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How Can National Governance affect Education Quality in Western Europe?

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How Can National Governance affect Education Quality in Western Europe?

Abstract:

Purpose – As the international society faces unprecedented challenges associated with resource scarcity, governance scandals, increasing injustice and inequality, new opportunities for higher education institutions are emerging. This paper investigates the association between national governance standards and education quality across nine western European countries; namely, the United Kingdom, Germany, France, Finland, Norway, Switzerland, Sweden, Denmark, and Ireland.

Design/methodology/approach - Using panel data from 2002 to 2017, this article employs fixed-effects and random-effects models to examine the relationship between national governance (proxied by voice and accountability indicator) and education quality (proxied by Human Development Index: Education index). This analysis is supplemented with conducting Instrumental Variable (IV) estimations to address any concerns regarding the expected occurrence of endogeneity problems.

Findings - Our findings are suggestive of a significant and positive relationship between national governance and education quality in Europe. This implies that national governance standards, such as voice and accountability, are essential actors in the enhancement of the quality of educational institutions outcomes.

Originality/value - So far, a very limited number of studies focused on examining the role of country-level governance in advancing education quality. This study, therefore, extends the body of prior literature by investigating the possible effect of national governance structures on education quality across a sample of Western European countries.

Keywords – Education Quality, National Governance, Voice and Accountability, Education Spending, Western Europe.

Paper type - Research paper.

1. Introduction

Corporate accountability is a progressively significant aspect in the education governance systems. Accountability can be guaranteed through numerous means, such as frameworks quality assurance, market mechanisms, and external stakeholders' participation in governing bodies, where external representatives would offer the advice and support to educational institutions about their positive contributions to society (Hénard and Mitterle, 2010).

The quality of governance cannot be entirely appreciated without addressing the advances in higher education institutions. In Europe, a process of institutionalisation has been developed in most higher education institutions led to more transparent decision-making structures and a more robust corporate culture (Boer and File, 2009). In countries associated with influential leadership figures and governing boards, such as the United Kingdom and the United States, there is a tendency towards the stronger impact on education affairs by business-university relationships and governing boards (Hudson, 2007). Higher education institutions are structurally varied. Even though some commonalities related to quality

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3 and accountability are evident, yet very divergent individual structures remain (Lepori et al., 2014).
4 These differences are attributable to differences in governance systems at both micro and macro levels
5 across the globe.
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8 The World Governance Index (WGI) has included more than 200 countries, measuring six governance
9 dimensions starting in 1996 namely Voice and Accountability, Government Effectiveness, Political
10 Stability, Rule of Law, Regulatory Quality, and Control of Corruption (Kaufmann et al., 2009). These
11 indicators have been calculated based on hundreds of variables collected from comprehensive sources
12 of existing databases. The aggregate data is reflective of observed perceptions of different respondents,
13 such as public and private sector experts, and Non-Governmental Organisations (NGOs) on global
14 governance (Kaufmann et al., 2011). In our study, we have used the most relevant national governance
15 indicator in the regression analysis to avoid multi-collinearity problems (Lensink et al., 2008). The
16 selected indicator is voice and accountability (V&A). Voice and accountability can be defined
17 according to Kaufmann et al. (2011, p223) as follows:
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25 “Indicates the extent to which a country’s citizens are engaged in the selection of the
26 government, as well as freedom of association, freedom of expression, and a free media”.
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28 Governance structures contain formal constraints (e.g., laws, economic and political procedures and
29 regulations, and other restrictions on corporate behaviour), and informal rules covering unwritten social
30 norms, codes of ethics and values and conventions (Kaufmann et al., 2011). Thus, governance quality
31 might serve as an incentive for economic actors to be committed to regulations (Elamer et al., 2017).
32 Therefore, governments in countries with rigorous governance structures tend to require mandatory
33 disclosure of university governance information and spending details, thus improving education quality
34 (Boer and Goedegebuure, 2007). Collectively, strong governance can be considered as a valuable
35 instrument of external governance to enhance accountability and education quality (Elamer et al., 2017).
36 For example, Hénard and Mitterle (2010) point out that universities operating within countries
37 associated with more exceptional governance standards are more likely to have better accountability
38 indicators and therefore, more advanced education quality. Our aim in this paper is to examine whether
39 there is a relationship between national governance standards and the quality of education outcomes in
40 Western Europe. In stating our aim, we purport that countries which are deemed to be associated with
41 reliable governance indicators, in this case, by having a higher voice and accountability score, may be
42 achieving better education quality outcomes if they also were categorised with greater spending on
43 education simultaneously.
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54 While there is evidence on corporate governance in higher education institutions worldwide (e.g.,
55 Goedegebuure and Hayden, 2007; Knight, 2002; Middlehurst, 1999; Kennedy, 2003), whether national
56 governance (proxied by voice and accountability) has an impact on education quality (proxied by the
57 education index) is still unknown. Our study attempts, therefore, to contribute to this extant dearth of
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3 prior studies examining the association between national governance standards and education quality
4 at a macro-level of analysis, by addressing existent limitations. Most importantly, our paper offers, to
5 the best of our knowledge, the first multi-country examination of the governance-education quality
6 nexus at a national scale covering the most extended and updated period of investigation, which spans
7 from 2002 to 2017.
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12 The remainder of this paper is designed as follows. First, we briefly discuss previous literature and the
13 development of the hypothesis. Second, we introduce the methodology and data section. Third, we
14 present the results of our statistical analysis, including additional analysis and; finally, we conclude our
15 outcomes' policy and practitioner implications, limitations and future studies.
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20 **2. Literature review and hypothesis development**

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22 Changing conditions of the early twenty-first century appeared to have brought governance standards
23 to the fore. In a study conducted on Hong Kong's higher education sector, the University Grants
24 Commission (2002) highlighted the importance of new governance structures for the public higher
25 education institutions. Similarly, the result of a study reviewed the governance of the Australian higher
26 education sector pointed to the need for enhancing the quality of governance standards in local
27 Australian universities (Commonwealth of Australia, 2002). In the UK, furthermore, Bargh et al. (1996)
28 stated that a general crisis of governance standards seems to be engulfing the UK. To shed light on the
29 importance of national and local governance systems in improving education quality, it worth saying
30 that not only Hong Kong, Australia and the UK that are experiencing such turbulence.
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37 Other researchers investigated several issues related to governance in higher education such as
38 Demichel (2000) in France; Askling and Kristensen (2000) in the EU; (Lee, 2000) in South Korea;
39 Locke (2001) in New Zealand; Ehara (1998) in Japan; and Paquet (1998) in North America. These
40 studies concluded that even though governance issues may not always be the same in each of these
41 countries, yet what countries share is the opening up of the higher education institutions to greater public
42 scrutiny along with higher expectations of both governments and societies. For example, Locke (2001)
43 states that the standards of the governance of education institutions in New Zealand are critical to the
44 success of these institutions. In that enhancing the quality of governance standards might require a
45 thorough analysis of the purpose of governance structures and competent analysis of alternative
46 institutional arrangements. Locke (2001) further argued that national governance standards, such as
47 accountability, efficiency and transparency, are essential actors in the development of the educational
48 institutions in New Zealand.
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57 Moreover, Yonezawa (2014) argue that the Japanese regulatory framework, such as the National
58 University Corporation Law enacted in 2003, which is considered as a national governance structure,
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has mostly affected the outcomes of the education system in Japan. This means that education quality seemed to be attributed to better country-level governance indicators. Collectively, these research studies have the following shortcomings; first, our review of the existing studies, indicate that vast majority of them have been confined to single-country studies (e.g. Demichel, 2000; Askling and Kristensen, 2000; Lee, 2000; Locke, 200; Ehara, 1998; Paquet, 1998). Second, the longitudinal studies identified, focus on small periods of time. For instance, De Silva Lokuwaduge and Armstrong (2015) studied the impact of the micro-level governance structures on the performance of Australian universities from 2005 to 2007. Similarly, Yonezawa (2014) collected one-time data point for examining the governance-education quality nexus in Japan in 2011. Finally, previous studies focus only on the effects of micro-level governance structures on education quality (e.g., De Silva Lokuwaduge and Armstrong, 2015; De Silva and Armstrong, 2012; Boer and Goedegebuure, 2007; Meek, 2003; Goedegebuure et al., 2009, among others).

Our study, therefore, addresses the shortage in the existing governance in higher education literature as follows. Firstly, our study expands the body of existing literature by exclusively examining the possible effects that the macro-level governance system might have on the enhancement of education institutions outcomes. Secondly, by identifying the relationship between country-level governance and education quality across nine Western European countries, utilising data covering 16 years from 2002 to 2017, we aim to resolve some of the empirical gaps identified in extant studies conducted in the region.

According to Marginson and Considine (2000), it is likely in the contemporary environment to identify two groups of actors that could affect the quality of higher education institutions. These actors could be classified to external institutional actors such as governance systems and internal actors such as government investments in the education sector. Arguably, stronger governance systems seemed to be attributed to greater spending on education, which is resulting in better education quality (Clark, 1993). The argument of this study will be that governance system includes aspects related to both internal and external factors that may affect the quality of higher education institutions. It will be further argued that it is only when internal/external perspectives are regarded as complementary, and to an extent interdependent, that the real challenges of education governance and its relationship with the quality of education outcomes can be fully appreciated (Marginson and Considine, 2000). Besides, Boer and Goedegebuure (2007) argue that governance and accountability were key considerations in the development of higher education institutions in the Netherlands. Given this probability, the primary hypothesis to examine in our study is as follows:

H1: Ceteris paribus, there is a significant positive relationship between national governance structure and education quality.

H0: Ceteris paribus, there is an insignificant negative relationship between national governance structure and education quality.

3. Methodology and data

3.1. Methodology

This paper focuses mainly on nine developed economies during two different periods: 2002-2017. Given this, panel data techniques are applied to estimate the proposed model in equation 1. "Panel data or longitudinal data typically refer to data containing time-series observations of a number of individuals. Therefore, observations in panel data involve at least two dimensions; a cross-sectional dimension, indicated by subscript i , and a time-series dimension, indicated by subscript t " (Hsiao, 2007:1).

The essential advantage of using panel data is a large number of observations (several periods of data per individual country), which creates more degrees of freedom and more sample variability than cross-sectional data. Therefore, this approach improves the precision of the estimation.

This study assumes that economies under consideration have many common characteristics, such as economic features and politics, but that these countries are heterogeneous in terms of regulations, some economic policies, traditions and culture. Panel data has an advantage in controlling for this heterogeneity (or unobserved effects) for each economy, which is captured by α_i in the models.

The fixed effect (FE) model treats α_i as a country-specific constant term in the estimations, which is fixed over time ($\alpha_i = \alpha$) and can be associated with independent variables. However, a random effect model (RE) considers country characteristics as a random variable and as uncorrelated with explanatory regressors (Cameron, 2010, Baltagi, 2008)

This study reports both results of FE and RE estimations using the statistical software STATA.15.

From the empirical perspective, both FE and RE have some advantages and disadvantages. The FE model is costly in terms of degrees of freedom lost. Also, the FE model ignores between-panel variation and focuses only on the within-variations. In the empirical section of both FE and RE, results will be reported. The choice between FE and RE is subject to the specification of the Hausman test. The null hypothesis of the Hausman test is that RE is appropriate (Hausman, 1978).

One of the main concerns in panel data analysis is the endogeneity issue. Endogeneity refers to the correlation of the right-hand side variables and the error term in the regression models. In other words, an empirical model for which $E(\varepsilon|X) \neq 0$ is said to suffer from an endogeneity problem. Whenever there is endogeneity, OLS estimates of the β 's will no longer be unbiased because one of the main assumptions of OLS has failed (Baltagi, 2008).

Theoretically, there are three primary sources of endogeneity. The first is that of omitted variables; There is an omitted variable bias when a variable which affects the left-hand side variable and is correlated with one or more explanatory variables is omitted from the regression (Wooldridge, 2010). This means that the exogeneity condition is violated and thus that endogeneity is present. The second source is the errors-in-variables problem. This issue arises when the actual value of a regressor, X_i , is

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3 unobserved. Instead, the analyst measures the 'error-ridden variable', X^* . The third and most common
4 source is simultaneity, which occurs when the causality runs in both directions: from the regressor(s) to
5 the dependent variable; and from the dependent variable to the regressor(s) (Wooldridge, 2010).
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8 Dealing with potential endogeneity requires a set of valid instruments that are exogenous but correlated
9 with an explanatory variable of interest. In other words, the instrumental variable should satisfy this
10 condition $E(\varepsilon | Z) = 0$ and $E(Z | X) \neq 0$ where Z donates the instrumental variable and X is the
11 explanatory variable of interest.
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15 Finding a valid instrumental variable is difficult in the study because of panel data availability. We will
16 depend on the instruments suggested by the previous empirical studies in the field. Also, this study tests
17 the validity and strength of these instruments based on several diagnostic tests, as discussed in detail
18 later in this section.
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22 The most commonly used estimators to mitigate endogeneity include the generalised method of
23 moments (hereafter, GMM). Arellano and Bond (1991) and Blundell and Bond (1998) propose dynamic
24 panel estimators for panel analysis when: N (number of panels) is larger than T (time), the dependent
25 variable is dynamic and depends on its previous values, and some explanatory variables may be
26 endogenous (Roodman, 2009a).
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30 However, the GMM estimator suffers from two main issues. The first is that the internal instruments
31 (lagged-levels) are weak instruments if the autoregressive process is too persistent (Arellano and Bond,
32 1991; Blundell and Bond, 1998). To solve this problem, Blundell and Bond (1998) and Arellano and
33 Bond (1991) suggest using additional moment conditions in which the lagged differences in the
34 dependent variable are uncorrelated with levels of the error term. To obtain these additional moment
35 conditions, the authors assume that the panel-level effect is unrelated to the first observable first-
36 difference of the dependent variable.
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42 Another key disadvantage of GMM estimators is instrument proliferation. This refers to the abundance
43 of internal instruments (Kiviet et al., 2017). In other words, there are too many instrumental variables
44 exceeding the number of panels. Roodman (2009b) illustrates the mechanism of instrument
45 proliferation and its costs: "if $T=3$, difference GMM generates only one instrument per instrumenting
46 variable, and system GMM only two. But as T rises, the instrument count can easily grow large relative
47 to the sample size, making some asymptotic results about the estimators and related specification tests
48 misleading" (Roodman, 2009b:139). This leads to overfitting of the endogenous variable; numerous
49 instruments can overfit instrumented variables, biasing coefficient estimates towards those from a non-
50 instrumenting estimator.
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56 Based on the above discussion, the data sample is limited to 9 panels (developed countries) over 34
57 years (2002-2017) ($N < T$). Therefore, it is difficult to apply a GMM estimator because this leads to
58 inconsistent results.
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As an alternative, this study adopts the instrumental variable estimation (IV). The IV estimator offers a consistent estimation under the very strong assumption that an exogenous instrument exists (valid IV) which satisfies $E(\varepsilon | Z) = 0$. This assumption implies that $E(y_{i,t} - X_{i,t}\beta | Z) = 0$.

The main advantage of the IV estimator is that it does not require a specific number for the sample size, like in GMM. However, the main challenge is finding valid and robust instruments. Consistent with these criteria, empirical studies undertake an examination of the first stage F statistics and perform a test for over-identification. However, recent empirical papers on weak instruments have revealed that these diagnostics may not be adequate. Therefore, several tests have been introduced to check the instruments' strength. This thesis applies the Cragg–Donald (C–D) statistic, among other diagnostic tests, to decide whether or not the instruments are weak. Andrews and Stock (2005) have compiled critical values for the Cragg-Donald F statistic for several different estimators (including IV and Limited Information Maximum Likelihood, LIML hereafter). When exceeding the threshold that Andrews and Stock (2005) provide, it can be stated that the instruments are robust: i.e., they satisfy the relevance condition.

To sum up, FE and RE results will be reported with the Hausman test. Also, IV estimations will be applied.

This study adopts an empirical econometric model which is formed as,

$$EI_{i,t} = \alpha_0 + \alpha_1 GOV_{i,t} + \alpha_2 GOV * ES_{i,t} + \alpha_3 X_{i,t} + \mu_i + \varepsilon_{1i,t} \quad (1)$$

Where: $EI_{i,t}$ is the education index, which reflects the quality of education in the country i at time t . $GOV_{i,t}$ refers governance index, which measured by voice and accountability indicator (World Governance Indicators) of country i at time t . $GOV * ES_{i,t}$ is an interaction term between governance and spending on education. $X_{i,t}$ designates the vector of other variables in the country i at time t (income per capita growth, urban population growth and trade openness) and $\varepsilon_{1i,t}$ are error terms. μ_i is fixed time and country effect. The fixed effect term is used to account for unobserved (country level) effects: “country heterogeneity”. There is an important issue with this specification; if the unobserved country-level effects are associated with explanatory variables, then FE is the appropriate model: otherwise, RE will be sufficient. This can be assessed subject to the Hausman test specifications.

3.2. Data construction

This section takes an in-depth look at the data used in this empirical work, discussing the sources and variables construction. This study utilises data published by international organisations such as World Bank (World Economic indicators and World Governance Indicators) and United Nations (Human Development Indicators) for a sample of nine developed countries; namely, the United Kingdom, Germany, France, Finland, Norway, Switzerland, Sweden, Denmark, and Ireland.

To test the relationship between national governance and educational quality, we use the quality of education proxy as the dependent variable. An Education index is found as a component of the Human

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3 Development Index published every year by the United Nations. Prior the year 2010, the Education
4 Index was measured by the adult literacy rate (with two-thirds weighting) and the combined primary,
5 secondary, and tertiary, gross enrolment ratio (with one-third weighting). The rate of adults' literacy
6 indicates the ability to read and write. Since 2010, the Education Index has been measured by combining
7 average adult years of schooling with expected years of schooling for children, each receiving 50%
8 weighting. (Human Development Index: Education index, 2019).
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13 Education is a major component of well-being and is used in the measure of economic development
14 and quality of life, which is a key factor determining whether a country is a developed, developing, or
15 underdeveloped country. This variable is taken from the Human Development Index dataset.
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19 For our independent variable, we use the voice and accountability index as a measurement of
20 governance. Voice and Accountability capture perceptions of the extent to which a country's citizens
21 are able to participate in selecting their government, as well as freedom of expression, freedom of
22 association, and free media (World Governance indicators, 2019). The source of this variable is World
23 Governance Indicators (WGI) published the World Bank. We include government spending on
24 education as a share of GDP as one of the interest variables. We believe that governance can affect the
25 quality of education through a financial channel which is education expenditure. Therefore, we
26 interacted both variables to reduce the problem of multicollinearity. In this model, we consider some
27 control variables that have a significant effect on the educational qualifications such as GDP per capita
28 growth, trade openness and urban population growth. The descriptive statistics of our used variables
29 are reported in Table 1.
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37 **Insert Table 1 right here**
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39 Table 2 shows the correlation matrix for the variables used between 2002 and 2017. This table reveals
40 some interesting findings. It indicates that there is a significant and positive association between
41 governance index (voice and accountability) and education index in the nine developed economies
42 (0.286).
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47 **Insert Table 2 right here**
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49 Figure 1 shows a positive relationship between governance and the quality of education. Further, the
50 correlation matrix shows that the interaction term (education and governance) has a positive correlation
51 coefficient (see Table.1). This coefficient is 0.031.
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54 **Insert Figures 1 & 2 right here**
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56 Also, Figure 2 shows a scatter plot that represents the association between these two variables. This
57 figure indicates that more governance correlated with high quality of education. This indicates
58 *governance led to quality of education* hypothesis.
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4. Empirical results and discussion

This section reports the empirical estimations of the proposed models in equation 1 using STATA.15 software. This study applies two different techniques of panel data. These methods are; fixed and random effects models and the IV estimations. Across two estimation techniques, all variables are consistently significant determinants of education quality, namely; governance and macroeconomic controls.

Starting with the interest variables governance and interaction terms (governance and education spending). Tables 3 presents all results of the estimation of FE and RE. The choice between FE and RE results is firstly considered. Although FE is preferred because of its ability to control for country-specific effects (heterogeneity), the estimations are subject to the Hausman test. As mentioned earlier, in section 1.1. (Methodology), the null hypothesis of the Hausman test is that RE is appropriate, while the alternative hypothesis is that FE is an efficient estimation.

The Hausman test strongly rejects the null hypothesis (at a 5 per cent level of significance) for the long-run relationship model. Therefore, the FE model is appropriate. Because the Chi-square of the Hausman test is statistically significant. This means that RE is an efficient model. In both estimations, there is no major difference in the results, and all estimations are consistent for the two models.

The results in Table 3, columns 1 and 2 show voice and accountability encourage quality of education in the developed countries; this result is highly statistically significant, the coefficient is statistically significant at 1 per cent level of significance. This means that a high level of governance leads to the more top quality of education as measured by education index. Table 3 shows that a one per cent increase in governance indicator leads to about a 0.091 per cent increase in education index in the sample of our study. When the interaction term is used as a proxy for governance and spending, the positive effect still holds. A one per cent increase in interaction term promotes education quality by 0.10. Our results are in line with previous studies (e.g., Demichel, 2000; Commonwealth of Australia, 2002; Locke, 2001; Yonezawa, 2014, among others) that suggest national governance standards, such as accountability, efficiency and transparency, are essential actors in the development of the educational institutions. In our words, stronger governance systems appeared to be attributed to higher spending on education, which is resulting in better education quality (Clark, 1993).

Insert Table 3 right here

One might think that the positive effect of governance on the quality of education comes through the financial channel, which is the spending on education. To understand the net impact of governance and education spending, we take the first derivation of equation 1 with respect to governance. The total impact is positive as the spending on education increases with governance taken into consideration. To check whether our results suffer from the problem of multicollinearity, this paper performs the Variance

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3 Inflation Factor (VIF) test. The results of the VIF test are reported in table 4. It is clear that the VIF
4 statistics are less than the threshold level of commonly recommended values are 10, 5, and 3.3. This
5 indicates the absence of the multicollinearity issue (see table 4).
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8 **Insert Table 4 right here**

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10 So far, the estimations have not considered the problem of endogeneity. It is important to note that the
11 regressions might be biased. There is a possibility that unobserved variables may affect both
12 governance and education index. This study applies two alternative methods for further robustness.
13 The first is an instrumental variables estimator. This method requires a valid instrument associated
14 with the endogenous regressor and not correlated with the error term.
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19 Further, several diagnostic tests are performed for the validity of instruments, including the Sargan test.
20 However, recent studies argue that these diagnostics tests could be biased and may lead to inaccurate
21 results. Therefore, the Cragg-Donald (CD) statistics are also performed to check whether the
22 instruments are weak.
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26 Based on Sargan statistics, the null hypothesis that the instruments are valid (uncorrelated with the error
27 term). The C-D statistics suggest that the instruments are acceptable in the sense that they are not weak.
28 More specifically, the C-D statistics for governance estimation (in Table 5, column 2) of 74.70 is more
29 significant than 16.38 (critical value for 10 per cent).
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32 **Insert Table 5 right here**

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34 According to the IV estimations, it is evident that the governance-led-education quality hypothesis still
35 valid even after the consideration of the endogeneity issue. We perform two models of the IV
36 estimation; fixed and Random models. To choose the best model, this study applies the Hausman test.
37 The Hausman statistic is insignificant, and then the null hypothesis accepted (RE is the appropriate
38 model). Interestingly, the magnitude of the estimates of governance is higher compared with the FE
39 estimations. Table 5, column 1, shows that the quality of education increases by 0.10 per cent when the
40 governance index increases by one per cent. This means that our main findings are highly unlikely to
41 be severely affected by the existence of endogeneity problems.
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48 **5. Conclusion**

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51 This study investigates the relationship between macro-level governance structures and education
52 quality in nine western European countries (i.e., United Kingdom, Germany, France, Finland, Norway,
53 Switzerland, Sweden, Denmark, and Ireland) from 2002 to 2017.
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56 The results show that national governance as measured by voice and accountability indicators
57 encourages the quality of education in Western Europe; this result is highly statistically significant, the
58 coefficient is statistically significant at 1% level of significance. This means that high macro-level
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3 governance seemed to be leading to a higher quality of education as measured by education index. Our
4 findings are consistent with prior empirical evidence that suggests that national governance indicators,
5 such as voice and accountability, efficiency and transparency, are essential actors in the process of the
6 development of educational institutions. In our words, stronger governance systems believed to be
7 attributed to higher spending on education, which is resulting in better education quality.
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11 Policymakers should implement stricter regulations and ensure that voice and accountability indicators
12 in a country are motivated if it wishes to increase the spending on education and improve the quality of
13 educational institutions outcomes. Also, a culture of continuous review of education policies needs to
14 be upheld in the Western Europe region to be watchful of any emerging problems, while maintaining a
15 sustainable relationship between the rule of law and the education administration.
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20 This study suffers from several limitations which need to be acknowledged. First, limitation related to
21 the sample gathered for this study purposes. Further studies are recommended to collect more data from
22 a more significant number of countries to be able to generate a more comprehensive understanding of
23 the governance-education quality nexus at a macro-level of analysis. Second, for statistical reasons, our
24 study was confined to one country-level governance indicator (i.e., voice and accountability). Future
25 studies are encouraged to include more national governance indicator to study their collective impact
26 on the quality of higher education institutions.
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Table 1: Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max	Observations
Education overall	0.8792	0.0386	0.764	0.941	N = 144
between		0.0323	0.808	0.91	n = 9
within		0.0236	0.8178	0.918	T = 16
Governance overall	1.469	0.1518	1.12	1.8	N = 144
between		0.137	1.241	1.623	n = 9
Within		0.0787	1.336	1.732	T = 16
Trade overall	89.70	37.41	49.33	226.0	N = 144
between		37.80	55.960	178.9	n = 9
Within		10.968	57.346	136.83	T = 16
GDPPCg overall	1.164	3.033	-8.706	23.985	N = 144
between		0.7623	0.6179	3.0557	n = 9
Within		2.946	-8.485	22.094	T = 16
Urbang overall	0.9404613	0.5742	-1.601	3.222	N = 144
between		0.4500	0.1947	1.7242	n = 9
Within		0.385	-0.85625	2.439	T = 16

Source: Authors' work using STATA 15.

Table 2: Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) education index	1.000					
(2) governance	0.286*	1.000				
(3) governance*Education Spending	0.031*	0.361	1.000			
(4) trade openness	0.054	0.310	-0.105	1.000		
(5) GDP per capita growth	0.034	0.099	-0.176	0.273	1.000	
(6) urban population growth	0.057*	0.381	0.131	0.315	-0.030	1.000

Source: SATA 15 outcomes

Figure 1: Governance- education quality correlation

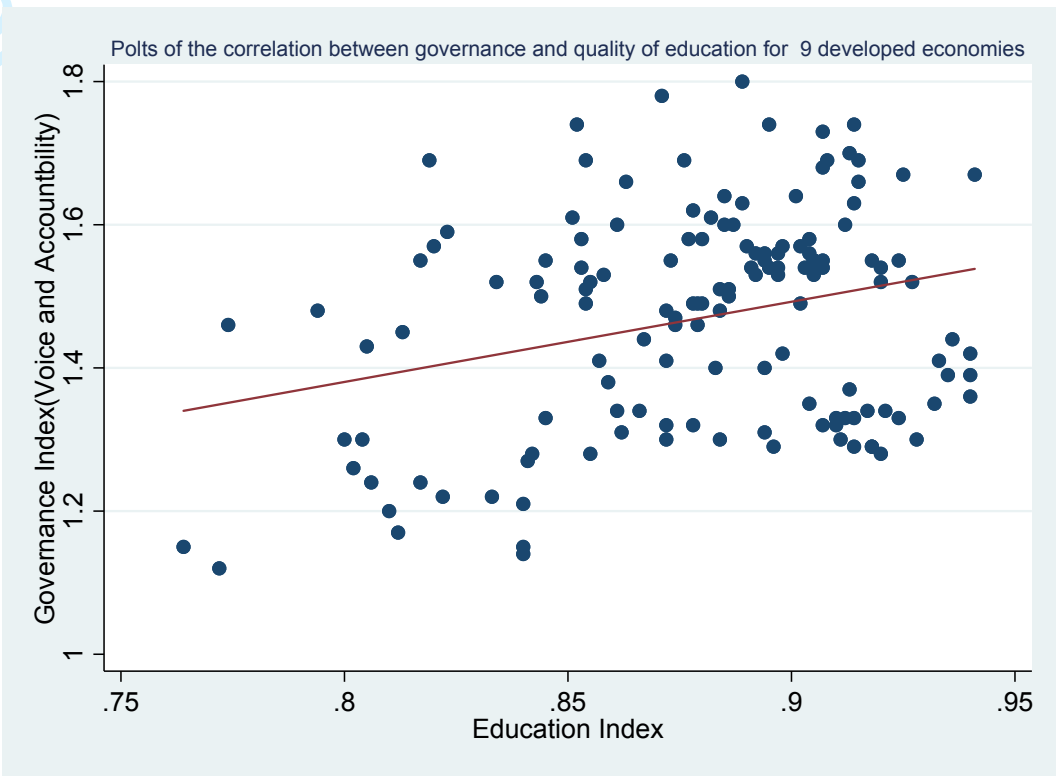


Figure 2: Education spending, governance and education quality correlation

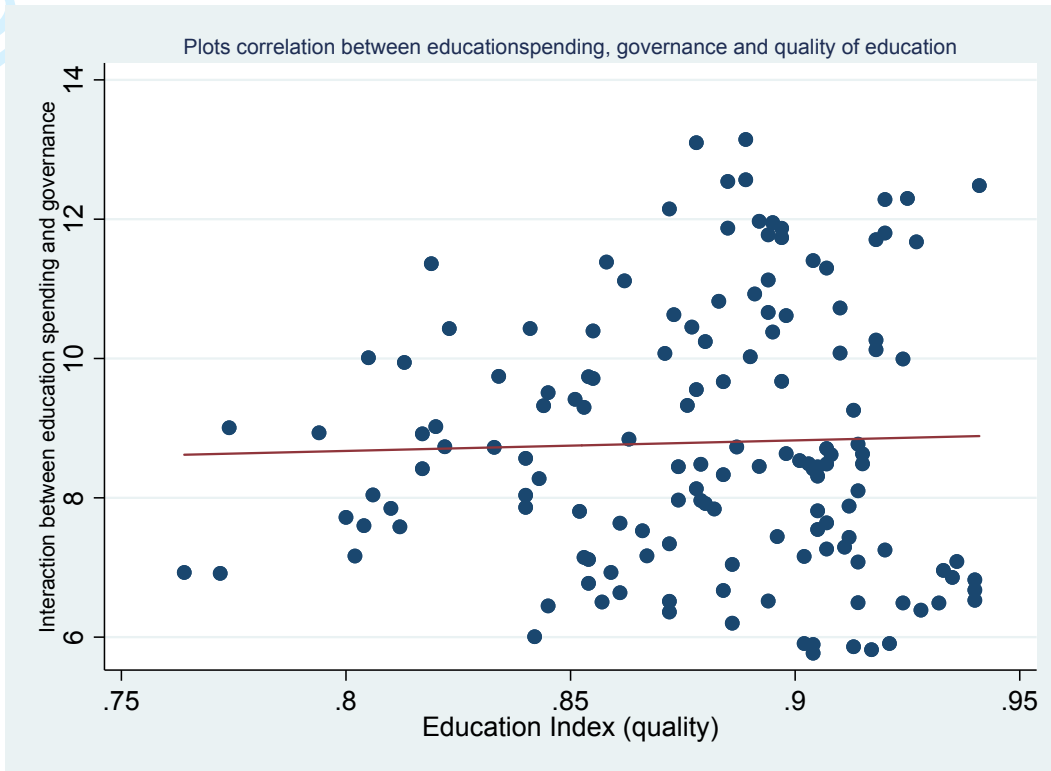


Table 3: Multivariate Regression Analysis

Dependent variable: education Index	(1) RE	(2) FE
Governance Index (voice and accountability)	0.0826*** (0.0270)	0.0911*** (0.0270)
Governance*education spending	0.00932*** (0.00264)	0.0106*** (0.00267)
Trade Openness	0.000995*** (0.000157)	0.00120*** (0.000166)
GDP Per Capita growth	0.00114* (0.000654)	0.00113* (0.000639)
Urban population growth	0.0212*** (0.00468)	0.0244*** (0.00465)
Constant	0.808*** (0.0372)	0.788*** (0.0350)
Observations	144	144
R-squared		0.362
Number of Countries	9	9
Hausman test for FE		19.48(0.0016)

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 4: Multi-collinearity test: Variance Inflation Factor

Variable	VIF	1/VIF
governance	1.47	0.682401
trade	1.32	0.760282
goveEx	1.26	0.791804
urbanpopul~b	1.26	0.795776
gdppercapi~a	1.13	0.881165
Mean VIF		1.29

Table 5: Robustness Analysis

Dependent variable: education Index	(1) IV-RE	(2) IV-FE
Governance Index (voice and accountability)	0.104*** (0.0305)	0.110*** (0.0312)
Governance*education spending	0.0101*** (0.00382)	0.0110*** (0.00399)
Trade Openness	0.000886*** (0.000151)	0.00105*** (0.000160)
GDP Per Capita growth	0.00124* (0.000634)	0.00123* (0.000631)
Urban population growth	0.0178*** (0.00443)	0.0203*** (0.00445)
Constant	0.848*** (0.0364)	0.831*** (0.0344)
Observations	135	135
Number of id	9	9
Hausman test for FE		4.94 (0.423)
Endogeneity test		4.26 (0.000)
The weakness of the IV test		73.70

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1