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Governance Quality and Capital Markets Efficiency in Southeast Europe

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Abstract: *This article explores the importance of qualitative factors in determining cross-country Southeast European (SEE) capital markets efficiency in period between 2005 and 2023. The study employs the Correlated Random Effects (CRE) model as the most appropriate specification. It ensures methodological rigor by addressing correlation between unobserved heterogeneity and explanatory variables, thereby combining the efficiency of random effects (RE) with the consistency of fixed effects (FE) estimation. In precedent quantitative review the selected frontier capital markets were found to be weak-form inefficient under the Eugen Fama hypothesis. This work broadens the study to grasp precedent recommendation to integrate conduciveness to qualitative factors in the likes of rule of law, control of corruption, regulatory quality, and government effectiveness. Specifically empirical statistical testing reveals that governance quality positively impacts market values. The results infer association with capital markets' role with more vigour under the perception of the proven weak-form inefficiency.*

Keywords: Capital Markets; Frontier Markets; Southeast Europe; Market Efficiency; Governance Quality

JEL classification: G14, G15, C33

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Introduction

The capital markets in SEE continue to offer an interesting studying profile of frontier market development. In comparison to precedent conducted scientific researches the operating environment evolved to reflect further integration and consolidation at the level of financial markets, capital markets, and the real economy. This trend appears in the backdrop of an increasing global volatility under Covid-19, the war in Ukraine, and ongoing trade fragmentation and globalization slowdown and. As prior determined, in its nascence some three decades ago the regional public stock exchanges primarily served as vehicles for privatization of state-owned assets while the improvements on corporate governance, institutional, legislative, and judicial surrounding lagged behind. This research now focuses to demonstrates with empirical evidence whether there exist meaningful relations in endogenizing the impact of qualitative governance quality on capital markets performance. The results build onto precedent attested Eugene Fama's weak-form market inefficiency (prices incorporate all historical trading data, rendering past price movements ineffective for forecasting future trends) and provide broader fundamental clarity to the frequently speculated lesser importance of frontier markets, commonly identified as developing economies with limited liquidity, low institutional maturity, and underdeveloped capital markets, situated between least developed and emerging market classifications (Fama, 1970; Marshall et al., 2013, Prates et al., 2023). As precedent established is understandable that the underlying research markets are shallow in daily secondary trading and that only sporadically corporate capital market actions occur. In this research therefore control variable tracking market turnover is introduced and functions to stabilize results. This research adds facts to expectations through empirically testing capital markets appearance in combination with the quality of governance as a precursor of stability sought by investors.

Prior researches on developed markets demonstrate that quality of governance is statistically significant with stock market performance as presented by Hooper *et al*. (2009). What that means is that strong stock market performance goes hand in hand with an efficient institutional environment. In practice the quality of governance lowers transaction and agency costs, therefore generating value for shareholders.

This paper is organized into the following sections:

- Introduction to the operating environment and the background economic thought posing the research question.
- Review of the relevant literature.
- Contrast of empirical assessment methods and the empirical results with implicit interpretations.
- Conclusion and recommendations.

Literature Review

The concept of capital market efficiency is foundational in finance. In an efficient market, asset prices "fully reflect all available information" (Tsenkov & Stoitsova-Stoykova, 2017a), meaning no investor can consistently outperform broad market returns using known information. Fama (1970) formalized the Efficient Market Hypothesis (EMH) in three forms: weak-form, semi-strong form (prices instantly incorporate all publicly available information), and strong-form (prices reflect all information, public and private). In an ideal efficient market, prices follow a random walk and adjust quickly to new data. The theoretical premise of the EMH suggests that in competitive markets, populated by numerous rational investors, opportunities for systematic mispricing or predictable return patterns should be eliminated through arbitrage.

Over time, this assumption has been extensively tested in empirical literature. Initial investigations in advanced economies, such as the United States and the United Kingdom, provided support for weak-form efficiency, indicating limited predictability in stock return dynamics. Nevertheless, a wide range of documented anomalies has challenged the strict form of the EMH and fostered a more nuanced interpretation. Phenomena such as momentum effects, the value premium, and extraordinary events like the stock market crash of 1987 present difficulties for traditional EMH explanations. Grossman and Stiglitz (1980) further argue that markets cannot achieve perfect informational efficiency, since if all available information were fully embedded in prices, investors would lack incentives to acquire information, ultimately reducing trading activity. In reality, financial markets tend to operate at an equilibrium level of efficiency in which minor mispricings persist, thereby compensating informed investors for their information-gathering efforts.

Another important insight is that market efficiency is not static over time or uniform across countries. Technological advances, globalization, and better information dissemination were expected to improve efficiency by reducing information costs. Indeed, lower trading costs and faster information flows should, in theory, arbitrate away mispricing more quickly. Yet empirical evidence is mixed: despite the ostensible improvements in information availability in recent decades, some studies question whether markets have become significantly more efficient over time (Pastushkov, 2024). This suggests that other factors, such as market structure, participant behaviour, or governance quality also play crucial roles.

Stable macroeconomic conditions are generally associated with higher levels of investor confidence and more efficient price formation in financial markets. Environments characterized by low and predictable inflation, prudent monetary policy, and sustained economic growth create the foundations for asset prices to more closely reflect underlying fundamentals. Conversely, periods of macroeconomic instability or systemic crises can disrupt this process and weaken pricing efficiency. Empirical

evidence shows that large-scale shocks, such as the global financial crisis of 2008, were followed by a temporary decline in market efficiency across numerous economies. In summary, robust macroeconomic fundamentals, along with transparent and liquid markets, create conditions conducive to efficiency, whereas instability and high information asymmetry can impede the efficient functioning of capital markets.

Notably, there is a well-documented disparity between advanced and emerging markets in terms of efficiency. Capital markets in advanced economies, supported by their long-standing development, sophisticated institutional infrastructure, and rigorous regulatory frameworks, generally achieve a higher level of informational efficiency. In contrast, developing and frontier markets often show frequent deviations from random-walk behaviour. In fact, weak-form EMH market inefficiency is more common for developing markets and SEE does not make an exception (Tsenkov & Stoitsova-Stoykova, 2017). This implies that many emerging markets have predictable components in price movements or other anomalies reflecting structural and informational frictions. This global framework provides the foundation for analyzing the particular case of SEE countries, most of which are classified as frontier markets characterized by transitional economic structures.

Since the 1990s, the financial markets in SEE have been reshaped by the broader shift from centrally planned models to frameworks based on market liberalization. Despite this transition, many of these markets still face persistent structural constraints such as limited capitalization, shallow liquidity, outdated regulatory frameworks, and insufficient institutional support that continue to obstruct their functional efficiency. Numerous studies have questioned whether these environments meet even the baseline standards of weak-form efficiency as defined by the EMH, and findings consistently point toward notable inefficiencies. Historical price patterns in several markets have shown deviations from the randomness expected in efficient systems, suggesting that past information retains some predictive relevance. Such anomalies, like return autocorrelations or seasonality patterns, have also been observed in focused country-level analyses. However, this inefficiency is not evenly distributed across the region. Markets with relatively stronger infrastructure and higher trading activity, such as those in Croatia, Greece, or Turkey tend to demonstrate more consistent alignment with EMH principles. In contrast, more fragmented markets, as in countries like Bosnia and Herzegovina, display deeper inefficiencies. Interestingly, signs of improvement have emerged in the years following the global financial crisis, likely driven by increased macroeconomic stability, stronger ties to international capital flows, and the gradual adoption of EU-aligned regulatory standards (Tsenkov & Stoitsova-Stoykova, 2017a; 2017b). These developments are consistent with more recent findings by Dodig and Bugarčić (2023), who applied panel pooled mean group (PMG) estimation to six Southeastern European countries over the 2005–2021 period. Their results reaffirm the persistence of weak-form inefficiency in regional stock markets, both in the short run and in the long run. Else this research also reveals clear

evidence of maturing market behaviour. Specifically, the estimated 19.7% quarterly error-correction rate, up from 8.8% in earlier studies indicates a stronger corrective mechanism in price adjustment across time. Furthermore, although the money market interest rate (MMIR) emerges as the only macroeconomic variable exerting a statistically significant long-run impact on stock indices. Short-run linkages are identified for industrial production (IPI) and portfolio investment (PI), indicating an increasing sensitivity of capital markets to macroeconomic signals. The study's methodological robustness, retaining long-run informational value by avoiding differencing, adds further weight to these findings. Collectively, the literature indicates that although SEE markets are still characterized by structural inefficiencies, they are evolving and pose imperative questions on h governance quality, regulatory alignment, and institutional reforms role in strengthening informational efficiency over time.

Despite notable progress, structural constraints continue to impede the attainment of full efficiency in SEE capital markets. Although SEE markets have advanced considerably since the early 2000s, they continue to lag behind mature capital markets in terms of depth, liquidity, and overall efficiency. The literature highlights small scale, low liquidity, and institutional weaknesses as key factors explaining why these markets do not yet fully reflect all available information in prices. These observations naturally lead to the question of governance: how the quality of institutions and governance frameworks in SEE might be affecting their market performance.

An expanding body of literature highlights the central role of governance quality—encompassing institutional strength, the effectiveness of legal frameworks, and the credibility of policy implementation—in shaping stock market performance. Governance can be conceptualized both at the national level, through dimensions such as political stability, rule of law, control of corruption, and regulatory quality on market outcomes. Similarly at the corporate level firm-specific governance practices directly influence investor confidence on individual companies' performance and subsequently on market outcomes. Both dimensions are highly relevant for investor confidence and market development. In cross-country studies, strong governance has consistently been linked to more robust and efficient capital markets. For instance, a panel study of 23 countries by Boadi and Amegbe (2017) found that multiple governance indicators from the World Governance Index – including Voice and Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption – "significantly affect stock market performance". Leong and Ward (2021) found that positive reforms improve transparency and thus shareholders protection and result in more efficient capital markets. In economies with higher scores on these governance dimensions, stock markets tend to be larger, more liquid, and deliver better risk-adjusted returns. The underlying rationale is that when investors have confidence in the protection of property rights, transparent financial disclosure, and the impartial enforcement of contractual obligations, their willingness to participate in equity markets increases, thereby enhancing both mar-

ket liquidity and overall valuations. Conversely, poor governance (e.g. rampant corruption or weak rule of law) raises the risk premium demanded by investors and often depressing equity prices and deterring market participation.

These results are consistent with the broader law and finance literature, which emphasizes the foundational role of legal institutions in shaping financial market development. Seminal work by La Porta et al. (1997) demonstrated that countries with stronger investor protection frameworks—often linked to common-law legal traditions — tend to exhibit more developed and dynamic equity markets. Later studies extended this by distinguishing between laws on the books and the enforcement of those laws. In the context of emerging Europe, governance quality has been a critical differentiator in market performance. A study of nine Central and Eastern European (CEE) stock markets, including several SEE countries, provides compelling evidence on the structural challenges of the 1990s. These transitional markets generated lower returns and exhibited higher volatility compared to their developed counterparts, partly due to episodic crises and what Pajuste (2002) characterizes as a "flight to quality" by international investors. More importantly, the study identified governance-related factors behind underperformance: instances of controlling shareholders manipulating stock prices, for example, artificially suppressing valuations to expropriate minority investors undermined investor confidence and constrained market growth. Such practices were facilitated by weak enforcement of legal frameworks, leading the authors to conclude that "enforcement of law matters more than the quality of law on the books" in explaining stock market outcomes. In fact, the strength of regulatory enforcement displayed the greatest explanatory power for cross-country variation in stock returns, surpassing the nominal comprehensiveness of securities legislation. The study also documented that stronger minority shareholder protections were associated with higher market liquidity, as reflected in improved turnover ratios. Collectively, these findings underscore the critical role of enforcement capacity and shareholder protection in fostering efficient and resilient capital markets. When outsiders are protected from insider misappropriation, more people are willing to trade and invest, which enhances liquidity and helps align prices with fundamentals. Similarly, political stability and absence of violence create a more predictable investment climate, and government effectiveness in formulating and implementing policy can lower uncertainty for businesses and investors. Alqahtani and Aldeehani (2020) Middle East study finds that government effectiveness reduces market volatility and increases investor confidence. Boubaker et al. (2018) broader emerging market study reveals that governance improvements lead to more favorable risk-return balance through lowering volatility and bettering returns. In SEE countries, which in the 1990s and 2000s undertook extensive governance reforms (often under the aegis of EU integration), improvements in these areas have been linked with better stock market development. Empirical analyses focusing on Eastern Europe find that countries ranking higher on governance indices tend to have more

active stock exchanges and greater ability to attract foreign portfolio investment (Pajuste, 2002). This observation is consistent with the notion that international investors are naturally drawn to markets where institutional arrangements provide credible safeguards for their investments.

Conversely, weaknesses in governance frameworks continue to represent a structural barrier to efficiency and development in several SEE markets. Issues such as corruption, bureaucratic inefficiencies, or political interference can stifle market growth. For example, if financial regulators lack independence or if judicial systems are slow to resolve disputes, the risk and cost of investing increase. Several SEE countries still score relatively low on corruption control and rule of law compared to Western Europe (Alfano, Capasso & Filoso, 2020), and this correlates with their smaller market capitalizations and fewer listed firms. During crises, governance quality can also influence resilience: research on the 2008 crisis suggested that countries with stronger institutional quality weathered the market turbulence better, with quicker recovery in investor confidence, whereas those with governance gaps saw more severe and prolonged market downturns (Tsenkov & Stoitsova-Stoykova, 2017b).

Both global evidence and regional studies in SEE concur that governance quality is a key determinant of stock market performance and efficiency. High-quality governance, characterized by strong legal frameworks, vigorous enforcement, low corruption, and accountable institutions creates an environment where stock prices more accurately reflect true corporate value and where markets function smoothly. Investors reward such environments with greater participation, leading to deeper and more liquid markets. By contrast, weak governance undermines trust, leading to shallow markets prone to mispricing and volatility. For SEE countries, continuing to strengthen governance (through legal reforms, better enforcement, and transparency) is not just a political or social imperative but an economic one: it directly shapes the vibrancy and efficiency of their capital markets. The literature clearly indicates that improvements in governance have the potential to unlock stronger stock market performance in the SEE region, complementing other macroeconomic and financial sector developments. This nexus of governance and market outcomes is thus critical to understanding how and why stock markets in SEE countries behave as they do, and what might drive their further development.

Table 1: Exemplary comparative empirical studies of capital markets efficiency

Authors	Markets	Period	Method/Model	Main Results
Alqahtani and Aldeehani (2020)	Middle East	2010 – 2019	VAR Model	Government effectiveness reduces market volatility and increases investor confidence.
Azar (2010)	USA	Jan 1947 - Mar 2009	ARMA and GARCH models	Negative impact of rising key borrowing interest rate and inflation on stock market indices.
Barakat et al. (2016)	Egypt and Tunisia	Jan 1998 - Jan 2014	Granger causality	Significant bi-directional causality between macroeconomic indicators and stock markets.
Barbic & Condic-Jurkic (2011)	Croatia, Czech Republic, Hungary, Poland, Slovenia	Jan 1998 - Jan 2010	Johansen cointegration and Granger causality	Significant bi-directional association between macroeconomic indicators and stock prices.
Boubaker et al. (2018)	Emerging Markets	2000 – 2017	Panel Data Regression	Governance improvements lead to higher stock market returns and lower volatility.
Bouri et al. (2021)	Global Markets	2003 – 2020	Dynamic Conditional Correlation (DCC) Model	Geopolitical risks significantly reduce market efficiency in both developed and emerging markets.
Campbell & Vuolteenaho (2004)	USA	Jun 1927 – Dec 2002	VAR model	Negative impact of rising key borrowing interest rate and inflation on stock market indices.
Dodig (2020)	Slovenia, Croatia, Serbia, B&H, North Macedonia	Sep 2005 – Dec 2016	Panel PMG model	Evidence of market inefficiency through established short- and long-term relationships between macroeconomic indicators and stock indices.
Dodig & Bugarčić (2023)	Croatia, Slovenia, B&H, Serbia, North Macedonia, and Montenegro	Sep 2005 – Dec 2021	Panel PMG model	Evidence of persistent weak-form inefficiency in analysed markets, with portfolio investment emerging as a significant factor influencing stock market performance.
Dumas et al. (2003)	Multiple Developed Countries	Jan 1970 – Jun 1996	Single-index statistical model	Positive impact of macroeconomic performance on financial markets.
Fink et al. (2006)	Several CEE Countries	1996 - 2000	Panel and cross-section regression models	Growth in stock prices positively impacts GDP.
Frijns et al. (2022)	Developed and Emerging Markets	2010 – 2020	Panel Regression Model	Technological innovation positively impacts market efficiency by improving information transmission.
Jamaludin et al. (2017)	Singapore, Malaysia, Indonesia	Jan 2005 - Dec 2015	Panel least squares regression	Significant cointegration between macroeconomic indicators and stock markets.
Leong and Ward (2021)	Asia-Pacific Markets	2011 – 2020	Panel Fixed Effects Model	Governance reforms positively impact capital market efficiency by improving shareholder protection and corporate transparency.

Authors	Markets	Period	Method/Model	Main Results
Pilinkus (2010)	Baltic States	Jan 2000 - Dec 2008	Granger causality, Johansen cointegration, VAR model	Positive association between money supply increase and stock prices.
Plihal (2016)	Germany	Jan 1999 – Sep 2015	Johansen cointegration, Granger causality, VAR model	Significant relationship between stock market index and industrial production, and between stock market index and key interest rates.
Stankovska and Todorovic (2020)	European Union Countries	2005 – 2019	Panel VAR Model	Higher efficiency levels in Western Europe compared to Central and Eastern Europe due to structural differences.
Stojanovic et al. (2021)	Western Balkans	2007 – 2020	Panel Data Regression	Regional integration improves market efficiency by increasing liquidity and cross-border investments.

Empirical Approach and Results

Data and Methodology

This empirical research is based on an annual panel data for six countries (Bosnia and Herzegovina, Croatia, North Macedonia, Montenegro, Serbia, and Slovenia) covering the time period from 2005 to 2023. The primary research aim is to statistically examine the impact of qualitative indicators that are Rule of Law Index (RoL), Government Effectiveness Index (GE), Control of Corruption Index (CoC), and Regulatory Quality Index (RQ) on the performance of inherent Stock Exchange Index (SEI). In addition to these qualitative, the model incorporates standard macroeconomic control variables: gross domestic product per capita (GDPpc), inflation rate (INF), money market interest rate (MMIR), and stock exchange market turnover (MT).

The dataset used in this study integrates multiple authoritative sources. Data on SEI and MT were obtained from the official statistical releases of the Vienna Stock Exchange (for Bosnia and Herzegovina), Zagreb Stock Exchange (for Croatia), Montenegro Stock Exchange (for Montenegro), Macedonian Stock Exchange (for North Macedonia), Belgrade Stock Exchange (for Serbia), and Ljubljana Stock Exchange (for Slovenia). GDPpc and INF were sourced from the World Bank's DataBank. Information on the MMIR was collected from the European Central Bank (ECB), national central banks, including the Croatian National Bank (HNB), the National Bank of the Republic of North Macedonia (NBRM), and the National Bank of Serbia (NBS), as well as from International Monetary Fund (IMF) reports where applicable. Institutional quality indicators Rule of Law, Government Effectiveness, Control of Corruption, and Regulatory Quality were obtained from the Worldwide Gover-

nance Indicators (WGI) project, developed by the Development Research Group of the World Bank in collaboration with the Brookings Institution.

Institutional quality is operationalized through four governance indicators from the Worldwide Governance Indicators (WGI) framework. WGI constitute a composite dataset measuring six key dimensions of governance (Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption) for over 200 countries, on an annual basis, using a scale from –2.5 (weak) to +2.5 (strong). The indicators are derived from more than 30 underlying data sources, including household and firm surveys, expert assessments by non-governmental organizations, commercial risk rating agencies, and data from international organizations. The aggregation follows an unobserved components model, ensuring comparability across countries and accounting for measurement error. This methodological approach allows WGI to serve as a robust benchmark for evaluating institutional quality in cross-country empirical research.

RoL index captures the degree of public confidence in legal institutions, the predictability and impartiality of contract enforcement, the protection of property rights, and the overall effectiveness of the judiciary basis. GE index denotes the capability of the public administration to deliver high-quality public services, maintain a competent and politically independent civil service, and ensure credibility in policy formulation and implementation. CoC index reflects the extent to which public authority is abused for selected private benefit, encompassing both minor and systemic forms of corruption, as well as the influence of entrenched elites over state institutions. RQ index assesses governments' or its agencies' ability to design and apply regulatory frameworks that support private sector development, while avoiding excessive or poorly aligned interventions that could distort market functioning.

The baseline model is specified as follows:

$$SEI_{it} = \beta_0 + \beta_1 GDPpc_{it} + \beta_2 INF_{it} + \beta_3 MT_{it} + \beta_{4MMIRit} + \beta_5 RoL_{it} + \beta_6 GE_{it} + \beta_7 CoC_{it} + \beta_8 RQ_{it} + u_{it}\text{it}$$

where *i* denotes country and *t* denotes time (year).

The dependent variable (SEI) represents the joint stock exchange index, while the explanatory variables include both quantitative indicators and qualitative measures of the operating environment. GDPpc captures the level of economic development, INF reflects price stability, MMIR represents monetary policy stance, and MT measures capital market liquidity. RoL, GE, CoC, and RQ are qualitative governance indicators designed to evaluate and compare the institutional and regulatory frameworks across countries under the objective of identifying strengths and weaknesses in operating systems that may shape economic performance, sustain market integrity, and foster investor trust. Inclusion in the model serves to capture the broader institutional and

regulatory context that influences investor confidence, ensures market transparency, and ultimately affects overall stock market performance.

Descriptive statistics

The data descriptive statistics highlight substantial heterogeneity across the observed countries and time period. The SEI exhibits a mean value of 4,034 points, with a median of 1,745, while the maximum reaches 34,168. Such a wide dispersion, confirmed by the high standard deviation (5,762), indicates pronounced asymmetry and reflects the divergent stages of capital market development and liquidity across the region. In terms of macroeconomic indicators, GDPpc records an average of USD 10,780, with the median value of USD 7,382 pointing to the presence of countries with significantly higher income levels that elevate the mean. The substantial standard deviation (7,224) and the wide range (USD 2,740–32,610) confirm deep structural disparities in the level of economic development. INF averages 3.41%, but with episodes of sharp increases, reaching up to 16.1%, which illustrates exposure to macroeconomic instability and simultaneously the diversity across countries in terms of development stage and policies in place. The MMIR 2.92% but ranges from 0 to 18%, suggesting marked differences in monetary policy responses across countries. MT remains relatively low (mean 0.63, maximum 5.49), underlining the broadly limited depth and liquidity of regional capital markets.

The institutional quality indicators display values closer to the central point of the WGI scale (–2.5 to +2.5). RoL and GE record modestly positive mean values (0.04 and 0.13, respectively), implying relatively moderate institutional performance. CoC registers a slightly negative average (–0.06), reflecting perceptions of corruption, while RQ exhibits the highest mean (0.22), indicating comparatively more sound and favorable regulatory conditions. The dispersion of these governance indicators, with standard deviations ranging between 0.36 and 0.57, suggests notable, yet not extreme, differences among the analyzed countries.

Table 2: Panel descriptive statistics

	Observations	Mean	Median	Standard deviation	Minimum	Maximum
SEI	109	4034.56	1745.44	5762.17	589.58	34168.63
GDPpc	114	10780.28	7382.31	7224.26	2739.61	32610.11
INF	112	3.41	2.20	3.89	-1.60	16.10
MMIR	114	2.92	1.40	3.66	0.00	18.00
MT	114	0.63	0.39	0.79	0.01	5.49
RoL	114	0.04	-0.11	0.48	-0.95	1.09
GE	114	0.13	0.02	0.57	-1.08	1.14
CoC	114	-0.06	-0.22	0.45	-0.68	1.05
RQ	114	0.22	0.24	0.36	-0.62	1.00

Empirical research

Prior to estimation, a panel unit root test was conducted for each variable in order to assess their stationarity properties. Specifically, the Im, Pesaran and Shin (2003) test was employed to detect the presence of unit roots in balanced panels with a relatively small cross-sectional dimensions. The results indicated that variables GDPpc and MMIR exhibit root behavior, i.e., they are non-stationary in standard levels. Consequently, these two variables were transformed into first differences of the same in order to satisfy the stationarity requirement and to prevent spurious regression results. All other variables were found to be stationary in level form and were retained as such in the estimation process.

To account for the underlying structure of the panel data and to determine the optimal econometric specification, a series of diagnostic tests were conducted. The F-tests of joint significance revealed that individual effects, time effects and their combination are all statistically significant. These results indicate presence of substantial cross-sectional and temporal heterogeneity. Therefore, in next step we followed recommendation to employ panel models that explicitly control for such unobserved heterogeneity (Baltagi, 2021; Wooldridge, 2002).

In order to choose between fixed effects (FE) and random effects (RE) specifications, a Hausman test was applied (Hausman, 1978). In its initial form, the test indicated that the RE model was preferable, as it failed to reject the null hypothesis of no correlation between the individual effects and the regressors, suggesting that the RE estimator is both efficient and consistent. However, to assess the robustness of this result, the Mundlak specification, also known as the CRE model, was estimated (Mundlak, 1978). By incorporating the panel-level means of the time-varying regressors, the CRE model allows for a partial relaxation of the strict RE assumptions. The statistical significance of these mean terms indicated the presence of correlation between the unobserved individual effects and the regressors, suggesting that the RE model's assumptions may not hold fully. Therefore, the CRE model was ultimately adopted as the preferred specification. CRE combines the efficiency of the RE approach with the robustness of the FE estimator in the presence of endogenous unobserved heterogeneity.

To further validate the model, the Wooldridge test for autocorrelation in panel data was conducted, confirming the presence of serial correlation within panels (Wooldridge, 2002). As a result, all specifications were estimated with standard errors clustered at the country level, thereby ensuring valid inference under conditions of heteroskedasticity and autocorrelation. Additionally, the presence of multicollinearity among the explanatory variables was assessed using the Variance Inflation Factor (VIF), with a mean VIF value of 4.23. This indicates moderate collinearity that remains within an acceptable thresholds (i.e., VIF < 10) and does not pose a significant threat to the reliability of the model estimates (Greene, 2018).

In summary, the methodological framework of this study integrates a comprehensive dataset, rigorous econometric testing, and robust model specification to provide credible evidence on the relationship between institutional quality and stock market performance in SEE. By combining descriptive insights with panel econometric techniques, the analysis captures both macroeconomic fundamentals and the institutional environment that shape market dynamics. The adoption of the CRE model ensures methodological consistency by addressing unobserved heterogeneity, while diagnostic procedures confirm the validity of the empirical specification.

Table 3: Impact of institutional quality variables on SEI

Variables	FE	RE	CRE
GDPpc	.1627618	.5947101	.1590288
	(.2600501)	(.4991981)	(.3385137)
INF	154.1556	50.57431	279.9327**
	(99.11209)	(171.9562)	(127.4059)
MMIR	-165.18	258.259	-213.5269
	(211.5995)	(398.8448)	(275.3345)
MT	1064.832**	-1443.293*	1173.943*
	(531.0485)	(782.4128)	(691.0552)
RoL	6183.3*	-4824.869	-3991.361
	(3614.016)	(3755.912)	(4407.807)
GE	-2984.032	5087.857**	13574.29***
	(2578.149)	(2450.914)	(2025.764)
CoC	-6647.592***	-450.0572	-4561.339
	(2559.024)	(3999.678)	(3314.048)
RQ	-5310.28***	-3782.982	-2171.075
	(2093.91)	(3111.033)	(2678.08)

Note: *p<0.1, **p<0.05, ***p<0.01;

The findings reveal that qualitative factors notably affect public stock exchanges performance and, if understood and managed properly, can be utilized towards generating economic and financial sector advancements. The results clearly attest towards governance significantly impacting capital markets in SEE. This is illustrated in government effectiveness positively effecting the capital markets index value. The public stock exchanges operating under more efficient governance experience an improved return. It is generally believed that stronger governance quality reduces agent and transaction costs therefore implicitly improving returns. Empirical evidence strongly supports the view that effective governance, and particularly government effectiveness is a critical determinant of financial market performance. Ali Imran et al. (2020) demonstrate that higher levels of government efficiency are positively associated with stock market returns, underscoring the role of institutional quality in

shaping investor confidence. Similarly, Boadi and Amegbe (2017), analyzing a panel of 23 countries over the 1996–2014 period, confirm that improvements in governance indicators, including Government Effectiveness, significantly enhance equity market development. More recent studies, such as Waris et al. (2024) for Malaysia and Maghdid et al. (2024) for Pakistan and the Kurdistan region of Iraq, reaffirm these findings by showing that better policy implementation and administrative efficiency contribute to stronger market outcomes. What is furthermore apparent in the results is that higher market turnover results in greater prices, consistent with the liquidity-based asset pricing literature which demonstrates that more liquid stocks command lower expected returns and, consequently, higher valuations (Baker & Stein, 2004; Acharya & Pedersen, 2005). Such revelation is critical in an environment of relatively illiquid markets as it points to perception of greater investors' involvement in market booms, or alternatively a likely lower presence of speculative market fall trend traders. Lastly, the results reveal an interesting learning that a rise in inflation leads to increase in market prices, which is a relationship direction that contradicts the frequent perception that relies on an impact of inflation leading to a rise in interest rates and subsequent decrease in equity valuations prices and an in-parallel growing interest for higher yield fixed interest financial products. This finding resonates with Chaudhary and Marrow (2023), who show that under conditions of moderate and predictable inflation, equity prices may rise as investors anticipate stronger nominal earnings growth that outweighs the potential negative effects of higher discount rates. The interpretation of results may amongst others imply market instability, structural bias such as purely low participation of fixed income products availability and therefore an opportunity to transition to an alternative product in a rising interest rates environment, or purely an investors' profile that views that companies can better transfer inflation to end users without diminishing of inherent value. SEE capital markets that exhibit important prevalence of oligopolic or monopolic utility companies may truly infer such better capacity to pass-on higher inflation impact onto end users.

Conclusions and Recommendations

The methodological framework employed in this study integrates theoretical grounding, empirical validation of specification tests, and robustness checks, providing a credible basis for analyzing the relationship between institutional quality and capital market performance across the observed countries.

The empirical research results factually confirm markets inefficiency respective to the weak-form theorem. Specifically, the utilized model is an evolution of precedent own (Dodig and Bugarčić, 2023) prior empirical research results and affirms significance in relationships and the continued use of stated macroeconomic indicators. Furthermore, it is shown that market turnover is indeed critical control variable in known illiquid

environment. Equivalently important it is scientifically proven that the respective WGI governance empirical researches (Ali Imran et al., 2020) also play a significant role in SEE frontier markets; in particular government effectiveness determining markets attractiveness. In search of continued progress, we believe that future researches may benefit from the specific review of the same explanatory factors impact on market's risk premia. In an addition it may be beneficial to review on a country per country basis the impact significance of individual governance factors. In overall researches may uncover new value through integration of additional quantitative and qualitative influences into the research model endogeneity. As SEE markets evolve we also observe that with further data length, and consequently lower data limitation availability that currently exists, the equivalent research would benefit repetition and better data stability. Equivalently once sufficient transactions and agents costs publicly available data is accumulated, it would be beneficial to learn the relative impact value of such price forming inputs.

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Code Availability

The computer program results are shared through the tables in the manuscript.

Authors' Contributions

Authors jointly contributed to all article segments as part of joint sequel series reasearch. The work covered is hollistic and covers conceptualization, investigation, soliciting data, drafting, reviewing and editing, analzying, supervising, and processing for completion.

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