УДК 330.4

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АНАЛИЗ ВЛИЯНИЯ ЭНДОГЕННЫХ ФАКТОРОВ ВВП ВЕЛИКОБРИТАНИИ

Аннотация: В статье рассматривается влияние эндогенных факторов, таких как конечное потребление, государственные расходы и экспорт, на формирование ВВП Великобритании. В конце статьи автор делает вывод о возможности использовать построенную эконометрическую модель для прогнозирования показателей, влияющих на формирование ВВП Великобритании.

Ключевые слова: ВВП, экономика Великобритании, инвестиции, конечное потребление, экспорт, эконометрическая модель

ANALYSIS OF INFLUENCE OF ENDOGENIOUS FACTORS ON GDP OF UK

Annotation: The article examines the impact of endogenous factors, such as consumption, government spending and exports, on the formation of the UK GDP. At the end of the article, the author concludes that it is possible to use the constructed econometric model to predict the indicators that influence the formation of the UK GDP.

Introduction.

The following creative research work is prepared on the topic of econometric model of GDP UK. It includes statistical data for 20 years since 1994 till 2014 and econometric model estimation, forecasting and tests.

The aim of this creative research work is to estimate the existence of economic relationship between variables on the example of UK, construct econometric model and make several tests to check whether this model can be used for forecasting or not.

Gross domestic product (GDP) is a measure of the size of an economy. It is defined as "an aggregate measure of production equal to the sum of the gross values added of all resident, institutional units engaged in production (plus any taxes, and minus any subsidies, on products not included in the value of their outputs)» by the OECD. [1]

GDP (Y) is the sum of consumption (C), investment (I), government spending (G) and net exports (X – M).

The econometric formula of the equation is:

$$\begin{cases} Y_t = a_0 + a_1 * x_{1t} + a_2 * x_{2t} + a_3 * x_{3t} + a_4 * x_{4t} + \varepsilon_t \\ E(\varepsilon_t) = 0 \\ \sigma(\varepsilon_t) = const \end{cases}$$

Where Y_t – GDP,

x_{1t} – Consumption, bln\$

x_{2t} – Government spending, bln\$

x_{3t} – Foreign investments, bln\$

x_{4t} - Domestic investments, bln\$

ε_t - Disturbance term.

In order to define the linear relationship we have to find correlation coefficient.

In the chosen cell you would see the correlation analysis with indicators.

The correlation analysis shows the strength of the relationship between 2 variables. The calculated correlation matrix takes the following way:

Table 1.Correlation matrix

	Y(Output)	X1(Cons)	X2(Gov.sp)	X3(For.inv)	X4(Dom.inv.)
t					
Y(Output)	1,00				
X1(Cons)	0,97	1,00			
X2(Gov.sp)	0,99	0,98	1,00		
X3(For.inv)	0,80	0,69	0,72	1,00	
X4(Dom.inv	0,69	0,65	0,67	0,57	1,00
	strong positive linear correlattion				

If the coefficient is positive that means that relationship between 2 variables is also positive and vice-a-versa. If coefficient is equal to 0 that means that there is no relationship. But in the range of data, which was chosen, there are no independent variables.

R^2 test

We take R^2 normed as we have more than 1 variable in the model. R^2 normed is equal to 0,995 and it shows that 99,5 % of Output is explained by values of Consumption, Government spending, Foreign investment, Domestic investment.[6]

Here we can see that R^2 is close to 1, which means that independent variables describe Y by linear regression model.

F test

The next test is for checking non-randomness of R^2.We should make F-test to see whether quality of specification of a model is high or low. F critical=3,06. 3,06< 964,36 – then R2 is not random and quality of specification is high.

T test

The test for checking of significance of coefficients. T critical = 2,13. If $|t| > t_{crit}$ then coefficient is significant. Now, we compare t-statistics and t critical:

$|T| > T$ crit

As a result I conclude that, as

$A_0 = 4{,}24$, $|4{,}24| > 2{,}13$, A_0 is significant, $A_1 = 2{,}58$, $|2{,}58| > 2{,}13$, A_1 is significant, $A_2 = 8{,}46$, $|8{,}46| > 2{,}13$, A_2 is significant, $A_3 = 8{,}26$, $|8{,}26| > 2{,}13$, A_3 is significant

$A_4 = 0{,}70$, $|0{,}70| < 2{,}4$, A_4 is significant

We apply **Goldfield – Quant test**. As a result of this test, we find out, if the residuals are homoscedastic or not and if we may use ordinary square to estimate parameters. [2]

$$GQ = \frac{SS_1}{SS_2} = 0{,}57;$$

$$1/GQ = 1{,}74$$

In the model we obtained $F_{critGQ} = 19{,}25$, as we can see $0{,}57 < 19{,}25$ and $1{,}74 < 19{,}25$ so residuals in this model are homoscedastic and we can use ordinary square to estimate parameters of coefficients of the model.

To calculate DW constant this formula was used

$$DW = \frac{\sum(e_t - e_{t-1})^2}{\sum e_t^2} = 1{,}45$$

There are 4 coefficients and sample size 21. Using table of values for Durbin-Watson criteria we find values dl=0,93 and du=1,81. DW is in the interval between dl and dw, so we can`t say reject or not the null hypothesis.

Conclusion.

Conclusion In macroeconomic models the consumption function tracks total aggregate consumption expenditures; for simplicity it is assumed to depend on a

basic subset of the factors economists believe are important at the household level. Analysis of consumption expenditure is important for understanding short-term (business cycle) fluctuations and for examining long-run issues such as the level of interest rates and the size of the capital stock (the amount of buildings, machinery, and other reproducible assets useful in producing goods and services). [3]We have tested our model by some tests, so we can say that there is strong positive linear relationship between output and consumption, output and government spending, output and foreign investments, output and domestic investments, consumption and government spending, consumption and foreign investments, consumption and domestic investments, government spending and foreign investments, government spending and domestic investments, foreign investments and domestic investments, we found that variance of X explains variance of Y by 99,5% and checked R^2 using the F-test, and found that it is not random, we got the results of the t-test. Moreover we made GQ test and DW test and found out that residuals in this model are homoscedastic and we can use ordinary square to estimate parameters of coefficients of the model, moreover DW is in the interval between dl and dw, so we can`t say reject or not the null hypothesis.

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