Секция «9. Количественные методы и информационные технологии в финансах и экономике»

Forecasting China's GDP

Кагермазова Диана Аслановна

Финансовый университет при Правительстве РФ, международный финансовый, Москва, Россия
E-mail: lesken2006@rambler.ru

Научный руководитель
д. э. н. Трегуб Илона Владимировна

This creative research explains an econometric model that concerns GDP (Gross Domestic Product) and shows how a number of factors affect it . China is taken as a country under the consideration, because my specialization is international finance relationship with China and I am really interested in China's economy. **GDP (Gross Domestic Product)** – is the monetary value of all the finished goods and services produced within a country's borders in a specific time period, though GDP is usually calculated on an annual basis. It includes all of private and public consumption, government outlays, investments and exports less imports that occur within a defined territory. China's reemergence as a major power in the world economy is one of the most significant developments in modern history .Underpinned by economic reforms and the "open door" policy, the Chinese economy has performed extraordinarily over nearly three decades. The Chinese economy is now the fourth largest in the world and its macroeconomic performance remains strong. China has become a major destination for foreign direct investment and a trading nation of global rank, with an increasing share of high-technology products in its export structure. A significant and continuing increase in income per capita and an impressive reduction in poverty levels imply huge domestic demand for goods and services. According to this data we can conclude that FDI, GDP and other factors have a great role in the economy and policy of the country. China's innovation policy and success story are one of the most relevant topics in today' economy. **Determination of variables** The first stage of my research is collecting statistical data. I am going to describe in details the variables I took for the construction of my model. According to the data I managed to find, I decided to take a period from 1991-2010. I collected data from the Worldbank' site. (http://databank.worldbank.org/data/views/reports/tableview.aspx?
We have two types of variables : endogenous and exogenous, they are endogenous variable (Y) an internal variable of a model in my model is *GDP* is the market value of all officially recognized final goods and services produced within a country in a given period of time. exogenous variables (X_1, X_2, X_3, X_4) external variables of my model variable : *Foreign direct investment (FDI)*- is direct investment into production in a country by a company in another country, either by buying a company in the target country or by expanding operations of an existing business in that country. *Gross Domestic Income (GDI)* is the total income received by all sectors of an economy within a nation. *Growth rate* - the amount of increase that a specific variable has gained within a specific period and context. *Consumption* – number of all final goods consumed by economy during the period **Then we get an econometric model where:** Y – GDP in bln USD Independent variables

X_1– FDI in millions of USD X_2 – GDI in bln of USD X_3– Growth rate in X_4 – Consumption in bln of USD. *Correlation analysis .* After having collected al data, next step is to find the correlation coefficient which may indicate that 2 variables are associated with one another. **Specification of estimated model** R^2*=0,999;* $F_{stat.}$*=2949,37;* $F_{cr.}$*= 2,93* ***Goldfeld-Quandt test*** Next step is Goldfeld-Quandt test that checks the estimated model for homoscedasticity. **Durbin-Watson (DW)** => the value of the Durbin-Watson statistic for the final estimated model is: According to the upper described DW analysis I found out that my DW is lying in the yellow zone, that means there is no autocorrelation in the sample. **Confidence intervals** The last step in our analysis is to find out whether the estimated model is adequate and good for forecasting, let's construct the confidence interval and check whether the real value of Y in 2010, which equals 3838,00 , belongs to this interval. Thus, the boundaries of the confidence interval are: One can easily check that It follows that the real value of Y in 2010 belongs to the confidence interval, so the model is adequate and may be used for forecasting. Error approximation Forecasting. If we suppose that in 2013 Growth rate would be 8.1 Consumption 25970,1 bln $and FDI 280072,2 mln$ than GDP will be equal to China's economy As far as inflows are concerned, we can say that their share is also rapidly growing. A lot of russian companies invest money abroad, a lot of people working here send their wages to the relatives in other countries. But it is worth mentioning that the growing amount of external debt will only increase outflow of investments. None country can be attractive if it has a large money debt. Then if government starts promoting private sector in our country then the amount of FDI will increase – other country residents will have a desire to invest into Russia. So, I think that the best way to increase inward FDI it is to promote private sector, to reduce external debt and to create limitations on employment of foreigners in order to decrease remittances. **Interpretation of coefficients** Now I am going to find out the economic meaning of the final estimated model by interpreting its coefficients. According to the final estimated model: If FDI go up by 1 bln dollars, GDP falls by mln (negative dependence) If GDI rises by 1 bln, then GDP rises 16,4 mln (positive dependence) If growth rate grows by 1 dependence) If consumption rises by 1 bln , GDP rises by 19,7 mln (positive dependence)

Литература

1. 1. http://www.oecd.org/
2. 2. Трегуб И.В «Математические модели динамики экономических систем» Москва 2009
3. 3. http://databank.worldbank.org
4. 4. http://www.stats.gov.cn/english/statisticaldata/

Иллюстрации

Specification of the model .

$$Y_t = -0{,}0016 \cdot x_{1_t} + 0.16 \cdot x_{2_t} + 22{,}09 \cdot x_{3_t} + 0{,}02 \cdot x_{4_t} + \varepsilon_t$$

$$(58{,}70) \quad (0{,}001) \quad (0{,}005) \quad (4{,}729) \quad (0{,}001)$$

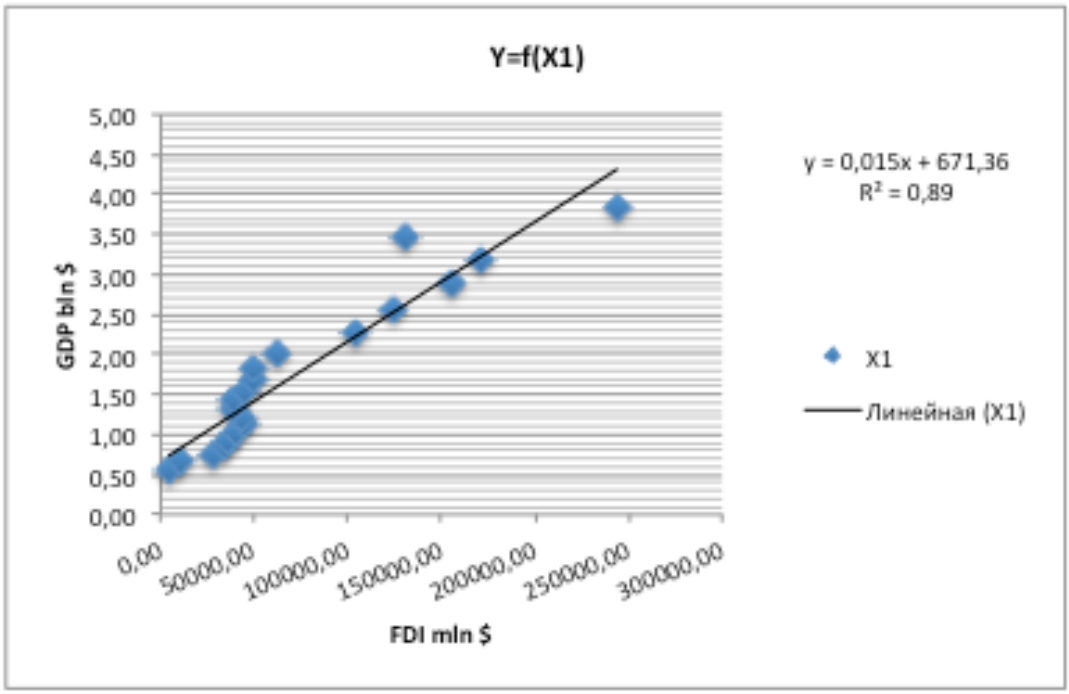
$$E(\varepsilon_t) = 0$$

$$\sigma(\varepsilon_t) = \text{const.}$$

$$F = 2949{,}367 \qquad F_{crit} = 2{,}93$$

$$t_{crit} = 2{,}09$$

Рис. 1: Formula



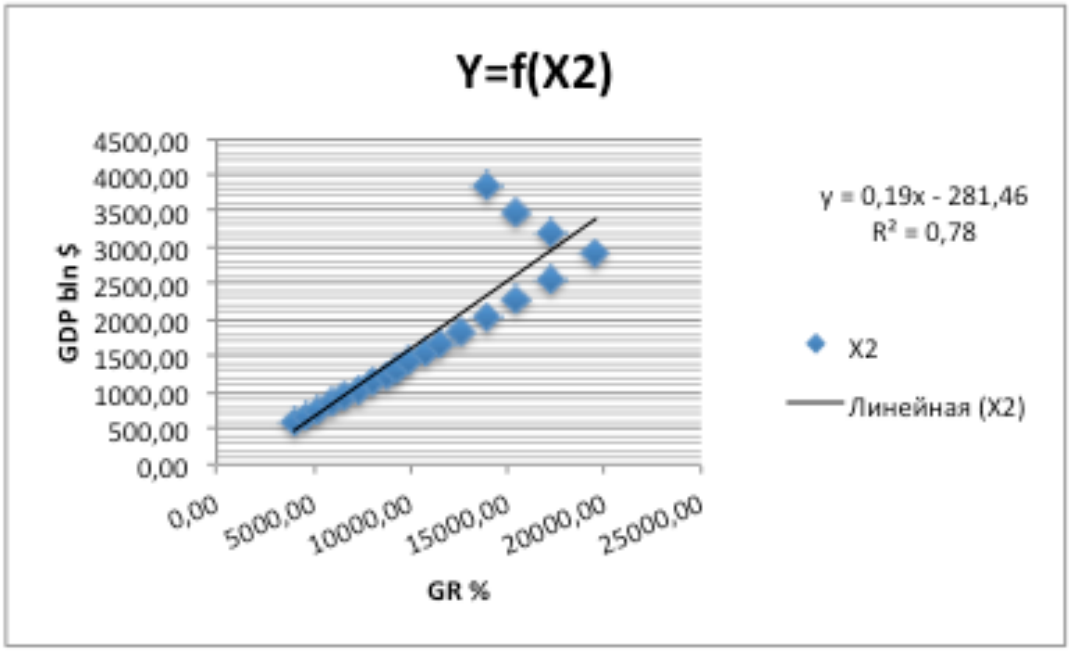
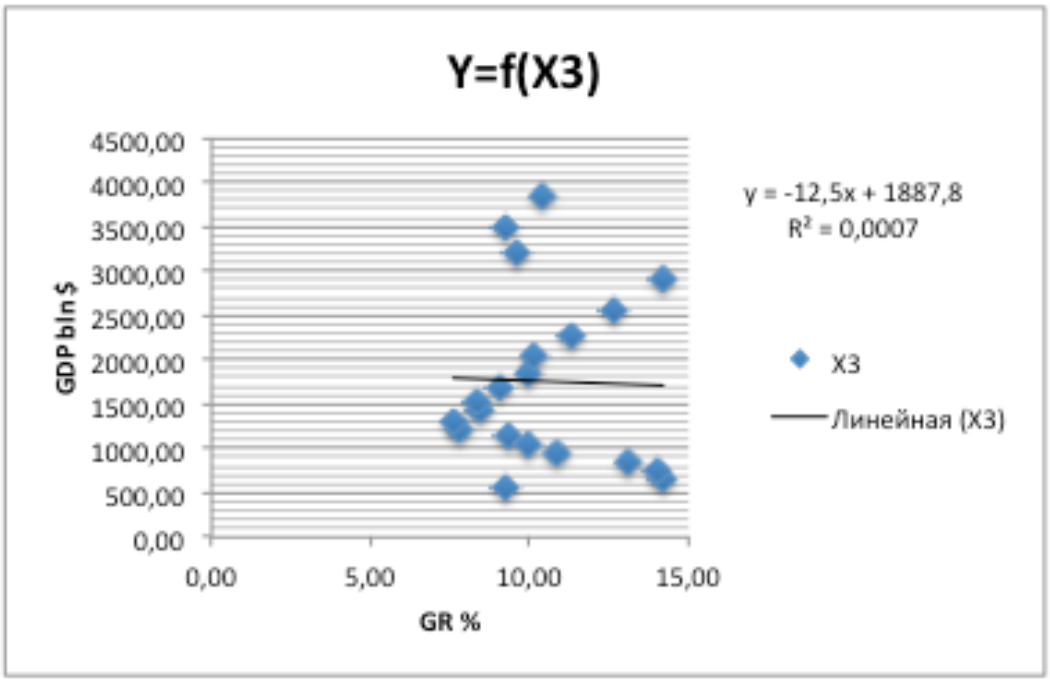


Рис. 2: Scatter Diagrams



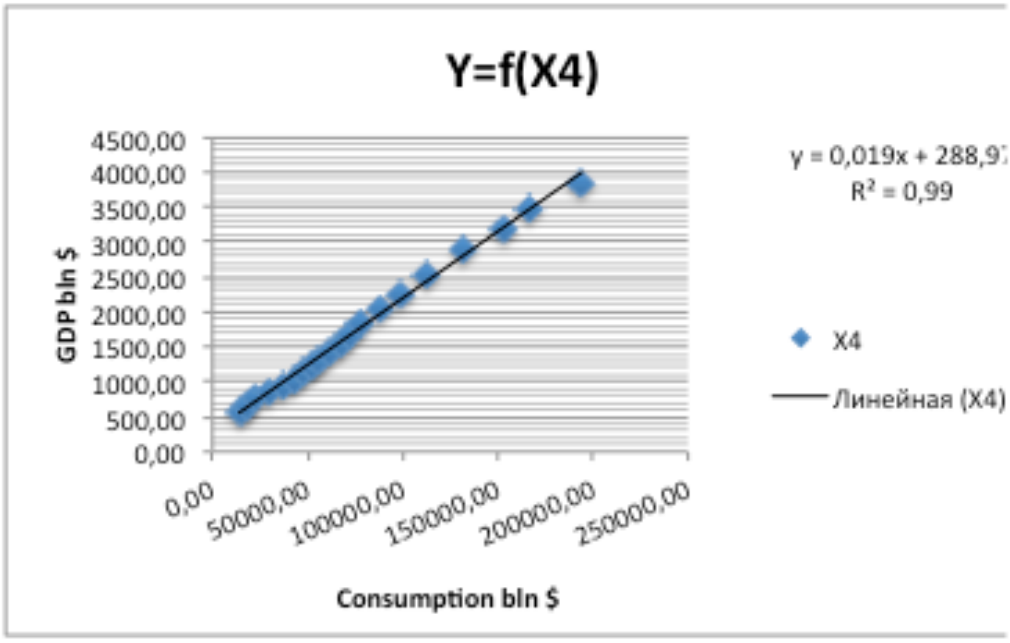


Рис. 3: Scatter Diagrams1

	Y	X1	X2	X3	X4
Y	1,00				
X1	0,95	1,00			
X2	0,89	0,79	1,00		
X3	- 0,03	0,11	0,02	1,00	
X4	1,00	0,95	0,86	- 0,06	1,00

I found it through correl or through function data analysis , function correlation which built me correlation matrix. After this , I built a diagram and here is my results:

X4 vs. Y	0,99747	strong positive linear correlation
X4 vs. X1	0,95181	strong positive linear correlation
X1 vs. Y	0,94563	strong positive linear correlation
X2 vs. Y	0,88509	positive linear correlation
X4 vs. X2	0,86075	positive linear correlation
X2 vs. X1	0,78955	positive linear correlation
X3 vs. X1	0,10501	positive weak correlation
X4 vs. X3	-0,06387	negative weak linear correlation
X3 vs. Y	-0,02696	negative weak linear correlation
X3 vs. X2	0,02075	no correlation

Рис. 4: Matrix