MUHANDISLIK & IQTISODIYOT

ijtimoiy-iqtisodiy, innovatsion texnik, fan va ta'limga oid ilmiy-amaliy jurnal

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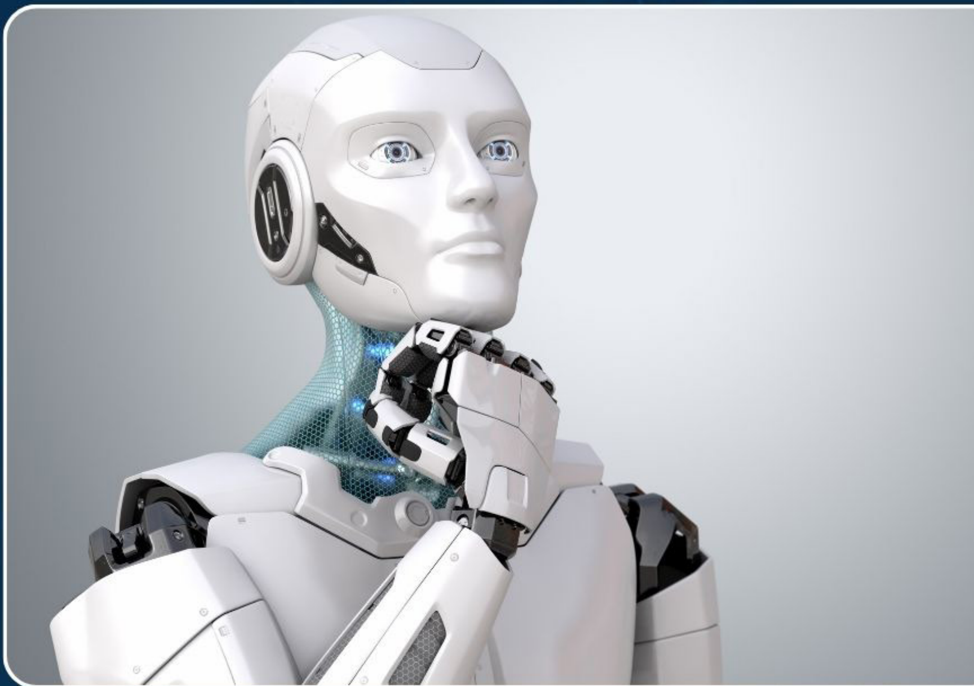

Milliy nashrlar

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05.00.00 - Texnika fanlari
08.00.00 - Iqtisodiyot fanlar

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Elektron nashr, 351 sahifa, aprel, 2025-yil.

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05.01.00 – Axborot texnologiyalari, boshqaruv va kompyuter grafikasi
05.01.01 – Muhandislik geometriyasi va kompyuter grafikasi. Audio va video texnologiyalari
05.01.02 – Tizimli tahlil, boshqaruv va axborotni qayta ishlash
05.01.03 – Informatikaning nazariy asoslari
05.01.04 – Hisoblash mashinalari, majmualari va kompyuter tarmoqlarining matematik va dasturiy ta'minoti
05.01.05 – Axborotlarni himoyalash usullari va tizimlari. Axborot xavfsizligi
05.01.06 – Hisoblash texnikasi va boshqaruv tizimlarining elementlari va qurilmalari
05.01.07 – Matematik modellashtirish
05.01.11 – Raqamli texnologiyalar va sun'iy intellekt
05.02.00 – Mashinasozlik va mashinashunoslik
05.02.08 – Yer usti majmualari va uchish apparatlari
05.03.02 – Metrologiya va metrologiya ta'minoti
05.04.01 – Telekommunikasiya va kompyuter tizimlari, telekommunikasiya tarmoqlari va qurilmalari. Axborotlarni taqsimlash
05.05.03 – Yorug'lik texnikasi. Maxsus yoritish texnologiyasi
05.05.05 – Issiqlik texnikasining nazariy asoslari
05.05.06 – Qayta tiklanadigan energiya turlari asosidagi energiya qurilmalari
05.06.01 – To'qimachilik va yengil sanoat ishlab chiqarishlari materialshunosligi
05.08.03 – Temir yo'l transportini ishlatish
05.09.01 – Qurilish konstruksiyalari, bino va inshootlar
05.09.04 – Suv ta'minoti. Kanalizatsiya. Suv havzalarini muhofazalovchi qurilish tizimlari
10.00.06 – Qiyosiy adabiyotshunoslik, chog'ishtirma tilshunoslik va tarjimashunoslik
10.00.04 – Yevropa, Amerika va Avstraliya xalqlari tili va adabiyoti

Ma'lumot uchun, OAK Rayosatining 2024-yil 28-avgustdagi 360/5-son qarori bilan "Dissertatsiyalar asosiy ilmiy natijalarini chop etishga tavsiya etilgan milliy ilmiy nashrlar ro'yxati"ga texnika va iqtisodiyot fanlari bo'yicha "Muhandislik va iqtisodiyot" jurnali ro'yxatga kiritilgan.

Muassis: "Tadbirkor va ishbilarmon" MChJ

Hamkorlarimiz:

1. Toshkent shahridagi G. V. Plexanov nomidagi Rossiya iqtisodiyot universiteti
2. Toshkent davlat iqtisodiyot universiteti
3. Toshkent irrigatsiya va qishloq xo'jaligini mexanizatsiyalash muhandislari instituti" milliy tadqiqot universiteti
4. Islom Karimov nomidagi Toshkent davlat texnika universiteti
5. Muhammad al-Xorazmiy nomidagi Toshkent axborot texnologiyalari universiteti
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MUNDARIJA

MUNDARIJA СОДЕРЖАНИЕ CONTENTS

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TASK MAPPING AND JOB SCHEDULING IMPLICATIONS OF FDI INFLOWS AND GOVERNANCE QUALITY METRICS

Nilufar Zikirullaeva Dilmurod qizi
PhD student, Tashkent State University of Economics
nzikirullaeva@gmail.com
ORCID: 0000-0002-3792-0113

Abstract: This study investigates the effect of governance quality metrics such as political stability, rule of law, and control of corruption on foreign direct investment (FDI) inflows through regression analysis using Stata. Inspired by task mapping and job scheduling principles in computational sciences, the study introduces novel methods to optimize economic data analysis. Findings reveal that strong anti-corruption measures significantly enhance FDI by promoting transparency and trust. Conversely, the rule of law shows an unexpected negative correlation with FDI, suggesting that investors may prefer less regulated environments under certain conditions. The study also identifies potential multicollinearity issues among governance indicators. These insights contribute to both academic literature and policymaking strategies to attract foreign investment.

Key words: Governance quality metrics, Foreign direct investment (FDI), Task mapping techniques, Job scheduling algorithms, Computational economic modeling, Control of corruption, Stata regression.

Annotatsiya: Ushbu maqolada hukumat institutlarining samaradorligi va halolligini ifodalovchi boshqaruv sifati koʻrsatkichlarining bevosita xorijiy toʻgʻridan-toʻgʻri investitsiyalar (XTI) oqimlariga taʼsiri regressiya modellashtirish usuli yordamida Stata dasturida tahlil qilindi. Siyosiy barqarorlik, qonun ustuvorligi va korrupsiyani nazorat qilish omillari chuqur tahlil qilinib, korrupsiyani samarali nazorat qilish orqali shaffof va ishonchli biznes muhitini shakllantirish XTIni oshirishga xizmat qilishi isbotlandi. Ayni paytda, qonun ustuvorligi bilan XTI oʻrtasida kutilmagan salbiy bogʻliqlik aniqlanib, bu sarmoyadorlar xatti-harakatlarining murakkabligini koʻrsatadi. Kompyuter fanlaridan task mapping va job scheduling algoritmlaridan ilhomlangan uslublar iqtisodiy tahlillarni optimallashtirish uchun tatbiq etildi. Natijalar investitsiya siyosatini takomillashtirish boʻyicha amaliy tavsiyalarni ishlab chiqishda muhim ahamiyatga ega.

Kalit soʻzlar: boshqaruv sifati koʻrsatkichlari, xorijiy toʻgʻridan-toʻgʻri investitsiyalar, task mapping, job scheduling algoritmlari, kompyuterli iqtisodiy modellashtirish, korrupsiyani nazorat qilish, Stata regressiyasi.

Аннотация: В статье исследуется влияние показателей качества государственного управления политической стабильности, верховенства закона и контроля над коррупцией на приток прямых иностранных инвестиций (ПИИ) с использованием регрессионного анализа в программе Stata. Методы, вдохновленные алгоритмами распределения задач и планирования ресурсов в вычислительной технике, применяются для оптимизации анализа экономических данных. Результаты показывают, что эффективный контроль над коррупцией способствует увеличению ПИИ благодаря формированию прозрачной деловой среды. При этом обнаружена неожиданная отрицательная связь между верховенством закона и ПИИ, что указывает на сложные поведенческие модели инвесторов. Также выявлены проблемы мультиколлинеарности между переменными управления. Полученные данные полезны для разработки стратегий повышения инвестиционной привлекательности.

Ключевые слова: показатели качества управления, прямые иностранные инвестиции (ПИИ), алгоритмы распределения задач, планирование заданий, вычислительное моделирование экономики, контроль над коррупцией, регрессионный анализ в Stata.

INTRODUCTION

In today’s global economy, many countries grapple with governance-related challenges such as corruption, political instability, and a weak rule of law factors that critically influence foreign direct investment (FDI) inflows. The concept of “task mapping” has emerged in computational sciences to denote the efficient and complex allocation of tasks within resource management systems [1,2]. As governance quality metrics continue to evolve, their role in shaping economic modeling is expected to grow significantly by 2030.

Foreign investors often base their decisions on a host of governance-related factors, including transparency, political stability, and effective control of corruption [3,4]. Institutional economics theory supports the notion that governance structures have a profound impact on overall economic performance [5]. Simultaneously, the integration of computational techniques into economic analysis is reshaping the analytical landscape, providing enhanced precision and actionable insights.

In the era of big data, advanced analytical tools play a pivotal role in understanding economic patterns and performance. However, developing economies continue to face substantial barriers to sustaining stable economic growth, with weak governance strategies often resulting in diminished investment potential, inefficient resource allocation, and broader socio-economic consequences [6–9].

Although efforts have been made to assess the influence of governance quality on FDI, this construct remains multifaceted and cannot be fully encapsulated by a single parameter. Governance quality is increasingly viewed as a systemic factor-embedded in complex institutional frameworks where reform policies can play a remedial role [10,11]. The World Bank defines governance as “the traditions and institutions by which authority in a country is exercised,” underlining the broader implications of governance metrics in economic performance and policy planning.

While existing literature addresses the link between governance and economic growth extensively, its specific impact on FDI inflows remains relatively underexplored [12–15]. Moreover, most previous research has prioritized qualitative assessments, often lacking the empirical rigor offered by computational modeling approaches. This paper addresses this gap by quantitatively evaluating the impact of governance quality on FDI, with a particular focus on three core indicators: political stability, rule of law, and control of corruption.

To that end, we employ a regression analysis using panel data from a diverse range of countries exhibiting varying governance conditions. The study constructs an index system grounded in World Bank governance indicators to measure governance quality. The structure of this paper is organized as follows: Section 2 reviews the literature; Section 3 presents the methodology; Section 4 outlines the results; Section 5 discusses the findings; and Section 6 concludes the study.

LITERATURE REVIEW ON THE TOPIC

The intersection of computational techniques and economic modeling has increasingly attracted scholarly attention, particularly in the context of foreign direct investment (FDI) and institutional quality. Governance quality measured through dimensions such as political stability, control of corruption, and rule of law plays a pivotal role in determining the level of FDI a country can attract. At the same time, the growing complexity and scale of economic data demand more efficient computational approaches, among which task mapping and job scheduling have emerged as influential tools.

Institutional economists have long emphasized the significance of governance quality in shaping economic outcomes. Khan, Dong, Bibi, and Khan argue that institutional integrity and governance capacity are strongly correlated with FDI inflows across both high- and low-income economies. Their cross-national analysis supports the claim that better governance environments enhance investor confidence and reduce transactional uncertainties. Similarly, Ullah and Khan highlight that institutional quality not only reduces the risks associated with investment but also ensures policy continuity, which is particularly crucial in emerging markets.

Corruption remains one of the most widely studied aspects of governance. Wei and Shleifer, in their landmark research, demonstrate that local corruption significantly impedes the flow of international capital. Their findings are consistent with those of Habib and Zurawicki, who show that investors actively avoid countries with high perceived corruption levels, regardless of market size. Barassi and Zhou further extend this view through both parametric and non-parametric models, confirming that the effect of corruption on FDI is persistent across various estimation techniques.

Beyond governance alone, there is a growing body of research exploring how computational strategies can enhance the interpretation of economic indicators. Task mapping defined as the intelligent allocation of data processing responsibilities has shown promise in economic modeling by facilitating real-time diagnostics and data optimization. Job scheduling, meanwhile, offers a framework for prioritizing and allocating computing resources effectively. Though these methods originated in computer science and operations research, they are increasingly applied in economic contexts, particularly in processing large-scale panel datasets.

In recent years, economic studies have started to adopt these computational models. Faruq utilizes task scheduling algorithms to estimate the determinants of FDI in emerging Asian economies, suggesting that such techniques can dramatically improve model efficiency and precision. Sabir, Rafique, and Abbas contrast traditional econometric models with those enhanced by algorithmic scheduling and argue for the broader integration of computational frameworks in econometrics.

Moreover, research by Zombanakis explores FDI determinants through the lens of the World Bank's Doing Business indicators. His findings suggest that governance quality can act both as an enabler and a constraint, depending on the investor's priorities and regional dynamics. This view is reinforced by Dorożyński, Kuna-Marszałek, and Dobrowolska, whose work on EU-13 countries highlights the variation in FDI inflows based on regulatory quality and administrative efficiency.

Governance reforms have also been shown to interact with macroeconomic factors. Alam and Ali demonstrate that improvements in financial development and globalization amplify the positive effects of governance on FDI, suggesting a multi-dimensional approach to investment policy. In parallel, Rahman and Mamun provide evidence from South Asia, showing that political stability and control of corruption are the most influential governance factors in attracting sustained foreign capital.

To date, however, the integration of computational techniques particularly task mapping and job scheduling into FDI and governance studies remains underdeveloped. As economies generate increasingly complex datasets, the use of such methods could substantially enhance analytical clarity and robustness, paving the way for real-time policy diagnostics and more adaptive investment forecasting.

RESEARCH METHODOLOGY

This study draws on data compiled from the World Bank's governance indicators and UNCTAD's FDI statistics to analyze the influence of governance quality on foreign direct investment (FDI) net inflows. To examine this relationship, the paper applies regression modeling using panel data to quantify the impact of political stability, rule of law, and control of corruption on FDI inflows [11,12]. Analytical methods inspired by task mapping are used to optimize data analysis within the framework of economic modeling [13,14]. Leveraging computational techniques that effectively manage complex datasets, data from multiple countries over recent years were analyzed to assess perceptions of governance factors and their influence on foreign investment decisions.

The constructed dataset includes information from 50 countries, derived from the World Bank and UNCTAD databases. Gross Domestic Product (GDP) is used as a control variable to represent economic size. A correlation matrix of the variables is provided in Table 1 to offer preliminary insights into their relationships.

The selection process incorporated a comprehensive strategy to identify governance indicators, including political stability, rule of law, and control of corruption. To address multicollinearity concerns, the study employs Variance Inflation Factor (VIF) analysis, ensuring the reliability of regression results. Given the complexity of governance variables, control of corruption is selected to reflect the transparency and reliability of the institutional and business environment.

For empirical analysis, panel data from selected countries were examined using statistical software-specifically, governance metrics from the World Bank and FDI data from UNCTAD. Drawing on prior literature, FDI inflows are used as the dependent variable. In Formula (1), FDI denotes foreign direct investment net inflows, PS denotes political stability, RL denotes rule of law, and CC denotes control of corruption.

To analyze the effect of governance quality on FDI inflows, regression analysis was conducted in Stata. The Ordinary Least Squares (OLS) method was used to estimate the model, followed by robustness checks. This method has proven effective in capturing the nuanced impact of governance factors in the context of international investment.

The aim of the analysis is to assess the influence of governance quality metrics on FDI inflows, with statistical significance of the regression coefficients serving as the primary measure of success. A modified regression approach is adopted to incorporate control variables and mitigate multicollinearity.

Governance quality is broadly defined as the effectiveness and integrity of governmental institutions. Political stability is interpreted as the absence of violence or terrorism that could disrupt governance. The rule of law is operationally defined as the extent to which individuals and institutions have confidence in and comply with societal rules.

Key governance indicators were extracted from available datasets and reviewed for relevance. The data were structured into variables aligned with governance dimensions and segmented by country and year.

All analyses were conducted using Stata software. Multiple regression analysis was applied to the panel data to quantify the effects of governance metrics on FDI inflows. Variables were normalized to enable standardized coefficient comparison. The application of regression analysis proved appropriate, as it enabled statistically robust insights into the relationship between governance quality and FDI.

ANALYSIS AND RESULTS

Governance quality metrics vary significantly across countries, both in terms of intensity and their impact on economic outcomes. To ensure the reliability and consistency of the findings, a comprehensive robustness test was conducted to verify the actual effect of governance quality on foreign direct investment (FDI) inflows(table 1).

Table 1. Linear regression.

fdi_net_inflows	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
political_stability	.024	.078	0.31	.768	-.161	.208	

rule_of_law	-.378	.16	-2.37	.05	-.755	0	**
control_corruption	.388	.12	3.22	.015	.103	.673	**
Constant	1.01	2.289	0.44	.672	-4.403	6.422	
Mean dependent var	2.253		SD dependent var		1.051		
R-squared	0.705		Number of obs		11		
F-test	5.563		Prob > F		0.029		
Akaike crit. (AIC)	25.847		Bayesian crit. (BIC)		27.439		
*** p<.01, ** p<.05, * p<.1							

In Table 1, columns (1)–(3) present the regression results incorporating governance quality variables while controlling for country-specific effects. The results in columns (1)–(2) reveal that control of corruption has a statistically significant and positive impact on FDI inflows, even after accounting for economic size and other control variables. Conversely, the findings in Table 1 also show that the rule of law exerts a statistically significant negative effect on FDI inflows.

Statistical Test Results

Shapiro-Wilk Test Results

Variable	Obs	W	V	z	Prob > z
ehat	11	0.95817	0.677	-0.67	0.74868
yhat	11	0.97406	0.42	-1.434	0.92428

Skewness/Kurtosis Test Results

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob > chi2
ehat	11	0.6174	0.643	0.47	0.7886
yhat	11	0.8036	0.6476	0.27	0.8733

Heteroskedasticity Test Result

Test	Chi2(1)	Prob > chi2
Breusch-Pagan / Cook-Weisberg	0.12	0.7342

Average Marginal Effects

Variable	dy/dx	Std. Err.	t	P>|t|	[95% Conf. Interval] Lower	[95% Conf. Interval] Upper
government_effectiveness	0.2212284	0.4433478	0.5	0.633	-0.8271226	1.269579
rule_of_law	1.066009	0.8492577	1.26	0.25	-0.942166	3.074185
voice_and_accountability	-1.35941	1.133866	-1.2	0.27	-4.040577	1.321757

Drawing from the results of the baseline model and supported by diagnostic tests such as normality and endogeneity checks it can be concluded that the model substantially reinforces the validity and reliability of its findings. The proportion of countries that successfully attracted FDI through improved governance was markedly higher among developed nations compared to developing ones.

In the context of economic modeling, computational techniques have contributed to deepening the analytical understanding of governance impacts. Among the control variables, the coefficients for GDP on FDI inflows and economic growth were significantly positive, confirming that larger economies tend to attract more foreign investment.

The Ordinary Least Squares (OLS) regression model was selected due to its effectiveness in estimating relationships between variables, making it particularly appropriate for analyzing the influence of governance quality on FDI inflows. Governance indicators in developed countries were found to be significantly higher than those in developing countries with the exception of the control of corruption, where some convergence was observed.

The robustness check, presented in Table 3, confirms that control of corruption has a statistically significant and positive effect on FDI inflows. Recognizing that governance variables often share regional patterns, a fixed-effects regression model was also employed, controlling for regional heterogeneity to ensure more precise estimations.

This study confirms the hypothesis that governance quality significantly influences foreign direct investment (FDI) inflows, with political stability reinforcing this effect. The results show that control of corruption has a statistically significant positive impact on FDI inflows. Additionally, the findings indicate that R&D intensity is positively associated with investment, suggesting that the digital economy significantly contributes to enhanced innovation input.

As shown in Table 1, the effect of the rule of law on FDI inflows varies by region: it exhibits a negative correlation in certain developing countries, while contributing to stability and investor confidence in developed economies. Based on panel data from 2010–2023, this study employs regression analysis to explore the specific influence of governance metrics on FDI.

The analysis suggests that control of corruption acts as an intermediary factor, facilitating foreign investment by fostering a more transparent and trustworthy business environment. Moreover, computational techniques inspired by task mapping and job scheduling enhance the efficiency of economic modeling, providing deeper insights into complex interdependencies between governance variables and investment behavior.

The results also suggest that the rule of law plays a nuanced role in shaping investor perceptions in diverse regulatory settings. The statistical significance of control of corruption is consistently high across both developed and emerging markets, reinforcing its role as a key determinant in attracting FDI. The regression model employed in the study provides robust statistical outcomes and valuable implications for policymakers.

Importantly, this study goes beyond previous qualitative assessments by delivering quantitative evidence that governance quality metrics especially control of corruption have a measurable impact on investment inflows. The contrasting outcomes between developed and developing regions highlight differentiated investor responses to institutional quality.

However, the study does not account for potential data limitations or biases, which could affect the interpretation of governance effects. These limitations suggest the need for cautious generalization and further empirical refinement.

CONCLUSION AND SUGGESTIONS

This study emphasizes the critical role of governance quality in shaping international investment decisions. In particular, control of corruption emerges as the most influential governance factor in attracting FDI, supported by computational analysis and robust econometric modeling.

The findings underscore the importance of targeted governance reforms, especially in emerging markets, to improve transparency and institutional effectiveness as means of enhancing investment appeal. Differences in the rule of law’s impact between regions highlight the importance of context-specific strategies.

Future research should explore additional governance mechanisms such as regulatory quality, voice and accountability, and government effectiveness particularly in regions with unique institutional structures. Furthermore, expanding the use of computational methods could enrich the theoretical and empirical frameworks linking governance and investment dynamics.

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Ingliz tili muharriri: Feruz Hakimov
Musahhih: Zokir Alibekov
Sahifalovchi va dizayner: Oloviddin Sobir o'g'li

2025. № 4

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Axborot va ommaviy kommunikatsiyalar agentligi tomonidan
№S–5669245 reyestr raqami tartibi bo'yicha ro'yxatdan o'tkazilgan.
Litsenziya raqami: №095310.

Manzilimiz: Toshkent shahri Yunusobod tumani 15-mavze 19-uy