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Preface

This book covers key areas of Economics, Business and Management. The contributions by the authors include social event, business model, circular economy, industry hack, smart solution, gamification, ECOWAS treaty, food trade, openness index, trade index, social protection, economics, economic disruptions and agricultural inefficiency, expanded public works programme, macroeconomic variables, stock markets development, panel data analysis, globalization, advanced economies, diversification, product diversification, geographic diversification, capital markets, information asymmetry, balanced scorecard, applied strategic analysis, comparative assessment, variance diagnostic, Corporate social responsibility, physical and natural capital assist, livelihood strategies, fangoa cluster communities, corruption perception index, investment policy, world economy, global investment, shadow economy, growth drivers, retail industry, emerging trends and amalgamation of firms, consumer behavior. This book contains various materials suitable for students, researchers and academicians in the field of Economics, Business and Management.

Chapter 11
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Global Impacts of Corruption Perception Index for the Attractiveness of Foreign Direct Investment

Ikboljon Odashev Mashrabjonovich [a*]

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ABSTRACT

The article examines the correlation between the index of corruption perception and the index of the attractiveness of foreign direct investment in the formation and implementation of state investment policy and the impact of development projects of countries that carry out analytical formulas of multiple regression. And we recognize some important drivers and factors of modelling the problems of foreign direct investment, which associate with attracting into the economy, increasing the attractiveness of its development. At the main part of the investigation, it interpreters of econometric modeling of between the corruption degrees of selected countries and the attractiveness of foreign direct investment. The real examples are given related to corruption and foreign direct investment studied by different scientists of the world. The task is set on how it will determine how much corruption in the world will affect the attractiveness of foreign investors by selected countries.

Keywords: Corruption perception index; investment policy; world economy; global investment; attractiveness; regression; correlation; shadow economy.

"*Integrity, transparency and the fight against corruption have to be part of the culture. They have to be thought as fundamental values*"

Angel Gurria,
OECD Secretary-general

1. INTRODUCTION

Corruption is a pervasive global problem. Christiane Taubira, the former French Justice Minister, when launching the Foreign Bribery Report in 2014, outlined many of the issues and concluded that corruption is *"stealing the future of the world's children"*. This is no exaggeration[1] [1,2].

Today, territorial attractiveness has become an important component of economic policies, and seducing potential investors is now a major objective for all states, seen the positive impact of Foreign Direct Investment (FDI) inflows on the host countries [3,4].

The actuality of calculating the multiple regression analyses on corruption perception association with FDI attractiveness index and shadow economics is linked with the problems of assessment of the real situation and assessment of their criteria between corruption and FDI attractiveness and not enough investigated by world scientists.

Why do we focus on FDI? The answer is very simple – FDI has become an increasingly more important factor in economic growth. This is reflected in the trend over the last several years as

[1] *OECD Working Papers on International Investment 2017/01, Foreign direct investment, corruption and the OECD Anti-Bribery Convention, Adrian Blundell-Wignall, Caroline Roulet*

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countries have increased their reliance on FDI. In 2020, global FDI flows plummeted to $ 846 billion, a 38% decrease compared to 2019. The pandemic accelerated a steady decline and contributed to sinking global FDI flows to their lowest levels since 2005. In 2020, global FDI flows represented only 1% of world GDP, their lowest level since 1999. This decrease represents the lowest level of equity flows in OECD countries seen since 2005, mostly resulting from major divestments from Switzerland and the Netherlands, e.g. sales of existing stakes in companies residing in these two countries by foreign parents and to large decreases in FDI flows in the United States and other OECD countries. Negative intra-company debt flows further accentuated the drop in total FDI flows[2]. Often, the value of FDI flowing into a country exceeds the level of official government aid to that country.[3] In brief, while the value of international trade in goods is still far greater than the value of FDI, FDI plays an increasingly important role [4,1,2].

Developing and transition nations have a particularly strong interest in attracting foreign capital. Domestic savings are often insufficient in these countries to finance their investment needs. Prime Minister Narendra Modi summed this up when he said, at the Asian Infrastructure Investment Bank (AIIB) 2018 Annual Meeting, "As developing economies, we share similar challenges. One of them is to find resources for the provision of infrastructure"[4]. This capital shortage affects both public and private investment. Developing Asia will need to invest $1.7 trillion per year in infrastructure by 2030 to maintain its growth momentum, tackle poverty, and respond to climate change. The report examines how much the region has been investing in infrastructure and what will likely be needed through 2030[5]. Foreign investment is also a key component of privatization schemes in transition economies in Central and Eastern Europe. The privatization process in the Czech Republic, Hungary, Poland, as well as in countries like Slovakia, Bulgaria, and Romania, has actively pursued foreign capital.[6]

Besides, studying territorial attractiveness as a concept entails two approaches that can be considered: A theoretical approach based on Foreign Direct Investment (FDI) determinants and a strategic one based on territory promotion policies. The central issue for the economy of any country is that of increasing its rate of economic growth, a reliable driver of which is the formation and development of a strategy for the sustainable development of territories based on the intensification of investment activities. Developing of any country is determined by solving the problems associated with the formation of effective regional strategies aimed at accelerating economic growth, which is a necessary condition for attracting active foreign investment. In the process of innovation, investment projects in the formation of the production capacity of the regions on a new scientific and technical basis predetermine the competitiveness of the country's regions. Along with solving global problems related to economic and social development, developing of important aspects of the concept of innovation and investment in regional development is an integral part of the modern economy.

2. LITERATURA REVIEW

Previous studies have mainly reported a negative association between corruption levels and country wealth [5,6,7,8]; i.e.,on average richer countries are less corrupt. There is ongoing debate concerning the relationship between corruption and economic growth [9]. Some earlier studies have suggested that corruption may even help the most efficient firms bypass bureaucratic obstacles and rigid laws [10], while recent papers do not find a significant negative association between growth and corruption [5,6]. Most studies have found an insignificant negative association between corruption levels and foreign investments [6,11,12], without reporting a specific functional dependence.

Mathematical models have been actively used during the selection of appropriate development schemes. In the process of the digitalization of the economy, the problems of applying mathematical modelling methods to solving problems of sustainable development are becoming increasingly important. Mathematical modelling of the world economy regarding foreign direct investment,

[2] *OECD: FDI in figures, April 2021.*
[3] *Ibid.*
[4] *Keynote Address, Meeting of the AIIB Board of Governors 2018.*
[5] *Asian Development Bank, Meeting Asia's Infrastructure Needs, February 2017.*
[6] *This topic has been discussed in several publications. For a more recent piece see, for example, Weimer.*

influences of corruption perception has been given attention by researchers such as Makhov [13]. The directions in which the sustainable development of territories based on innovation using foreign direct investment have taken, as well as the application of intelligent decision support methods, are studied in the scientific works of Zakharova [14], and Kolosova & KHavin [15]. According to Badulescu, Bungau & Badulescu [16], the task of introducing a sustainable development model is effective, that of promoting it as the main driving force for sustainability-oriented enterprises, that is, firms that meet profitability, environmental and social requirements. Despite the importance of approaches, methods, models and technologies designed to support decision-making in the field of sustainable development, it is important to consider the factors of countries' propensity to corruption and to adequately study the problems associated with mathematical modelling in this area. Because correlation of such kinds of factors such as The Foreign Investment Attractiveness Index and The Corruption Perceptions Index would have helped to make effective decisions and attracted the attention of foreign investors and partners. In this context, economic analysis of the relationship between countries, these global indexes are requiring today's global economic development [16-22].

Woo (2010) applied panel regression to evaluate the impact of corruption on FDI inflows in 90 countries from 1984 to 2004 and the results indicated that corruption had a negative influence on FDI inflows. Samimi and Monfared (2011) used panel regression to evaluate the effect of corruption on foreign direct investment inflows in 16 Organizations of Islamic Cooperation countries from 2002 to 2008. The findings indicated that corruption had a negative correlation with FDI inflows [22-27].

3. THE MAIN PART OF THE STUDY

Foreign direct investment (FDI) is a category of international investment involving a long-term relationship and reflecting a lasting interest in and control by a resident entity in one economy (foreign direct investor or parent enterprise) of an enterprise resident in a different economy (FDI enterprise or affiliate enterprise or foreign affiliate)[7]. Capital transferred from the parent firms adds to local stock and contributes to increasing the host country's production base and productivity through a more efficient use of existing resources. Foreign investments promote the diffusion of new technologies, know-how and managerial and marketing skills through direct linkages or spillovers to domestic firms. Finally, FDI may also contribute to improving external imbalances due to their greater propensity to export concerning domestic firms. The main aspects of the benefits that FDI confers on the recipient country can be summarized to the following points[8]:

- FDI brings in financial resources;
- FDI can attract and support the transfer of managerial skills and advanced technical expertise (know-how);
- FDI introduces improved and adaptable skills and new organisational techniques and management practices in the host economy;
- FDI brings in modern technologies, which could contribute to raising efficiency;
- FDI transnational activities may provide improved access to export markets;
- FDI causes spillovers of technologies, management experience and skills.

FDI is considered to be one of the most important elements of the strategy of national economies regarding growth and development[9]. Motives refer to economic advantages provided to foreign enterprises by a government so that they are encouraged to locate in the specific potential host country[10]. A more general approach defines the provided motives as government-owned energies or actions that have been planned aiming to affect the decision-making, to increase the rate of attribution of investment, or to reduce the uncertainty of the potential investor[11]. The motives of location choice can be categorized into four general categories: motives related to the expected demand in a certain

[7] *This definition is based on the FDI concept as presented in the IMF Balance of Payments Manual (BPM)*
[8] *OECD, Official development assistance and FDI: Improving the synergies, by Vangelis Vitalis, Global forum on International Investment, Attracting FDI for development, Shangai.*
[9] *Balasubramanyam et al, Barrell and Pain, Ramirez, Buckley et al.*
[10] *United Nations Conference on Trade and Development, 'Incentives and foreign direct investment', United Nations series, A. N. 30, Geneva.*
[11] *OECD, Investment Incentives and Disincentives: Effects and International Direct Investment.*

region, motives related to the factors of cost, motives related to the number the domestic and foreign enterprises in the same region, and the motives related to the public policies of attracting investment capital[12].

The Corruption Perceptions Index (CPI) is an index published annually by Berlin-based Transparency International since 1995, which ranks countries "by their perceived levels of public sector corruption, as determined by expert assessments and opinion surveys." The CPI generally defines corruption as an "abuse of entrusted power for private gain".

The World Bank estimates that over 1000 billion US dollars annually are lost due to corruption, representing 5% of the world's GDP. The African Union estimates that due to corruption, the African continent loses 25% of its GDP.

According to the investigation of a group of Transparency International experts and a public opinion poll, about one in four people have paid a bribe when applying to the civil service in the past 12 months, with most people in the world (57 per cent of those surveyed) saying governments do not fight corruption well. Fifty-eight per cent of people aged 24 and under said they were capable of making changes against corruption. Fifty per cent of those over the age of 55 also expressed an interest in it. When the Corruption Perceptions Index of the 180 countries surveyed was calculated on a 100-point scale, the index of 2/3 of the selected countries was lower than the overall average index.
The Decision of the Cabinet of Ministers of the Republic of Uzbekistan No. 169 of March 30, 2021 "On the organization of the activities of the Agency for International Cooperation and Development under the Ministry of Investments and Foreign Trade of the Republic of Uzbekistan" and to take measures to prevent other offences, as well as to identify and analyze such adverse events through the development and implementation of measures to improve law enforcement practices and legislation, to eliminate the causes and conditions of their occurrence, and assignments were assigned.

Just as corruption hurts all sectors and industries of the government and society, it is one of the main factors that reduce its attractiveness for economic development, particularly, the attraction of foreign Direct Investment in the economy. Therefore, the index of corruption of the state has a special role in further increasing the investment attractiveness and the formation of public investment policy, an objective assessment of investment flows, increasing the interest of all interested investors in the world. This is because the level of corruption in government agencies is completely contrary to the interests of foreign investors.

The strategic criterion for providing the necessary targeted funding to the state projects, increasing its mutual interest for foreign investors and the state, and the study of the Foreign Investment Attractiveness Index and the State Corruption Perceptions Index, is an important factor of economic development.

4. RESEARCH OBJECTIVE

The main objective of the study is to prove the existence of a direct correlation between the Corruption Perceptions Index and the Foreign Investment Attraction Index of the selected countries based on calculating the regression analysis, the correlation coefficients and the regression equations. And it is trying to interpret multiple linear regression function of global influences of CPI index with foreign direct investment attraction based on the equation making some conclusion and recommendation.

5. RESEARCH IMPLEMENTATION STEPS

A Global Foreign Direct Investment Country Attractiveness Index, Corruption A summary table is formed based on the statistical indicators presented in the official reports of the Perceptions Index and the Shadow Economy Index. It is then based on assessing the adequacy of the statistical series using a linear regression equation.

[12] *Crozet et al. (2014).*

In the first stage, we construct the regression equation based on tables compiled with the available indicators and shown in the appendix. It is carried out in the following sequence:

First, it is necessary to enter the appropriate designations. In our example, the object of research is the International Corruption Perceptions Index of developed and pure developed countries (marked as **X)**, the attractiveness of foreign investment. Development of a regression equation based on such concepts as the index (marked as **Y**) and finally the Shadow Economics Index in these countries (marked as $\mathbf{X_1}$) and proving the relationship between these variables based on scientific evaluation of its corresponding parameters, foreign investment in the economy to make suggestions and conclusions for work on the international index of propensity to corruption in further enhancing its attractiveness.

5.1 Multiple Linear Regression Calculator for the Firth Example

Values of the response variable Y vary according to a normal distribution with standard deviation σ for any values of the explanatory variables $X_1,X_2,\ldots,X_k$. The quantity σ is an unknown parameter.
Repeated values of Y are independent of one another [28,29,30].

The relationship between the mean response of Y (denoted as μ_y) and explanatory variables $X_1,X_2,\ldots,X_k$ is linear and is given by $\mu_y=\beta_0+\beta_1X_1+\cdots+\beta_kX_k$ where each β_i is an unknown parameter.

For sample data go here:

Table 1. Analysis of the impact of the corruption perceptions index on the foreign investment attractiveness index and the shadow economy index in developed countries (2020)

Countries	**The Foreign Investment Attractiveness Index-2020-(Y)**	**The Corruption Perceptions Index 2020-(X_1)**	**The Shadow economy index 2015-(X_2)**
Denmark	67.1	88.0	14.70
New Zealand	60.5	88.0	9.00
Finland	65.7	85.0	13.30
Singapore	68.2	85.0	9.20
Sweden	70.4	85.0	11.70
Switzerland	72.7	85.0	6.90
Norway	63.2	84.0	15.70
Netherlands	69.3	82.0	7.80
Germany	69.9	80.0	7.80
Luxembourg	0.00	80.0	10.38
Australia	62.7	77.0	8.10
Canada	63.5	77.0	9.40
Hong Kong	66.8	77.0	12.40
United Kingdom	70.1	77.0	8.32
Austria	62.7	76.0	8.10
Belgium	64.6	76.0	17.80
Estonia	58.2	75.0	18.50
Iceland	0.00	75.0	12.45
Japan	66.0	74.0	8.20
Ireland	61.4	72.0	9.60
United Arab Emirates	59.1	71.0	24.30
Uruguay	44.5	71.0	20.40
France	67.2	69.0	11.70
Bhutan	0.00	68.0	20.28
Chile	50.6	67.0	13.16
United States	75.9	67.0	7.00

Model: $Y = \beta_0+\beta_1X_1+\beta_2X_2$, and using https://stats.blue/index.html, we can get these results of this model.

Model: **The Foreign Investment Attractiveness Index =**24.4+0.62·The Corruption Perceptions Index −1.27·The Shadow economy index

Table 2. The paired correlation coefficients of the multiple linear regression equation

Predictor	**Coefficient**	**Estimate**	**Standard Error**	t-**statistic**	p-**value**
Constant	β_0	24.4	57.47	0.42	0.68
The Corruption Perceptions Index	β_1	0.62	0.69	0.91	0.37
The Shadow economy index	β_2	-1.27	0.93	-1.36	0.19

We will find the paired correlation coefficients of this equation one to another:

$$r_{xy}=\frac{\overline{x\cdot y}-\overline{x}\cdot\overline{y}}{s(x)\cdot s(y)} \qquad r_{yx_1}=\frac{4439.554-77.346\cdot 56.935}{6.348\cdot 21.521}=0.263$$

The values of the pairwise correlation coefficient indicate a low linear relationship between $\mathbf{X_1}$ and **Y**. An increase in $\mathbf{X_1}$ by **1** unit of measure leads to an increase in **Y** by an average of **0.263** units;

$$r_{yx_2}=\frac{659.393-12.161\cdot 56.935}{4.669\cdot 21.521}=-0.328$$

The values of the pair correlation coefficient indicate a weak linear relationship between $\mathbf{X_2}$ and **Y**. An increase in $\mathbf{X_2}$ by **1** unit of measure leads to an increase in **Y** by an average of -**0.328** units;

$$r_{x_1x_2}=\frac{932.048-12.161\cdot 77.346}{4.669\cdot 6.348}=-0.289$$

The values of the pairwise correlation coefficient indicate a low linear relationship between $\mathbf{X_2}$ and $\mathbf{X_1}$. An increase in $\mathbf{X_1}$ by **1** unit of measure leads to an increase in $\mathbf{X_2}$ by an average of -**0.289** units;

Summary of Overall Fit:

R-Squared: $\mathbf{r^2}$=0.14

Adjusted R-Squared: $\mathbf{r^2_{adj}}$=0.06

Residual Standard Error: 21.24 on 23 degrees of freedom.

Overall *F*-statistic: 1.85 on 2 and 23 degrees of freedom.

Overall *p*-value: 0.18

Table 3. Analysis of variance table of the multiple linear regression equation

Source	**df**	**SS**	**MS**	F-**statistic**	p-**value**
Regression	2	1667.96	833.98	1.85	0.18
Residual Error	23	10373.81	451.04		
Total	25	12041.78	481.67		

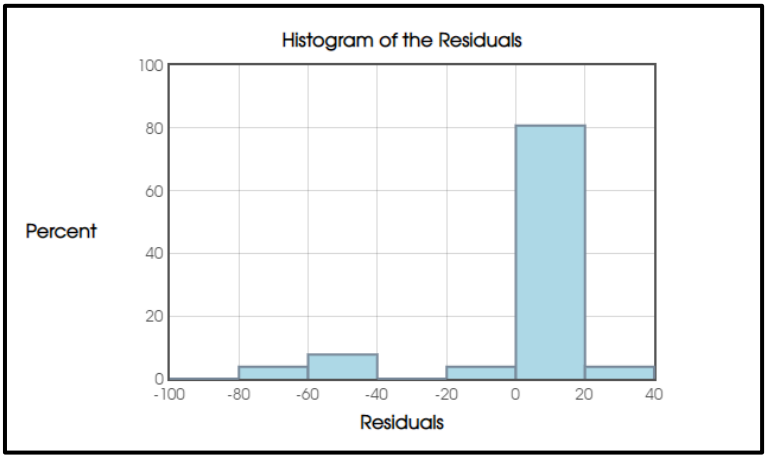

Fig. 1. Histogram of the residuals of the multiple linear regression equation

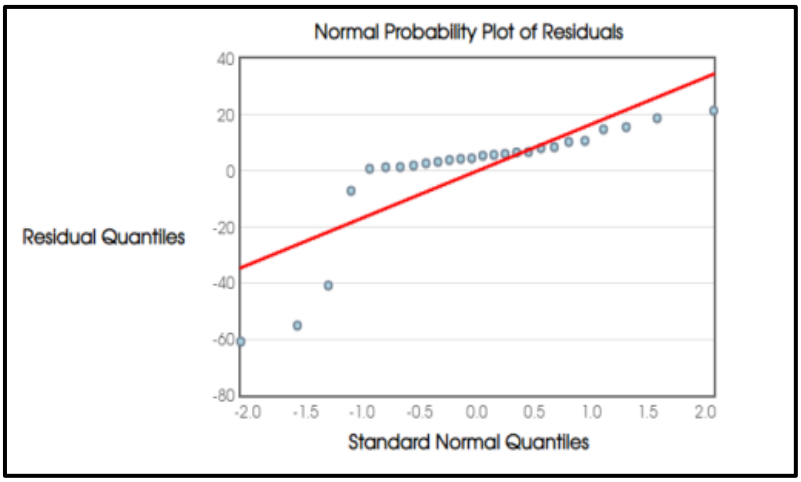

Fig. 2. Normal probability plot of residuals of the multiple linear regression equation

Five Number Summary of Residuals:

Minimum:	Min = −60.84
1st Quartile:	Q1 = 1.44
Median:	M = 5
3rd Quartile:	Q3 = 8.5
Maximum:	Max = 21.51

Results of the Multiple Linear Regression equation:

Because of calculations, the multiple regression equation was obtained:

$$Y = 24.4007 + 0.6203X_1 - 1.2697X_2$$

An economic interpretation of the model parameters is possible: an increase in X_1 by 1 unit of measure leads to an increase in **Y** by an average of 0.62 units; an increase in X_2 by 1 unit leads to a decrease in **Y** by an average of 1.27 units. The statistical significance of the equation was tested using the coefficient of determination and Fisher's test. It was found that in the studied situation, 13.85% of the total variability in **Y** is explained by changes in the factors **Xj**.

5.2 Multiple Linear Regression Calculator for the Second Example

Values of the response variable **Y** vary according to a normal distribution with standard deviation **σ** for any values of the explanatory variables $X_1, X_2, \ldots, X_k$. The quantity **σ** is an unknown parameter [28,29,30].

Repeated values of y are independent of one another.

The relationship between the mean response of **Y** (denoted as **μy**) and explanatory variables $X_1, X_2, \ldots, X_k$ is linear and is given by $\mu_y=\beta_0 + \beta_1X_1 + \cdots + \beta_kX_k$ where each β_i is an unknown parameter.

For sample data go here:

Table 4. Analysis of the impact of the corruption perceptions index on the investment attraction index and the index of the shadow economy in developed countries (2020)

Countries	The Foreign Investment Attractiveness Index 2020 – (Y)	The Corruption Perceptions Index 2020 - (X_1)	The shadow economy index 2015 - (X_2)
Angola	26.8	27.0	35.25
Madagascar	25.9	25.0	45.29
Ethiopia	24.8	38.0	25.10
Mauritania	24.8	29.0	25.75
Sudan	19.0	16.0	0.00
Venezuela	23.9	15.0	33.63
Yemen	17.7	15.0	28.81
Iraq	23.7	21.0	0.00
Cameroon	27.3	25.0	28.93
Togo	28.3	29.0	31.49

Model: $Y = \beta_0 + \beta_1X_1 + \beta_2X_2$, and using https://stats.blue/index.html, we can get these results of this model.

The Foreign Investment Attractiveness Index 2020 = 15.9551+0.2621·The Corruption Perceptions Index 2020 + 0.0777·The shadow economy index 2015

Table 5. The paired correlation coefficients of the multiple linear regression equation

Predictor	Coefficient	Estimate	Standard Error	t-statistic	p-value
Constant	β_0	15.9551	3.1437	5.0753	0.0014
The Corruption Perceptions Index 2020	β_1	0.2621	0.1258	2.0842	0.0756
The shadow economy index 2015	β_2	0.0777	0.0638	1.2176	0.2628

We will find the paired correlation coefficients.

$$r_{xy}=\frac{\overline{x\cdot y}-\overline{x}\cdot\overline{y}}{s(x)\cdot s(y)} \qquad r_{yx_1}=\frac{596.16-24\cdot24.22}{7.014\cdot3.262}=0.65$$

The values of the pairwise correlation coefficient indicate a moderate linear relationship between X_1 and **Y**.

An economic interpretation of the model parameters is possible: an increase in X_1 by **1** unit of measure leads to an increase in **Y** by an average of **0.65** units;

$$r_{yx_2} = \frac{637.344 - 25.425 \cdot 24.22}{13.828 \cdot 3.262} = 0.478$$

The values of the pair correlation coefficient indicate a weak linear relationship between $\mathbf{X_2}$ and **Y**. An increase in $\mathbf{X_2}$ by **1** unit of measure leads to an increase in **Y** by an average of **0.478** units;

$$r_{x_1x_2} = \frac{635.761 - 25.425 \cdot 24}{13.828 \cdot 7.014} = 0.264$$

The values of the pairwise correlation coefficient indicate a low linear relationship between $\mathbf{X_2}$ and $\mathbf{X_1}$. An increase in $\mathbf{X_1}$ by **1** unit of measure leads to an increase in $\mathbf{X_2}$ by an average of **0.264** units;

Summary of Overall Fit

R-Squared:	$\mathbf{r^2}$ = 0.5238
Adjusted R-Squared:	$\mathbf{r^2_{adj}}$ = 0.3877
Residual Standard Error:	2.6907 on 7 degrees of freedom.
Overall F-statistic:	3.8493 on 2 and 7 degrees of freedom.
Overall p-value:	0.0745

Table 6. Analysis of variance table of the multiple linear regression equation

Source	**df**	**SS**	**MS**	F-**statistic**	p-**value**
Regression	2	55.7372	27.8686	3.8493	0.0745
Residual Error	7	50.6788	7.2398		
Total	9	106.416	11.824		

Five Number Summar of Residuals:

Minimum:	Min = −4.4241
1st Quartile:	Q1 = −1.1485
Median:	M = 0.4528
3rd Quartile:	Q3 = 2.2411
Maximum:	Max = 2.5457

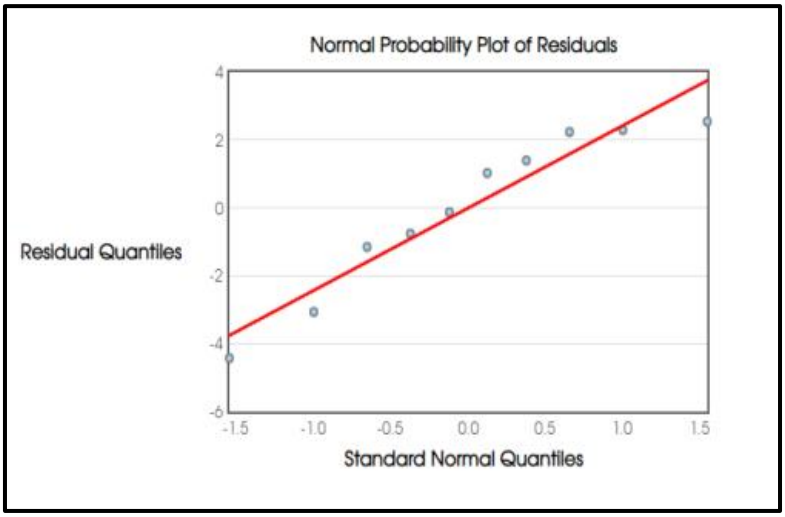

Fig. 3. Histogram of the residuals of the linear regression equation

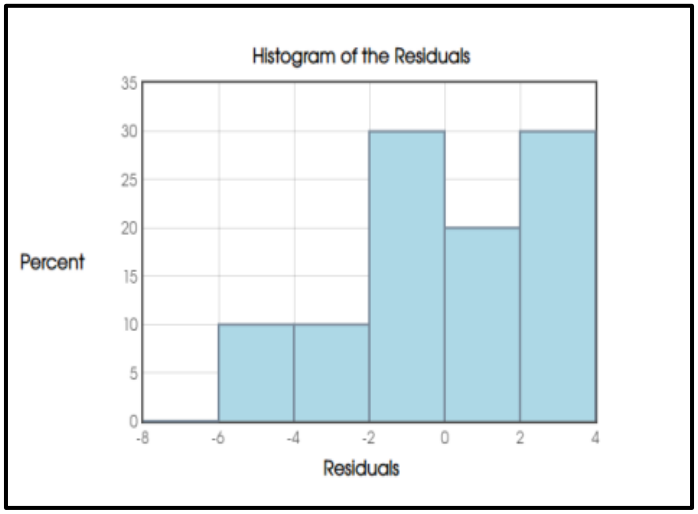

Fig. 4. Normal probability plot of residuals of the multiple linear regression equation

6. DISCUSSION

The study aims to identify a direct correlation between a country's propensity for corruption and foreign direct investment, thus proving that this is the most important factor influencing the attractiveness of foreign investment. The main reason the most developed and poorest countries were selected was to explain the importance of global indices, which discourage foreign investment, with more concrete examples. Because we are able to prove the attractiveness of foreign investment in the world and many factors influencing it, using the example of the economies of developed countries, and many studies and scientific experiments have been verified. There are many reasons countries have chosen the Corruption Perceptions Index for in-depth analysis and reflections, including:

- It turned out that in selected countries of the world, state policy and measures taken, transparency, accountability of state bodies and the attitude of officials towards corruption directly affect the psychology of investors;
- The leading investors of the world regularly monitor and analyze all international indicators, including the tendency of countries as corruption is in the lead;
- In the multivariate regression equation, the shadow economy index was also studied, and scientific conclusions were drawn. In other words, the shadow economy is an important factor in corruption, and it has been shown that its scale in the economy varies in direct proportion to the corruption index, as well as in inverse proportion to the attractiveness of foreign investment.
- It is recommended to study the impact on the attractiveness of foreign investment through a joint analysis of the management and business environment.

7. CONCLUSION

The results of the project will involve researchers in more research in this area to study the impact of not only the Corruption Perceptions Index and the shadow economy index but also several other global indices on foreign investment, attractiveness of developing effective mechanisms based on developing its main scientific and working evaluation criteria, developing modern methods of attracting the attention of potential foreign investors to the economics of the republic.

Based on the scientific results of Tables 1 and 2, which were used in this study, we can draw the following conclusions and recommendations:

- The corruption perception index and the shadow economy indices are interrelated, and a change in one leads to a change in the other in the correct proportion;

- According to research in developed and underdeveloped countries, the indices are economically significant, and especially in less developed countries. Has the property of strong interaction 65%;
- It is necessary to accelerate transforming of the republic's economy through in-depth study of the most advanced forms of economic and financial management in all sectors of the economy;
- I have proposed to determine the criteria for calculating these indices, and conducting research. Because these indices will positively affect the level of attractiveness of foreign investors;
- Distinguish between outdated forms of economic and financial management. Show its negative sides to the actors. Regarding cases of corruption, it is necessary to deeply rethink the ways in which it can transform economic processes into new and modern forms.
- A complex of economic and mathematical models of design and investment analysis at the stage of environmental expertise, in contrast to the existing application of the mathematical apparatus of fuzzy algebra and fuzzy logic. The advantage of the models lies in the ability to quantitatively process qualitative information that reflects the semi-structured knowledge of specialists.
- A negative relationship has also been proven between corruption, the level of the shadow economy and the index of attractiveness by investments in the country [5,6,7,8], i.e. on average, richer countries are less corrupt.
- Attention was paid to the mathematical modelling of the selected economy regarding foreign direct investment, the impact of the perception of corruption, and the most efficient programming algorithms, such as Makhov [13], were developed.
- Key research methods were examined (2010), which applied panel regression to assess the impact of corruption on FDI inflows in the 1990s countries from 1984 to 2004, and the results were compared.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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