МЕДИЦИНА, ПЕДАГОГИКА И ТЕХНОЛОГИЯ: ТЕОРИЯ И ПРАКТИКА
Researchbib Impact factor: 11.79/2023
SJIF 2024 = 5.444
Том 2, Выпуск 7, 31 Июль

ECONOMETRIC ASSESSMENT OF THE EFFECT OF INVESTMENTS ON THE VOLUME OF CONSTRUCTION PRODUCTION

R.A. Khurramov
Teacher of Termiz State University

Abstract. In this article, a regression analysis of the impact of investments on the volume of construction production was carried out. Conclusions about short-term and long-term changes were made by creating an autoregression model.

Key words: model, autoregression, regression equation, Student t test, Fisher, instrumental variable.

In order to assess the impact of investments on the volume of construction production of Surkhondarya region, data for 2010-2023 were obtained from www.surkhonstat.uz (Table 1).

Table 1

Construction production and investment volume indicators of Surkhandarya region[1]

Year	*y*	*x*	*Year*	*y*	*x*
2010	335,9	655,3	2017	1 827,0	3 551,0
2011	470,6	802,9	2018	2 879,7	7 240,6
2012	605,3	980,3	2019	3 979,7	11 835,1
2013	849,5	1 371,0	2020	4 774,7	10 068,2
2014	1 051,5	1 509,1	2021	5 868,4	12 037,8
2015	1 351,3	1 843,6	2022	6 521,9	11 569,4
2016	1 554,8	2 142,4	2023	7 353,3	17 956,0

Autoregression models are useful in assessing the short-term and long-term impact of investments on the volume of construction production. The general appearance of the $AR(1) + x$ model is as follows:

$$y_t = a + b_0 \cdot x_t + c_1 \cdot y_{t-1} + e_t \qquad (1)$$

To calculate model (1), it is necessary to first create a model that evaluates the instrumental variable:

[1] Information from the Surkhandarya Region Statistics Department website www.surkhonstat.uz

$$\hat{y}_{t-1} = d_0 + d_1 \cdot x_{t-1} \quad (2)$$

To estimate the model (2), we need to determine the lags of the y_t and factor indicators for the period t-1 (Table 2).

Table 2

Values of the indicators of the volume of construction production and investments in fixed capital of Surkhandarya region in the period $t-1$[2]

Year	y_t	x_t	y_{t-1}	x_{t-1}
2010	335,9	655,3	-	-
2011	470,6	802,9	335,9	655,3
2012	605,3	980,3	470,6	802,9
2013	849,5	1 371,0	605,3	980,3
2014	1 051,5	1 509,1	849,5	1 371,0
2015	1 351,3	1 843,6	1 051,5	1 509,1
2016	1 554,8	2 142,4	1 351,3	1 843,6
2017	1 827,0	3 551,0	1 554,8	2 142,4
2018	2 879,7	7 240,6	1 827,0	3 551,0
2019	3 979,7	11 835,1	2 879,7	7 240,6
2020	4 774,7	10 068,2	3 979,7	11 835,1
2021	5 868,4	12 037,8	4 774,7	10 068,2
2022	6 521,9	11 569,4	5 868,4	12 037,8
2023	7 353,3	17 956,0	6 521,9	11 569,4

Using the OLS method in the Gretl program, we estimate the form of association of the lag indicators in Table 2 (Table 3).

Table 3

Results of regression analysis[3]

Model 2: OLS, using observations 2011-2023 (T = 13)
Dependent variable: yt1

Coefficient *Std. Error* *t-ratio* *p-value*

[2] Information from the Surkhandarya Region Statistics Department website www.surkhonstat.uz
[3] Development of the author

xt-1	0.464409	0.0256488	18.11	<0.0001	***

Mean dependent var	2466.947	S.D. dependent var	2138.834
Sum squared resid	4731975	S.E. of regression	627.9580
Uncentered R-squared	0.964690	Centered R-squared	0.913800
F(1, 12)	327.8440	P-value(F)	4.44e-10
Log-likelihood	−101.6781	Akaike criterion	205.3562
Schwarz criterion	205.9211	Hannan-Quinn	205.2400
rho	0.444907	Durbin-Watson	1.079236

From Table 3, the general view of the regression equation of the instrumental variable $\hat{y}_{t-1}$ is as follows:

$$\hat{y}_{t-1} = 0{,}464409 \cdot x_{t-1} \qquad (3)$$

The calculated value of Fisher's F criterion is equal to $F_{est} = 327{,}844\ 4$. This value is greater than Fisher's table value $F_{1;12;0,05} = 4.75$ at $\alpha = 0{,}05$ significance level. Also, the value of the Student's t criterion are equal to $t_{d_1} = 18{,}1$, which is greater than the table value of the Student's t criterion $t_{13;0,05} = 2{,}16$ at the degree of freedom $df = n - m = 13$. Therefore, the model is statistically significant.

We determine the theoretical values of the instrumental variable $\hat{y}_{t-1}$. (Table 4).

Table 4

Theoretical values of the instrumental variable[4]

Year	y_t	x_t	y_{t-1}	x_{t-1}	$\hat{y}_{t-1}$
2010	335,9	655,3	-	-	-
2011	470,6	802,9	335,9	655,3	304,3

[4] Information from the Surkhandarya Region Statistics Department website www.surkhonstat.uz

2012	605,3	980,3	470,6	802,9	372,9
2013	849,5	1 371,0	605,3	980,3	455,3
2014	1 051,5	1 509,1	849,5	1 371,0	636,7
2015	1 351,3	1 843,6	1 051,5	1 509,1	700,9
2016	1 554,8	2 142,4	1 351,3	1 843,6	856,2
2017	1 827,0	3 551,0	1 554,8	2 142,4	995,0
2018	2 879,7	7 240,6	1 827,0	3 551,0	1 649,1
2019	3 979,7	11 835,1	2 879,7	7 240,6	3 362,6
2020	4 774,7	10 068,2	3 979,7	11 835,1	5 496,3
2021	5 868,4	12 037,8	4 774,7	10 068,2	4 675,8
2022	6 521,9	11 569,4	5 868,4	12 037,8	5 590,4
2023	7 353,3	17 956,0	6 521,9	11 569,4	5 372,9

It is possible to evaluate the model (1) with the participation of variables y_t, x_t and $\hat{y}_{t-1}$ in Table 4. For this, we again used Gretl's capabilities. (Table 5).

Table 5

Results of regression analysis[5]

Model 2: OLS, using observations 2011-2023 (T = 13)
Dependent variable: y

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	346.814	187.231	1.852	0.0937	*
x	0.216391	0.0574790	3.765	0.0037	***
yt-1_fitted	0.546096	0.149724	3.647	0.0045	***

Mean dependent var	3006.744	S.D. dependent var	2422.853
Sum squared resid	1933064	S.E. of regression	439.6662
R-squared	0.972558	Adjusted R-squared	0.967070
F(2, 10)	177.2045	P-value(F)	1.56e-08
Log-likelihood	−95.85904	Akaike criterion	197.7181
Schwarz criterion	199.4129	Hannan-Quinn	197.3697

[5] Development of the author

rho	0.399093	Durbin-Watson	1.173993

Test for normality of residual -
Null hypothesis: error is normally distributed
Test statistic: Chi-square(2) = 1.99324
with p-value = 0.369125

Based on Table 3, autoregression equation has the following general form:

$$y_t = 346{,}814 + 0{,}216391x_t + 0{,}546096y_{t-1} \quad (4)$$

It can be seen from the model (4) that the short-term multiplier is equal to $b_0 = 0{,}216391$, and the long-term multiplier is equal to $b = \frac{b_o}{1-c} = \frac{0{,}216391}{1-0{,}546096} = 0{,}476733$

In conclusion, an increase in the volume of investments in fixed capital by 1 billion soums increases the volume of construction production by an average of 0.216391 billion soums. An increase of x_t by 1 billion soums increases y_t by 0.546096 billion soums in the long term.

References

1. R.A. Xurramov, (2024). Eksport faoliyatini takomillashtirishning xorijiy mamlakatlar tajribasi. Technical science research in Uzbekistan, 2(2), 154-160.
2. R.A. Xurramov (2024). Eksport va eksport salohiyati tushunchalariga nazariy qarashlar. Journal of Universal Science Research, 2(2), 202-210.
3. R.A. Xurramov (2023). Globallashuv sharoitida hududning eksport salohiyatini yanada takomillashtirish yo'nalishlari. Journal of Universal Science Research, 1(6), 799-803.
4. R.A. Xurramov (2023). Hududning eksport salohiyatini statistik tadqiq qilish va ekonometrik modellashtirish (Surxondaryo viloyati misolida). O'zbekistonda fanlararo innovatsiyalar va ilmiy tadqiqotlar jurnali, 2(20), 767-769.
5. R.A. Xurramov (2022). Ways to further improve the diversification of exports in Surkhandarya region. Web of scientist: international scientific research journal, 3(6), 1597-1600.
6. Ergashevich, T. B. (2022). Issues of sustainability of development trends of the construction materials industry of surkhandarya region. Open Access Repository, 8(12), 426-430.

7. Mamatqulova, S. F., & Turayev, B. E. (2024). Surxondaryoda to'qimachilik mahsulotlarini ishlab chiqarishni arima modeli asosida prognozlash. Journal of Universal Science Research, 2(1), 307-320.

8. Mirzohidovna, P. M., & Turayev, B. E. (2024). Surxondaryo viloyati asosiy kapitalga kiritilgan investitsiyalar hajmini trend modellari orqali modellashtirish. Journal of Universal Science Research, 2(2), 296-302.

9. Субханова, М. А., & Тураев, Б. Э. (2024). Корреляционно-регрессионный анализ ликвидности коммерческих банков. Multidisciplinary Journal of Science and Technology, 4(3), 38-43.

10. Tulaganova, M. H., & Turayev, B. E. (2024). Asosiy kapitalga kiritilgan investitsiyalarni trend modellari yordamida prognozlash (Surxondaryo viloyati misolida). Technical science research in Uzbekistan, 2(2), 223-230.

11. Тураев, Б. (2021). Корреляционно-регрессионный анализ доли строительных работ в валовом региональном продукте Сурхандарьинской области. Экономика и инновационные технологии, (6), 205-214.

12. Тураев, Б. Э. (2022). Моделирование изменения цен в промышленности строительных материалов (на примере Сурхандарьинской области). In Современные тенденции развития финансово-банковского сектора в условиях экономической неопределенности (pp. 71-75).

13. Тўраев, Б. Э., & Хатамов, О. Қ. Арима модели ёрдамида курилиш ишлари ҳажмини прогноз қилиш (Сурхондарё вилоятида мисолида).“. UzBridge” электрон журнали, 74-84.

14. To'rayev, B. E. (2024). Mahalliy byudjet daromadlarini ARIMA modeli asosida prognozlash. Journal of Universal Science Research, 2(1), 141-149.

15. Turaev, B. E. (2021). Forecasting the volume of construction work using the arima model (on the example of Surkhandarya region). Scientific progress, 2(2), 1287-1290.

16. Tuychiyeva, M. K., & Turayev, B. E. (2024). Trend modellari yordamida elektron tijorat aylanmasi hajmini modellashtirish va prognozlashtirish. Technical science research in Uzbekistan, 2(2), 193-199.

17. Xursanova, S. A., & Turayev, B. E. (2024). Hudud dehqonchilik mahsulotlari ishlab chiqarish hajmini trend modellari yordamida prognozlashtirish. Technical science research in Uzbekistan, 2(2), 200-208.

18. The Surkhandarya Region Statistics Department website www.surkhonstat.uz

19. Khurramov, E. X. (2019). ROLE OF INNOVATION IN INCREASING EFFICIENCY OF PRODUCTION OF AGRICULTURAL PRODUCTS IN FORESTRY. *Theoretical & Applied Science*, (10), 518-521.

20. Khidirberdievich, A. E., & Mamadillayevich, Z. S. (2021). Issues of Regulation of Blockchains in the Digital Economy and World Experience in Reducing, Preventing the" Hidden Economy". *International Journal of Multicultural and Multireligious Understanding*, *8*(7), 591-597.

21. Ziyodullaev, S. M. (2023, July). DESCRIPTIVE INDICATORS OF THE LEVEL OF INCOME OF BANKS'ASSETS. In *" ONLINE-CONFERENCES" PLATFORM* (pp. 229-233).

22. Ziyodullaev, S. M. (2023). Commercial banking investment attractive legislation normative-legal basis. *innovative development in the global science*, *2*(6), 10-17.

23. Allayarov, P. (2022). The factors affecting Kyrgyzstan's bilateral trade: a gravity-model approach. *Архив научных исследований*, *4*(1).

24. Mukhammadiyevich, O. S. (2023). Experiences in the study and analysis of population employment in foreign countries. *International Multidisciplinary Journal for Research & Development*, *10*(12).

25. Muhammadiyevich, O. S. (2023). Main problems of population employment and ways to solve them. *American Journal of Science on Integration and Human Development (2993-2750)*, *1*(4), 10-13.

26. Ismatov, S. A., & Ortikov, S. M. (2020). The population bandhini tamines, turmus of regine oshirildi humiliation tagirova and using Uzbekistana characteristic.(foreign experience in providing employment, improving well-being and its specifics for uzbekistan). *Theoretical & Applied Science*, (11), 521-526.

27. Khatamov, O. K., & Ortikov, S. M. (2019). USE FROM THE INTERNATIONAL EXPERIENCES IN EMPLOYMENT THE POPULATION IN UZBEKISTAN. *Theoretical & Applied Science*, (11), 364-371.

28. Ortiqov, S. M., & Mamataliyev, X. B. (2024). ECONOMETRIC ASSESSMENT OF THE EFFECT OF FIXED CAPITAL INVESTMENTS ON THE VOLUME OF AGRICULTURAL PRODUCTION. *Multidisciplinary Journal of Science and Technology*, *4*(4), 110-114.

29. Gulnoza, E. (2024). The status of the population's use of the stock market in Uzbekistan. *Western European Journal of Linguistics and Education*, *2*(4), 145-149.

30. Khassanov, F. O., Khuzhanazarov, U., Rakhimova, N., Esankulov, A., & Achilova, N. (2013). Two new species of Iris L.(Iridaceae Juss.) from Uzbekistan. *Stapfia*, *99*, 1-3.

31. Bozorov, R. K., & Esankulov, A. E. (2019). Practice of analysis of financial stability indicators of major commercial banks in Uzbekistan. *International Journal of Advanced Science and Technology*, *28*(20), 873-880.

32. Eshquvvatov, O. A., & Ilkhamovna, B. T. (2024). CORPORATE ECONOMICS AND INVESTMENTS. *Gospodarka i Innowacje.*, *46*, 145-148.

33. Eshquvvatov, O. A. (2024). ACTIVATION OF THE HUMAN FACTOR IN THE INNOVATIVE ECONOMY. *Multidisciplinary Journal of Science and Technology*, *4*(3), 475-479.

34. Eshquvvatov, O. A. (2024). THE ROLE OF INFORMATION IN THE IMPLEMENTATION OF FOREIGN ECONOMIC ACTIVITY. *Multidisciplinary Journal of Science and Technology*, *4*(3), 470-474.

35. Abdugabbarovna, D. L., & Tokhtayevich, E. S. (2024). PECULIARITIES OF INCREASING THE INCOME OF THE POPULATION IN THE REGION. *Open Access Repository*, *10*(1), 74-77.

36. Abdugabbarovna, D. L., & Samandarovich, I. E. (2024). IMPROVEMENT OF THE ORGANIZATIONAL AND LEGAL BASIS OF MICROFINANCING OF SMALL BUSINESS AND PRIVATE ENTREPRENEURSHIP. *Open Access Repository*, *10*(1), 65-68.

37. Abdugabbarovna, D. L. (2024). PECULIARITIES OF SMALL BUSINESS AND PRIVATE ENTREPRENEURSHIP DEVELOPMENT. *Open Access Repository*, *10*(1), 50-53.

38. Abdugabbarovna, D. L., & Choriyevna, S. N. (2023). THE ROLE OF INVESTMENT AND PREFERENTIAL LOANS IN THE DEVELOPMENT OF SMALL BUSINESS ENTITIES. *Open Access Repository*, *9*(11), 35-38.

39. Solijonovna, S. R. (2021). Export-oriented localization as a key factor in import substitution. *World Bulletin of Social Sciences*, *5*, 36-39.

40. Sobitova, R. N. S. (2020). SCIENTIFIC AND THEORETICAL BASES OF LOCALIZATION OF INDUSTRIAL PRODUCTION. *Theoretical & Applied Science*, (10), 401-406.

41. Sobitova, R. N. S. (2020). LOCALIZATION OF PRODUCTION AS A TOOL OF MODERNIZATION. *Theoretical & Applied Science*, (10), 407-411.

42. Solidjonovna, S. R. (2024). The role of localization of production in the stable and consistent development of the economy. *Web of Scientists and Scholars: Journal of Multidisciplinary Research*, *2*(3), 1-4.

43. Solijonovna, S. R. (2023). Import Replacement-As an Assistant Mechanism for Diversification of Production and Approval of Foreign Trade.

44. Turopova, N., & Abdurahmonov, B. (2024). MARKETING: MARKETING FAOLIYATI SAMARADORLIGINI BAHOLASH USULLARI. *Молодые учены*е, *2*(9), 4-11.

45. Sultonov, X. G. (2022). EFFECTIVENESS OF ATTRACTING INVESTMENTS IN IMPROVING THE ECOLOGICAL CONDITION OF IRRIGATED LANDS. *Экономика и социум*, (4-1 (95)), 56-60.

46. Алтиев, А. С., Очилов, И. С., & Султонов, Х. Ғ. (2021). GLOBAL EXPERIENCES IN IMPROVING THE ECONOMIC MECHANISMS OF IRRIGATED LAND IMPROVEMENT. *Экономика и социум*, (6-1), 418-426.

47. Ibragimov, A., & Sultonov, X. (2019). BIOECOLOGY RARE S'ECIES AND EXTINCTION OF THE SURKHAN STATE NATURAL RESERVOIR. *Scientific Bulletin of Namangan State University*, *1*(2), 77-81.

48. Norqobilov, N. (2020). The role of foreign investment in the development of the economy of Kashkadarya region. *Business Expert*, *1*, 145.

49. Norqobilov, N., & Rasulov, F. (2023). THE ROLE OF SOCIAL PROTECTION IN IMPROVING THE LIVING WELL-BEING OF THE POPULATION. *Multidisciplinary Journal of Science and Technology*, *3*(2), 24-25.

50. Norkobilov, N. N. (2021). Structure and features of expanding investment in the southern region of uzbekistan. *Asian Journal of Research in Social Sciences and Humanities*, *11*(11), 704-709.