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INDICATOR OF FOOD PRODUCTION IN UZBEKISTAN AND FACTORS AFFECTING IT

Abstract: In the article, we studied the factors influencing the food production index. Factors include agricultural land, per capita expenditure, import volume index, rural population, export volume index and cereal crop yield. These variables are denoted by y and x1,x2,x3,x4,x5,x6 respectively. In addition, the relationship between the residuals was checked using the Heteroscedasticity test and found to be normally distributed. Data for variables were obtained from https://databank.worldbank.org/source/world-development-indicators?l=en.

The relationship between these variables was checked with multicollinearity, and we also checked how reliable the data of the variables was using the STATA 17 program.

Keywords: OLS, regression, correlation, model parameters, model estimation, export volume index, import volume index, agroculture.

Methods and Materials. Building mathematical models based on statistical data representing economic and social processes and using these models to make predictions, we will consider the relevant conclusions on the example of the following problem.

Literature review. Based on a systematic literature review, it takes stock of existing social sustainability indicators, analyses their structure and evolution, and proposes critical considerations for selecting indicators relevant to the current period. Three sub-questions guide this research. First, what indicators exist on the social dimension of sustainability, and how are they defined? Second, how can these indicators be structured according to conceptually and empirically relevant themes? And third, how has the meaning of the main indicators evolved over time? While our first question is straightforward, structuring social indicators (second question) by theme, although seemingly more intuitive, can be risky due to the lack of conceptual clarity when deriving them [1]

Circular resource use in agriculture and food systems could play an important role when aiming for sufficient food output with limited environmental impact and resource depletion. Circularity, however, is not a goal in itself. With respect to nutrient use and emissions, agricultural system sustainability is currently commonly assessed by nutrient output/input ratio (O/I, nutrient use efficiency) or surplus per ha (I–O)[2]

The food security indicators can primarily be grouped into four dimensions represented by the availability of food, access to food, potential utilization and stability of food production. Each of the identified indicators that are independent of each other can be utilised to assign individual values based upon actual statistics and observations available for each country. The projection of these statistical values for evaluating future food security can also be done once the appropriate methodology is available for making projections [3]

Introduction. Food production index is an index that includes all phases of production and consumption related to the food sector in a country or region. Factors influencing this index are:

-Activities in the field of agriculture: Proper and efficient activities in the field of agriculture are of great importance in obtaining food production index. Energy prices: Energy prices affect the index because they increase the amount of energy needed to produce food.

-Transport services: Food transport is one of the important factors affecting food production index. The cost and quality of transportation services can increase or decrease the index of food production.

-Political and economic situation: Political and economic situation is one of the important factors affecting food production index. If the economic situation is good, the food production index will also increase.

-Joint trade: Joint trade is one of the factors affecting food production index. Food export-import can increase or decrease the index.

-Fiscal Policy: Fiscal policy is one of the important factors affecting food production index. If the fiscal policy is good, the index will also increase.

-Demography: Demography is one of the factors influencing food production index. Changes in the number and composition of the population can increase or decrease the index.

- Technological development: Technological development is one of the important factors influencing food production index. If the technological development is good, the index will also increase.

-Tourism activity: Tourism activity is one of the factors affecting food production index. The development of activities in the field of tourism can increase or decrease the index.

In the article, we want to study and analyze other factors affecting food production index. Factors include agricultural land, per capita expenditure, import volume index, rural population, export volume index and cereal crop yield. The data was taken from the World Bank, which studied the data of Uzbekistan for the period from 2003 to 2020. There y=food production index, x1=Agricultural land (%), x2=Expenditure per capita $, x3=Import volume index (2000 = 100), x4=% of rural population, x5=Export volume index, x5=Grain yield (kg per hectare)

Yil	Y	x1	x2	x3	x4	x5	x6
2003	43.59	61.6343601520	15.0751471	93.7985686	52.429	100.292814	3522.4
2004	45.52	61.2224763853	16.5599636	111.327931	51.946	120.379680	3596.1
2005	48.66	60.807756814	18.5837609	114.754813	51.463	118.625261	4042.1

2005	54.3	60.3923368131	21.4218209	131.453918	50.979	111.616691	4103.2
2007	56.05	59.9586223347	27.0282577	178.061288	50.495	145.682170	4396.9
2008	59.08	59.5457913098	34.8361878	238.191658	50.011	150.805094	4285.3
2009	64.11	59.1336063035	40.2692118	234.509710	49.528	182.330261	4553.1
2010	68.9	58.7255558716	53.4781476	219.062830	49.044	157.47343	4434.2
2011	73.94	58.3214206223	63.4045761	241.339903	48.85	139.706935	4414.5
2012	80.17	57.9072969251	71.3737475	279.714610	48.95	129.804959	4597.9
2013	86.92	57.5048934231	78.2416559	313.476190	49.05	144.558919	4746.4
2014	93.08	58.6109332727	53.3899822	335.917682	49.15	144.629185	4806.6
2015	100.51	57.9845665002	63.7842766	299.885148	49.25	136.086054	4835.2
2016	106.41	57.9805306962	70.5774287	303.151333	49.35	134.975874	4827.0
2017	101.18	57.9525543137	52.7453972	310.674899	49.45	138.986859	4298.2
2018	105.11	57.9234067278	49.6840134	426.216918	49.522	134.275291	4102.4
2019	105.23	58.0070592775	56.8701192	545.302953	49.567	180.799234	4533.6
2020	106.96	58.2832179734	64.0036967	498.465745	49.584	166.677777	4481.1

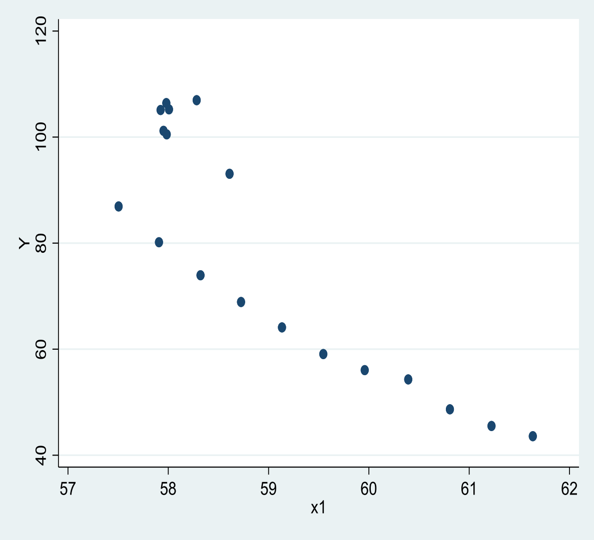
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Yil	18	2011.5	5.339	2003	2020
Y	18	77.762	23.352	43.59	106.96
x1	18	58.994	1.289	57.505	61.634
x2	18	47.296	20.558	15.075	78.242
x3	18	270.85	127.421	93.799	545.303
x4	18	49.923	1.084	48.85	52.429
x5	18	140.984	21.76	100.293	182.33
x6	18	4365.344	381.063	3522.4	4835.2

This table shows the descriptive statistics for seven variables, including the number of observations (Obs), mean, standard deviation (Std. Dev.), minimum value (Min), and maximum value (Max).The variable "yil" represents the year and has 18 observations with a mean of 2011.5 and a standard deviation of 5.339. The minimum value is 2003, and the maximum value is 2020. The variable "y" represents some numerical value and has 18 observations with a mean of 77.762 and a standard deviation of 23.352.

The minimum value is 43.59, and the maximum value is 106.96. The variables x1, x4, x5, and x6 are all numerical values with 18 observations each. x1 has a mean of 58.994 and a standard deviation of 1.289, with a minimum value of 57.505 and a maximum value of 61.634. x4 has a mean of 49.923 and a standard deviation of 1.084, with a minimum value of 48.85 and a maximum value of 52.429. x5 has a mean of 140.984 and a standard deviation of 21.76, with a minimum value of 100.293 and a maximum value of 182.33. x6 has a mean of 4365.344 and a standard deviation of 381.063, with a minimum value of 3522.4 and a maximum value of 4835.2. The variables x2 and x3 are also numerical values with 18 observations each. x2 has a mean of 47.296 and a standard deviation of 20.558, with a minimum value of 15.075 and a maximum value of 78.242. x3 has a mean of 270.85 and a standard deviation of 127.421, with a minimum value of 93.799 and a maximum value of 545.303.

Figure 1 There is a negative relationship between the dependent variables x1 and x4 and y, and this relationship is well correlated. There is a positive correlation between the variables x2 and x3 and y, and there is a good correlation. There is a positive but less significant correlation between variables x5 and x6 and y.



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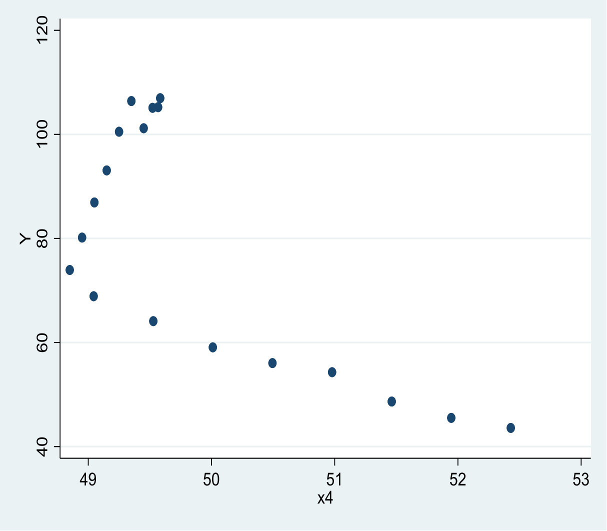

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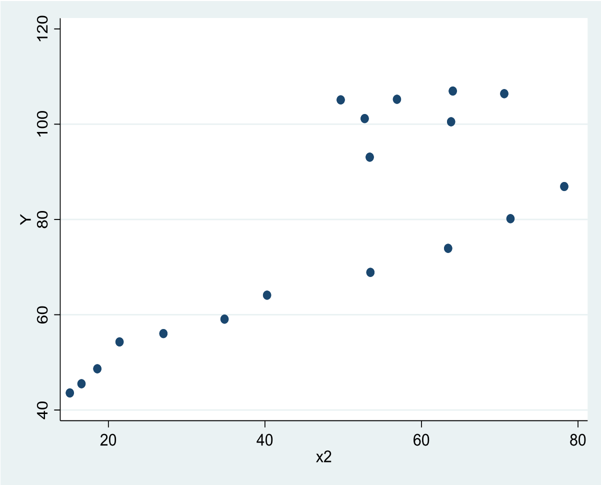
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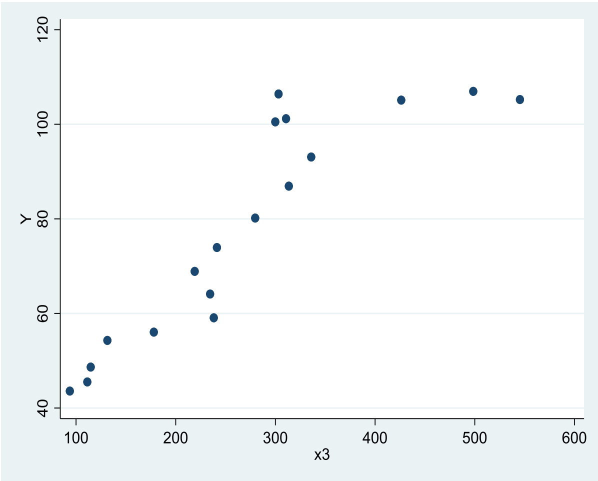
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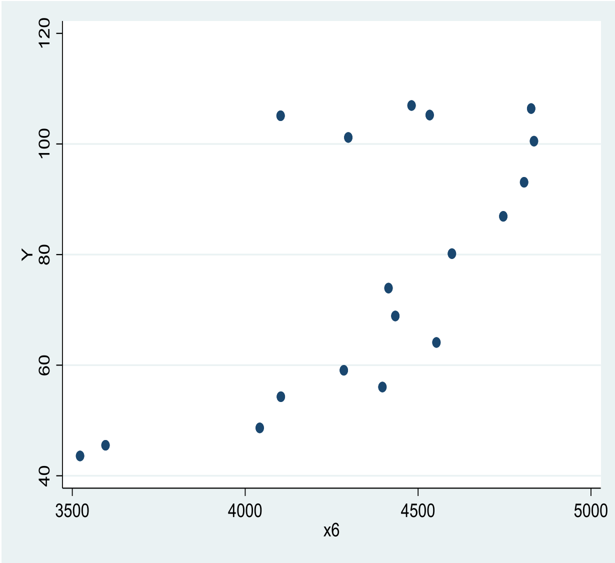


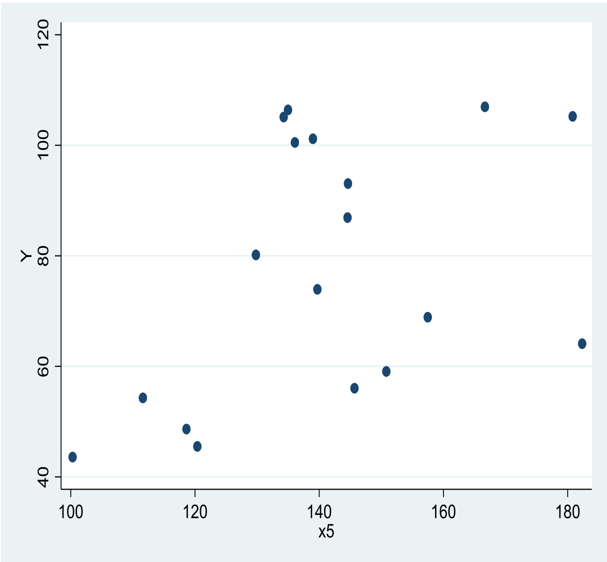
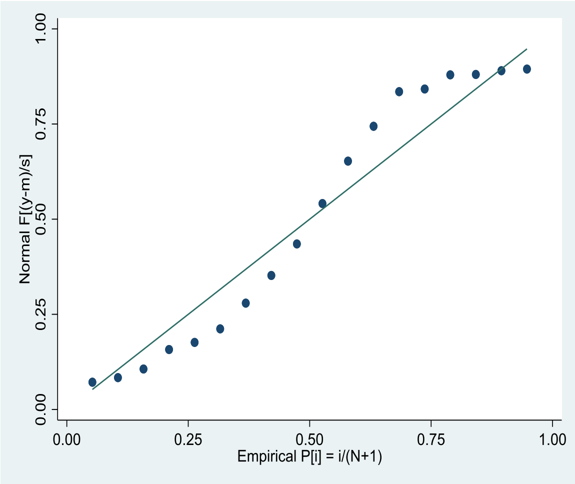
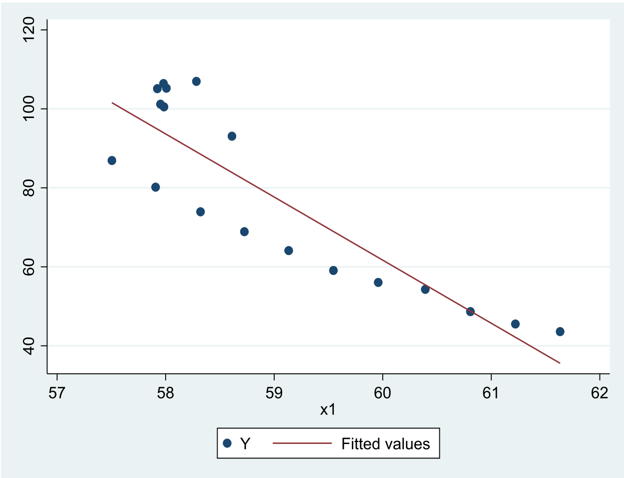


Figure 3 above shows the relationship between x1,x2,x3,x4,x5,x6 and y. It is known from the regression line that these variables are normally distributed.





Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) y	1.000						
(2) x1	-0.882	1.000					
	(0.000)						
(3) x2	0.810	-0.946	1.000				
	(0.000)	(0.000)					
(4) x3	0.891	-0.781	0.688	1.000			
	(0.000)	(0.000)	(0.002)				
(5) x4	-0.727	0.939	-0.895	-0.642	1.000		
	(0.001)	(0.000)	(0.000)	(0.004)			
(6) x5	0.439	-0.534	0.440	0.649	-0.605	1.000	
	(0.068)	(0.022)	(0.068)	(0.004)	(0.008)		
(7) x6	0.665	-0.809	0.813	0.547	-0.863	0.569	1.000
	(0.003)	(0.000)	(0.000)	(0.019)	(0.000)	(0.014)	

This scatterplot shows the relationship between social studies scores and reading scores for a group of students. The dots represent individual students, with their social studies score on the x-axis and their reading score on the y-axis. The line of best fit (lfit) is also shown, which represents the trend in the data. The pairwise correlations table below the plot shows the strength and direction of the correlation between each variable. For example, there is a strong negative correlation (-0.882) between social studies scores (x1) and reading scores (y), meaning that as social studies scores increase, reading scores tend to decrease. Conversely, there is a strong positive correlation (0.810) between social studies scores (x1) and another variable, x2. Overall, this scatterplot and correlation table provide a visual and numerical summary of the relationship between social studies and reading scores in this group of students.

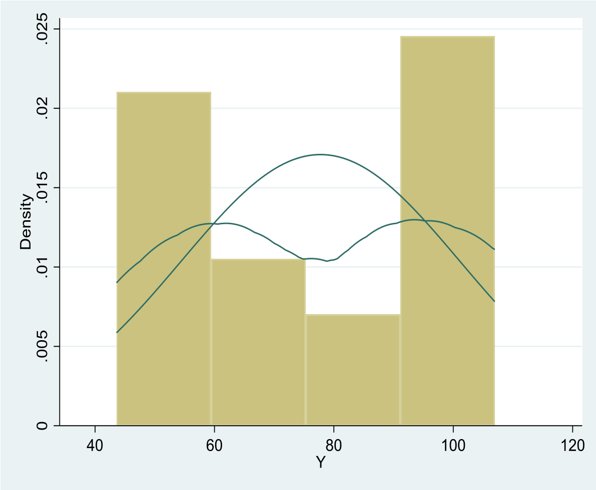
Spearman's rank correlation coefficients

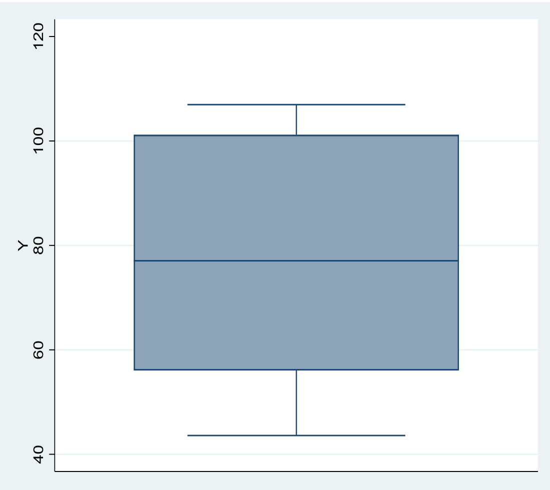
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) y	1.000						
(2) x1	-0.810	1.000					
(3) x2	0.765	-0.856	1.000				
(4) x3	0.936	-0.800	0.711	1.000			
(5) x4	-0.523	0.738	-0.810	-0.501	1.000		
(6) x5	0.414	-0.207	0.354	0.478	-0.300	1.000	
(7) x6	0.631	-0.628	0.825	0.577	-0.701	0.459	1.000

Spearman rho = 0.459

The Spearman's rank correlation coefficient for the relationship between social studies scores and reading scores is 0.459. This indicates a moderate positive correlation between the two variables, meaning that as social studies scores increase, reading scores tend to increase as well, but not strongly. It is important to note that this correlation coefficient is different from the Pearson correlation coefficient mentioned in the previous paragraph, as Spearman's rank correlation coefficient measures the strength and direction of the relationship between two variables based on their ranks rather than their actual values.

Figure2 The graph show s that the given variables are not normally distributed. According to the box plot, 75% of the data is between 50 and 100.





Linear regression

Y	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
x1	-15.652	7.889	-1.98	.073	-33.015	1.711	*
x2	-.202	.282	-0.72	.488	-.823	.419	
x3	.112	.034	3.30	.007	.037	.186	***
x4	8.084	7.145	1.13	.282	-7.642	23.81	
x5	-.269	.146	-1.85	.092	-.59	.052	*
x6	.015	.01	1.57	.146	-.006	.036	
Constant	549.702	328.479	1.67	.122	-173.275	1272.679	

Mean dependent var	77.762	SD dependent var	23.352
R-squared	0.940	Number of obs	18
F-test	28.660	Prob > F	0.000
Akaike crit. (AIC)	126.873	Bayesian crit. (BIC)	133.105

*** p<.01, ** p<.05, * p<.1

This is the output of a linear regression model with y as the dependent variable and x1, x2, x3, x4, x5, and x6 as the independent variables. The table shows the coefficients, standard errors, t-values, p-values, and confidence intervals for each independent variable, as well as the constant term. The mean and standard deviation of the dependent variable, R-squared value, number of observations, F-test statistic, and AIC and BIC values are also provided. The significance levels for each coefficient are indicated by asterisks (*, **, or ***) based on their p-values.

Test scale = mean(unstandardized items)
Reversed items: x1 x4
Average interitem covariance: 2462.005
Number of items in the scale: 7
Scale reliability coefficient: 0.4530

The Shapiro-Wilk test is a statistical test used to determine whether a data set is normally distributed or not. It tests the null hypothesis that a sample comes from a normally distributed population. The test calculates a W statistic, which measures the degree of deviation from normality, and compares it to critical values to determine whether to reject or fail to reject the null hypothesis. A p-value is also calculated, which indicates the probability of obtaining the observed W statistic or a more extreme value if the null hypothesis is true. If the p-value is less than the significance level , the null hypothesis is rejected and the data is considered non-normal.

ShapiroвЂ“Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z

y	18	0.894	2.325	1.689	0.046
x1	18	0.866	2.937	2.156	0.016
x2	18	0.923	1.693	1.054	0.146
x3	18	0.940	1.321	0.557	0.289
x4	18	0.825	3.841	2.694	0.004
x5	18	0.969	0.687	-0.753	0.774
x6	18	0.914	1.883	1.267	0.103

The Shapiro-Wilk test is a statistical test used to determine whether a data set is normally distributed or not. It tests the null hypothesis that a sample comes from a normally distributed population. The test calculates a W statistic, which measures the degree of deviation from normality, and compares it to critical values to determine whether to reject or fail to reject the null hypothesis. A p-value is also calculated, which indicates the probability of obtaining the observed W statistic or a more extreme value if the null hypothesis is true. If the p-value is less than the significance level (usually 0.05), the null hypothesis is rejected and the data is considered non-normal.

VIF	1/VIF
34.710	0.029
20.140	0.050
11.290	0.089
6.230	0.160
4.430	0.226
3.380	0.296
13.360	

The VIF (Variance Inflation Factor) is a measure of how much the variance of the estimated regression coefficient is increased due to multicollinearity in the data. A VIF value of 1 indicates no multicollinearity, while values above 5 or 10 are often considered problematic. The 1/VIF column shows the degree to which the standard errors of the regression coefficients are reduced when the variable is removed from the model. In general, variables with high VIF values and low 1/VIF values should be considered for removal from the model to improve its accuracy and reduce multicollinearity. However, it is important to also consider the theoretical importance and relevance of each variable before removing them from the model

VIF	1/VIF
1.950	0.513
1.880	0.532
1.610	0.622
1.810	

.. 0.552

In this example, all variables have relatively low VIF values, indicating less multicollinearity in the model. The variable with the highest VIF value is 1.950, but its corresponding 1/VIF value of 0.513 suggests that removing this variable may not have a significant impact on reducing multicollinearity. The other variables have even lower VIF values and higher 1/VIF values, indicating their potential importance in the model. Overall, the model appears to have low levels of multicollinearity, which is a good indication for its accuracy and reliability.

We remove the variables x1,x2, and x4 from the model because these variables cause the problem of multicollinearity. According to the VIF analysis, the value went above 10.

Conditional marginal effects	Number of obs = 18
Model VCE: OLS	
Expression: Linear prediction, predict()	

dy/dx wrt: x3 x5 x6

At: x3 = 270.8503 (mean)

x5 = 140.9837 (mean)

x6 = 4365.344 (mean)

		Delta-method						
	dy/dx	std.	err.	t	P>t	[95%	conf.	inte
x3	0.171	0.020	8.550	0.000	0.128	0.214		
x5	-0.404	0.119	-3.390	0.004	-0.660	-0.148		
x6	0.023	0.006	3.650	0.003	0.009	0.036		

These conditional marginal effects show how the predicted value of the response variable changes when each predictor variable is increased by one unit, holding all other variables constant at their mean values. In this example, an increase of one unit in x3 (which has a mean value of 270.8503) is associated with an increase of 0.171 in the predicted value of the response variable. An increase of one unit in x5 (which has a mean value of 140.9837) is associated with a decrease of 0.404 in the predicted value of the response variable. And an increase of one unit in x6 (which has a mean value of 4365.344) is associated with an increase of 0.023 in the predicted value of the response variable. The standard errors, t-values, and p-values indicate whether these effects are statistically significant. In this case, the effect of x3 is highly significant (p<0.001), while the effects of x5 and x6 are also significant (p=0.004 and p=0.003, respectively). The confidence intervals provide a range of plausible values for the true effect sizes, based on the observed data. Overall, these results suggest that x3 has the strongest positive association with the response variable, while x5 has a negative association and x6 has a weaker positive association.

ShapiroвЂ“Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
yhat	18	0.942	1.273	0.483	0.315

Based on the provided information, it appears that the Shapiro-Wilk W test was performed on a variable called "yhat" with 18 observations. The results show that the W statistic is 0.942 and the test statistic V is 1.273. The z-score is 0.483 and the p-value is 0.315. However, it is still unclear what "hist yhat,kdensity norm" refers to in relation to this information. It is possible that it could be related to the method or software used to perform the test, but more context is needed to provide a definitive answer.

Shapirob“Wilk W test for normal data

Variable	Obs	W	V	Z	Prob>z
ehat	18	0.914	1.882	1.265	0.103

Based on the provided information, it appears that the Shapiro-Wilk W test was performed on a variable called "ehat" with 18 observations. The results show that the W statistic is 0.914 and the test statistic V is 1.882. The z-score is 1.265 and the p-value is 0.103. Again, it is unclear what "hist yhat,kdensity norm" refers to in relation to this information. It is possible that it could be related to the method or software used to perform the test, but more context is needed to provide a definitive answer.

BreuschвЂ“Pagan/CookвЂ“Weisberg test for heteroskedasticity

Assumption: Normal error terms

Variable: Fitted values of y

H0: Constant variance

chi2(1) = 0.64

Prob > chi2 = 0.4243

Linear regression

Lny	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
x3	.002	0	8.28	0	.002	.003	**
x5	-.005	.002	-3.10	.008	-.008	-.001	**
x6	0	0	4.60	0	0	.001	**
Constant	2.792	.308	9.05	0	2.13	3.454	**

Mean dependent var	4.307	SD dependent var	0.319
R-squared	0.920	Number of obs	18
F-test	53.928	Prob > F	0.000
Akaike crit. (AIC)	-28.597	Bayesian crit. (BIC)	-25.035

**** p<.01, ** p<.05, * p<.1*

This is the output of a linear regression model with the dependent variable "lny" and four independent variables (x3, x5, x6, and a constant). The coefficients, standard errors, t-values, and p-values are provided for each independent variable. The results show that x3 and x6 have significant positive effects on the dependent variable at the 1% level, while x5 has a significant negative effect at the 5% level. The constant is also significant at the 1% level. The R-squared value indicates that the model explains 92% of the variation in the dependent variable. The F-test and associated p-value suggest that the overall model is significant at the 1% level.The Akaike and Bayesian information criteria (AIC and BIC) are measures of model fit that take into account both the goodness of fit and the complexity of the model. Lower values indicate better fit, and the values provided here suggest that this model fits well. The asterisks below each coefficient indicate the level of significance, with *** indicating significance at the 1% level, ** indicating significance at the 5% level, and * indicating significance at the 10% level.

Linear regression

Lny							
	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
x3	.002	0	8	0	.002	.003	
			.78				**
x5	-.005	.001	-	.	-.008	-.002	
			3.72	002			**
x6	0	0	5	0	0	.001	
			.85				**
Constant	2.79	.225	1	0	2.30	3.27	
	2		2.38		8	6	**

Mean dependent var	4.307	SD dependent var	0.319
R-squared	0.920	Number of obs	18
F-test	104.982	Prob > F	0.000
Akaike crit. (AIC)	-28.597	Bayesian crit. (BIC)	-25.035

*** *p<.01*, ** *p<.05*, * *p<.1*

This linear regression model estimates the relationship between the natural logarithm of the dependent variable (lny) and three independent variables (x3, x5, and x6). The coefficients for x3, x5, and x6 are 0.002, -0.005, and 0, respectively. The t-values for x3, x5, and x6 are 8.78, -3.72, and 5.85, respectively, with corresponding p-values of 0, 0.002, and 0. The constant term is 2.792 with a standard error of 0.225, a t-value of 12.38, and a p-value of 0.The R-squared value for this model is 0.92, indicating that the independent variables explain 92% of the variation in the dependent variable. The F-test has a value of 104.982 with a p-value of 0, indicating that the model as a whole is statistically significant. The Akaike criterion (AIC) and Bayesian criterion (BIC) are -28.597 and -25.035, respectively. These values can be used to compare this model with other models to determine which one is the best fit for the data. The significance levels for the coefficients are indicated by asterisks (*). In this case, all three independent variables are statistically significant at the p<0.01 level.

Linear regression

Y	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
x3	.171	.016	1	0	.137	.205	
			0.81				**
x5	-.404	.107	-	.	-.632	-.175	
			3.79	002			**
x6	.023	.006	4	.	.011	.035	
			.02	001			**
Constant	-	17.3	-	.	-	27.0	
	10.135	49	0.58	568	47.345	74	

Mean dependent var	77.762	SD dependent var	23.352
R-squared	0.911	Number of obs	18
F-test	86.683	Prob > F	0.000
Akaike crit. (AIC)	127.875	Bayesian crit. (BIC)	131.436

*** *p<.01, ** p<.05, * p<.1*

Linear regression

Lny	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
x3	.002	0	8	0	.002	.003	
			.28				**
x5	-.005	.002	-	.	-.008	-.001	
			3.10	008			**
x6	0	0	4	0	0	.001	
			.60				**
Constant	2.79	.308	9	0	2.13	3.45	
	2		.05			4	**

Mean dependent var	4.307	SD dependent var	0.319
R-squared	0.920	Number of obs	18
F-test	53.928	Prob > F	0.000

Akaike crit. (AIC)	-28.597	Bayesian crit. (BIC)	-25.035

*** *p<.01, ** p<.05, * p<.1*

This linear regression model has three independent variables (x3, x5, and x6) that are all statistically significant at the p<0.01 level. The coefficients for x3, x5, and x6 are 0.002, -0.005, and 0, respectively. The R-squared value is 0.92, indicating that the independent variables explain 92% of the variation in the dependent variable. The F-test has a value of 104.982 with a p-value of 0, indicating that the model as a whole is statistically significant. The Akaike criterion (AIC) and Bayesian criterion (BIC) are -28.597 and -25.035, respectively, which can be used to compare this model with other models to determine which one is the best fit for the data.

Conditional marginal effects Number of obs = 18

Model VCE: OLS

Expression: Linear prediction, predict()

dy/dx wrt: x3 x5 x6

At: x3 = 270.8503 (mean)

x5 = 140.9837 (mean)

x6 = 4365.344 (mean)

Delta-method

	dy/dx	std. err.	T	P>t	[95%	conf.	inter
x3	0.002	0.000	8.280	0.000	0.002	0.003	
x5	-0.005	0.002	-3.100	0.008	-0.008	-0.001	

x6	0.000	0.000	4.600	0.000	0.000	0.001

This output shows the conditional marginal effects of the three independent variables (x3, x5, and x6) on the dependent variable, holding all other variables constant at their mean values. For example, for a one-unit increase in x3 (keeping x5 and x6 constant), the predicted value of the dependent variable increases by 0.002 units. The standard errors, t-values, and p-values are also provided to assess the significance of these effects. Overall, this model suggests that x3 has a positive effect on the dependent variable, while x5 has a negative effect. X6 does not appear to have a significant effect. However, it's important to keep in mind that these effects are conditional on the other variables being held constant at their mean values. The coefficients and effects may change if the values of the other variables change.

Variable	Ols	Robust	Ln	margins
x3	0.002***	0.171***	0.002***	0.002***
x5	-0.005**	-0.404**	-0.005**	-0.005**
x6	0.000***	0.023**	0.000***	0.000***
_cons	2.792***	-10.135	2.792***	2.792***

Legend: * p<.05; ** p<.01; *** p<.001

Conclusion

The output shows the regression coefficients and associated statistics for a linear regression model. The "ols" column shows the coefficients estimated using ordinary least squares regression, while the "robust" column shows the coefficients estimated using a robust regression method that is less sensitive to outliers. The "ln" column shows the coefficients estimated using a logarithmic transformation of the dependent variable. The "margins" column shows the marginal effects of each independent variable on the dependent variable, holding all other variables constant at their mean values. These effects are estimated using the "margins" command in Stata. The legend at the bottom of the output indicates the level of statistical significance for each coefficient, based on the p-value. A p-value less than .05 indicates that the coefficient is statistically significant at the 5% level, while a p-value less than .01 indicates significance at the 1% level, and so on. The most optimal models are OLS, margins, Ln models, because their p-value was 0.001. Thus, we can construct regression equations as follows. Linear regression model.

$$y=-10.135+0.002x3-0.404x5+0.023x6$$

1% increase in the import index increases the food production index by 0.002. 1% increase in the export volume decreases the food production index by 0.404. 1% increase in cereal yield increases the food production index by 0.023.

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