AN ASSESSMENT OF THE INTERRELATIONS BETWEEN COUNTRY RISK, ECONOMIC GROWTH AND GOOD GOVERNANCE: THE CASE OF THE VISEGRAD FOUR

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ABSTRACT

Investors assess the environment and the level of risk before they invest in a specific region or country. Several country risk indexes have been developed since the beginning of the 1990s, using risk factors such as politics, the economy and sovereign risk factors. This study aims to determine the relationships between the country risk index, economic performance and good governance. The study implemented a quantitative research methodology with panel data, focusing on the four Visegrad countries (V4), using time-series data from 1996 to 2019. The results indicate both long- and short-run relationships. According to different estimation models, both GDP and good governance significantly impact the country risk index with coefficients of between 0.17 to 0.31 and 0.02 to 0.15. The Granger causality results indicated that both GDP and good governance cause changes in the country risk indexes of the countries, and good governance causes increased economic performance. In conclusion, the study showed clear evidence that a lower country risk index is important to attract investment and sustained economic growth and good governance is critical in this process.

Keywords: country risk index, economic growth, good governance, Visegrád region

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INTRODUCTION

The study of the relationship between country risk, including political, governance and economic risk factors, has been gaining momentum over the last two decades. Various country risk indexes have been developed, and academics, researchers and investors use these indexes for research and decision-making purposes. These indexes include the Euler Hermes risk index (Euler Hermes, 2021), risk rating agencies such as Moody's, Standard and Poor (S & P), and Fitch, the OECD's country risk classification (OECD, 2021), the PRS international country risk guide (PRS Group, 2021), The Euro Money Country Risk index (EuroMoney Country Risk, 2021), and CountryRisk.io's country risk index (2021). Country risk refers mainly to the performance and stability of governance in a country.

For this reason, the quality of governance is important, and the notion of "good governance" started in the 1990s. (Simonis, 2004). According

to Asiri and Hubail (2014), risk analysts use country risk indexes and data for decision-making regarding investment and using different country risk indexes for a collection of countries across the globe, found that the impacts of various risk factors such as political and economic factors varied significantly for different countries over time.

The term "good governance" is critically linked to the concept of country risk, which has become vital in the development literature and research. Good governance is seen as one of the critical factors for economic development (Mira & Hammadache, 2017). Good governance as a factor is more and more used in determining the level of country risk in a country. (UNESCAP, 2021). The World Bank started its Governance Indicators index in 1996 to determine levels of good governance and includes factors such as government effectiveness, political stability, quality of regulations, corruption control, and the rule of law (World Bank, 2021).

This study assesses the relationship between country risk levels, economic growth and good governance using panel time-series data from 1996 to 2019. The study region is the Visegrad group of countries in Central and Eastern Europe. This group of countries is relatively homogeneous regarding socio-economic and governance factors.

Table 1: Summary of comparative analysis between the four Visegrad countries

Variable	Year	Czech Republic	Hungary	Poland	Slovakia
CRI	1996	27.03	43.67	33.47	38.66
	2000	28.87	36.48	37.16	42.81
	2005	26.50	35.73	29.86	25.06
	2010	26.89	26.46	25.91	23.01
	2015	19.61	25.84	24.22	27.89
	2019	**17.87 (1.47%)**	**33.85 (0.98%)**	**17.11 (2.13%)**	**24.47 (1.59%)**
GDP constant US$ billions	1996	146.1	92.7	268.2	49.9
	2000	152.7	107.1	326.9	55.6
	2005	184.9	132.7	379.9	71.1
	2010	209.1	131.9	479.8	90.3
	2015	227.4	146.2	555.1	102.5
	2019	**258.9 (3.36%)**	**171.7 (3.71%)**	**660.9 (6.37%)**	**114.5 (5.63%)**
Good governance	1996	0.62	0.86	0.68	0.46
	2000	0.65	0.98	0.61	0.61
	2005	0.93	0.77	0.48	0.93
	2010	0.91	0.67	0.64	0.84
	2015	1.05	0.50	0.80	0.84
	2019	**0.89 (1.89%)**	**0.50 (-1.82)**	**0.60 (-0.51)**	**0.67 (1.98)**

Sources: CRI data from CountryRisk.io (2021); GDP data from World Bank (2021); Good governance data from World Bank Governance Indicators Index (2021).

Note: Data in brackets are annual growth rates from 1996 to 2019 in percentage.

The primary research problem investigated is the relationship between country risk and economic growth and governance: Does this matter, and what are the strength and directions of causality of these relationships? Limited studies have been conducted on this developing research sub-field, especially in the Visegrad region. Figures 1 to 3 with Table 1 summarize the status quo for the four Visegrad countries. Regarding the country risk index (CRI), Poland had the lowest country risk index in 2019 of 17.11, followed by the Czech Republic; Hungary had the highest risk index, 33.85. Poland also had the highest annual improvement rate from 1996 to 2019, 2.13%, followed by Slovakia. Poland had by far the largest economy as measured in US$ (billions) in 2019 with US$ 660.9, followed by the Czech Republic with a GDP of US$ 258.9. Slovakia had the smallest economy with a GDP of US$ 114.5. Poland had the highest annual average GDP growth rates of 6.37% from 1996 to 2019, followed by Slovakia with 5.63%. Lastly, the Czech Republic had the highest good governance index of 1.05, followed by Slovakia. This index ranges between +2.5 to -2.5. Slovakia had the highest rate of per annum improvement since 1996, 1.98%, while Poland and Hungary both had negative improvement rates.

Figure 1 is a summary of the CRI for the four Visegrad countries. From 1996 to 2019, the Czech Republic overall had the lowest country risk compared to the other countries. In 2019 however, Poland overtook the Czech Republic with the lowest risk, as all three of the other Visegrad countries experienced increased risk. Overall, Hungary had the highest risk index over the total period.

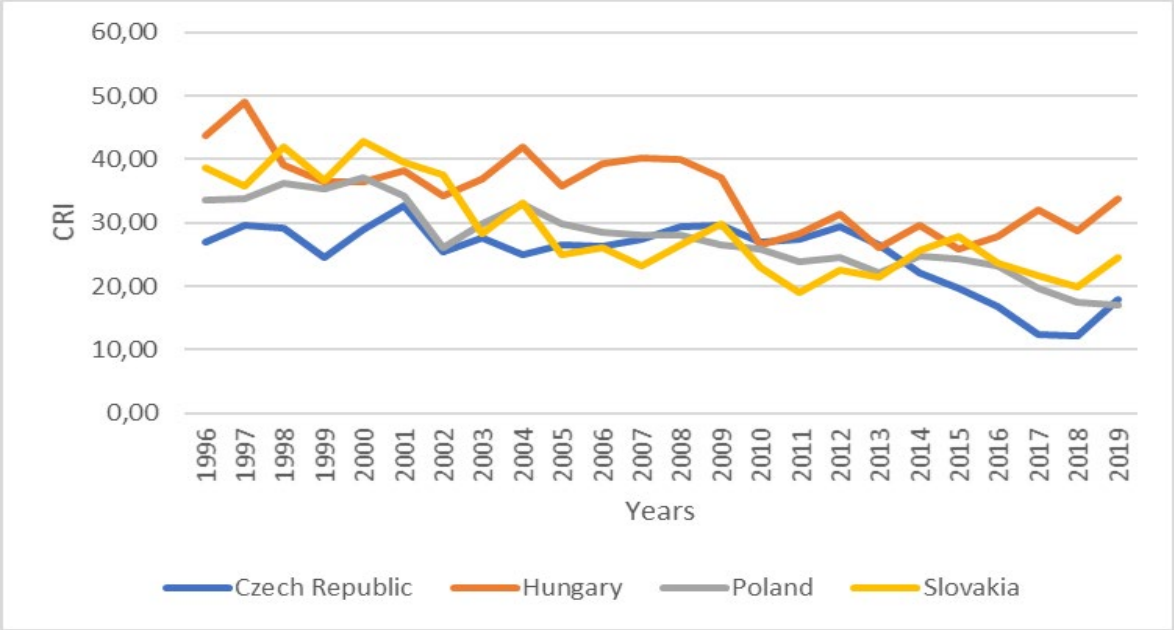

Figure 1: Status quo of CRI, country comparison (low index indicates lower risk)

Figure 2 is a presentation of the GDP at constant prices for the Visegrad countries. Poland experienced the highest total GDP and growth rates over the study period, followed by the other three countries with similar growth rates, all much lower than Poland's.

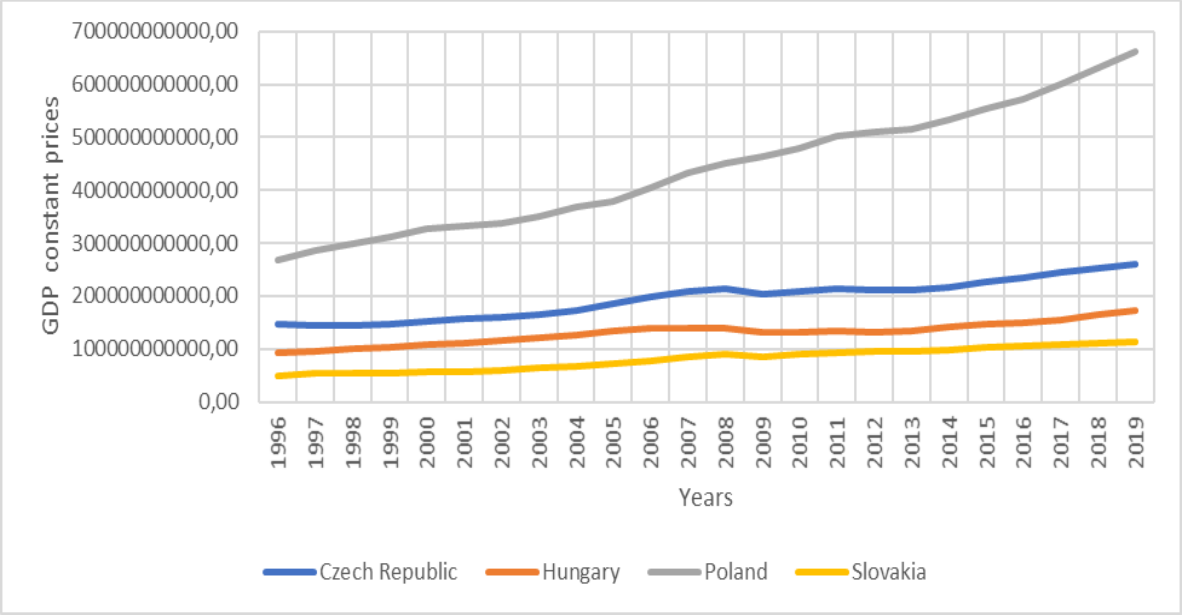

Figure 2: GDP country comparison

Lastly, Figure 3 is a presentation of the good governance index for the Visegrad four. All four countries have experienced declining good governance indexes since 2016, with the Czech Republic achieving the best good governance index over the period, followed by Slovakia. It is interesting to note that Poland, with its rapidly increasing economic performance, does not feature as the top-performing country in terms of country risk or good governance.

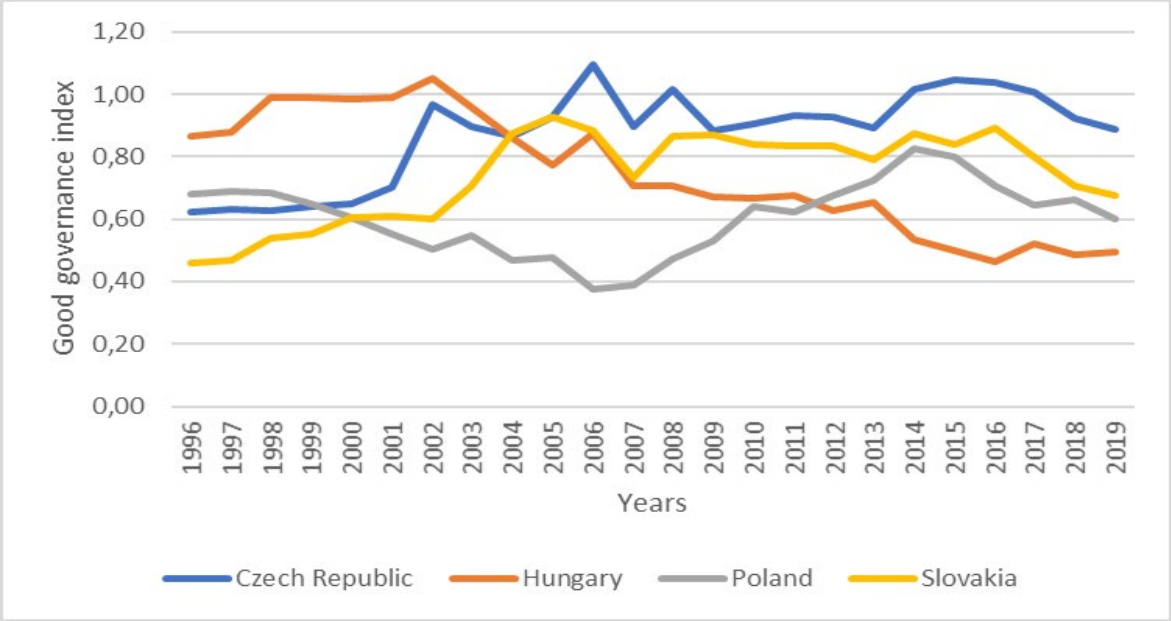

Figure 3: Good governance country comparison

LITERATURE REVIEW

The literature review section consists first of a clarification of concepts used in the study, second an exposition of the theoretical foundation, and last a focus on empirical studies of previous studies on this topic. In terms of defining the main concepts, country risk is difficult to define, as it depends on the specific objective and point of view of the determinant of the country risk. Since the 1990s, a growing number of institutions have determined country risk. Most risk indexes include political, economic, and sovereign risks (Bonatti et al. 2021). Meldrum (2000) defines country risk as risks that could emerge when investments are made in foreign countries, focusing on political, economic, and social risks in a country. In this study, the country risk index of CountryRisk.io is used due to the availability of relatively long time series data and the comprehensiveness of the compilation of the index. The index consists of the following components: economic prospects, quality of governance and institutions, fiscal and monetary policy and stability; public debt and sovereign liquidity, and strength of the private sector and partnerships with the public sector (CountryRisk.io, 2021). In terms of good governance, UNESCAP (2021) divides the concept into eight sections, as indicated in Figure 4. Good governance attempts to control and prevent corruption and takes all citizens' views and opinions into account in decision-making.

Figure 4: Good governance principles
Source: UNESCAP, 2020.

In addition, and according to Bala (2017), the delivery of effective and reliable services is a way to determine if a government is successful or not. Good governance could also include justice, effective and quality institutions, and effective budgeting and management. Good governance is critical for the proper functioning of a nation, but also efficient democracy and a necessity to achieve national developmental goals. "Good governance" and "pro-poor growth" are essential concepts in development studies. In a study by Resnick and Birner (2006), results show that good governance through sustainable policy implementation and a stable political environment with the rule of law is in most cases associated with increased investment and strong economic performance. In a study with a focus on good governance, Samimi et al. (2012) findings are that better governance has an overall positive impact on country risk and the economy and even on environmental quality. Countries should therefore attempt to improve governance indicators and country risks levels.

Lastly, economic output, known as GDP and growth, are defined. GDP is the value of all goods and services produced over a specific timeframe within a selected country. According to Callen (2020), the concept of GDP is globally accepted to

determine the size and health of an economy. A growing economy is usually an indication of positive impacts on citizens and businesses. Acemoglu (2012) states that globally disparity exists between developed and developing countries and differential growth rates. These differential growth rates have resulted in growing differences between countries related to GDP and income per capita. Over the last few decades and most recently, China has closed this gap using rapid and continuous economic growth, improving quality of life, and living standards.

The study's theoretical foundation is focused on the equilibrium theory (Romanelli & Tushman, 1994; Gresov et al., 1993). The equilibrium theory expects changes in the organizational environment and changes in the external environment (Anderson & Tushman, 1990). In terms of this theory, organizational transformations are needed for structural change, and changes occur in short-term bursts of fundamental changes (Romanelli & Tushman, 1994). Various reasons could drive short term structural and fundamental changes, such as political events with changes in political leadership or disruptions in the economy via new technology (Anderson & Tushman, 1990). The equilibrium theory is also applicable in public management and policy development and implementation. Baumgartner and Jones (1993) state that, as with the economy, policy formulation could be characterized by periods of stability with short bursts of instability and rapid policy and political changes. Therefore, the equilibrium theory is a suitable theoretical foundation to study country risk with associated variables such as economic output and good governance, as is the case in this study.

The next section of the study assesses empirical studies and their findings in the literature. Chiu and Lee (2017) examined the non-linear impacts of country risk indexes on the debt-growth relationship in a panel analysis including 61 countries. Results indicate a differentiation between high-risk countries and low-risk countries. For countries with high country risk indexes, the impact on economic growth is significant when public debt is rising. In contrast, in a low-risk environment, the negative impact of rising public debt is less significant on the economy and could even stimulate economic growth under such conditions. Lessons from this analysis are that countries should attempt to keep their country risk index low and effectively use public finance to boost economic performance with stable and effective policies. Cheng et al. (2011) assessed the impact of a low-risk country index versus a high-risk country index on economic growth and the stock markets in 28 countries, using panel data from 1976 to 2003. Results from that study include that low-risk countries can expand and strengthen their stock markets for economic growth. However, high-risk countries have to use different strategies to attain economic growth. They should develop their stock markets, leading to more robust credit markets, leading to economic growth.

Glova et al. (2020) investigated the impact of political and economic factors on country risk in selected European countries using an econometric panel model. The results conclude that economic factors such as GDP, unemployment, inflation, government debt, and political and governance factors such as corruption and the rule of law impact and influence country risk. The results also indicated differences in the impact of these factors related to the level of country risk. Iloie (2015) investigated the relationships between macro-economic variables, including FDI inflows, the corruption index (a proxy for good governance) and country risk indexes for Central and Eastern Europe. FDI is used to measure economic progress and the improvement in the competitiveness in a country. FDI inflows are affected by perceptions of the international community and risk factors as measured by the corruption perception index and the country risk assessment in this study. Iloie (2015) did not find any significant relations between FDI, CRA and the Corruption Index, however, special conditions existed over this analysis period, with the EU implementing support policies during it. For example, it was found in Ukraine that high FDI inflows were achieved while corruption levels and CRA were at high levels. Săvoiu et al. (2013) investigated the relationship between macro-economic factors, including Foreign Direct Investment (FDI) and country risk in Romania using econometric models. The main findings from this study are that FDI inflows are

dependent on lower levels of country risk, and FDI can play an essential and positive role in economic growth. Feinberg and Gupta (2009) state that country risk and foreign direct investment (FDI) are negatively associated, meaning that high levels of country risk lead to lower levels of inflow of FDI. However, other factors also attract FDI despite high levels of country risk, such as rapid economic growth, low production cost, and high productivity.

Hammoudeh et al. (2013) assessed the relationships between country risk, including the economic, financial and political risk of the BRICS countries and the stock markets and economic growth in these developing countries. Results are interesting and were provided per individual BRICS countries. The study found that financial risk ratings are more sensitive to changes than economic and political risk ratings. Of the five BRIC countries, Brazil showed high levels of sensitivity to economic and financial risks, while Russia and China had the highest sensitivity related to political risk. The Chinese stock market was most sensitive to all the risk factors. Montes and Tiberto (2012) assessed the impact of changes in the economic environment, including policies on country risk and the impact of both the economic environment and country risk on the stock market in Brazil, a BRIC country member, and a developing country. The methodology included a time series econometric process using ordinary least squares (OLS) and generalized method of moments (GMM) systems. An interesting result from the study confirms that macro-economic changes, including monetary policy and public sector debt management policy, affect country risk and the Brazilian economy and stock market performance.

Sari et al. (2013) examined the relationships between the country risk index, including political risk, financial risk and economic risk, and economic and stock market movements in Turkey, a developing country, using an econometric autoregressive distributed lag approach. The study's outcomes are that a long-run relationship exists between risk ratings and economic and stock market movements. In the short run, however, only improvements in political and financial risk rating components positively and significantly impact economic performance and stock market movements. Verma and Verma (2014) assessed the response of country risk in Asia to domestic and global macroeconomic factors changes, including Hong Kong, Indonesia, Malaysia, Philippines, and Singapore. The results indicate significant impacts of global risk factors on the country risk of the Asian economies. Specifically, interest rates and inflation of G-7 countries have significant negative impacts on country risk in these Asian countries. Changes in the exchange rate and money supply are endogenous factors affecting country risks in these countries.

Tanjung et al. (2017) analyed the relationship between macro-economic factors such as GDP and monetary and fiscal policy and country risk in Indonesia from 1980 to 2014 using econometric models. The results from the study indicate that economic variables such as the money supply have a positive and significant impact on economic growth, and country risk has a significant impact on the interest rate and economic performance with inflation. A recommendation from the study is that policy formulators should focus on implementing economic policies to promote economic growth and stability with lower levels of country risk. Masrizal et al. (2020) also tested the relationships between Indonesia's country risks and other economic variables such as exchange rate, oil prices, and industrial production index 2003 to 2016 using a Johansen Cointegration Test and Vector Error Correction Model (VECM). Those findings indicate the existence of short-term and long-term causalities between country risk and macroeconomic variables. In addition, it was found that investors consider all risks, including financial and economic risks, and exchange rates, in decisions in the locality of investments.

Hassan et al. (2003) also analyzed the relationship between country risk, including political, financial, and economic risk and the macro-economic conditions, including the stock market and investment in the Middle East and Africa (MEAF) from 1984–1999. The findings indicate that country risks significantly impact the economy, specifically stock market volatility and investment. Shareef and Hoti (2005) compared six small island tourism economies (SITE) using monthly country risk rating data

from ICRG from 1984 to 2001. The study analyzed the relationship between country risk and economic growth and found that the economic growth rate and the country risk index was positively correlated.

Regarding the relationship between economic performance and good governance, Kurtz and Schrank (2007) indicated that scholarly consensus links good governance or, in other terms, the quality of public administration, to economic growth and development. Research including good governance as a variable is limited, but research indicates that economic growth and development contribute positively to improvements in governance rather than vice versa. Mira and Hammadache (2017) state that many studies have tested the relationship between good governance and economic growth and results mainly indicated a positive relationship between the concepts. Could sustained levels of good governance allow developing countries to achieve high levels of economic growth and political reforms? Results from the research are that good governance policy becomes significant and relevant only if countries achieve economic and social development that could allow for quality government institutions with good governance in support of growth.

Gupta and Ahmed (2018) assessed the impact of corruption on macro-economic variables, including FDI inflows in the South Asian region using panel data from 1998 to 2015, including Bangladesh, Nepal, India, Pakistan and Sri Lanka. The results show that the level of corruption does not affect FDI inflows in these countries, but the size of the economy and the effectiveness of governance play an important role. Quah (2013) assessed good governance and effective policy implementation leading to economic growth and development. The paper analyzed the critical good governance policies as introduced by the Singapore government, namely corruption control measures, decentralization of the public sector, and a strategy of attracting and retaining quality officials via, for example, competitive salaries, and assessed them based on eight performance governance indicators. Results indicate that the policies are effective, and proof of this is reflected in the countries excellent performance and rankings in most global indexes such as the *Global Competitiveness Report*'s, the World Bank governance index and other indexes. It was found that the government's political will has resulted in high levels of good governance.

Similar studies related to the Visegrad Group (V4) of countries are limited. Tomaszewski (2017) states that the V4 group was established in 1991 and are therefore young democracies. These countries represent the conservative right component of the EU. The concept of "New Public Management" has been incorporated in the governance of these countries with success, as is evident from the relatively good levels of good governance according to the World Bank Governance Indicators. Further analysis shows that good governance usually leads to improved socio-economic conditions and economic development and lower country risks, resulting in more investment and economic growth. Alexy, Kacer and Ochotnicky, (2014) assessed the country risk rating relative to economic and governance indicators for the V4 countries from 1993 to 2012. The results from their study are that certain government variables such as government debt and variables from the World Bank Governance Indicators do have an even more significant impact on country risk than economic indicators such as GDP. Kemiveš and Barjaktarović, (2021) assessed the relationships between country risks, political stability, governance and investment in the V4 region from 1990 to 2018, with results indicating that Poland was the most successful in attracting investment. The most important factors in attracting investment include the economic environment, political and governance risks, and quality of institutions.

In summary, the main findings from the empirical studies assessed are that major differences exist between developing and developed countries regarding the relationships between the three variables under review, namely country risk index, economic performance, and good governance. A significant difference has also been found between the relationship and impact of the three variables between countries with high country risk indexes and countries with low-risk indexes. Overall, it was found that a low country risk index leads to improved economic performance and vice versa. At the same time, good

governance also positively impacts country risk index across developed and developing countries and regions. Only a few researchers did not find a significant relationship between the variables, but special reasons should be considered. Lastly, the empirical results from other studies indicate a clear link between good governance and economic performance.

METHODOLOGY

The research methodology is based on quantitative methods and is founded on the Functionalist research paradigm. The research focuses on the four Visegrad countries in Central European economies - the Czech Republic, Hungary, Poland, and Slovakia - from 1996 to 2019. An econometric model was formulated to achieve the objective of the study. The econometric model selected is a pooled panel with a cross-sectional component consisting of four cross-sections and time-series data. The selection of this methodology allows for more variability in the data with a higher degree of freedom and efficiency if compared to only cross-sectional or time-series data (Greene, 2011). The variables selected to comprise the econometric model are listed in Table 2. The variables were selected as the best fit for the objectives and theoretical foundation of the study.

Table 2: Summary of variables

Name of variable	Variable defined	Source
Country Risk Index (dependent variable). The abbreviation is CRI (LogCRI).	The sovereign country risk index is a composite risk index including political, economic and social components compiled by CountryRisk.io. The index indicates the level of sovereign risk, with a level of 0.0 indicating the lowest level of risk, while an index of 100.0 indicates the highest. The country risk index was inverted for this study.	CountryRisk.io (2021)
Gross Domestic Product (Independent variable). The abbreviation is GDP (LogGDP).	The value of all goods and services produced in a region and, in this case, a country and all values are listed in US$ in constant values.	World Bank Development Indicators data set (World Bank, 2021).
Good (effective) governance (independent variable). The abbreviation is GG (LogGG).	The quality of public services and the level of independence of the public officials from political influence. Also, the quality of policy formulation and implementation. The index ranges from -2.5 for absolutely weak to + 2.5 for strong governance performance.	World Bank Governance indicators data set (World Bank, 2021).

Sources: indicated in the table.

Equation (1) depicts the functional relationship between the variables (all variables were transformed to the natural logarithm):

$$LogCRI = f(LogGDP, LogGG) \dots\dots\dots\dots \quad (1)$$

Equation (1) indicates that the Country Risk Index is a function of gross domestic product (LogGDP) and Good Governance (LogGG). Equation (1) was transformed into a panel data regression econometric specification:

$$LogCRI_{it} = \alpha_i + \beta_1 LogGDP_{it} + \beta_2 LogGG_{it} + \varepsilon_{it} \quad (2)$$

Where i and t denote the number of countries and time dimensions, respectively, ε_{it} is the residual as a whole, where the residual is a combination of cross-section and time series. An Ordinary Least Squares (OLS) panel regression could not be estimated as the best fit model for panel models, but panel-based models are more

suitable. The empirical process is initiated by stationarity tests on each of the variables. Once the stationarity of all variables in the model have been confirmed as either I(0) or at the first difference I(1), the selection of the specific panel methods will be made. Multi-collinearity tests were also conducted, using correlation tests and all coefficients were found to be below 0.5. The next step is to determine which of the Fixed or Random Effects is the most appropriate model to use to determine the independent variables' impact on the dependent variable. The Fixed Effect model examines if intercepts vary across groups and/or time period and assumes that differences between individual cross-sections, in this case countries, could be accommodated from different intercepts. The Fixed Effect model allows for the testing of possible unobserved country-specific time-variant effects.

On the other hand, the Random Effects model explores differences in error variance components across individual cross-sections and time periods or estimates panel data where interference variables may be interconnected between individual cross-sections and the time observations. In the Random Effects method, differences between intercepts are accommodated by the error terms of each cross-section (each country). The Fixed Effect method uses the OLS estimation while the Random Effect method uses the Generalized Least Square (GLS) technique (Longhi & Nandi, 2014; Park, 2010).

The Hausman test is performed to statistically determine which Fixed or Random Effects are the most appropriate model to use in the regression estimation. The hypothesis of the Hausman test is formulated as follows:

H0: Select Random effect ($p>0.05$)

H1: Select Fixed effect ($p<0.05$)

Both the Fixed Effect and Random Effect models were estimated. The Hausman test was performed and indicated that the Fixed Effect model was preferred and used in the results. The Fixed Effects model only determines the regression type relationships between the variables in the model, but a different model is required to determine the direction of causality. For this purpose, a panel-based error correction model was used as proposed by Engle and Granger (1987). The Granger causality estimation is listed as follows:

$$\Delta Z_{it} = \Phi_0 + \sum_{i=1}^{p-1} \Gamma_i \Delta Z_{it} + \Pi Z_{i,t-1} + \varepsilon_{it} \quad \dots \quad (3)$$

where,

$$\Gamma_i = -\sum_{j=1+1}^{p} \Phi_j \text{ and } \Pi = +\sum_{i=1}^{p} \Phi_{i-1} \dots \dots \quad .(4)$$

Where Δ is the first-difference operator, Z_{it} indicates a matrix of the three variables included in the model, Φ_0 is the vector of intercepts, Π captures the long-run information, and ε_{it} represents the error terms.

A robustness test was included in the study to test the results from the main model, using a panel fully modified ordinary least squares (FMOLS) model. Phillips and Moon (1999) state that the OLS model could provide asymptotically biased results as used in the first model of this study (Pedroni, 2001). To address this problem, Pedroni (2001) recommends the use of the FMOLS method, which has the properties to solve problems of endogeneity, and serial correlation (Narayan & Narayan, 2010). The FMOLS method is also recognised as the appropriate technique to estimate cointegrated panel data (Hamit-Haggar, 2012).

RESULTS AND DISCUSSION

Table 3 summarizes the descriptive statistics for the balanced pooled time series data for the Visegrad countries for all the variables used in the model. First, the overall mean over the 24 years from 1996 was 70.88 for the CRI (from 0 to 100 with 100 the lowest level of country risk), which is a relatively good performance by the Visegrad four. The highest index achieved was 87.8 by the Czech Republic, and 50.9, the lowest index, was achieved by Hungary. In terms of the performance in economic output, the mean achieved for GDP at constant prices was US$211 billion, Poland achieved the highest GDP output of US$661 billion. Lastly, the good governance index as formulated by the World Bank indicated a mean index for the Visegrad countries combined as 0.74 (index between -2.5 and +2.5), which is an acceptable achievement. The Czech Republic achieved the highest index of 1.1, while Poland had the lowest index of 0.37 over the total period.

Table 3: Descriptive statistics

Variable	Mean	Maximum	Minimum	Std. dev.	Kurtosis	Obs.
CRI	70.8831	87.8175	50.9297	7.1184	2.9015	96
GDP	2.11E+11	6.61E+11	4.99E+10	1.52E+11	3.7616	96
GG	0.7417	1.0964	0.3737	0.1781	1.9754	96

Table 4 indicates the outcomes of the panel unit root tests. Three different unit root tests were conducted: the Levin, Lin and Chu test, the Im, Pesaran and Shin test, and the ADF Fisher test. All unit root tests determine that the panel variable contains a unit root under the null hypothesis, while the alternative hypothesis indicates that the variable is stationary. The tests indicate that all three variables became stationary only after the first difference, thereby lending support to use the Fixed and/or Random Effect or the panel FMOLS estimation technique.

Table 4: Panel unit root tests results

	Levin, Lin & Chu		Im, Pesaran & Shin		ADF Fisher	
	Level	1st Diff.	Level	1st Diff.	Level	1st Diff.
LogCRI	-1.0071	-4.2881***	0.2994	-5.8812***	6.9611	6.12201***
LogGDP	-0.0412	-3.8113***	2.1272	-2.6411***	1.2672	20.8722***
LogGG	-0.6413	-2.0112***	-0.0515	-3.1762***	8.5511	24.7131***

Note: *** indicates 1% level of significance.

As an initial analysis, the basic panel OLS was estimated as reported in Annex 1, to understand the relationships between the variables with CRI as the dependent variable. The results indicate that both independent variables are significant predictors of CRI with significant p-values of below 0.05 or 5%. GDP had the highest coefficient of 0.17, while GG had a slightly lower coefficient of 0.13. The adjusted R-squared value is 0.17, indicating that the two variables combined predicts 17% of the dependent variable. Equation (5) is a summary of estimation:

$$LogCRI = f(0.17LogGDP + 0.13LogGG) \ldots\ldots \quad (5)$$

The next step is to determine which of the Fixed or Random Effects is the most appropriate model to use to determine the independent variables' impact on the dependent variable. The Fixed Effect model examines if intercepts vary across groups and or time period and assumes that differences between individual cross-sections, in this case, countries, could be accommodated from different intercepts. The Fixed Effect model allows for the testing of possible unobserved country-specific time-variant effects, while the Random Effects model explores differences in error variance components across individual cross-sections and time periods or estimates panel data where interference variables may be interconnected between individual cross-sections and the time observations. In the Random Effects method, differences between intercepts are accommodated by the error terms of each cross-section (each country). The Fixed Effect method uses the OLS estimation while the Random Effect method uses the Generalized Least Square (GLS) technique (Longhi & Nandi, 2014; Park, 2010). The Hausman test is performed to statistically determine which of the Fixed or Random Effects are the most appropriate model to use in the regression estimation. The hypothesis of the Hausman test is formulated as follows:

H0: Select Random effect ($p>0.05$)

H1: Select Fixed effect ($p<0.05$)

Both the Fixed Effect and Random Effect models were estimated. The Hausman test was

performed and indicated that the Fixed Effect model was preferred and used in the results. The results of the Hausman test are indicated in Table 5. The p-value is 0.0006, which is smaller than 0.05. The null hypothesis is rejected, while the alternative hypothesis is accepted. This means that the Fixed Effect model is the most appropriate model for regression estimation.

Table 5: Hausman test

Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		14.8648	2	0.0006*
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
LogGDP	0.3092	0.2722	0.0094	0.0001*
LogGG	-0.0240	-0.0103	0.0015	0.0004*

Note: * indicates statistical significance at the 5% level.

Annex 2 is a summary of the results of the Fixed Effects model estimation. The results indicate that the two variables combined have an F-statistic of 0.0006, which is statistically significant, meaning the two independent variables combined have a significant impact on the CRI. The two independent variables predict 69.9% of CRI. In terms of the Fixed Effects model, only GDP significantly affects CRI, while GG does not significantly impact it. A one percentage change in GDP could lead to a 0.31% increase in the CRI. Similar results were achieved by authors such as Glova et al. (2020) in European countries and by Montes and Tiberto (2012) in Brazil. Verma and Verma (2014) also estimate that economic performance and good governance positively impact country risk in many Asian countries. Equation (6) is a summary of estimation:

$$LogCRI = f(0.31LogGDP + 0.02LogGG) \ldots (6)$$

Table 6 shows the residual tests for the Fixed Effects model. Three different tests were estimated, and it was confirmed that the data are normally distributed, and no serial correlation exists within the data.

Table 6: Residual tests

Type of test	Probability	Notes
Normality test (Jarque-Bera Test)	0.6409	The data is normally distributed.
Residual Cross-Section Dependence Test (Breusch-Pagan LM)	0.5777	No serial correlation detected
Bias-corrected scaled LM	0.7429	Na

As an alternative method of estimation to test the relationships between the variables, a robustness test was also conducted using a panel (FMOLS) regression estimation. This method was selected due to its effectiveness in relative short time series data (Pedroni, 2001). The FMOLS model is also described as the most appropriate technique for estimating cointegrated panel data (Hamit-Haggar, 2012). The results of the robustness test are listed in Annex 3. It was

found that both independent variables do have significant impacts as predictors for the CRI. The coefficients for GDP and GG are similar at 0.17 and 0.15, respectively. These results are like the results as estimated as part of the main estimation, with both independent variables being significant predictors of CRI. Equation (7) is a summary of estimation:

$$LogCRI = f(0.17LogGDP + 0.15LogGG) \quad \ldots. \ (7)$$

The results of the panel Granger causality tests are displayed in Table 7. The results provide the outcomes of the direction of impact between the three variables. It is interesting to note that causality is from the independent variables causing changes in the dependent variable, which is CRI in this study. Therefore, GDP does cause changes in the CRI, while good governance (GG) also causes changes in CRI. Lastly, the estimation indicates that GG does cause changes in the GDP. Similar results were determined by Kurtz and Schrank (2007) and Mira and Hammadache (2017).

Table 7: Results of panel Granger causality

Null Hypothesis	Prob.	Outcome
LogGDP does not homogeneously cause LogCRI	0.0071**	Uni-directional causality
LogCRI does not homogeneously cause LogGDP	0.7109	
LogGG does not homogeneously cause LogCRI	0.0331*	Uni-directional causality
LogCRI does not homogeneously cause LogGG	0.9000	
LogGG does not homogeneously cause LogGDP	0.0196*	Uni-directional causality
LogGDP does not homogeneously cause LogGG	0.8410	

Note: * and ** represent significance at 5% and 1% respectively.

The findings from this study contribute to the relatively small body of knowledge on the relationships between country risks, good governance, and economic performance for the V4 countries. Comparable studies for the region are limited, but the few empirical studies indicate a strong and significant positive relationship between the three main variables included in the study. Country risk in the V4 region is affected by good governance, and good governance may result in the improvement of the economic environment. Alexy, Kacer and Ochotnicky, (2014) even found that specific governance indicators such as government debt could have an even more significant impact than economic indicators on country risk. This finding in 2014 is slightly different from this study's findings, where GDP had a more significant impact on country risk.

CONCLUSION

Research regarding country risk and its relationship with other factors has gained momentum over the last two decades. Many factors determine the risks associated with any country, and the development of risk indexes has grown exponentially over the last few decades. This study used a unique set of variables to determine the relationships between country risk indexes, economic performance, and good governance. The study region as selected is also unique, and no similar studies have been conducted with the same equation as far as it could be determined. The econometric estimations indicate significant positive relationships between country risk index (CRI), economic output (GDP), and good governance in both the long and short run. The Granger causality results indicate that both GDP and good governance cause changes in the country risk indexes of the countries, and good governance causes increased economic performance. The research also assessed the four countries individually via descriptive analysis. Overall, Poland had the lowest risk index and the largest economy with the best growth rates, followed by the Czech Republic who had the best index

regarding good governance. The strength and direction of relationships between the variables were determined, and all objectives were met. This study fills the gap in the research regarding the unique set of variables used and the focus on the Visegrad four.

Limitations of the study relate to the time period, as good governance data is only available from 1996. Future studies will include comparisons of regions and individual countries using similar and additional variables related to economic performance such as FDI, interest rates, inflation, and governance indicators such as government debt, rule of law, political stability, and corruption control. The implication of the research is important for both developed and developing countries. Lower country risks have a positive relationship with economic growth, macro-economic factors, and good governance.

The following recommendations and conclusions are listed. Countries are affected in different ways regarding the different types of risks affecting country risk indexes or ratings, and these factors include political, economic, sovereign and social risks. High levels of good governance are required to ensure lower country risks and increased economic growth and development. A good governance factor is sustainable debt management, and effective control measures will contribute to lower country risks and economic performance. Therefore, through effective policy implementation, governance policies should strive to lower country risks as far as possible to reap the rewards of investment.

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Annexures:

Annexure 1: Panel OLS estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LogGDP	0.1662	0.0007	229.1670	0.0000*
LogGG	0.1285	0.0452	2.839567	0.0055*
R-squared	-0.1562	Mean dependent var		4.2558
Adjusted R-squared	-0.1685	SD dependent var		0.1027
SE of regression	0.1110	Akaike info criterion		-1.5373
Sum squared resid	1.1589	Schwarz criterion		-1.4838
Log-likelihood	75.7907	Hannan-Quinn criter.		-1.5157
Durbin-Watson stat	0.2750			

Annexure 2: Fixed Effect model estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.7482	0.6824	-5.4921	0.0007*
LogGDP	0.3092	0.0263	11.7527	0.0003*
LogGG	0.0240	0.0274	0.8737	0.3846*
R-squared	0.7149	Mean dependent var		4.2558
Adjusted R-squared	0.6991	SD dependent var		0.1027
SE of regression	0.0563	Akaike info criterion		-2.8542
Sum squared resid	0.2857	Schwarz criterion		-2.6939
Log-likelihood	143.0047	Hannan-Quinn criter.		-2.7894
F-statistic	45.1499	Durbin-Watson stat		1.0764
Prob (F-statistic)	0.0006			

Note: * indicates statistical significance at the 5% level.

Annexure 3: Robustness test using an FMOLS estimation (LogCRI as the dependent variable)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LogGDP	0.1664	0.0011	142.8906	0.0004*
LogGG	0.1520	0.0734	2.0701	0.0413*
R-squared	-0.1873	Mean dependent var		4.2601
Adjusted R-squared	-0.2005	SD dependent var		0.1008
SE of regression	0.1105	Sum squared resid		1.0997
Long-run variance	0.0303			

Note: * indicates statistical significance at the 5% level.

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