

HOW CORRUPT IS ROMANIA? UNDERSTANDING CORRUPTION QUANTIFICATION AND ITS IMPORTANCE IN CONTEMPORARY GOVERNANCE: A CASE OF STUDY OF ROMANIA

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ABSTRACT: *The current article aims to define corruption quantification and its importance in contemporary governance, to review methods, explore statistical models, analyze the impact of corruption quantification and also to introduce Romania as a case study for examining the challenges and methods of quantifying corruption by summarizing the primary methods and models discussed and emphasize the importance of a multi-faceted approach to corruption quantification. The article also reflects on the specific challenges of measuring corruption in Romania and the impact of accurate quantification on improving governance and suggests potential future directions for both research (e.g., integrating new technologies like blockchain to improve transparency) and policy reform in Romania.*

Key words: *corruption quantification, methods, statistical models, governance*

JEL Classificaton: *C40, G39*

1. INTRODUCTION

Corruption remains one of the most pervasive challenges in contemporary governance, with far-reaching consequences for economic development, political stability, and public trust in institutions. As such, understanding and quantifying corruption is critical to devising effective anti-corruption strategies and fostering transparent governance. **Corruption quantification** refers to the measurement and analysis of corruption levels using various indicators, methods, and statistical models. This process involves both subjective tools, such as surveys, and objective measures, like financial audits or criminal convictions, to estimate the extent and impact of corruption within a specific country or region.

Accurate **corruption quantification** is important because it helps policymakers and international bodies assess the severity of corruption, monitor anti-corruption efforts, and identify areas where reforms are most needed. It also provides insights into the effectiveness of governance systems, helps secure foreign investment, and strengthens the rule of law, which is essential for a functioning democracy. Quantifying corruption is, therefore, not only crucial

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for creating accountability but also for promoting sustainable development and improving public trust in governmental institutions.

In this article, we will explore **Romania** as a case study for understanding the challenges and methods of quantifying corruption. Romania provides a unique context due to its complex history of corruption, its struggle with post-communist reforms, and its experience with EU accession processes. We will examine the various methods used to measure corruption in Romania, from traditional indices like the **Corruption Perceptions Index (CPI)** to more advanced statistical models such as **econometric analysis**, **machine learning**, and **social network analysis**. Additionally, we will analyze the **impact of corruption quantification** on Romania's governance, focusing on its role in shaping policy, driving reforms, and influencing public opinion.

Through this case study, we aim to provide a comprehensive understanding of how corruption quantification can inform better governance, while recognizing the challenges involved in obtaining reliable and accurate measures of such a complex phenomenon.

2. METHODS OF CORRUPTION QUANTIFICATION

A. Perception-Based Indicators: Corruption Perceptions Index (CPI) and World Bank Governance Indicators:

The **Corruption Perceptions Index (CPI)**, developed by **Transparency International**, and the **World Bank Governance Indicators** are two of the most widely used tools for measuring corruption and governance globally. Both indices serve as crucial resources for quantifying the perceived or actual extent of corruption in a given country, but they differ in their construction, methodology, and the type of data they rely on.

1. Corruption Perceptions Index (CPI):

The **CPI** is an annual index that ranks countries based on perceived levels of public sector corruption, as determined by expert assessments and surveys. Transparency International constructs this index by gathering data from a variety of reputable sources, including surveys conducted by institutions such as the **World Bank**, **Economist Intelligence Unit (EIU)**, and the **World Economic Forum (WEF)**. The CPI aggregates these various surveys and expert assessments into a single composite score, which ranges from 0 (highly corrupt) to 100 (very clean).

Strengths of CPI:

- The CPI is one of the most widely recognized indices and provides an easy-to-understand score that facilitates cross-country comparisons.
- It draws from a wide array of expert opinions, making it a valuable tool for identifying trends in perceived corruption across different regions and over time.

Limitations of CPI:

- **Subjectivity:** Since the CPI primarily relies on perceptions of experts and businesspeople, it does not necessarily capture the actual levels of corruption. Perceptions can be influenced by factors like media coverage, political narratives, or even the personal biases of survey respondents.
- **Biases in Data Sources:** The data sources used by Transparency International may have their own biases, which could skew the results in particular countries. For instance, surveys might be more common or reliable in certain regions, leading to potential underreporting or overreporting of corruption in others.
- **Lack of Granularity:** The CPI provides a national-level assessment, which can overlook regional disparities within a country. For example, some parts of a country may experience far higher levels of corruption than others, but the CPI gives no insight into these variations.

Table 1. Europe CPI by country

Country	Last	Previous	Reference	Unit
Denmark	90	90	Dec/23	Points
Finland	87	87	Dec/23	Points
Norway	84	84	Dec/23	Points
Sweden	82	83	Dec/23	Points
Switzerland	82	82	Dec/23	Points
Netherlands	79	80	Dec/23	Points
Germany	78	79	Dec/23	Points
Luxembourg	78	77	Dec/23	Points
Ireland	77	77	Dec/23	Points
Estonia	76	74	Dec/23	Points
Belgium	73	73	Dec/23	Points
Iceland	72	74	Dec/23	Points
Austria	71	71	Dec/23	Points
France	71	72	Dec/23	Points
United Kingdom	71	73	Dec/23	Points
Lithuania	61	62	Dec/23	Points
Portugal	61	62	Dec/23	Points
Latvia	60	59	Dec/23	Points
Spain	60	60	Dec/23	Points
Czech Republic	57	56	Dec/23	Points
Italy	56	56	Dec/23	Points
Slovenia	56	56	Dec/23	Points
Poland	54	55	Dec/23	Points
Slovakia	54	53	Dec/23	Points
Cyprus	53	52	Dec/23	Points
Malta	51	51	Dec/23	Points
Croatia	50	50	Dec/23	Points
Greece	49	52	Dec/23	Points
Montenegro	46	45	Dec/23	Points
Romania	46	46	Dec/23	Points
Bulgaria	45	43	Dec/23	Points
Hungary	42	42	Dec/23	Points
Macedonia	42	40	Dec/23	Points
Moldova	42	39	Dec/23	Points
Kosovo	41	41	Dec/23	Points
Albania	37	36	Dec/23	Points
Belarus	37	39	Dec/23	Points
Serbia	36	36	Dec/23	Points
Ukraine	36	33	Dec/23	Points
Bosnia and Herzegovina	35	34	Dec/23	Points

Country	Last	Previous	Reference	Unit
Turkey	34	36	Dec/23	Points
Russia	26	28	Dec/23	Points

Source: tradingeconomics.com

In 2023, Denmark was the EU country with the highest corruption perception index score, implying that it is the least corrupt country in the European Union. The other Nordic countries in the EU, Finland and Sweden, also have high scores and are second and third in this statistic respectively. Bulgaria and Hungary have the lowest index score of all EU countries with a score of 45 and 42 respectively. The index itself is a composite indicator that includes data on the perception of corruption in areas such as bribery of public officials, kickbacks in public procurement, embezzlement of state funds, and effectiveness of governments' anti-corruption efforts. The highest possible score in perception of corruption is 0, whereas a score of 100 indicates that no corruption is perceived in the respective country.

Romania is the 63rd least corrupt nation out of 180 countries, according to the 2023 Corruption Perceptions Index reported by *Transparency International*. Corruption Rank in Romania averaged 68.07 from 1997 until 2023, reaching an all time high of 87.00 in 2004 and a record low of 37.00 in 1997 (Table 2).

Table 2. Romania's Corruption Index

Actual	Previous	Highest	Lowest	Dates	Unit	Frequency
46.00	46.00	87.00	37.00	1997 - 2023	Points	Yearly

Source: tradingeconomics.com

Table 3. Romanian corruption related indicators

Related	Last	Previous	Unit	Reference
Business Confidence	-2.30	-2.70	points	Jan 2025
Capacity Utilization	72.40	68.00	percent	Dec 2024
Car Registrations	13807.00	10237.00	Units	Dec 2024
Changes in Inventories	9166.80	155.00	RON Million	Jun 2023
Corruption Index	46.00	46.00	Points	Dec 2023
Corruption Rank	63.00	63.00		Dec 2023
Electricity Production	3866.00	3771.00	Gigawatt-hour	Nov 2024
Factory Orders	7.10	8.20	percent	Nov 2024
Industrial Production YoY	-1.30	-0.90	percent	Nov 2024
Industrial Production MoM	-0.60	0.40	percent	Nov 2024
Manufacturing Production	-1.20	-0.70	percent	Nov 2024
Mining Production	-3.40	1.80	percent	Nov 2024
Natural Gas Stocks Capacity	33.86	33.86	TWh	Feb 2025
Natural Gas Stocks Injection	0.00	0.00	GWh/d	Feb 2025
Natural Gas Stocks Inventory	14.69	14.90	TWh	Feb 2025
Natural Gas Stocks Withdrawal	214.80	217.50	GWh/d	Feb 2025
New Orders	138.10	149.20	points	Nov 2024
New Car Registrations YoY	21.40	8.10	percent	Dec 2024

Source: tradingeconomics.com

2. World Bank Governance Indicators. The **World Bank Governance Indicators** are a set of six dimensions of governance, including **Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption**. These indicators are compiled from over 30 data sources, such as World Bank surveys, surveys from NGOs, and reports from international organizations. Unlike the CPI, which focuses specifically on corruption, the World Bank Governance Indicators offer a more comprehensive view of governance, with corruption being just one of the six dimensions.

Strengths of World Bank Governance Indicators:

- The **Control of Corruption** indicator is more comprehensive than the CPI in that it looks at both perceptions and actual governance practices that contribute to corruption.
- The World Bank Governance Indicators cover a broader range of dimensions, giving a more nuanced understanding of a country's governance structure beyond corruption alone.
- Data from multiple reputable sources provides a multi-faceted view of governance, which may increase the reliability and robustness of the indicators.

Limitations of World Bank Governance Indicators:

- **Aggregation of Data:** Like the CPI, the World Bank Governance Indicators aggregate data from multiple sources, which can lead to the loss of nuanced or localized insights. This aggregation may mask differences in corruption or governance at a more granular level.
- **Data Quality Issues:** The indicators rely on a variety of different data sources, some of which may not be consistent across countries or regions. In particular, governance data in developing or conflict-affected countries may be less reliable due to gaps in data collection or the absence of formal institutions.
- **Perception Bias:** Much like the CPI, the **Control of Corruption** component of the World Bank Governance Indicators is partially based on perceptions, which introduces the same biases and limitations discussed above. For example, in countries where political or economic stability is perceived to be lower, corruption levels might be viewed as higher even if objective measures of corruption do not support such views.

How These Tools Are Constructed and Limitations: both the CPI and the World Bank Governance Indicators are built using a blend of subjective and objective data, with a significant reliance on expert opinions, surveys, and assessments from international organizations. While these tools have contributed to the study and understanding of corruption in a global context, they share common limitations:

1. **Subjectivity and Perception Bias:** Both indices are largely based on surveys of experts and business leaders, whose views may not necessarily reflect the reality of corruption on the ground. These perceptions can be influenced by recent events, media portrayal of corruption, or even the respondent's own experiences and biases. As a result, countries that experience political instability or media attention regarding corruption scandals may have artificially high perceived corruption levels, even if actual corruption levels are not as severe.
2. **Limited Focus on the Public Sector:** While the CPI focuses solely on the public sector, the World Bank Governance Indicators include a broader range of governance dimensions. However, both indices tend to overlook corruption in the private sector or informal sectors of the economy, where illicit activities might also be prevalent but are harder to capture.

3. **Lack of Granularity:** Both indices provide national-level data, which can obscure regional differences in corruption levels. For example, a country with high national-level scores for corruption control might still have regions with significant corruption problems. Furthermore, the indices tend to overlook corruption in specific industries (e.g., healthcare, education) or sectors that are not well-documented in global surveys.
4. **Data Quality Issues:** Both indices depend on the availability and quality of data, which can be problematic in countries with limited statistical capacity or political will to collect accurate data. In countries with weak institutions or ongoing conflicts, corruption may be underreported or inaccurately assessed, leading to skewed results in these indices.

*In summary, while both the **Corruption Perceptions Index (CPI)** and the **World Bank Governance Indicators** are invaluable tools for gauging corruption and governance at a global level, they are far from perfect. Their reliance on perception-based data, national-level aggregation, and the subjective nature of their data sources means they should be used with caution. These indices provide useful starting points for analysis but should be supplemented by more granular, locally-focused research when possible to develop a fuller understanding of corruption dynamics in a given country.*

B. Objective Measures of Corruption: Convictions, Financial Audits, and Government Expenditure Reviews

While **perception-based indicators** like the **Corruption Perceptions Index (CPI)** and **World Bank Governance Indicators** provide a broad overview of corruption levels, **objective measures** of corruption focus on quantifiable data that are more directly tied to observable actions and events. These methods are crucial for offering a more concrete understanding of corruption, as they rely on actual evidence rather than subjective assessments. Common objective measures include:

1. **Convictions:** one of the most direct ways to quantify corruption is by examining criminal convictions related to corrupt activities. This includes cases where government officials, business leaders, or other individuals are prosecuted for bribery, embezzlement, fraud, or other forms of corruption.

Strengths of Conviction Data:

- **Direct Evidence:** Convictions provide tangible evidence of corruption, linking corrupt practices to legal consequences.
- **Public Accountability:** The frequency of convictions can indicate the effectiveness of the judicial system and law enforcement in combating corruption.

Challenges:

- **Underreporting and Underprosecution:** Many corruption cases go unreported or are not pursued by authorities due to political pressure, lack of resources, or fear of retaliation. Even when corruption is detected, it may not result in a conviction, particularly in environments with weak rule of law.
- **Political Influence:** In some countries, political considerations may influence whether corruption cases are pursued. High-ranking officials or powerful individuals may avoid prosecution, skewing the data.
- **Data Accessibility:** Information about convictions is often difficult to obtain, especially in countries with opaque legal systems or where corruption is endemic.

2. *Financial Audits*: conducted by independent institutions (such as government agencies, international bodies like the **World Bank**, or third-party auditors) are another crucial tool for quantifying corruption. These audits track public spending, procurement practices, and financial transactions within government departments and agencies.

Strengths of Financial Audits:

- **Transparency**: Audits can reveal discrepancies, misuse of funds, or mismanagement, which may indicate corruption. A well-conducted audit can highlight areas where funds are being diverted or used inefficiently.
- **Track Record**: Financial audits, when conducted regularly, can reveal trends in corruption, such as an increase in wasteful spending or funds being siphoned off for personal gain.

Challenges:

- **Data Gaps**: In many countries, financial auditing practices may be inconsistent or incomplete, meaning that not all government departments or spending areas are subject to scrutiny.
- **Manipulation**: Governments or officials may manipulate or obstruct the audit process, making it difficult to obtain reliable data. For example, fake receipts, altered financial records, or suppressed documents can obscure the true nature of corruption.
- **Complexity**: Audits can be technically complex, and understanding the nuances of financial mismanagement may require expertise in accounting and finance. This makes it difficult for non-specialists to fully comprehend audit reports or to act on the findings.

3. *Government Expenditure Reviews (GERs)* are comprehensive analyses of public spending, aimed at evaluating the effectiveness, efficiency, and transparency of government programs. These reviews often focus on large-scale projects like infrastructure development or public health spending, which are prone to corruption.

Strengths of GERs:

- **Comprehensive Coverage**: GERs often look at entire sectors or large projects, providing a holistic view of how public funds are used. This can help to uncover inefficiencies and corrupt practices that might not be visible in smaller-scale audits.
- **Impact Analysis**: Expenditure reviews help assess the outcomes of government spending, linking funds to specific results or benefits. If there is no tangible benefit or if outcomes are disproportionately low, it may indicate corruption or mismanagement.

Challenges:

- **Difficulty in Attribution**: Determining whether inefficiencies or poor outcomes are due to corruption or other factors (e.g., incompetence, lack of training, or bureaucratic inefficiencies) can be difficult.
- **Political Resistance**: Expenditure reviews may face resistance from politicians or government officials who have a vested interest in concealing inefficiencies or corruption. Furthermore, findings may be ignored or dismissed, particularly if they point to high-level corruption.
- **Inadequate Data**: For GERs to be useful, governments must keep accurate and up-to-date records. In many countries, however, data may be incomplete or outdated, hindering the review process.

C. Hybrid Approaches: Combining Subjective and Objective Data

To address the limitations of relying solely on perception-based or objective data, many researchers and organizations have begun using **hybrid approaches** that combine both types

of data. These methods seek to balance the strengths and weaknesses of each approach, offering a more comprehensive picture of corruption.

Corruption Risk Indicators (CRI): one example of a hybrid approach is the use of Corruption Risk Indicators (CRIs). These indicators combine subjective data (e.g., survey responses, expert assessments, or public opinion) with objective data (e.g., government expenditure reviews, convictions, financial audits) to generate a more nuanced and accurate picture of corruption risks within a country or sector.

How CRIs Work:

- **Survey Data:** CRIs might integrate survey data on public perceptions of corruption, asking citizens or experts to rate how pervasive corruption is in various sectors (e.g., healthcare, education, infrastructure).
- **Statistical Analysis:** These perceptions are then combined with objective data on financial audits, convictions, and government spending, often using statistical techniques such as regression analysis to correlate corruption perceptions with actual outcomes.
- **Corruption Risk Profiling:** The result is a comprehensive **Corruption Risk Profile**, which assesses the likelihood of corruption in different parts of the public sector. For example, the profile might indicate that corruption risk is particularly high in procurement processes but lower in judicial systems.

Advantages of CRIs:

- **Balanced View:** By combining both subjective and objective data, CRIs provide a more balanced view of corruption, addressing the limitations inherent in relying on either type of data alone.
- **Improved Accuracy:** These hybrid approaches can improve the accuracy of corruption quantification by identifying correlations between perceived corruption and objective indicators, helping to validate or challenge perceptions.
- **Sector-Specific Insights:** CRIs can be tailored to focus on specific sectors or regions, providing more granular insights into where corruption risks are most concentrated.

Challenges with Hybrid Approaches:

- **Complexity in Data Integration:** Combining subjective and objective data requires sophisticated statistical techniques and expertise. Without careful data integration, hybrid models may fail to provide accurate results.
- **Data Availability:** The success of CRIs and similar approaches depends on the availability and quality of both subjective and objective data. In many developing or conflict-affected countries, data might be incomplete or unreliable, which can hinder the development of effective hybrid models.
- **Modeling Biases:** Both subjective data (based on perceptions) and objective data (based on legal or financial records) can be biased in their own ways. If not properly accounted for, these biases could distort the final corruption risk assessment.

*Conclusion: incorporating both **objective measures** such as convictions, financial audits, and government expenditure reviews, along with **hybrid approaches** like **Corruption Risk Indicators**, allows for a more comprehensive and accurate quantification of corruption. While each method has its challenges—such as underreporting, manipulation, or data gaps—the combination of subjective and objective data offers a promising way to improve corruption measurement. However, for these methods to be truly effective, they require robust data collection mechanisms, transparency in governance, and strong political will to combat corruption. As countries, including Romania, work to improve their corruption measurement frameworks, hybrid approaches may play a critical role in fostering a clearer understanding of corruption's scope and impact.*

3. STATISTICAL MODELS FOR CORRUPTION QUANTIFICATION

The challenge of measuring corruption has prompted the development of a variety of **statistical models** designed to analyze and quantify its impact. Traditional methods, such as surveys and indices, provide valuable insights into public perception but lack precision in capturing the complexities and nuances of corruption at various levels. By using more advanced **econometric models**, **machine learning techniques**, and **social network analysis (SNA)**, researchers have made strides in uncovering hidden patterns and relationships that were previously difficult to detect. However, these models also face significant challenges in terms of data quality and biases. Below, we delve into the different types of statistical models used for corruption quantification and discuss the challenges associated with them.

1. Econometric Models

Econometric models are widely used to assess the **economic impact** of corruption, particularly how it relates to macroeconomic outcomes like **GDP growth**, **income inequality**, **foreign direct investment (FDI)**, and **public spending**. These models typically rely on **regression analysis** and **panel data analysis**, which help researchers control for multiple variables while identifying correlations between corruption and various economic outcomes.

Regression Models and Panel Data Analysis:

- **Regression analysis** is used to estimate the relationship between corruption and various economic indicators. A common approach involves specifying a regression equation where corruption (often measured by indices such as the **Corruption Perceptions Index (CPI)**) is the independent variable, and economic outcomes like **GDP growth**, **FDI**, or **income inequality** are the dependent variables.
- **Panel data analysis** is particularly useful in econometric studies, as it allows researchers to account for data over time and across countries or regions. Panel data can offer insights into how changes in corruption levels over time might affect economic performance. By including both time-series and cross-sectional data, these models allow researchers to observe not only how corruption evolves but also how its economic consequences differ across countries or regions.

Studies Using Econometrics:

- A well-known **study by Mauro (1995)** used cross-country regressions to demonstrate that corruption negatively affects GDP growth. It showed that countries with higher levels of corruption experience slower economic growth, especially in developing economies.
- Research by **Dreher et al. (2007)** used econometric models to investigate the relationship between **corruption** and **foreign direct investment (FDI)**. The study found that high levels of corruption are often associated with lower FDI inflows, as investors are deterred by the risks of bribery, corruption, and the lack of a transparent legal environment.
- Another study, **Svensson (2005)**, employed econometric techniques to analyze the relationship between corruption and **public spending**. It found that corruption can lead to inefficient public spending, as resources are often diverted from crucial public services to private pockets, further exacerbating issues like poverty and inequality.

While econometric models are powerful in assessing relationships between corruption and economic outcomes, they also have their limitations. For instance, they rely heavily on **the availability of accurate data** and may not capture the full range of economic costs associated with corruption, particularly in countries where data collection is sparse or unreliable.

2. Machine Learning Models

In recent years, **machine learning (ML)** techniques and **natural language processing (NLP)** have emerged as powerful tools to analyze large datasets related to corruption. These approaches can analyze vast amounts of data from diverse sources such as **news articles**, **legal records**, and **social media** to identify patterns and trends that are not easily detectable using traditional methods.

Machine Learning and NLP for Corruption Detection:

- **Natural Language Processing (NLP)** enables the analysis of **unstructured text data**, such as news reports and social media content. By applying sentiment analysis, topic modeling, and text classification, NLP can help uncover **patterns of corruption** and **public sentiment** towards corruption-related events. This can be particularly useful in tracking corruption scandals and identifying emerging trends.
- **Supervised learning algorithms** can be trained on labeled datasets (e.g., identifying articles related to corruption) to predict new instances of corruption. By using these models on historical data, researchers can identify the types of events or patterns that precede corruption scandals or reveal covert practices.
- **Unsupervised learning algorithms** such as clustering can identify groups of entities (e.g., businesses or government officials) that are linked through corrupt activities, without pre-existing labels or prior knowledge.

Advantages of ML Models:

- **Handling Big Data:** One of the most significant benefits of using ML is its ability to process and analyze large amounts of data that would be impossible to handle manually. For example, analyzing the entire corpus of news articles or legal documents related to corruption can uncover valuable insights about patterns of corruption in different sectors or countries.
- **Pattern Recognition:** Machine learning models can identify **hidden patterns** that traditional methods might miss, including unusual behavior in financial transactions, irregularities in public procurement, or even subtle changes in public opinion.
- **Dynamic Analysis:** Machine learning models can continuously update their predictions based on new data, allowing for real-time detection of corruption-related events as they occur.

Challenges:

- **Data Quality:** ML models depend on large amounts of reliable, labeled data. In cases where corruption-related data is sparse or unreliable, ML models may not perform well. Inaccurate labeling or biases in data can skew the results.
- **Interpretability:** Many ML models, particularly deep learning models, are often described as “black boxes,” meaning that their decision-making processes are not transparent. This lack of interpretability can be problematic when trying to explain the reasons behind a prediction, especially in sensitive areas like corruption detection.
- **Bias in Algorithms:** If the training data contains biases—such as disproportionate representation of certain countries, sectors, or types of corruption—the ML models could perpetuate or even amplify these biases.

3. Social Network Analysis (SNA)

Social network analysis (SNA) is a method used to examine the **relationships and connections** between individuals, organizations, or entities within a network. In the context of corruption, SNA can be used to track and analyze the networks that facilitate corrupt practices, such as the ties between **businesses**, **government officials**, and **criminal organizations**.

Tracking Corruption Networks:

- SNA models can help uncover the **systemic nature of corruption** by mapping out how corrupt networks operate. For example, SNA can identify key individuals who serve as **nodes** in the corruption network and analyze how they connect with other entities to facilitate corrupt practices, such as money laundering, bribery, or kickbacks.
- By using SNA to map out these connections, researchers can identify **core actors** within corrupt systems, such as politicians, business leaders, or bureaucrats, and track how they collaborate with one another. This approach allows for a more granular understanding of how corruption operates at different levels of society.

Applications of SNA:

- **Mapping Corrupt Networks:** By identifying and visualizing relationships between corrupt officials and businesses, SNA can reveal **hidden connections** and help identify new corruption risks before they escalate.
- **Identifying Structural Weaknesses:** SNA can also be used to analyze the structure of government institutions, helping to identify where corruption is most likely to occur. If certain individuals or departments are heavily connected to corrupt actors, reforms can be targeted at those areas.

Challenges:

- **Data Access:** To effectively use SNA for corruption analysis, data on social networks must be accessible. In many cases, the information about relationships between individuals or entities is not readily available, or it is difficult to verify.
- **Dynamic Networks:** Corruption networks are often fluid, with individuals frequently shifting alliances or entering and leaving networks. This dynamic nature makes it difficult to map networks over time, and models may need continuous updates to reflect changing relationships.

4. Challenges and Limitations of Statistical Models

While **econometric models**, **machine learning**, and **social network analysis** represent powerful tools for quantifying and analyzing corruption, they all face significant challenges that must be carefully considered:

- **Data Quality and Availability:** High-quality data is a prerequisite for any statistical model. In the case of corruption, however, data is often incomplete, biased, or unreliable. For example, corruption-related datasets may be based on estimates, subject to underreporting, or influenced by political interests.
- **Bias in Algorithms:** In machine learning models, biases in the training data can lead to skewed results. If certain corruption-related patterns are underrepresented or if the data is not representative of the broader population, the model's predictions can be misleading.
- **Measurement of Covert Actions:** Many instances of corruption are hidden or covert, making them difficult to detect and measure accurately. This is particularly true when analyzing practices like bribery or illicit financial flows, which are intentionally kept secret.

Conclusion: quantifying corruption through statistical models offers valuable insights into its economic and political impacts. **Econometric models** provide a foundation for understanding the broader consequences of corruption on GDP growth, foreign investment, and public spending. **Machine learning** and **social network analysis** offer more dynamic and detailed methods for uncovering patterns and networks that traditional methods may miss. However, challenges related to data quality, biases, and the covert

nature of corruption remain significant obstacles. Despite these challenges, the integration of these models into corruption research holds the potential to transform how we understand and combat corruption on a global scale.

4. IMPACT OF CORRUPTION IN ROMANIA

Corruption has had far-reaching consequences for Romania, affecting not only its political and social fabric but also its economic development and integration into European structures. By analyzing the economic and political impacts, case studies, and anti-corruption efforts, we can better understand the pervasive nature of corruption and its implications for Romania's governance and development.

1. Economic Impact of Corruption in Romania

Corruption in Romania has significantly undermined the country's economic potential, contributing to slower growth, diminished foreign investment, and inefficient public spending. Several studies and reports underscore the profound negative effects of corruption on Romania's economy, which has struggled to recover from the legacy of state socialism and to meet the standards required by European Union (EU) integration.

Slower Economic Growth: Corruption can create an unfavorable business environment, increase the costs of doing business, and reduce the efficiency of the private sector. The **World Bank** has highlighted that corruption, particularly in public procurement, has a direct impact on the overall business climate, deterring investment and stifling innovation. In Romania, corruption has increased transaction costs and reduced competition in sectors like construction, healthcare, and infrastructure, leading to slower growth compared to other EU countries.

Reduced Foreign Investment: The negative perception of corruption, as captured in indices like the **Corruption Perceptions Index (CPI)**, can also deter foreign direct investment (FDI). Investors are often hesitant to engage in markets where corrupt practices are prevalent, fearing that they might face bribery demands or lack confidence in the legal protection of their investments. Studies show that in Romania, while FDI flows have improved since the 1990s, they have not reached the levels expected from a country with Romania's potential. Corruption is frequently cited as one of the primary barriers to greater foreign investment.

Inefficiencies in Public Spending: Public spending in Romania, particularly in infrastructure and public services, has been plagued by corruption, which diverts funds away from critical development projects. Public procurement systems have been a hotspot for corrupt practices, including kickbacks and rigged bidding processes, resulting in inefficient allocation of public resources. The **European Court of Auditors** has frequently criticized Romania's management of EU funds, citing irregularities and corruption in the implementation of projects designed to modernize infrastructure and improve social services.

Corruption¹⁵ is identified and experienced as a self-generating, spiral phenomenon, starting with corruption, followed by a slowdown in economic activity, a shortage of budget resources, increasingly higher debts for public servant salaries, and ending with an increase in the initial level of corruption. Calculations indicate a very close indirect link between the degree of corruption and the GDP per capita. There is also a clear correlation between the country's corruption index and the reform performance index in transition countries, with key components including progress in the political system, media independence, the viability of the

¹⁵ <https://www.contributors.ro/2-melanjul-politic-romanesc-si-tranzitia-ca-stare-de-spirit/>

legal system, public administration efficiency, and the development of the private sector. (Gheorghe Savoiu).

The Gross Domestic Product per capita in Romania was last recorded at 12386.46 US dollars in 2023 (Table 4). The GDP per Capita in Romania is equivalent to 98 percent of the world's average. GDP per Capita in Romania averaged 7235.71 USD from 1990 until 2023, reaching an all time high of 12386.46 USD in 2023 and a record low of 4057.26 USD in 1992, according to World Bank. GDP per Capita in Romania is expected to reach 12783.00 USD by the end of 2025, according to Trading Economics global macro models and analysts expectations. In the long-term, the Romania GDP per capita is projected to trend around 13256.00 USD in 2026 and 13746.00 USD in 2027, according to our econometric models.

Table 4. Romanian GDP related indicators

Related	Last	Previous	Unit	Reference
Full Year GDP Growth	2.10	4.10	percent	Dec 2023
GDP	351.00	298.89	USD Billion	Dec 2023
GDP Growth Rate YoY	1.20	0.90	percent	Sep 2024
GDP Constant Prices	302006.80	302237.70	RON Million	Sep 2024
GDP from Agriculture	10879.40	14062.50	RON Million	Sep 2024
GDP from Construction	20160.20	20540.10	RON Million	Sep 2024
GDP from Manufacturing	45527.80	48873.30	RON Million	Sep 2024
GDP from Public Administration	40553.20	40490.60	RON Million	Sep 2024
GDP from Services	61958.50	61228.90	RON Million	Sep 2024
GDP Growth Rate	0.00	0.10	percent	Sep 2024
GDP per Capita	12386.46	12131.74	USD	Dec 2023
GDP per Capita PPP	40517.55	39684.31	USD	Dec 2023
Gross Fixed Capital Formation	56027.50	78838.90	RON Million	Sep 2024

Source: tradingeconomics.com

Table 5. GDP per capita by country in Europe

Country	2023	2022	Reference	Unit
Luxembourg	105997	109715	Dec/23	USD
Ireland	91783	97317	Dec/23	USD
Switzerland	89943	90057	Dec/23	USD
Norway	78939	79435	Dec/23	USD
Denmark	61032	60346	Dec/23	USD
Iceland	58393	57816	Dec/23	USD
Sweden	55521	55894	Dec/23	USD
Netherlands	50100	50547	Dec/23	USD
United Kingdom	47005	47343	Dec/23	USD

Country	2023	2022	Reference	Unit
Finland	45939	46655	Dec/23	USD
Austria	45852	46698	Dec/23	USD
Belgium	44283	44198	Dec/23	USD
Germany	42879	43361	Dec/23	USD
Andorra	40162	39721	Dec/23	USD
France	38976	38816	Dec/23	USD
Euro Area	37400	37450	Dec/23	USD
European Union	34163	34169	Dec/23	USD
Italy	33774	33364	Dec/23	USD
Malta	31190	30761	Dec/23	USD
Cyprus	30769	30557	Dec/23	USD
Spain	28047	27703	Dec/23	USD
Slovenia	25643	25350	Dec/23	USD
Portugal	22378	22126	Dec/23	USD
Greece	20827	20288	Dec/23	USD
Estonia	20245	21141	Dec/23	USD
Czech Republic	19800	20237	Dec/23	USD
Slovakia	19217	18898	Dec/23	USD
Lithuania	18214	18535	Dec/23	USD
Poland	17270	17179	Dec/23	USD
Croatia	17234	16712	Dec/23	USD
Latvia	16945	17015	Dec/23	USD
Hungary	16287	16345	Dec/23	USD
Turkey	14630	14055	Dec/23	USD
Romania	12386	12132	Dec/23	USD
Russia	10421	10030	Dec/23	USD
Bulgaria	9780	9551	Dec/23	USD
Montenegro	8375	7889	Dec/23	USD
Serbia	7736	7493	Dec/23	USD
Belarus	6483	6207	Dec/23	USD
Bosnia and Herzegovina	6421	6271	Dec/23	USD
Macedonia	6350	6218	Dec/23	USD
Albania	5394	5155	Dec/23	USD
Kosovo	4854	4666	Dec/23	USD
Moldova	3685	3582	Dec/23	USD
Ukraine	2207	2043	Dec/23	USD

Source: tradingeconomics.com

The Romanian economy grew by 2.1% in 2023, slowing sharply from the expansions of 4.1% and 5.7% recorded in 2022 and 2021, respectively. Full Year GDP Growth in Romania averaged 3.33 percent from 2012 until 2023, reaching an all time high of 7.10 percent in 2017 and a record low of -3.70 percent in 2020 according to Institutul National de Statistica. Full Year GDP Growth in Romania is expected to reach 2.00 percent by the end of 2024, according to Trading Economics global macro models and analysts expectations. In the long-term, the

Romania Full Year GDP Growth is projected to trend around 3.20 percent in 2025 and 3.70 percent in 2026, according to our econometric models.

Table 6. Romania's CPI, GDP per capita, GDP growth

YEAR	CPI	RANK	GDP per capita	Full year GDP Growth
2012	44 points	66		
2013	43	69	8,29K USD	3,5%
2014	43	69	8,66	3,1%
2015	46	58	8,98	4%
2016	48	57	9,29	4,8%
2017	48	59	10,1	7,1%
2018	47	61	10,8	4,5%
2019	44	70	11,3	4,2%
2020	44	69	10,9	-3,7%
2021	45	66	11,6	5,7%
2022	46	63	12,1	4,1%
2023	46	66	12,4	2,1%
2024			12,6	2,65%
2025	Forecast		12,8	3,2%
2026			13,3	3,7%
2027			13,7	3,7%

Source: Made by author based on data of tradingeconomics.com

2. Political Impact of Corruption in Romania

Corruption has also had significant political consequences in Romania, affecting the legitimacy of government institutions, eroding public trust, and impeding democratic reforms. The politicization of anti-corruption bodies, such as the **National Anti-Corruption Directorate (DNA)**, and scandals involving high-ranking officials have illustrated the deep-rooted challenges to establishing a fair and transparent political system.

Erosion of Public Trust: Corruption has eroded public trust in Romanian government institutions. The public's perception of widespread corruption in both local and national politics has resulted in cynicism and disillusionment with the political process. According to surveys conducted by organizations like the **Eurobarometer**, Romanian citizens are among the most distrustful of their government in the EU, with corruption seen as one of the primary reasons for this lack of confidence.

Politicization of Anti-Corruption Bodies: One of the significant challenges Romania faces is the politicization of anti-corruption bodies. The **DNA** has made considerable progress in prosecuting high-ranking politicians and officials, but this success has often been met with political resistance. Various political leaders have accused the DNA of being used as a political tool to target their opponents, undermining the institution's independence and credibility. This has created a polarized political environment where anti-corruption measures are sometimes viewed not as neutral efforts but as partisan attacks, further eroding trust in the rule of law.

Undermining Democratic Processes: Corruption in Romania has also had a broader impact on the democratic process. It has contributed to the entrenchment of patronage networks, where political loyalty is prioritized over merit, and public resources are allocated to those who support the ruling elite. This has undermined the development of democratic institutions, reduced political competition, and hindered reforms necessary for strengthening democracy. Corruption also creates opportunities for oligarchic elites to control large sectors of the economy and politics, further consolidating their power and limiting accountability.

The consequences of the economic risk posed by the antidemocratic and corrupt political class have unfortunately extended even to the political security of the state: the formation of a political component that imposes its will on society, contributing to the substantial increase of state debts; the reduction of budget payments, resulting in the failure of policies supporting entrepreneurship, social protection, education, healthcare, the environment, and public sector salaries; the violation of citizens' constitutional rights and guarantees, the discrediting of the public system, and the lack of respect for the state by the population; the deterioration of the environment, with the dominance of economic-political interest groups seeking immediate profits; the decrease in the performance of reforms and the economic development of the country¹⁶.

3. Case Studies of Corruption in Romania

To understand the impact of corruption more concretely, it is helpful to look at specific **case studies** that illustrate both the persistence of corruption and the attempts to combat it in Romania.

DNA and High-Ranking Official Trials: The **National Anti-Corruption Directorate (DNA)** has been a central actor in Romania's fight against corruption, particularly in prosecuting high-ranking political and business leaders. The DNA's efforts have led to the conviction of former prime ministers, ministers, and other senior officials. For instance, **Liviu Dragnea**, the former leader of the Social Democratic Party (PSD), was convicted of corruption-related offenses and sentenced to prison. While the DNA's success in securing convictions has been significant, its work has also been politically contentious, with critics accusing it of overreach and bias, especially when targeting opposition figures.

The Colectiv Nightclub Fire Scandal: The **Colectiv nightclub fire**, which killed 64 people in 2015, brought to light corruption within the Romanian public safety and regulatory systems. The fire, caused by inadequate fire safety measures and regulatory oversight, led to protests across the country. Many critics argued that corrupt practices and bribery in the approval of safety permits contributed to the tragedy. The ensuing investigations uncovered systemic corruption within Romania's local government and the fire safety inspection system. Although some individuals were prosecuted, the case highlighted the challenges in holding officials accountable for regulatory failures that endanger public lives.

Trial of High-Ranking Officials: High-profile corruption trials have highlighted both the success and limitations of anti-corruption measures in Romania. While the DNA has secured convictions of high-ranking officials, the process of prosecuting top-level corruption is often slow and fraught with political interference. Additionally, many of the trials have led to only partial convictions or have been delayed due to appeals, further complicating the fight against corruption.

4. Reforms and Anti-Corruption Efforts in Romania

Despite the challenges posed by corruption, Romania has made significant strides in its anti-corruption efforts, often driven by its commitment to European Union (EU) standards and the expectations of EU accession.

The Role of the EU: The EU has played a pivotal role in pushing Romania to strengthen its anti-corruption measures. During Romania's accession process, the EU made anti-corruption reform a condition for membership, and since joining the EU in 2007, Romania has been under the **Cooperation and Verification Mechanism (CVM)**, which monitors the

¹⁶ <https://www.contributors.ro/2-melanjul-politic-romanesc-si-tranzitia-ca-stare-de-spirit/>

country's progress in judicial reform and anti-corruption efforts. While Romania has made some progress, EU officials continue to express concern about the pace of reforms and the persistence of corruption at all levels of government.

National Anti-Corruption Directorate (DNA): The DNA has been one of the most prominent agencies in Romania's anti-corruption efforts, securing thousands of convictions, including high-profile cases. However, its independence has been under threat in recent years, with political figures seeking to undermine its work. Despite these challenges, the DNA remains an essential player in Romania's fight against corruption, and its success in prosecuting corruption within the public sector has led to some public trust in the legal system.

Public Procurement and Judicial Reforms: Efforts to improve transparency in public procurement have been another area of focus in Romania's anti-corruption reform agenda. The introduction of online procurement platforms and the implementation of transparency measures in the allocation of EU funds have helped to reduce corruption in these areas. Similarly, judicial reforms aimed at increasing judicial independence and reducing political influence have been critical in strengthening Romania's rule of law. However, progress has been slow, and efforts to reform the judiciary have often been met with political resistance.

5. CONCLUSION

The features of Romanian corruption have always remained the same: the erosion of ethical values and the demoralization of society; the non-transparent and contradictory legislative system; the low salary level in the public sector; the state policy that generates the search for methods of obtaining unofficial income; the promotion of candidates to positions without real achievements, based solely on political reasons or affiliation with interest groups or fraudulent intentions; poor information and widespread public tolerance (in this regard, Romania has the highest level of tolerance for corruption among the EU-27); the transformation of fighting corruption into fighting political opponents, etc.

Corruption in Romania has had a profound impact on both the country's economic and political development. From slower growth and reduced foreign investment to the erosion of public trust in institutions, the consequences of corruption are far-reaching. The work of institutions like the DNA and the ongoing anti-corruption reforms, both at the national and EU levels, illustrate the challenges and successes of efforts to combat corruption. While Romania has made progress, particularly in improving transparency and prosecuting high-ranking officials, there is still much work to be done to address the deep-rooted corruption that continues to affect the country's governance and development.

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