjusted R-squared	0.997992	S.D. dependent var	21.67373
S.E. of regression	0.971273	Sum squared resid	7.546973
Durbin-Watson stat	2.660999		

Source: Compiled by the author from EVIEWS10 results