IQTISODIY TARAQQIYOT VA TAHLIL ILMIY ELEKTRON JURNAL

UO‘K: 330.341

ITALIYADA IQTISODIY RIVOJLANISH VA TANLANGAN IQTISODIY KO'RSATKICHLAR O'RTASIDAGI BOG'LIQLIK

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Annotatsiya. *Bu yerda biz Italiyaning iqtisodiy rivojlanishini o'lchaymiz va unga ta'sir qiluvchi omillarni o'rganamiz. Iqtisodiy o'sishga katta ta'sir ko'rsatishini o'rganish uchun biz bir nechta omillarni tanlaymiz. Biz aholi jon boshiga YaIMni mamlakatning iqtisodiy rivojlanishining o'lchovi sifatida olamiz. Ushbu tadqiqot o'zgaruvchilar va aholi jon boshiga to'g'ri keladigan YaIM o'rtasidagi dinamik va uzoq muddatli munosabatlarni o'rganishga qaratilgan.*

Kalit so‘zlar: *aholi jon boshiga yalpi ichki mahsulot, ko'p o'zgaruvchan vaqt seriyasi, VAR modeli, valyuta kursi, ishsizlik, eksport, sanoat.*

ВЗАИМОСВЯЗЬ МЕЖДУ ЭКОНОМИЧЕСКИМ РАЗВИТИЕМ И ОТДЕЛЬНЫМИ ЭКОНОМИЧЕСКИМИ ПОКАЗАТЕЛЯМИ НА ПРИМЕРЕ ИТАЛИИ

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Аннотация. *В данной статье мы измеряем экономическое развитие Италии и изучаем факторы, которые на него повлияют. Для изучения мы выбрали несколько факторов, которые оказывают большое влияние на экономический рост. Мы принимаем ВВП на душу населения в качестве меры экономического развития страны. Целью данного исследования является изучение динамических и долгосрочных связей между переменными и ВВП на душу населения.*

Ключевые слова: *ВВП на душу населения, многомерные временные ряды, модель ВАР, обменный курс, безработица, экспорт, промышленность.*

THE RELATIONSHIP BETWEEN ECONOMIC DEVELOPMENT AND SELECTED ECONOMIC INDICATORS IN CASE OF ITALY

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Abstract. *In this article, we measure the economic development of Italy and examine the factors that will influence it. For the research purposes we have selected several factors that have a great impact on economic growth. We take GDP per capita as a measure of a country's economic development. The purpose of this study is to examine the dynamic and long-term relationships between variables and GDP per capita.*

Keywords: *GDP per capita, multivariate time-series, VAR model, exchange rate, unemployment, export, industry.*

Introduction.

Studying economic development of countries is important for several reasons. Understanding the components that lead to economic growth: By studying economic development, we can learn more about the elements that support economic growth, such as industry, investment, and innovation, as well as the elements that discourage it, such as inflation and unemployment. Identifying opportunities for trade and investment: Economic development studies can help identify countries and regions that offer opportunities for trade and investment. And also understanding global economic trends: Economic development studies can help us understand global economic trends and how they affect different countries and regions. As there are many cases of global trends, downturns, recessions, whose causes and effects to economic development are clear. This information can be used to construct policies that support economic growth and development by economists and policymakers. So, we opted to check and find the answer for the question of whether link between independent and dependent variables exist or not.

Literature review.

Regarding these variables, there are several scientists that studied link between variables we chosen and economic growth. To begin with Simon Kuznets (1946) book of National Income, which says GDP per capita would be best variable to show one nation's well -being, its welfare and thus urged us to take GDP per capita as dependent variable of in research.

Additionally, exchange rate, in Paul Krugman (1986) states: exchange rate fluctuations could have a significant impact on economic growth in his paper called "Target Zones and Exchange Rate Dynamics", indicating there is a link between them.

For unemployment, one of the scientists that studied it is Arthur Okun (1962), which is famous for his Okun law. In his book called "Potential GNP: Its Measurement and Significance" he states that 1 % increase in unemployment leads to 2 % decrease in GDP.

As for industry, Robert Solow (1957) finding is worth to look at. In his paper "Technical Change and the Aggregate Production Function,", he argued that Economic expansion was mostly fueled by technological advancement, and that industry was essential to this process.

However, there are some scholars who argues about the findings of above mentioned scientists. As for Paul Krugman's (1986) statement, Theodore McKinnon Exchange rate stability, according to McKinnon's (1993) essay "The Rules of the Game: International Money and Exchange Rates," was crucial for economic expansion.

For unemployment Robert Lucas (1976): Lucas argued that other factors, such as productivity growth, were more crucial for economic growth in his 1976 paper "Econometric Policy Evaluation: A Critique," which challenged Okun's law, which suggests a negative relationship between unemployment and economic growth.

As a result, there are different opinions about the link between indicators and economic growth. Therefore we decided to look at this in case of Italy between the period of 1970-2021 to see which is true for Italy. Data for these variables are taken from official site of FRED for the period given above

Methodology.

We have opted for a quantitative method utilizing a multi-factor time-series model to determine the link between GDP per capita and various parameters.

The variables chosen for this hypothesis test were as follows:

-exchange rate, unemployment rate, export, industry were selected as independent variables

-GDP per capita, as a measure of economic development, was selected as a dependent variable.

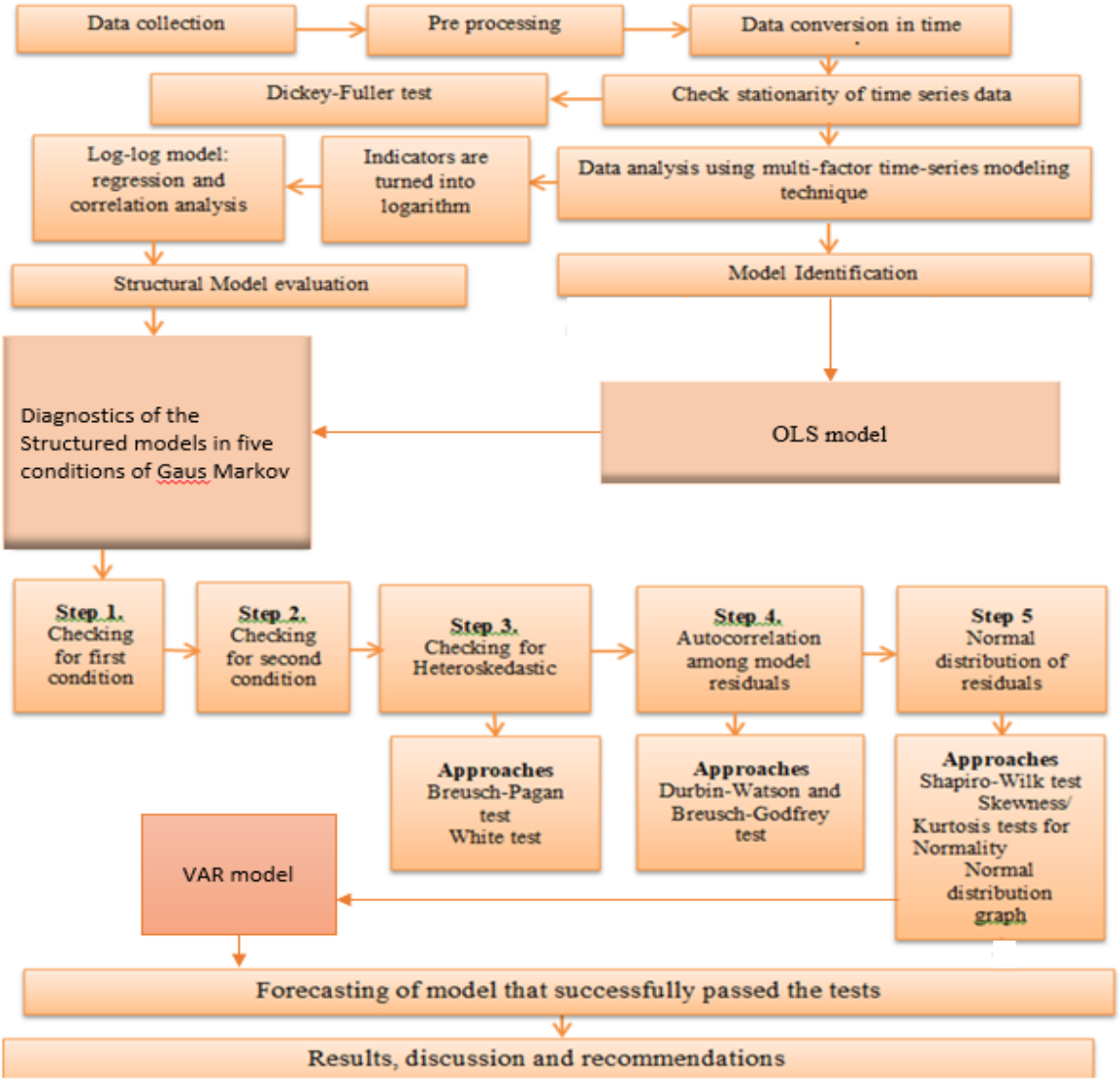

Figure 1. Model[6]

Our hypothesis as follows:

H0: There is no link between exchange rate and GDP per capita.

H1: There is a link between exchange rate and GDP per capita.

H0: There is no relationship between unemployment rate and GDP per capita.

H2: There is relationship between unemployment rate and GDP per capita.

H0: There is no connection between export and GDP per capita.

H3: There is a connection between export and GDP per capita.

H0: There is no link between industry and GDP per capita.

H4: There is a link between industry and GDP per capita.

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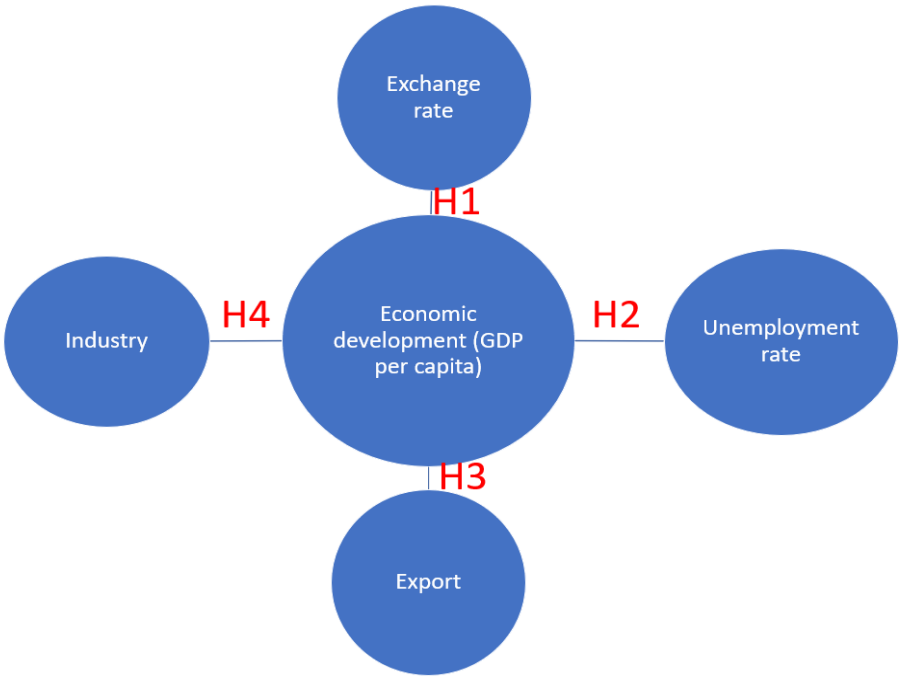

Figure 2. Hypothesis testing [7]

In particular, we created an econometric model and equations utilizing multi-factor time series, examining selected factors and the per capita GDP value for the years 1970–2021.

The following model is developed to investigate the link between variables and GDP per capita:

$\ln GDPpercapita = \beta_0 + \beta_1 \ln exhangerate_i + \beta_2 \ln unemployment_i + \beta_3 \ln export_i + \beta_4 \ln industry_i + \varepsilon_i$

lnGDPpercapita: natural logarithm of GDP per capita

lnexhangerate: natural logarithm of exchangerate

lnunemployment: natural logarithm of unemployment rate

lnexport: natural logarithm of export

lnindustry: natural logarithm of industry

β_0 : the intercept of the model

ε_i: error term

The VAR model specification is given as follows:

$$Y_t = a + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \cdots + \beta_p Y_{t-p} + \varepsilon_i$$

where α is the intercept, a constant and β1, β2 till βp are the coefficients of the lags of Y till order p.

Order 'p' means, up to p-lags of Y is used and they are the predictors in the equation.

The ε_{t} is the error, which is considered as white noise.

By utilizing models like VAR in multi-factor time series, we also created a forecast for a few chosen indicators in our study. We employed the Stata 17 program, which is now popular among scholars all over the world, in order to model and forecast.

In multi-factor time series, the cointegration relationship was performed in the following steps:

-indicators were logged;

-time series were checked for stationary;

-a regression model was built;

-the residue was checked for stationary.

Stationary Test

With the Augmented Dickey-Fuller (ADF) test, a unit root is examined. Do the observed variables typically resume their long-term trend after a shock, or do they randomly wander? The regression between variables is false if, after a transient or persistent shock, the variables behave randomly. Therefore, the parameter estimates from the OLS will not be consistent. Every series ought to be level and stationary. Equation can be used to determine the ADF test.

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$$\triangle Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + a_i \sum_i^m \triangle Y_{t-1} + \varepsilon_t$$

The hypothesis tested:

H0: δ = 0 (contains a unit root, the data are not stationary)

H1: δ < 0 (does not contains a unit root, the data are stationary).

Before performing the model's prognosis, the direction and density of the indicators were determined using the six conditions of Gaus Markov, as well as the heteroskedastic problem, the model residual autocorrelation problem, and regression models.

Analyses and Results.

As mentioned above, the first figure (GDP per capita) is our dependent variable, and the rest of the figures (exchange rate, unemployment rate, export, industry) are our independent variables. We can see that economy of the Italy developed during this period, as we took GDP per capita as its measure and it had almost reached 35600 USD. And we have conducted some work on which factors have significant from above influence to it and whether there is positive or negative correlation between them. Since our study uses multi-factor time series, the first step in the multi-factor time series criterion is to look at the variables that the Dickey-Fuller test determines to be stationary or non-stationary. Then, we can choose a certain suited model.

Table 1.

Results of the Dickey-Fuller test on GDP per capita, exchange rate, unemployment, export and industry respectively[8]

Variable: GDP per capita					
Test statistics	1 % critical value	5 % critical value	10 % critical value	Observation	P-value
-6.021	-3.580	-2.930	-2.600	50	0.0000
Variable: exchange rate					
Test statistics	1 % critical value	5 % critical value	10 % critical value	Observation	P-value
-5.246	-3.580	-2.930	-2.600	50	0
Variable: unemployment					
Test statistics	1 % critical value	5 % critical value	10 % critical value	Observation	P-value
-5.160	-3.580	-2.930	-2.600	50	0
Variable: export					
Test statistics	1 % critical value	5 % critical value	10 % critical value	Observation	P-value
-6.893	-3.580	-2.930	-2.600	50	0
Variable: industry					
Test statistics	1 % critical value	5 % critical value	10 % critical value	Observation	P-value
-7.064	-3.580	-2.930	-2.600	50	0

Since none of the variables were chosen to be stationary, as can be seen from the example above, the values of all variables became stationary after one integration

The development of a model of regression and correlation of the impact of chosen economic indicators assets on the GDP per capita is the next step in achieving the main objective of our study.

	gdpper~a	exchan~e	unempl~t	export	industry
gdppercapita	1.0000				
exchangerate	0.5876	1.0000			
unemployment	0.4115	0.6972	1.0000		
export	0.9603	0.5442	0.3724	1.0000	
industry	0.6663	0.7469	0.4911	0.5175	1.0000

Figure 3. Correlation table between variables[9]

[8] created by author

[9] created by author

It is the result of correlation test. We can see that factors have significant influences with the biggest is export (96 %), which is also the one that has positive correlation, whereas the lowest unemployment (41 %). Figures for exchange rate and industry negative 58% and 66% respectively. We can also see that there is a strong correlation between industry and exchange rate which is negative 74%, whereas export and unemployment the least correlated one with negative 37%. Correlation between other variables has a range of between 49% and 69%. It is also worth mention that all variables are positively correlated with each other in our case.

We convert the indicators to a natural logarithm and put them in the form of a simple regression and correlation econometric formula because they were different in the development of a simple regression and correlation econometric model.

ln$GDPpercapita$l = β_0 + $\beta_1$lnexchangerate$_i$ + $\beta_2$lnunemployment$_i$+ $\beta_3$lnexport$_i$+ $\beta_4$lnindustry$_i$+ε_i

The "Ordinary least squares method" has been used to generate an economic model from the simple regression and correlation.

The results of this simple regression and correlation econometric model analysis are presented below

Source	SS	df	MS	Number of obs	=	52
				F(4, 47)	=	806.24
Model	37.688232	4	9.42205801	Prob > F	=	0.0000
Residual	.549263908	47	.011686466	R-squared	=	0.9856
				Adj R-squared	=	0.9844
Total	38.2374959	51	.749754822	Root MSE	=	.1081

lnGDPpercapita	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
lnexchangerate	-.2420766	.097254	-2.49	0.016	-.4377265	-.0464267
lnUnemployment	.2092923	.0943164	2.22	0.031	.0195522	.3990323
lnExport	.7258104	.0257383	28.20	0.000	.6740316	.7775892
lnIndustry	.8648694	.1684643	5.13	0.000	.525963	1.203776
_cons	-11.83763	.8363577	-14.15	0.000	-13.52017	-10.1551

Figure 4. Regression table[10]

The calculations described above are used to create the following four-factor regression model:

ln$GDPpercapitai$ = -11.83 -0.24lnexchangerate$_i$ +0.20lnunemployment$_i$+ 0.727lnexport$_i$ +0.86lnindustry$_i$+ε_i

Generally, each factor we chosen have significant influence on our dependent variable (GDP per capita in our case), as all independent variables' p value is smaller than 0.05. The developed regression model's Fisher F-statistic has a P-value probability of less than 0.05, showing that the constant and independent variable component influences GDP per capita. We have 52 observations. R-squared and adjusted R-squared are also 98% both, meaning factors we chose can explain 98% of changes in GDP per capita. Other part is explained by some other variables or error term. As for coefficients, exchange rate's coefficient is negative 0.24 meaning that 1 unit change inflation leads to 0.24 unit change in GDP per capita. As for unemployment and industry, figures are 0.20 and 0.86 respectively, showing 1 percent change in them leads to 0.20 and 0.86 percent increase in GDP per capita. As there should be some unemployment too for economic growth, as otherwise there would be inflation. So this is why unemployment has also positive effect on GDP per capita. Export's figure is also 0.72, means 1 unit change in export has effect of 0.47 in GDP per capita. In fact, export has only positive influence on GDP. Our intercept is negative 11.83.

We continue a diagnostic analysis on this model using globally recognized Gauss-Markov criteria.

According to Gauss Markov's first condition, there should be six times as many observations as indicators. With 31 observations and 5 indicators, we can see that our model has met the first requirement of the Gauss-Markov equation.

The empirical model, which is expressed as follows in the table, is equal to the total of the theoretical data in accordance with Gauss Markov's second condition.

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Table 2.

Gaus Markov's 2nd condition on the model[11]

Var	Obs	Mean	Std.dev.	Min	Max
lnGDPpercapita	52	9.65441	0.8658838	7.652956	10.61998
model	52	9.65441	0.8596423	7.548821	10.62664

As there is no negative data which we chose, the number of observations of gdp per capita and our model is the same. Based on the information in Table, it can be concluded that our model met requirement 2 with success.

The residue need not be connected to the model, which is the third requirement. A heteroskedastic state is one in which the residuals and the model are connected. You may check this in three distinct ways. We'll use the White test and the Breusch-Pagan test for the tests.

We will use the Breusch-Pagan test to start evaluating our model.

Table 3

Breusch-Pagan test result[12]

	Chi2(1)	Prob>chi2
lngdppercapita	0.10	0.7576

According to the Breusch-Pagan test results, the test's p value is greater than 0.05, which is referred to as the homoscedastic state by this test criterion. Additionally, the White test is where we will test our model next. The p value for this test must be more than 0.05, just like it was for the Breusch-Pagan test mentioned above.

Source	chi2	df	p
Heteroskedasticity	15.74	14	0.3298
Skewness	7.12	4	0.1299
Kurtosis	0.03	1	0.8536
Total	22.89	19	0.2424

Figure 5. White test[13]

From the picture above, the White test's p value is higher than 0.05, which disqualifies the heteroskedastic state in accordance with its criteria and enables us to accept alternative hypothesis 1.

The value of the Shapiro-Wilk test was 0.08 in accordance with Gaus Markov's fourth requirement, and given that this value is likewise bigger than p 0.05, we can see that this condition is also satisfied.

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
qoldiq	52	0.96058	1.912	1.386	0.08290

Figure 6. Shapiro-Wilk test[14]

Figure below shows that the residuals are regularly distributed, with some exception on the right sight.

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[12] created by author
[13] created by author
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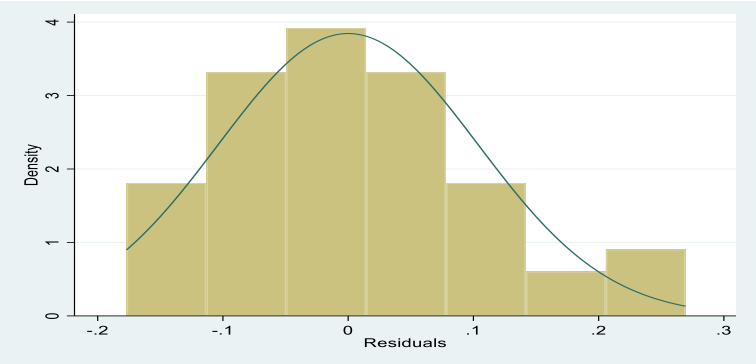

Figure 7. Histogram. Normal distribution of residuals[15]

Below is test results of checking distribution of residuals. According to sktest our residuals was perfectly distributed as probability is greater than 0.05 (almost 5 which is also acceptable in case of r)

Skewness and kurtosis tests for normality

				Joint test	
Variable	Obs	Pr(skewness)	Pr(kurtosis)	Adj chi2(2)	Prob>chi2
qoldiq	52	0.0449	0.5852	4.41	0.1104

Figure 8. Sktest of residuals[16]

The 5th of Gauss Markov conditions is checking the existence of correlation between independent variable and there should be no correlation between them. We will use VIF test to check this

Variable	VIF	1/VIF
lnexchange~e	5.21	0.192120
lnIndustry	3.43	0.291414
lnExport	3.33	0.300466
lnUnemploy~t	2.44	0.410542
Mean VIF	3.60	

Figure 9. VIF results between variables[17]

According to the picture above, there is no any strong correlation between independent variables as VIF test should be smaller than 10.

The absence of an autocorrelation issue in the model residuals is the sixth need for model verification. The sixth criterion can be verified in three different methods, using the graph, autocorrelation table, Durbin-Watson test, and Breusch-Godfrey test.

We will start testing the model using the Durbin-Watson test in the test procedure. The Durbin-Watson test value falls between 0 and 4 according to the requirements of this test. There is no autocorrelation if the test result for the model is close to 2. There is an autocorrelation if the result is between 0 and 1.5 or greater than 2. The outcome of our model's execution using this test was 0.5679359, showing there is some autocorrelation between residuals. Next, we'll use the Breusch-Godfrey test to see if there are any autocorrelation issues in the residuals.

Breusch–Godfrey LM test for autocorrelation

lags(*p*)	chi2	df	Prob > chi2
1	26.190	1	0.0000

H0: no serial correlation

Figure 10. Breusch-Godfrey test[18]

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[17] created by author
[18] created by author

We can infer that there is autocorrelation between the residuals from the Breusch-Godfrey test results. As a result of the R-square probability level being less than 0.05.

These tests showed that our model passed all 6 conditions of the Gauss-Markov test, with the exception of the last. But we are allowed to go on to the forecasting phase of our research after the identification and assessment phases.

Firstly, we used VAR model to forecast and see which variables has significant influence on our dependent variable. If p value is smaller than 0.05, we can say that it has significant influence on GDP per capita. First, we look at GDP per capita itself, to see whether it has influence. According to GDP per capita it has no significant influence on upcoming years to itself, as p value is not smaller than 0.05 (which are 0.42 and 0.06).

```
Vector autoregression

Sample: 1972 thru 2021                          Number of obs     =         50
Log likelihood =  -1636.264                     AIC               =   67.65055
FPE            =   1.71e+23                     HQIC              =   68.45147
Det(Sigma_ml)  =   1.83e+22                     SBIC              =   69.75377

Equation              Parms      RMSE     R-sq      chi2     P>chi2
------------------------------------------------------------------
gdppercapita             11    1874.5   0.9804   2504.15   0.0000
unemployment             11   .709979   0.9033   398.1079   0.0000
export                   11   2.8e+09   0.9739   1866.498   0.0000
industry                 11   4.44848   0.9296   516.5383   0.0000
exchangerate             11     .0628   0.9223   419.0224   0.0000
------------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
gdppercapita |
gdppercapita |
         L1. |   .3078189   .3828238     0.80   0.421    -.442502    1.05814
         L2. |   .6363403   .3458271     1.84   0.066   -.0414684    1.314149
             |
unemployment |
         L1. |  -495.9692   351.9647    -1.41   0.159   -1185.807     193.869
         L2. |  -58.90023   360.0653    -0.16   0.870   -764.6153    646.8148
             |
      export |
         L1. |  -1.71e-08   2.06e-07    -0.08   0.934   -4.21e-07    3.87e-07
         L2. |  -7.93e-09   2.02e-07    -0.04   0.969   -4.05e-07    3.89e-07
             |
    industry |
         L1. |   155.9842   74.17125     2.10   0.035    10.61117    301.3571
         L2. |  -144.0712   75.45605    -1.91   0.056   -291.9623     3.81995
             |
exchangerate |
         L1. |  -13698.13   7103.099    -1.93   0.054   -27619.95     223.692
         L2. |   22009.71   6658.023     3.31   0.001    8960.223    35059.19
             |
       _cons |   712.7325   2814.034     0.25   0.800   -4802.674    6228.139
------------------------------------------------------------------------------
```

Figure 11. VAR model of our analysis[19]

Industry and exchange rate posses great influence for both years. P values are 0.035 and 0.056 for the former, 0.054 and 0.001 for the latter. Industry has 155 % and negative 144 % impact on GDP for upcoming 2 years. As for exchange rate, 1st year it impacts almost 137 times negatively and 2nd year 220 times. Other variables or variables in other years do not hold significant influence. The figures for log likelihood should be as big as possible but negative in our case. This criteria is true for Det(sigma), AIC,HQIC and SBIC figures and these are 1.83e , 67, 68 and 69 respectively which meets criteria.

The VAR model specification is given as follows:

$$Y_t = a + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \cdots + \beta_p Y_{t-p} + \varepsilon_i$$

where α is the intercept, a constant and β1, β2 till βp are the coefficients of the lags of Y till order p.Order 'p' means, up to p-lags of Y is used and they are the predictors in the equation. The ε_{t} is the error, which is considered as white noise.

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Y_t=712.73+156*L1*industry$_{t-1}$-144*L2*industry$_{t-2}$-13698*L1*exchangerate$_{t-1}$ +22009*L2*exchangerate$_{t-2}$+ ε_t

On the basis of the findings from our VAR model, we will forecast GDP per capita for the years 2022 through 2026 in the following phase.

Our study's prognosis was improved by using the VAR that was more successful at doing so, and as a result, we met our research objective.

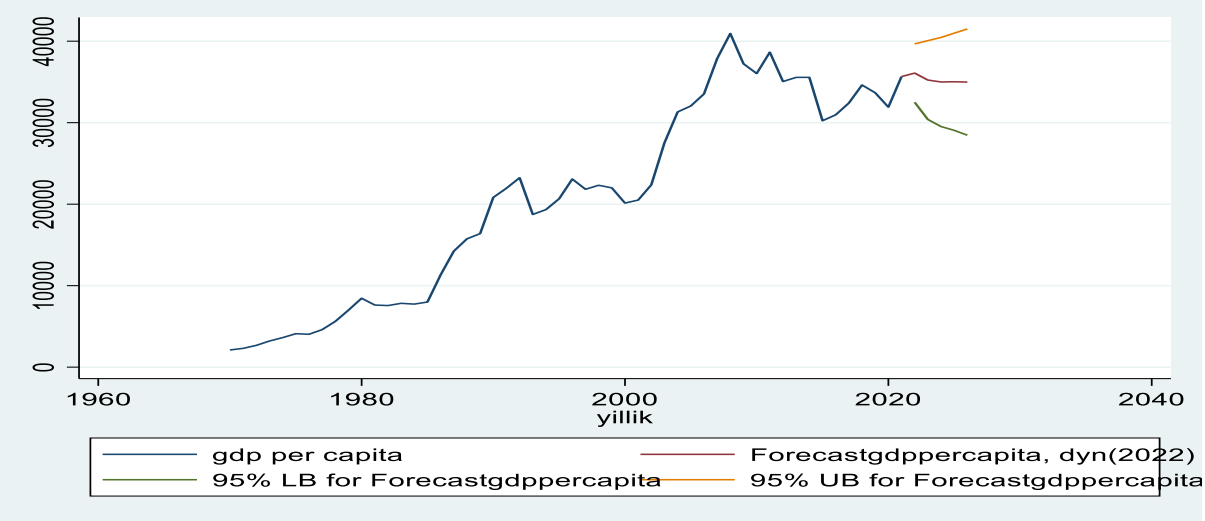

Figure 12. Forecasting GDP per capita for the period 2022-2026 according to 3 probability[20]

yillik	Forecastgdppercapita	Forecastunemployment	Forecastexport	Forecastindustry	Forecastexchangerate	Forecastgdppercapita_lb	Forecastgdppercapita_ub
2022	36084.343	9.7839593	5.023e+10	95.589309	.8079255	32500.405	39668.281
2023	35231.171	9.8444841	4.896e+10	92.166516	.81877162	30395.91	40066.432
2024	34994.3	9.8223212	4.944e+10	90.938768	.81186374	29527.033	40461.568
2025	35022.593	9.8723642	5.027e+10	90.076416	.79338089	29060.059	40985.127
2026	34982.539	9.9024007	5.079e+10	88.799473	.7750846	28461.063	41504.016

Figure13. Table of forecast for variables for the period of 2022-2026[21]

It is clear from the table and figure that the dependent variable's forecast ranges from 2022 to 2026.

Additionally, according to projections based on economic metrics we chose, Italy's GDP per capita will increase to almost $35000 by 2026. But this figure can reach around 41500 if economy do well and take into account external factors or can decrease to up to 28500 if there is any kind of sudden condition like quarantine and etc.

The main objective of the article was to draw attention to how economic variables affected the nation's economic growth from 1970 to 2021. Therefore, in order to specifically show how the selected economic indicators can affect the economic advancement in the instance of Italy, we employ the World Bank's approach to calculate the level of development of countries.

In order to test our hypothesis, we employed a multi-factorial time series to look at the relationship between GDP per capita growth and both short- and long-term economic indices. 6 Gauss Markov conditions were used to assess our findings, and our models passed almost all six evaluation tests (although 6th condition was unsuccessful).

Furthermore, we decided to use the VAR model only after our models had passed the identification and evaluation tests. because when it came to forecasting, the VAR model provided us with useful results. The research utilizing the multi-factor time series model showed that the impact of economic indicators on GDP per capita is significant in the case of Italy, which has one of the best economies in the world. As a result, we can draw the conclusion that both long- and short-term economic growth are significantly influenced by economic indicators.

[20] created by author in stata
[21] created by author in stata

There are many famous economists and organizations that support the idea that GDP per capita is a good indicator of economic development of a country. Such as The World Bank, Nobel laureate economist Simon Kuznets who is known for developing the concept of GDP and for his work on economic growth, The International Monetary Fund (IMF) and others. Depending on them we chose GDP per capita to see economic development. And we would like to know exactly which macroeconomic indicators have significant impact on GDP per capita, in case of Italy. So we made hypothesis whether several indicators and our dependent variable has a link. We used a multi-factorial time series to evaluate how long-term and short-term macroeconomic indicators can effect GDP per capita growth, primarily utilizing the log-log model (as our variables has different such as $ and % units) and VAR model (which is one of the strong models for forecasting). Also We examined our study under 6 different Gauss Markov settings to see how accurate it was, and all of our models passed five evaluation tests. Additionally, the stationary status of our factor indicators and residuals was checked; after 1 integrations, all variables became stationary, enabling the use of the VAR model. Through VAR model, we detected that 2 variables (industry and exchange rate) have significant impact on our dependent variable for next 2 lags. It also allowed us to forecast and see figures for all variables for next 5 years. Overall, we can say that all variables almost stay the same or will not change very much except industry which may face a decrease of 7% until 2026. As for correlation, the most correlated variable with dependent variable was export(96%) and industry and exchange rate also strongly correlated with almost 75%. Strangely, all chosen variables have positive correlation with GDP per capita. For regression, all variables have significantly important with p value smaller than 0.05. Industry has biggest impact of 0.86% for every 1 percent change. Only exchange rate have negative impact with 0.24 unit for every 1 unit change. The chosen variables can explain 98% changes of our GDP per capita, which was known through our R-squared.

Conclusion.

We can conclude that 4 variables, in our case exchange rate, unemployment, export and industry are proven to have significant influence on economic growth (which is shown through GDP per capita in our case) . At first we hypothesized whether there is a link between these variables and we proved it. To do this we used time series and VAR model. We also used D.Fuller test to make our variables stationary. From regression, we saw 3 our independent variables, except for exchange rate, have positive impact on GDP per capita. This is always the case for export and industry as they always serve to increase GDP figure. But for unemployment this can increase GDP up to certain point, and when it exceeds it's norm it will start to impact negatively. As it is supported by some scholars, one of them is Robert Lucas VAR model helped us to determine for upcoming 2 lags which variables have great impact on GDP per capita by stating how much effect will result for every percent change. Also we can see 3 possible outcomes of our GDP per capita which all have the same probability to occur according to situation in world and other external and internal factors.

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