SSE RIGA

Bachelor Thesis

The Role of Institutional Quality in Economic Growth:
Implications for the Baltic States

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May 2018

Riga

Abstract

This paper studies the impact of several institutional drivers on economic growth, by applying system Generalized Method of Moments on a panel of 113 countries during 2006 - 2016. The institutional effect is captured by several proxies: the components of World Governance Indicators, Index of Economic Freedom, and Global Competitiveness Index. The obtained results show statistically significant positive effect on economic growth for the following variables: Government Effectiveness, Regulatory Quality, Tax Burden, Monetary Freedom, Financial Freedom, Trade Freedom, Strength of auditing and reporting standards, Efficacy of corporate boards, and Strength of investor protection. These outcomes are then applied to the situation in the Baltic States, which share common history but have different strength of institutions, to give suitable suggestions for boosting economic growth.

Key words: Economic growth, Institutions, Generalized Method of Moments, Baltic States

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1. Introduction

The question why some countries seem to be more blessed with higher income than others has always been relevant and interesting for researchers. While neoclassical growth theories attribute economic growth to such factors as total factor productivity, physical and human capital, some argue that it is not even nearly the whole story and there are deeper underlying causes (Rodrik, Subramanian, & Trebbi, 2002; Bloch & Tang, 2004). One particularly popular indirect cause for economic growth that researchers seem to enjoy debating about is the institutional quality and government policies. While literature holds plenty of theory on the matter, no clear consensus on the effect of institutions and government policies on the economic growth has been reached simply due to lack of credible empirical evidence. Lack of result credibility arises mostly because institutions are endogenous. Respectively, it is not clear if better institutions lead to higher economic growth or vice versa. Additionally, institutions cannot be directly observed or measured. Instead proxies are used to estimate institutional quality, which might lead to a measurement error.

Since there is no clear consensus on the issue, we believe more extensive research is needed to assess the role of institutions and its affecting factors in the economy as a possible driver of economic growth. To tackle the problem of reverse causality we use Generalized Method of Moments (GMM), which offers some advantages over the more extensively used Instrumental Variables (IV) regression, and arrive to various significant outcomes for such variables as Monetary Freedom, Government Effectiveness, and Strength of investor protection.

Our research pays particular interest to the case of the Baltic States. Even though there has been a significant improvement in the economic and political situation over time, it is highly important to understand how and to what extent the institutions can influence the economic growth of a country. Also, it might help to explain differences in the economic development of the Baltic countries. To illustrate, in 2016, GDP per capita at PPP in Lithuania and Estonia was 79.4% and 79.0% respectively of the European Union average, while the level in Latvia stood at only 68.4% (International Monetary Fund, 2017).

The aim of this research is to determine the main drivers of economic growth from institutional side. Furthermore, our goal is to provide policy suggestions for promoting sustainable economic growth in all three Baltic countries, based on the determined drivers.

In our research, we address the following research questions:

1) *What is the impact of institutional quality on the economic growth?*

2) Which policies and improvements in institutional quality could positively affect the economic growth in the Baltic States?

The structure of the research is following: second section provides an overview both of theoretical and empirical literature on the topic, third section introduces and explains the methods used to answer the research questions, fourth section analyses and fifth section discusses the obtained results. The sixth section is dedicated to conclusions of this paper.

2. Literature Review

In this chapter, we will look at the theory of economic growth and how institutional factors fit into it. We will pay close attention to the previous empirical research on the effect of institutions on economic growth generally and in the Baltics as well as examine important characteristics of good institutions.

2.1. Economic growth

The historical basis of the modern theory in economic growth derives from the Solow-Swan neoclassical growth model, which presents three factors driving the output of an economy – technological change, labour, and capital (Solow, 1956; Swan, 1956). In essence, it shows that in the short run changes in capital have an influence on the growth of the economy, however, over the long term, the main progress prevails in the improvements in technology. Even while widely used, the main caveats of this model lie in its inability to explain the underlying drivers of the economic growth as well as the differences in country-specific growth, especially why there is a difference in growth rates between countries over time. Several attempts to improve the model have been made, considering such variables as accumulation of human capital (Mankiw, Romer, and Weil, 1992), inflation (Bruno & Easterly, 1998), international trade (Dollar, 1992), and migration (Piras, 2012), but a clear consensus about the most effective framework has not been reached. Institutions as a relevant determinant of the economic growth was first discussed by North (1990), however it has to be noted that the effect on the output is not direct. Rather institutional quality affects investments (physical or human capital and Total Factor Productivity (TFP)).

TFP is of high importance due to its power to portray cross-country differences that cannot be explained by variations in human and physical capital (Miller & Upadhyay, 2000). Many researchers have attempted to break down the framework to explore determinants of productivity growth. Factors concerning inflation, size and spending of the government, level of education, trade openness, and institutional quality have been highly discussed in the literature by Dollar & Kraay (2004), Acemoglu et al. (2004), Ghali (1999), Grossman & Helpman (1991), Chang, Kaltani, & Loayza (2005) and others. As one of the few researching this area from institutional standpoint, McGuinness (2007) acknowledges that, even if only small, there is an evidence of institutional quality being part of the TFP growth, most of the effect coming from implementation of new regulations.

This paper is going to focus on the institutional aspect of economic growth, while paying close attention to the situation in the Baltic countries and trying to determine which institutional measures have an impact on the development.

2.2. Institutions and economic growth

Over the past few decades it has become rather common in the literature to separate what are thought to be proximate and deep causes of economic growth. Under this view, total factor productivity, human and physical capital are merely proximate causes, while institutions and government policies are considered to be the deeper causes that affect the proximate ones.

However, the following question arises – what is meant by institutions and policies? One of the main founders of the theory in institutional economics North (1981) describes institutions as a *"set of rules, compliance procedures, and moral and ethical behavioral norms designed to constrain the behavior of individuals in the interests of maximizing the wealth or utility of principals" (pp. 201-202).* In essence, institutions can be both formal and informal. They are designed to constrain individuals so far as to create economic environment that ensures freedom for all to pursue wealth-maximizing actions. North (1990) outlines that in order to boost economic growth, institutions should promote and incentivize productive and wealth increasing actions such as innovation, capital and education acquisition, ensure property rights and prevent predatory, wealth-destructive behaviour (e.g. corruption, theft and rent-seeking).

Hall and Jones (1999) contributed empirically to the theory by showing that the cross country differentials in income can only partially be explained by differences in education or physical capital accumulation, while the largest effects come from residual in Cobb-Douglas function - TFP. They argue and demonstrate that the underlying cause of high variation in productivity or output per worker is different "social infrastructures" or institutions and government policies that regulate the economic environment.

In theory, there have been several ideas discussed of how institutions and its setup could affect the wealth of a nation. One of such ideas discusses the role of state guidance in resource allocation. Markets usually allocate resources to productive activities well but not perfectly. Since private investors have limited information and may be more focused on short-term results over long-term results and might not consider potential positive spillover effects from other firms or industries, governments can deal with such market failures. They

can guide capital resources towards firms or sectors in need by, for instance, offering subsidies, help with exports, protect domestic production from imports. (Shonfield 1965; Johnson 1982; Magaziner and Reich 1983; Zysman 1983; Hall 1986; Dore 1987; Amsden 1989; Stiglitz 1989; Rodrik 2007). Nevertheless, critiques of this hypothesis emphasize that government can also fail in capital allocation since it also does not possess perfect information and can be heavily affected by interest of particular stakeholders, thus it might not work out in practice (Friedman 1961; Krugman 1994).

Continuing the critique of state guidance, comes the hypothesis that in democracy people self-organize in interest groups which can have both positive and negative effect on economic growth. The negative effect might arise since these groups have motivation to lobby the government in solely their favour, affecting the state effectiveness to deal with market failure, as well as their organization could potentially affect economic prosperity (Olson 1982, 1996).

Another idea presented in the literature is that implemented policies tend to differ between left-wing and right-wing parties. Left governments usually focus on the low income part of society and reducing the level of unemployment, which accelerates economic growth, while right governments pays attention to lower inflation, thus slower economic growth (Hibbs, 1977). Empirical support to these arguments have been found by Hibbs (1987), Boix (1999), Bartels (2008). In addition, Lange and Garrett (1985) suggested that favourable conditions for economic growth are when strong and concentrated unions are present in with left government, which, in response, will pursue expansionary policies to avoid downward pressure on wages and when weak and fragmented unions are with right governments, which will then lean towards policies that support free-market. Empirical evidence to the argument has been presented in Lange and Garrett (1985), Alvarez et al. (1991), Beck et al. (1993), and Garrett (1998).

Furthermore, economic growth can be achieved by establishing cooperation-promoting institutions since cooperative relationships between stakeholders are more likely to result in long-term benefits for all parties (Hicks and Kenworthy,1998). Similar ideas have been presented in the works by Zysman (1983), Dore (1987), Aoki (1988), Florida and Kenney (1990), Womack et al. (1990), and Herrigel (1994).

Bouis, Duval, and Murtin (2011) find that institutions and policies, including, the quality of education, trade and financial liberalisation as well as patent rights, have significant impact on economic growth of a country. Similar thoughts are presented by

Rodrik, Subramanian, & Trebbi (2002), who claim that the quality of institutions plays a crucial role in determining long-term economic growth.

Another issue is the endogeneity of institutions. The main question is whether the high institutional quality is the cause of economic growth or is it the advancements in the economy that lead to better institutions. Barro (1996) argues that institutional quality has no influence on the growth of developed countries, because they are already sufficiently advanced and no further changes would have a considerable impact in the long run. Nevertheless, majority agrees that institutional quality matters and has to be taken into account when assessing the growth drivers.

While discussion about whether institutions affect growth is still ongoing, researchers have come to an agreement on one topic – the indicators of good institutions. The most widely used definition of Acemoglu, Johnson & Robinson (2001) states that good institutions secure property rights of investors, maintain stability in the political arena, prevent rent-seeking behaviour by constraining the officials, and provides an opportunity for society's participation. In other words, those with an opportunity to invest in productive actions should be able to expect and receive fair return on their investment. While secure property rights attract investment, high risk of expropriation, on the other hand, only discourages it. Additionally, wealth should not be concentrated in the hands of few, instead everyone should be given an equal chance to obtain sufficient income which can be invested. As reinforced by Rodrik (2008), good institutions are a stimulus for business activity and a helpful tool to ensure balanced macroeconomic indicators.

Alesina et al (1996) explore how political instability (inclination for government breakdown) affects GDP per capita growth. Their sample consists of 113 countries in a period between 1950-1982. They discover and conclude that countries and periods of time with higher levels of political instability have statistically significant lower economic growth. Nevertheless, it should be acknowledged that in this case there is a possibility of reverse causality problem that might bias the results. Similar findings are presented by Aisen & Veiga (2013) who, by employing system-GMM on a sample of up to 169 countries in a time span of 1960 till 2004, determine that GDP per capita growth rates are negatively affected by higher political instability. They report that lower economic growth rates largely are transmitted through lower productivity rates, which are affected by political instability. Jong-A-Pin (2009) by employing dynamic panel system-GMM as well comes to a conclusion that political instability has a significant negative relationship with economic growth. The negative impact of political instability on economic growth is also supported by several other

studies such as Barro (1991), Barro & Lee (1994), Caselli et al (1996), Easterly & Levine (1997).

Additionally, several studies have acknowledged the beneficial impact of economic freedom on economic growth. Dawson (1998) demonstrates that institutions which support economic freedom positively affect economic growth either directly through TFP or indirectly through investments. Aisen and Vega (2013) also show that higher economic freedom results in a higher economic growth, while democracy might have negative albeit small impact. Financial development and openness also might play an important role. However, only few studies try to look at the impact of different aspects of economic freedom on economic growth. For instance, Fung (2009) presents evidence for conditional convergence and relationship between level of financial development and GDP per capita. For low-income countries the likelihood to catch-up is higher if they have well-developed financial sector in comparison with the same income level countries with less developed financial sector. The study also points out that human capital is crucial for growth in the early periods of economic development, while economic freedom gains accelerating importance. Hassan, Sanchez, and Yu (2011) report positive relationship between financial development and economic growth in developing countries. Another aspect is trade openness. Yanikkaja (2003) employs various measures of trade openness and show that, on the contrary to the usual view, trade barriers have positive significant relationship with economic growth, particularly in developing countries.

In addition, cross-country study by Feld and Voigt (2003) shows that real GDP per capita growth is positively affected by de facto judicial independence. Moreover, Park & Ginarte (1997) conduct a cross - sectional study of countries between 1960 - 1990 to explore the impact of secure intellectual property rights and economic growth. They find out that secure intellectual property rights indirectly have a positive effect on economic growth through R&D and physical capital accumulation.

2.3. Previous research on the Baltic States

Researchers have closely observed the economic development of the Baltic States executing analysis about the main macroeconomic indicators – GDP per capita, unemployment level, foreign direct investment, however deep growth determinants, especially institutional quality, have received less attention, therefore previous research in the field of interest is limited. Also, it is important to mention that there are no researches, that

come from highly trustworthy sources, available on this topic concerning this particular region.

2.3.1. Economic situation in the Baltic States

The three Baltic States are closely linked and portray resemblance in terms of size, resources, demography, and common history. Ever since the restoration of independence, the Baltic countries have been trying to close the gap with developed economies. Some steps have already been taken, for instance, remarkable achievements like joining the European Union in 2004 and the Eurozone 2011 through 2015 has played a significant role in the development of the region (Poissonnier, 2017), however there is still a question - how their economic performance could be improved to be able to catch up with more established economies in Europe.

According to the most recent data from International Monetary Fund World Economic Outlook database, the GDP per capita of Lithuania in 2016 was the highest among all three countries closely followed by Estonia. Estonia, with some exceptions, was the leader ever since the recovery from the Global financial crisis, however during the last few years Lithuania has experienced exceptional growth and managed to surpass it in 2016. Graph 1 depicts the development of each country over time and it can be seen that while the GDP per capita for each country is different, similar trends can be observed among them. It is important to mention that none of them has managed to catch up with the average GDP per capita of the European Union and the situation is even more unfavourable, when compared to the average of OECD countries (International Monetary Fund World Outlook Database, 2017; OECD, 2018).

Graph 1: GDP per capita, PPP, international dollars, development over time for the Baltic countries and the average of the European Union.
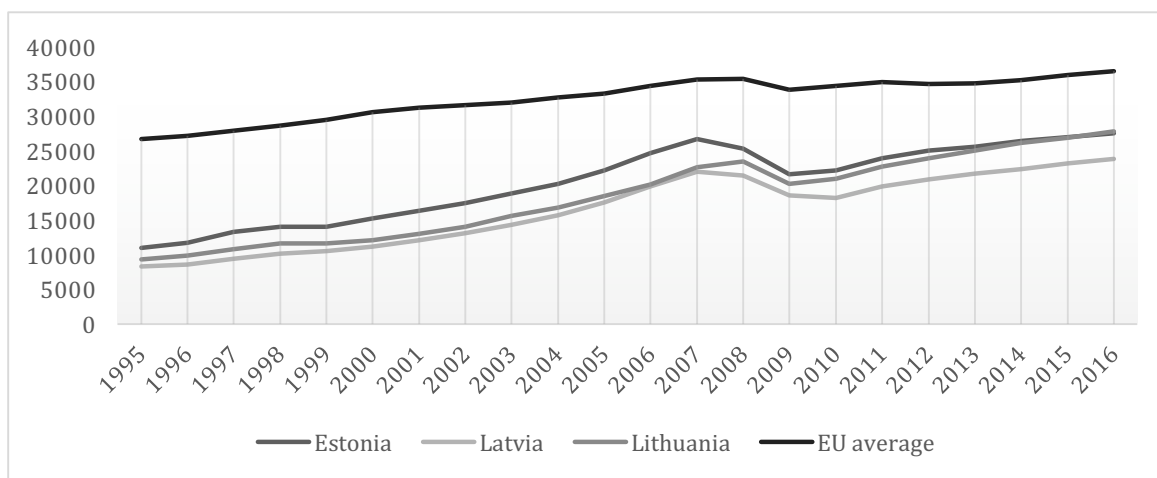
Created by the authors using data from International Monetary Fund (2017).

Savings and population growth, according to the Solow growth model, play a significant role as well and have the power to affect the development of the region. In terms of population all three countries can be described as small. None of them have more than 3 million residents and each year the number is decreasing; especially rapid drop in population can be observed in Lithuania, which has the highest number of inhabitants in Baltics – 2.8 million in 2016 (IMF, 2017). Savings rate, measured in % of GDP, portrays the exact opposite case, where Estonia records the highest rate and Lithuania the lowest – 24.5 and 15.4 respectively in 2016 with tendency to fluctuate (IMF, 2017).

Inflation, government expenditure and other macroeconomic indicators are also important determinants of country's economic development, however their description and analysis will not be provided as they are beyond the scope of this research.

2.3.2. Institutional aspects of the Baltic States

The Baltic States are still insufficiently researched area regarding institutional matters, and only a couple of researchers have attempted to provide their insights into the topic. The main problems emerge from lack of data for longer time periods, and inability to address the endogeneity issue with simple econometric models, nevertheless we would like to acknowledge some of the studies made in order to portray a picture of the existing claims among researchers.

Borys, Polgar, & Zlate (2008) have acknowledged institutions as an important aspect affecting the economic growth when analysing the development of European countries (including the Baltic States), however the effect cannot be detected directly. Even though

their utilized model of fixed effects regression for European countries does not yield significant results leaving the authors with uncertain outcome, it can be observed that inclusion of institutional quality improves other macroeconomic variables' explanatory power, specifically investment, inflation, foreign direct investment, and government balance. They also utilize difference-GMM model to analyse data – Index of Economic Freedom, but mostly arrive to insignificant results.

Another research made by Tvaronavičiene, Grybaite, & Tvaronavičiene (2009) compares the Baltic States through the institutional aspect using multi-criteria method by testing both – economic and institutional influence on the economic development. The main institutional indicators utilized in their research are Index of Economic Freedom and Corruption Perceptions Index. They present a ranking where Estonia confidently takes the 1st place in terms of sustainability of development, followed by Lithuania and Latvia, respectively, for the time period of 2004-2008.

One of the most recent analysis by Puharts & Kloks (2015) concludes that institutional variables have high explanatory power regarding the TFP differences within the Baltic States and other European countries. Using two proxies explaining the institutional quality – Index of Economic Freedom and World Bank data, their research shows that the main sources of inefficiency are the court system dependence and problems with contract enforcement, however they acknowledge the possibility of endogeneity affecting the results of their model.

We will contribute to the existing literature by exploring the effects of institutions on the economic growth by utilizing the General Method of Moments model, which is rather recently developed method and not yet widely used. This approach will help us to bypass the existing endogeneity problem and allow to see how specific institutional measures impact the development of the region that has not been frequently considered in the research arena – the Baltic States.

3. Methodology

A common criticism in the empirical literature on economic growth is the lack of credibility of the results and potential reverse causality. As previously discussed, it might be the case that more prosperous economies tend to improve and form better institutions instead of favourable institutions generating economic prosperity. Thus, simple ordinary least squares regression might not be appropriate to address our stated research questions since all the regressors need to be exogenous, i.e. uncorrelated with the error term.

Generally, the empirical literature features two most common methods for dealing with endogeneity - instrumental variables (IV) regression (Acemoglu, Johnson, & Robinson, 2001) and GMM (Bond, 2002). Theoretically, IV regression solves endogeneity problem by using exogenous and relevant instruments. In order for instrument exogeneity to hold true, instruments cannot be correlated with the error term. Additionally, instruments have to be relevant or, in other words, they have to strongly correlate with the explanatory variable. If both conditions for strong instruments are satisfied, coefficient on explanatory variable can be estimated using Two Stage Least Squares (TSLS) regression. Unfortunately, in practice finding at least somewhat appropriate instruments is extremely difficult. Weak instruments usually lead to highly biased results. Additionally, it does not completely solve the problem of omitted variables bias. Referring to previous researches, mortality of settlers has been used as an instrument in the regression by Acemoglu, Johnson & Robinson (2001), however they face some fundamental problems which are not fully acknowledged. For instance, it is difficult to judge the precision of early data due to the colonization period in Europe that took place in different areas at different times as well as the fact that 36 values of mortality are distributed among the sample of 64 countries (Albouy, 2006). Hall and Jones (1999) use a different approach and they utilize two instruments instead of one - distance to the equator and whether one of the primary languages is used as a first language nowadays. However, the validity of these instruments are also under question. To avoid the problem of inappropriate instrument choice, we choose to do the analysis using GMM approach, which have not been widely used to empirically analyse the impact of institutional quality on the economic growth, however there are some theoretical considerations that poses the GMM being superior to the IV regression (Behr, 2003).

GMM is known to address endogeneity issue better than IV regression under certain circumstances and if no strong and convincing instruments are available. In this case it should deal better with the endogeneity issue, leading to more robust and unbiased results.

Additionally, due to heteroscedasticity of the error term, GMM gives more efficient estimates than either OLS or TSLS (Baum et. al., 2003).

Lastly, contribution analysis is executed for the Baltic States with respect to the OECD average, where the difference in measures is calculated for each country from the Baltics and then, in order to quantify the effect if the improvement takes place, multiplied with the coefficient with the highest significance obtained from the regressions for the respective measurement.

3.1. Conditional Beta - Convergence model

In order to address our research questions and estimate the effect of institutional quality and its factors on economic growth, we employ widely - used conditional beta - convergence model of economic growth that has been modified to include time fixed effects (Barro & Sala-i-Martin, 1992; Mankiw et al., 1992). We formulate the following dynamic panel regression:

$$\Delta y_{it} = \alpha + \delta \cdot y_{i,t-1} + \beta_1 \cdot X_{it} + \gamma_t + \varepsilon_{it}$$

$$\text{for i=1,...N and t=1,...T}$$

where Δy_{it} is the growth of GDP per capita in a country *i* at a time point t. $y_{i,t-1}$ is the level of GDP per capita in the preceding period. X_{it} is the explanatory variable in a country *i* at a time point *t*. In this case, this variable captures institutional quality estimated by different proxies. γ_t are the time specific effects which are shared across countries. ε_{it} is the error term. Coefficient δ measures the speed of beta - convergence in a year conditional upon the explanatory variable. Without the explanatory variables X_{it} and fixed effects the model would transform into absolute beta - convergence model.

3.2. Generalised Method of Moments

Generalized Method of Moments is specifically designed for cases when:
- time series are shorter than number of observations;
- regression is linear;
- independent variables are weakly endogenous, i.e. they are correlated with the error term;
- it includes a dynamic variable (lagged value of dependent variable);
- there are directly unobservable individual fixed effects;

- autocorrelation and heteroscedasticity is only observed within variables but not between them (Roodman, 2009).

Over time two types of GMM have been developed - difference GMM by Arellano & Bond (1991) and system GMM as explored by Arellano & Bover (1995), Blundell & Bond (1998). In the difference GMM the estimation is made by applying regressors that are transformed by differentiation. The underlying assumption of difference GMM is that the error term is not correlated with initial observations of variables.

The system GMM is built upon the difference GMM by including additional assumption that no correlation is observed between first differences of instruments and the fixed effects. This introduces the possibility to increase the amount of instruments leading to two equation system and resulting in more efficient outcomes. We execute our analysis by applying both models assessing the significance of results, however more attention will be paid to the system GMM model.

Lagged values of independent variables as instruments in the model, according to Reed (2015), are appropriate instruments if both criteria hold – independent variables are weakly exogenous and no autocorrelation of the error term exists.

Two different tests are used to evaluate if the conditions of the GMM model are satisfied. First, it is important to check whether valid instruments, which are not correlated with the residual, are used. That can be done using Hansen J-statistic test (Hansen, 1982) and, for system GMM, difference-in-Hansen test, that focuses on the additional instruments. Second, to account for the residual second-order autocorrelation Arellano-Bond test is applied (Roodman, 2009).

3.3. Data

The main reason for the lack of clear consensus on the effect of institutions on economic growth is the fact that it notoriously hard to measure institutions and establish causality. In theory, institutional quality should be measured as the wedge between private and social returns on productive activities (Hall & Jones, 1999). In reality, however, no such data exist since institutions cannot be directly observed or measured, thus researchers in the past have relied on the use of proxies for measuring institutional quality and policies, but it should be taken into the account that this leads to a potential measurement error and might not accurately represent the situation.

Firstly, we use Index of Economic Freedom as a proxy for institutional quality in a country used also by Merkina (2009). The underlying idea of the index is that the main role of institutions is to constrain only as much as to provide economic liberty for all to pursue wealth - maximizing actions. Moreover, it is chosen over similar index of Economic Freedom by Fraser Institute as it provides more recent data, while results for Fraser Institute index does not have insights after year 2015 (Fraser Institute, 2018).

Secondly, we employ worldwide governance indicators (WGI) reported by the World Bank as a proxy for institutional quality. The index measures and discloses estimate on the strength of governance performance in a country on six broad categories. The indicators are reported for more than 200 countries in the time period between 1996 and 2016. Thirdly, we utilize Global Competitiveness Index subindex A Institutions pillar. This data is available for significantly shorter time span – from 2006 until 2016 and includes 142 countries in total. Full description of variables is provided in Appendix A. Similar index is compiled by IMD, however due to limited data availability, subscription-based access, and significantly lower amount of countries analysed (63 countries) (IMD, 2018), it is not employed in this research.

The aforementioned inputs allow us to estimate institutional quality and explore wide variety of important aspects of good institutions and their effect on the economic growth. Additionally, usage of different proxies for institutional quality allows us to compare results between inputs and overall increase the credibility and robustness of the results.

In order to assess the effects and apply our chosen methodology, we use panel data. Our sample together consists of 113 countries chosen based on data availability (See Appendix B), the employed time period is 11 years from 2006 to 2016 using annual data as the Global Competitiveness Index does not provide earlier insights and the chosen methodology is more suitable if there is a large amount of countries and a small number of periods.

As a dependent variable representing the economic growth, we take data for annual GDP per capita, adjusted for purchasing power parity, and transform it in a differentiated log form according to the conditional beta-convergence model in order to arrive to economic growth indicator that is comparable between countries. Macroeconomic indicators according to the Solow growth model – Savings (in % of GDP) and Population growth are included in all models and used as control factors. All macroeconomic data is obtained from the International Monetary Fund World Economic Outlook database.

All data regarding institutional quality are available in public databases from the World Bank (Worldwide Governance Indicators), the Heritage Foundation (Index of

Economic Freedom), and World Economic Forum (Global Competitiveness Index). Full description of used variables, their notation and expected effects can be found in Table 1 below.

Table 1. Name of variables, their notation, and expected effects.

Macroeconomic indicators		
GDP per capita growth, PPP, logarithm *(independent variable)*	$dln(GDP)$	
Initial GDP per capita, PPP, lagged logarithm	$ln(GDP_{t-1})$	Positive
	$ln(GDP_{t-2})$	Ambiguous
Total savings (% of GDP)	*Savings*	Positive
Demographic indicators		
Population (% change)	*Population*	Negative
Worldwide Governance Indicators		
Voice and Accountability	*VA*	Positive
Political Stability and Absence of Violence	*PS*	Positive
Government Effectiveness	*GE*	Positive
Regulatory Quality	*RQ*	Positive
Index Of Economic Freedom		
Tax Burden	*TaxBurden*	Ambiguous
Monetary Freedom	*MonFreed*	Positive
Business Freedom	*BusFreed*	Positive
Financial Freedom	*FinFreed*	Positive
Investment Freedom	*InvFreed*	Positive
Trade Freedom	*TradeFreed*	Positive
Global Competitiveness Index		
Property rights	*Prop rights*	Positive
Intellectual property protection	*IP protection*	Positive
Favoritism in decisions of government officials	*Favoritism*	Positive
Strength of auditing and reporting standards	*Auditing*	Positive
Transparency of government policymaking	*Transparency*	Positive
Strength of investor protection	*Investor protect*	Positive
Efficiency of government spending	*Eff gov spending*	Positive
Efficacy of corporate boards	*Eff corp boards*	Positive
Judicial independence	*Jud ind*	Positive
Protection of minority shareholders' interests	*Protect minority*	Positive

Created by the authors using data from International Monetary Fund World Economic Outlook (2017), Heritage Foundation (2017), World Bank (2017), and World Economic Forum (2018).

4. Analysis of Results

In order to assess the validity of results and ensure that the best method is chosen for the analysis, we compare 3 different approaches – Fixed effects (FE) regression, difference GMM, and system-GMM models for a sample of 113 countries over yearly 11 year period from 2006 to 2016. The dependent variable is GDP per capita (adjusted for Purchase Power Parity) growth. Together 6 different models are compiled for the analysis that combine various institutional aspects. All of the models include 2 macroeconomic indicators from the Solow growth model - savings rate (in % of GDP) and population growth (in %). To account for the institutional part, variables, which have the highest explanatory power, are used. We as well look at the correlation between variables (Appendix C) to check for potential multicollinearity and drop respective variables if such issue is found.

We treat all the institutional explanatory variables as potentially endogenous, while population growth and savings rate as weakly exogenous. Additionally, we apply Windmeijer (2005) corrections and small sample corrections to trigger t-statistics and F-test for the model. We use time dummies to capture time fixed effects and treat them as exogenous as well.

All results are presented in Table 2 below (system-GMM) and Appendices D and E (FE regression and difference-GMM). Our main focus is on the system-GMM approach, while other methods are included for comparison purposes. The FE regression is a part of the analysis as it helps us to compare results with other researches, where this specific method was used, however we have to acknowledge that the results are potentially biased and inconsistent due to the dynamic panel bias and endogeneity problem that this method is incapable of solving. Difference GMM is used for comparison and robustness purposes, however it should be noted that it tends to produce quite insignificant results, thus not always its provided insights are valuable. In this case the system-GMM offers an alternative for tackling the main problems of other models while producing statistically significant outcomes, that is why it receives more attention in this research.

Two-period lags of the dependent variable are used as instruments in order to mitigate endogeneity concerns. In addition, inclusion of the 2nd lag leads to improvement not only in the results and significance of the variables, but also has a favourable effect on the test results that indicate the validity of the regression.

Given the complexity of measuring and capturing the institutional quality quantitatively, variables are combined from various indices, and the best obtained combinations are presented and analysed in this study. Some sub-indices are excluded

because of potential overlap between them, for instance, Government integrity and effectiveness is measured by both – Economic Index of Freedom and World Governance Index, and using both of them in one model raises multicollinearity concerns and is likely to bias the results.

To ensure the reliability of the analysis using system GMM approach, several different tests are employed as already explained in the methodology section. The Hansen tests are rejected, showing that the instruments used in the regressions are valid, however for some models the values are rather low, therefore the respective results should be approached with caution. Furthermore, the second order autocorrelation coefficients lie between 1 and 0 pointing towards the correctness of the model. In comparison, in the case of difference GMM, Sargan/Hansen J tests show that the instruments are less appropriate considering that the tests generate lower values than for the system GMM models. Therefore, the validity of instruments in difference GMM under these specifications is rather questionable.

As expected, the macroeconomic indicators with statistical significance affect the level of GDP per capita in all six models. Savings rate (% of GDP) has a positive effect while population growth reports an opposite influence as predicted by the theory (Stavig, 1979). Thus, these exogenous macroeconomic indicators are still of very high importance for economic growth in a country.

According to the results, several elements of economic freedom present positive and significant outcomes. This corresponds to the aforementioned expectations that institutional measures also have an impact on the GDP growth of a country. First institutional variable – Monetary Freedom – is statistically significant and has a positive sign in almost all of the models. Different situation in terms of statistical relevance is observed regarding the Financial Freedom, which mostly is statistically insignificant with one exception in the 5th model, where the significance level corresponds to 90% confidence interval for the system-GMM analysis. Similarly, Trade Freedom, included in the 6th model, appears with a positive sign and is statistically significant within the system-GMM framework.

Other variables that yield positive statistically significant results which are in line with the expectations are Efficacy of corporate boards, Efficiency of government spending, Judicial independence, Strength of auditing and reporting standards, Regulatory Quality, Protection of minority shareholders' interests and Government Effectiveness. They appear in at least one of the analysed models and do not present conflicting outcomes regarding the direction of the effect.

Another variable that yields highly significant outcomes for some of the models is Tax Burden, however it should be approached with caution due to the fact that the effect can be ambiguous, that is, decrease in tax rate has a favourable effect on economy only to a certain point until it becomes too low and turns the situation around limiting the actions of a government. In this case, all models, where this variable appears, show positive effect on the economic growth for our chosen dataset.

Lastly, it can be observed that Favoritism in decisions of government officials, Strength of investor protection, Voice and Accountability, and Transparency of government policymaking to some extent contradict the previously made claims and do not have consistent effect on economic growth. In some models these variables yield statistically significant negative coefficients. However, a reason why all 6 models are still regarded as valid is because those inconsistencies are not observed applying system-GMM analysis, which we believe to be potentially more precise than FE regression or difference-GMM.

Table 2. Results of system-GMM models.

Variable	(1) System-GMM	(2) System-GMM	(3) System-GMM	(4) System-GMM	(5) System-GMM	(6) System-GMM
$\ln(\text{GDP}_{t-1})$	0.1827***	0.1948***	0.1803***	0.1798***	0.2433***	0.2023***
	(0.0521)	(0.0481)	(0.0471)	(0.0517)	(0.0446)	(0.0407)
$\ln(\text{GDP}_{t-2})$	-0.1993***	-0.2109***	-0.2042***	-0.1923***	-0.2621***	-0.2259***
	(0.0515)	(0.0464)	(0.0456)	(0.0511)	(0.0437)	(0.0409)
Population	-0.4806***	-0.5698***	-0.5886***	-0.5949***	-0.5400***	-0.5354***
	(0.1160)	(0.0539)	(0.0510)	(0.0657)	(0.0578)	(0.0557)
Savings	0.0011***	0.0011***	0.00125***	0.0009***	0.0013***	0.0013***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0002)
IP protection	-0.0047					
	(0.0049)					
Favoritism	-0.0053				0.0024	-0.0031
	(0.0054)				(0.0034)	(0.0030)
MonFreed	0.0013***	0.0016***	0.0014***	0.0019***		
	(0.0003)	(0.0005)	(0.0005)	(0.0005)		
BusFreed	0.0002			0.0002		
	(0.0003)			(0.0003)		
Investor protect	0.0028**				0.0027*	0.0016
	(0.0013)				(0.0014)	(0.0013)
Eff gov spending	0.0065					
	(0.0044)					
Eff corp boards	0.0084**		0.0051	0.0064*	0.0082*	0.0059*
	(0.0038)		(0.0051)	(0.0037)	(0.0044)	(0.0031)
Jud ind	-0.0004	-0.0023				
	(0.0037)	(0.0028)				
VA		-0.0005		-0.0044	0.0009	-0.0064
		(0.0041)		(0.0059)	(0.0051)	(0.0046)
Transparency		0.0007				
		(0.0046)				

	(1)	(2)	(3)	(4)	(5)	(6)
FinFreed	0.0001				0.0005*	0.0001
	(0.0003)				(0.0003)	(0.0003)
Auditing	0.0109**					
	(0.00451)					
RQ			0.1420*			
			(0.0079)			
Tax Burden			0.0005**	0.0005*		
			(0.0002)	(0.0003)		
Protect minority			0.0011			
			(0.0047)			
Property rights					-0.0059	
					(0.0061)	
PS					0.0062	
					(0,0060)	
GE						0.0117*
						(0.0069)
InvFreed						0.0002
						(0.0002)
TradeFreed						0.0007*
						(0.0004)
Number of observations	891	1005	1005	1005	1005	1005
Number of instruments	140	129	112	112	163	180
Hansen test	0.023	0.121	0.006	0.011	0.141	0.221
Arellano-Bond AR(2) test	0.078	0.023	0.020	0.016	0.038	0.040

Note: Significance depicted respectively – ***: 99% level, **: 95% level, *: 90% level. Standard errors attained in brackets. The models contain time fixed effects, which are excluded from the table.

Created by the authors using statistical software Stata 14.

5. Discussion of Results

In this section, the results of this research will be discussed and interpreted taking into consideration the theoretical framework and previous research on the importance of institutional drivers on economic growth. Mostly attention will be paid to the system-GMM analysis, as it is expected to give the most credible results. Additionally, the main findings will be reviewed in a practical context. Particular interest and focus of practical implications will be paid to the situation in the Baltic States and the discussion will revolve around statistically significant factors under the system-GMM.

5.1. Institutional factor contribution to the economic growth

While macroeconomic and demographic parameters are undoubtedly still important for economic growth, the results show that some institutional drivers are also of importance. Our obtained results confirm that the institutional quality is crucial when assessing the changes in GDP per capita as the main described model – system-GMM yields statistically significant and positive outcomes for a collection of institutional measures, therefore being in line with the expectations and theory.

The results of system-GMM show that two of the World Governance Indicators - Government Effectiveness and Regulatory Quality - have positive and statistically significant effect on economic growth. The significance of Government Effectiveness means that the quality of both public and civil services, as well as government's ability to formulate policies and commit to them free from political pressures matters for economic growth. The impact of Regulatory Quality includes government's ability to define and implement proper policies that fosters the growth of private sector. Our results show that economic growth can be boosted by high quality regulators and effective governments.

Outcomes indicate that economic freedom is still relevant and has a positive impact on economic growth as previously discussed in literature (e.g. Dawson (1998); Aisen & Vega (2012)). In our research we find the significance of four features of economic freedom – degree of Tax Burden, the level of Monetary Freedom, Financial Freedom, as well as Trade Freedom.

In our case, the variable Tax Burden captures the effect of equally weighted measures on marginal tax rates both on individual and corporate income, as well as overall tax burden as a percentage of GDP (Heritage Foundation, 2018). Higher score on this subindex indicates lower

tax burden. According to the results, higher score on this subindex indicates higher GDP value per capita if the tax burden itself is lower. One possible explanation to our results could be that lower corporate taxes are tempting for businesses and fosters business development, while lower personal taxes leave free income to be saved or consumed. However, these results should be approached with caution since, for instance, 0% tax rate might not be optimal, according to Kuznets curve (Appendix F). It states that the economic growth coming from taxes increases as the tax rate grows. This continues until tax rates reach the maximum point T* after which people would decide that it is not worth working since a disturbingly large part goes to the government.

Another highly significant aspect of economic freedom that affects economic growth is Monetary Freedom. This sub-index combines the evaluation of price stability and the level of price control. In an ideal case of free market economy prices would be stable without government direct control on them since both inflation and price controlling alters the activities on the market (Heritage Foundation, 2018). Independent central banks (that are essential for price stability) as well as free movement of capital (essential for foreign direct investment inflows) have a positive impact on economic growth. Low score on this sub-index signals low degree of monetary freedom in an economy, thus the regulatory efficiency is decreased and market activity is distorted, which negatively affects economic growth.

Financial Freedom is the next aspect which cannot be disregarded. It has a positive effect on the economic growth and illustrates how rigorously the financial sector is regulated by the government and whether the financial institutions experience government intervention. As the financial freedom grows, meaning that the financial sector is acting independently, and no interventions are taking place, there is an increase in the economic growth which is also presented in our models.

The results we obtained indicate that Trade Freedom as well plays an important role in the context of economic growth. It could be explained by the fact that trade freedom or openness allows countries to utilize their comparative advantage and contradicts the findings by Yannikaya (2003).

If we take a look at the first pillar (Institutions) of Global Competitiveness Index, we find an evidence for positive statistically significant effect for Strength of auditing and reporting standards, Efficacy of corporate boards and Strength of investor protection, which emphasizes also the importance of corporate segment regulations and high business ethics standards.

Strength of auditing and reporting standards (Auditing) has proven to be statistically significant positive driver of GDP per capita, which means that high quality auditing and reporting standards for companies tend to increase the country's GDP per capita. Thus, it is worth for regulators to pay close attention to improving these standards since there is evidence for gains in terms of GDP per capita.

Our results show that Efficacy of corporate boards adds value to economic growth. Strength of investor protection also yields statistically significant effect on economic growth which only stresses the importance of corporate sector accountability. It could be that high quality corporate policies result in higher economic growth through a transmission channel such as investment level. Ensuring protection of investor, rights against expropriation, some sort of transparency and accountability by strong auditing and reporting standards and sound decision-making of corporate boards attract investment to the country which in turn affects GDP.

According to the results, political stability and absence of violence positively impact economic growth. Positive relationship between political stability and economic growth has already been well established in the literature and holds little surprise. However, we find no evidence that this effect is statistically significant on the contrary to, for instance, the findings of Barro (1991), Barro & Lee (1994), Caselli et al (1996), Easterly & Levine (1997), Aisen and Veiga (2013), and Jong-A-Pin (2009).

To sum up, our results show that institutional drivers are of importance however that does not mean that the ones included in the Solow growth model are not relevant. Proximate causes of economic growth should still be considered as factors, but to a smaller extent. Rather, they complement each other providing more explicit explanation of economic growth across countries.

5.2. Institutional quality of the Baltic States

We begin our discussion of institutional factors as drivers of economic growth in the Baltic States by looking at their mean statistics against other developed countries with relatively high income level. The analysed factors are chosen based on the previously acquired results and variables that yielded statistically significant outcomes under the system-GMM framework are employed. We look at a sample of OECD countries (all except South Korea which is also

excluded from our initial analysis), EU countries, and also separately countries in the euro area focusing on the latest data – year 2016.

Table 5. Mean statistics for the Baltic States, OECD, the European Union and the euro area countries in 2016.

	OECD		EU		EA		Estonia	Latvia	Lithuania
	Mean	St. dev	Mean	St.dev	Mean	St.dev			
GDP per capita, PPP ($)	38 032	16 674	34 829	16 844	36 942	19 013	27 525	23 832	27 791
GE	1.21	0.65	1.01	0,65	1.06	0.62	1,12	1.00	1.09
RQ	1.24	0.59	1.08	0.56	1.10	0.57	1.70	1.08	1.14
TaxBurden	66.10	12.80	67.31	15.36	66.67	13.75	81.20	84.70	86.90
MonFreed	83.08	4.54	84.02	3.91	83.95	4.56	85.70	86.50	90.00
TradeFreed	85.95	3.02	86.21	2.34	85.86	3.00	87.00	87.00	87.00
FinFreed	69.09	11.82	65.93	11.85	64.21	11.70	80.00	60.00	70.00
Auditing	4.96	1.29	4.86	1.30	4.68	1.47	4.57	3.43	3.60
Eff corp boards	4.72	1.07	4.60	1.11	4.54	1.27	4.58	3.89	3.87
Investor protect	5.24	2.27	4.34	2.78	4.98	2.37	4.70	6.00	3.70

Created by the authors using data from International Monetary Fund World Economic Outlook (2017), Heritage Foundation (2017), World Bank (2017), and World Economic Forum (2018).

The mean real GDP per capita over the sample period is the highest in the sample of OECD countries. Both Estonia and Latvia are members of OECD, while Lithuania is in the final stages in the process of becoming a member. However, the level of the real GDP per capita is significantly lower in the Baltics than OECD average. Part of this could be attributed to institutional factors since the Baltics score lower on these measurements and we have previously discussed that some institutional aspects have a statistically significant effect and should be accounted for. All countries score substantially lower that OECD average in Government Effectiveness and Efficacy of corporate boards. Both Latvia and Lithuania has lower mean scores in Regulatory Quality and Financial Freedom, and Strength of auditing and reporting standards, and Lithuania and Estonia score lower in the measure of Strength of investor protection. However, Tax Burden is significantly lower in the Baltic States and Trade Freedom is

higher. Similar situations with some slight differences are revealed if we take for a comparison either the sample of EU or Euro Area countries.

If we take a look at the inter-Baltic situation, Latvia has the lowest mean scores over the sample period of all the Baltic countries in Government Effectiveness, Regulatory Quality, Monetary Freedom, Financial Freedom, Strength of auditing and reporting standards, Efficacy of corporate boards. Of all of these, the most problematic area seems to be the level of Financial Freedom, which is substantially lower than for the other Baltic countries and also well below the average score of all three samples of developed countries. Lithuania is at the bottom of the three in the area of Strength of investor protection, while Estonia has the highest Tax Burden. All countries score equally on Trade Freedom and surprisingly it exceeds the average for all regions used for comparison.

Looking into mean statistics, it is rather clear that Latvia has the weakest institutional quality of all three Baltic States some of whose indicators fall below the sample mean. Lithuania has slightly higher mean values, while Estonia undoubtedly takes the lead position with also the highest mean GDP per capita over the sample period. Additionally, if we look at the first pillar (Institutions) of Global Competitiveness index 2017 -2018, Latvia ranks at the 82nd place out of 137, while Lithuania stands at 53rd place and Estonia has the highest rank standing at the 24th place (World Economic Forum, 2018).

This comparison allows us to point out potential areas that could be improved in order to boost economic growth of the Baltic countries. The results suggest that Latvia should pay close attention to increasing its Financial Freedom, accessibility and overall improve its financial sector. Appendix G presents the contribution analysis, where it can be seen that reaching the OECD average value for Financial Freedom for the year of 2016 would allow additional GDP per capita growth of roughly 0.0045 percentage points. While the difference is rather small, it should be noted that this is only one of the areas where improvement might lead to positive advancements. Some of the main issues in Latvian financial sector are that capital markets are underutilized and underdeveloped, in addition to negative image of Latvian banks due to several money laundering scandals. Overall, there is a high risk for many Latvian banks to be involved in illicit activities due to the riskiness of their business model, i.e., focusing on non-resident clientele. Together with improving the transparency of financial sector, comes also generally increasing the quality of Strength of auditing and reporting standards and Efficacy of corporate

boards to attract investment to the country. Moreover, the regulatory environment should support innovation in the financial sector that would stir up the competition. Additionally, the country could benefit from improving the Government Effectiveness and Regulatory Quality by, for instance, reducing the level of bureaucracy which has been pointed out as one of the key issues in the Executive Opinion Survey of Global Competitiveness Index Report 2017-2018 (World Economic Forum, 2017) The size of the government has also been a topic of interest in terms of efficiency (Mitchell, 2014). Currently Latvia has 100 elected parliament members. It might be that large government reduces its efficiency, serves as an extra financial burden on country's budget and drags down the economic growth. However, additional research would be in place to explore this idea.

Lithuania would benefit from improvements in investor protection. Having the level of OECD countries in 2016 would increase the GDP per capita growth by additional 0.0043 percentage points (Appendix G). Stronger legislation with respect to investor relations would greatly benefit the current situation, creating an environment where the risk of expropriation has been minimized and potential investors would have a clear idea of the possible returns even in case of a bankruptcy. Another area, which should be approached with caution is taxes. Results indicate that Lithuania has smaller tax burden than other countries, however, as it was discussed earlier, tax rate that is too low also might be a reason for a setback in economic growth. Evidence supporting the claim that Lithuania is underperforming in terms of tax rates, can be found when looking at the tax-GDP ratio which falls behind not only the European Union average, but also Estonia and Latvia (IMF 2017). A suggestion would be to revise the tax system and adjust it according to the economic wellbeing of the country at the same time considering increasing the rate for certain aspects, especially the excise tax on tobacco products which remains at the minimum level set by the regulations of the European Union (European Commission, 2018).

Even though the situation in Estonia is significantly better than in the other Baltic countries and even have better measurements for some indicators compared to the European Union, there is still a room for improvement in terms of Strength of auditing and reporting standards in order to reach the average level of the European Union and OECD countries. Contribution analysis shows that improvement in this aspect might lead to supplementary 0.0042 pp in terms of GDP growth per capita in 2016 if the OECD average level is reached. One way to move towards advancement would be to impose higher level of transparency of private sector to

increase the attractiveness for the investors, meaning that companies should make more information accessible to the public. Doing so would not only enhance the institutional measurements, but also help with the issue of shadow economy. Moreover, the country would benefit if attention was paid to investor protection that, as already mentioned earlier, is a matter of quality of the commercial law and how easily charges can be enforced to protect the investment and ensure safe returns.

Overall, the Baltic States have some work to do to improve their institutional quality to the average of well-developed high income countries since, as previously discussed, some institutional drivers have significant positive effect on economic growth. Latvia of all has the longest way ahead and should pay particular attention to the environment, accessibility and regulations surrounding the financial sector.

5.3. Policy recommendations for the Baltic States

The obtained results clearly indicate areas subject to possible improvements. Firstly, Latvia demonstrates the largest difference in score for Financial Freedom, therefore by following the example of more advanced economies it could be possible to achieve higher level of convergence. As one of the main areas of focus, banking sector and its transparency has been an actual issue over the last year. Improvement in the regulatory framework that sets the capital requirements of banks as well as having better reporting standards that would allow to have an overview of the real situation would help to increase the score. However, it has to be noted that introducing regulations that substantially restrict the bank operations can have an opposite effect, therefore all changes have to be carefully assessed not to restrict the competition. The main aim is fraud prevention, ensuring that there is no room for incidents to take place. While the situation is kept stable, no other constraints have to be applied.

Secondly, Lithuania indicates a low tax burden compared to other countries and because the country has still a room for improvement in terms of growth, setting higher taxes in particular aspects, for instance, the excise tax can be increased (creating not only economical, but also environmental benefits). Also, adjustments in regulations concerning the investor protection might prove useful for attracting more foreign direct investments into the economy as more people are willing to invest if their expectations of safe returns are met. It means that procedures

in case of bankruptcy or power of voting for the directors should be clearly defined and understandable, allowing the potential shareholders to assess their risks.

Lastly, Estonia could be thought of somewhat of an example to other Baltic States since it shows significantly higher results in many areas. However, our empirical evidence shows that Estonia could economically benefit by more proactively dealing with information asymmetry in capital markets. Increasing transparency of private sector reporting would tackle this market failure and increase likelihood that capital is invested in productive and wealth-maximizing actions. Moreover, investors should be protected and rewarded for their risk. Our results show that Estonia could benefit from higher level of investor protection by amending commercial law so as to promote safe investment environment.

5.4. Limitations of the study

One of the main limitations of the study is data availability, which restricts the use of longer time period as well as inclusion of some particular countries. In order to obtain results that are more precise and get as close to a balanced panel as possible, countries without data were excluded. That contracted our sample to 113 countries and annual data of 11 years, which is appropriate for the chosen methodology, however does not offer insights into the long term economic growth that in this particular case could have been a valuable addition to the current research. For example, if a dataset that covers longer time span is available, it could be beneficial to use 5 year averages of economic growth to account for the business cycle fluctuations, long – term economic growth, potential economic growth, but still keep the number of time periods small to be useable for GMM. Also, even with careful data selection, it was not possible to obtain a strongly balanced panel, because that would have reduced the number of groups substantially.

Secondly, it is important to mention that our way of assessing the institutional quality was using different indices, therefore the results should be viewed with caution since the level of institutional quality cannot be measured directly. Moreover, the measurement of these indices heavily depends on the methodology and definitions used to assembly these indices, which might also impact the validity of the results. Also, all models include savings, therefore the effect can be observed only on TFP, not capital accumulation, which would also be a field worth investigating.

A problem with the GMM approach is – no direct solution has been found to the model uncertainty problem, specifically, to the variable selection problem and it is difficult to evaluate whether the set of variables that has been chosen is the most efficient combination that yields precise and unbiased results. Model uncertainty problem in essence is an issue that arises from lack of existing, widely accepted and proven structure of a model that should be used in order to research the problem at hand (Clyde & George, 2004) and as the topic of institutional quality is considerably recent such framework does not exist. In order to avoid it, it is necessary to compare various models to present credible conclusions, therefore 6 different models are described in this thesis to help to reduce the issue and reach more reliable outcomes.

6. Conclusions

To this point institutional quality and its effect on economic growth has not received too much attention from researchers, especially when looking at the Baltic States in particular, mostly due to the measurement and methodological issues that this research area poses. In this study we apply GMM analysis in order to minimise the problems researchers have faced previously and arrive to more reliable results. We provide new insights into the topic by looking at several indexes and compile models to include different institutional aspects to come up with the most effective framework for analysis. Also, by paying attention to the Baltic States we complement the existing literature, because there is very limited amount of studies that would tackle the institutional aspect and almost no studies that would make an attempt to apply the GMM method.

Two research questions were answered:

1) What is the impact of institutional quality on the economic growth?

The results show that in addition to the traditional macroeconomic indicators – savings and population growth, institutional measurements also play a role in determining the economic development. By utilizing system GMM analysis we find that Monetary Freedom, Financial Freedom, Trade Freedom, Tax Burden, Government Effectiveness, Regulatory Quality, Efficacy of corporate boards, Strength of auditing and reporting standards, and Strength of investor protection, have a statistically significant positive effect on economic growth.

2) Which policies and improvements in institutional quality could positively affect economic growth in the Baltic States?

The areas of institutional quality, which we found to be of importance regarding the economic growth, were analysed more in detail with respect to the Baltic States. The obtained results were used as a basis for the following policy suggestions. Latvia demonstrates the lowest values for most of our explored indicators, therefore it is necessary to improve the transparency and accessibility of the financial sector; improve the government effectiveness and regulatory quality by reducing the bureaucracy, and, potentially, embrace smaller size of the government. Lithuania is falling behind in terms of investor protection, which is mostly dependent on the quality of legislation and to what extent it favours investor relations, therefore legal improvements are expected to change the current standing. Additionally, taxes are also a topic of interest and regardless of the high score the country has received, review of the current tax system and

increase of the rate in some aspects (e.g. excise tax on tobacco) has a potential to positively affect the economic development. Estonia shows the most favourable situation not only in the context of the Baltic countries, but also the European Union, excelling in areas like government effectiveness and regulatory quality, however improvement in auditing and reporting standards and investor protection by increasing the transparency of the private sector and revising the quality of commercial law would be beneficial.

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Appendices

Appendix A: Full list of institutional variables.

Index	Notation	Explanation
World Governance Indicators	VA	Voice and Accountability
	PS	Political Stability and Absence of Violence
	GE	Government Effectiveness
	RQ	Regulatory Quality
	RL**	Rule of Law
	CC**	Control of Corruption
Index of Economic Freedom	Prop rights**	Property Rights
	Gov integr**	Government Integrity
	Jud eff*	Judicial Effectiveness
	Tax burden	Tax Burden
	Gov spend*	Government Spending
	Fiscal health*	Fiscal Health
	BusFreed	Business Freedom
	LabourFreed*	Labour Freedom
	MonFreed	Monetary Freedom
	TradeFreed	Trade Freedom
	InvestFreed	Investment Freedom
	FinFreed	Financial Freedom
Global Competitiveness Index	Prop rights	Property rights
	IP protection	Intellectual property protection
	Div of Publ Funds**	Diversion of public funds
	Trust**	Public trust in politicians
	Bribes*	Irregular payments and bribes
	Jud ind	Judicial independence
	Favoritism	Favoritism in decisions of government officials
	Eff gov spending	Efficiency of government spending
	Burden reg**	Burden of government regulation
	Eff legal disputes*	Efficiency of legal framework in settling disputes
	Eff legal reg*	Efficiency of legal framework in challenging regulations
	Transparency	Transparency of government policymaking
	BusCosts terrorism**	Business costs of terrorism
	BusCosts crime**	Business costs of crime and violence
	Org crime**	Organized crime
	Police reliab**	Reliability of police services
	Firm ethics**	Ethical behaviour of firms
	Auditing	Strength of auditing and reporting standards
	Eff corp boards	Efficacy of corporate boards
	Protect minority	Protection of minority shareholders' interests
	Investor protect	Strength of investor protection *0-10 (best)*

* Dropped either due to lack of sufficient or relevant data

** Dropped either due to multicollinearity or high level of insignificance

Created by the authors using data from International Monetary Fund World Economic Outlook (2017), Heritage Foundation (2017), World Bank (2017), and World Economic Forum (2018)

Appendix B: The list of countries in the sample. Created by the authors.

Albania	Algeria	Argentina	Armenia	Australia
Austria	Azerbaijan	Bahrain	Bangladesh	Belgium
Benin	Bolivia	Botswana	Brazil	Bulgaria
Cambodia	Cameroon	Canada	Chad	Chile
China	Colombia	Costa Rica	Croatia	Cyprus
Czech Republic	Denmark	Dominican Republic	Ecuador	Egypt
Estonia	Ethiopia	Finland	France	The Gambia
Georgia	Germany	Ghana	Greece	Guatemala
Honduras	Hungary	Iceland	India	Indonesia
Ireland	Israel	Italy	Jamaica	Japan
Jordan	Kazakhstan	Kenya	Kuwait	Kyrgyz Republic
Latvia	Lesotho	Lithuania	Luxembourg	Madagascar
Malawi	Malaysia	Mali	Malta	Mauritania
Mauritius	Mexico	Moldova	Mongolia	Mozambique
Namibia	Nepal	New Zealand	Nicaragua	Nigeria
Norway	Oman	Pakistan	Panama	Paraguay
Peru	Philippines	Poland	Portugal	Qatar
Romania	Russia	Saudi Arabia	Senegal	Singapore
Slovakia	Slovenia	South Africa	Spain	Sri Lanka
Sweden	Switzerland	Taiwan	Tajikistan	Tanzania
Thailand	Trinidad and Tobago	Tunisia	Turkey	Uganda
Ukraine	United Arab Emirates	United Kingdom	United States	Uruguay
Venezuela	Vietnam	Zambia		

Created by the authors.

Appendix C. Correlation of institutional variables.

		World Governance Indicators					
		VA	PS	GE	RQ	RL	CC
World Governance Indicators	VA	1.00					
	PS	0.66	1.00				
	GE	0.73	0.73	1.00			
	RQ	0.76	0.72	0.94	1.00		
	RL	0.77	0.76	0.95	0.94	1.00	
	CC	0.75	0.75	0.94	0.90	0.96	1.00
Index of Economic Freedom	Prop rights1	0.74	0.67	0.90	0.90	0.94	0.92
	Gov integr	0.71	0.73	0.93	0.89	0.95	0.97
	TaxBurden	-0.55	-0.26	-0.40	-0.34	-0.43	-0.45
	BusFreed	0.56	0.52	0.76	0.76	0.73	0.73
	MonFreed	0.48	0.44	0.55	0.63	0.56	0.53
	TradeFreed	0.57	0.61	0.66	0.74	0.66	0.62
	InvFreed	0.68	0.56	0.64	0.77	0.68	0.64
	FinFreed	0.61	0.54	0.67	0.79	0.68	0.64
Global Competiveness Index	Prop rights2	0.49	0.58	0.76	0.72	0.77	0.76
	IP protection	0.50	0.58	0.77	0.72	0.77	0.76
	Div of Publ Funds	0.40	0.54	0.74	0.68	0.74	0.78
	Trust	0.19	0.47	0.59	0.52	0.59	0.63
	Jud ind	0.49	0.52	0.73	0.68	0.76	0.76
	Favoritism	0.27	0.46	0.64	0.57	0.64	0.68
	Eff gov spending	0.09	0.36	0.49	0.44	0.48	0.51
	Burden reg	-0.06	0.18	0.26	0.25	0.26	0.28
	Transparency	0.37	0.51	0.66	0.64	0.65	0.65
	BusCosts terrorism	0.33	0.66	0.39	0.38	0.40	0.41
	BusCosts crime	0.22	0.51	0.54	0.50	0.57	0.53
	Org crime	0.29	0.56	0.58	0.53	0.63	0.60
	Police reliab	0.42	0.58	0.73	0.68	0.76	0.75
	Firm ethics	0.45	0.57	0.76	0.71	0.76	0.79
	Auditing	0.50	0.51	0.72	0.70	0.70	0.69
	Eff corp boards	0.43	0.46	0.62	0.60	0.60	0.60
	Protect minority	0.38	0.44	0.64	0.59	0.63	0.63
	Investor protect	0.23	0.12	0.33	0.34	0.29	0.27

		Index of Economic Freedom					
		Prop rights1	Gov integr	TaxBurden	Bus Freed	Mon Freed	Trade Freed
Index of Economic Freedom	Prop rights1	1.00					
	Gov integr	0.92	1.00				
	TaxBurden	-0.40	-0.42	1.00			
	BusFreed	0.70	0.73	-0.25	1.00		
	MonFreed	0.56	0.53	-0.24	0.44	1.00	
	TradeFreed	0.60	0.61	-0.13	0.58	0.47	1.00
	InvFreed	0.69	0.63	-0.29	0.56	0.58	0.61
	FinFreed	0.69	0.64	-0.21	0.58	0.54	0.61
Global Competiveness Index	Prop rights2	0.76	0.77	-0.27	0.57	0.44	0.46
	IP protection	0.74	0.76	-0.31	0.58	0.43	0.48
	Div of Publ Funds	0.73	0.79	-0.24	0.57	0.38	0.43
	Trust	0.56	0.66	-0.14	0.42	0.27	0.31
	Jud ind	0.75	0.77	-0.30	0.53	0.34	0.39
	Favoritism	0.63	0.70	-0.20	0.47	0.35	0.33
	Eff gov spending	0.48	0.52	-0.00	0.33	0.26	0.23
	Burden reg	0.24	0.30	0.18	0.21	0.18	0.16
	Transparency	0.64	0.67	-0.14	0.52	0.37	0.42
	BusCosts terrorism	0.35	0.38	-0.05	0.28	0.13	0.37
	BusCosts crime	0.49	0.54	-0.08	0.39	0.32	0.40
	Org crime	0.57	0.60	-0.10	0.40	0.27	0.38
	Police reliab	0.71	0.76	-0.26	0.54	0.41	0.44
	Firm ethics	0.76	0.81	-0.28	0.58	0.40	0.46
	Auditing	0.69	0.69	-0.21	0.56	0.35	0.49
	Eff corp boards	0.61	0.62	-0.22	0.47	0.32	0.39
	Protect minority	0.64	0.64	-0.22	0.47	0.33	0.32
	Investor protect	0.30	0.29	-0.03	0.45	0.17	0.24

		Index of Economic Freedom		Global Competitiveness Index			
		Inv Freed	FinFreed	Prop rights2	IP protection	Div of Publ Funds	Trust
Index of Economic Freedom	InvFreed	1.00					
	FinFreed	0.74	1.00				
Global Competiveness Index	Prop rights2	0.50	0.50	1.00			
	IP protection	0.49	0.50	0.92	1.00		
	Div of Publ Funds	0.42	0.45	0.87	0.86	1.00	
	Trust	0.26	0.31	0.77	0.79	0.90	1.00
	Jud ind	0.44	0.44	0.90	0.88	0.89	0.79
	Favoritism	0.33	0.36	0.81	0.81	0.93	0.94
	Eff gov spending	0.20	0.30	0.70	0.67	0.79	0.85
	Burden reg	0.14	0.17	0.48	0.48	0.57	0.68
	Transparency	0.43	0.45	0.84	0.80	0.81	0.80
	BusCosts terrorism	0.27	0.28	0.41	0.36	0.37	0.30
	BusCosts crime	0.28	0.32	0.61	0.60	0.69	0.64
	Org crime	0.33	0.36	0.71	0.65	0.75	0.68
	Police reliab	0.45	0.47	0.84	0.84	0.87	0.80
	Firm ethics	0.45	0.50	0.90	0.88	0.94	0.87
	Auditing	0.47	0.53	0.86	0.83	0.74	0.64
	Eff corp boards	0.41	0.49	0.75	0.78	0.66	0.61
	Protect minority	0.35	0.43	0.87	0.80	0.77	0.71
	Investor protect	0.25	0.25	0.27	0.30	0.25	0.16

		Global Competitiveness Index					
		Jud ind	Favoritism	Eff gov spending	Burden reg	Transparency	Bus Costs terrorism
Global Competitiveness Index	Jud ind	1.00					
	Favoritism	0.79	1.00				
	Eff gov spending	0.94	0.83	1.00			
	Burden reg	0.85	0.67	0.83	1.00		
	Transparency	0.68	0.46	0.65	0.72	1.00	
	BusCosts terrorism	0.80	0.78	0.82	0.75	0.68	1.00
	BusCosts crime	0.30	0.33	0.30	0.30	0.15	0.37
	Org crime	0.64	0.54	0.64	0.62	0.45	0.56
	Police reliab	0.68	0.66	0.68	0.65	0.47	0.63
	Firm ethics	0.80	0.82	0.83	0.72	0.52	0.76
	Auditing	0.87	0.89	0.90	0.75	0.54	0.85
	Eff corp boards	0.64	0.79	0.67	0.59	0.35	0.76
	Protect minority	0.61	0.69	0.65	0.56	0.40	0.73
	Investor protect	0.71	0.82	0.76	0.71	0.46	0.78

		Global Competitiveness Index						
		Bus Costs crime	Org crime	Police reliab	Firm ethics	Auditing	Eff corp boards	Protect minority
Global Competitiveness Index	BusCosts crime	1.00						
	Org crime	0.57	1.00					
	Police reliab	0.64	0.90	1.00				
	Firm ethics	0.42	0.76	0.78	1.00			
	Auditing	0.39	0.62	0.71	0.86	1.00		
	Eff corp boards	0.40	0.45	0.57	0.68	0.81	1.00	
	Protect minority	0.31	0.36	0.46	0.63	0.75	0.82	1.00
	Investor protect	0.34	0.47	0.61	0.71	0.83	0.87	0.26

Created by the authors using data from International Monetary Fund World Economic Outlook (2017), Heritage Foundation (2017), World Bank (2017), and World Economic Forum (2018 with statistical software Stata 14.

Appendix D: Results of Fixed effects and Difference-GMM models.

Variable	(1)		(2)		(3)	
	Fixed effects	Difference-GMM	Fixed effects	Difference-GMM	Fixed effects	Difference-GMM
$\ln(GDP_{t-1})$	0.2845***	-0.2486***	0.2984***	-0.2128**	0.2850***	-0.0733
	(0.0465)	(0.0954)	(0.0418)	(0.0953)	(0.0430)	(0.0653)
$\ln(GDP_{t-2})$	-0.2953***	-0.0669	-0.3101***	-0.0956*	-0.2984***	-0.1405***
	(0.0462)	(0.0510)	(0.0415)	(0.0485)	(0.0415)	(0.0373)
Population	-0.4393***	-0.6135***	-0.4882***	-0.5784***	-0.5020***	-0.6773***
	(0.0969)	(0.1701)	(0.0501)	(0.1263)	(0.0516)	(0.0923)
Savings	0.0008***	0.0009**	0.0008***	0.0012***	0.0009***	0.0009**
	(0.0002)	(0.0004)	(0.0001)	(0.0003)	(0.0001)	(0.0004)
IP protection	-0.0018	0.0100				
	(0.0021)	(0.0096)				
Favoritism	-0.0051**	-0.0185**				
	(0.0025)	(0.0081)				
MonFreed	0.0006**	0.00513***	0.0005*	0.0054***	0.0004	0.0029***
	(0.0003)	(0.00121)	(0.0003)	(0.0012)	(0.0003)	(0.0008)
BusFreed	-0.00013	0.0010				
	(0.0001)	(0.0008)				
Investor protect	0.00012*	-0.0041*				
	(0.0006)	(0.0024)				
Eff gov spending	0.0057***	0.0032				
	(0.0021)	(0.0053)				
Eff corp boards	0.0028	-0.0078			0.0007	-0.0022
	(0.0021)	(0.0088)			(0.0024)	(0.0055)
Jud ind	0.00252	0.0134**	-0.0001	0.0126**		
	(0.0018)	(0.0064)	(0.0013)	(0.0051)		
VA			-0.0025	0.0771**		
			(0.0015)	(0.0354)		
Transparency			0.0024	-0.0220***		
			(0.0023)	(0.0069)		

	(1)	(2)	(3)	(4)	(5)	(6)
FinFreed			0.00003	0.0019		
			(0.00008)	(0.0013)		
Auditing			0.0025	0.0079		
			(0.0019)	(0.0058)		
RQ					0.0031	0.0359
					(0.0026)	(0.0321)
TaxBurden					0.0030***	0.0015
					(0.0001)	(0.0018)
Protect minority					0.0038*	0.0067
					(0.0022)	(0.0051)
Number of observations	891	772	1005	887	1005	887
Number of instruments		71		66		58
Hansen test		0.101		0.010		0.005
Arellano-Bond AR(2) test		0.142		0.037		0.013

Note: Significance depicted respectively – ***: 99% level, **: 95% level, *: 90% level. Standard errors attained in brackets. The models contain time fixed effects, which are excluded from the table.

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*Appendix E: Results of Fixed effects and Difference-GMM models.*

Variable	(4)		(5)		(6)	
	Fixed effects	Difference-GMM	Fixed effects	Difference-GMM	Fixed effects	Difference-GMM
$\ln(GDP_{t-1})$	0.2891***	-0.1214	0.2992***	-0.0954	0.2965***	-0.1123*
	(0.0417)	(0.0892)	(0.0419)	(0.0801)	(0.0419)	(0.0624)
$\ln(GDP_{t-2})$	-0.3005***	-0.1288***	-0.3113***	-0.1454***	-0.3100***	-0.1361***
	(0.0414)	(0.0468)	(0.0417)	(0.0440)	(0.0417)	(0.0408)
Population	-0.5010***	-0.6340***	-0.4851***	-0.6883***	-0.4628***	-0.6468***
	(0.0521)	(0.1336)	(0.0491)	(0.1149)	(0.0522)	(0.1019)
Savings	0.0009***	0.0009***	0.0009***	0.0014***	0.0009***	0.0014***
	(0.0001)	(0.0004)	(0.0001)	(0.0004)	(0.0001)	(0.0004)
TaxBurden	0.0003***	0.0012				
	(0.0001)	(0.0020)				
MonFreed	0.0005**	0.0036***				
	(0.0002)	(0.0010)				
Eff corp boards	0.0053***	0.00216	0.0026	0.00591	0.0040**	0.0066
	(0.0015)	(0.0044)	(0.0022)	(0.0083)	(0.0017)	(0.0051)
BusFreed	-0.0001	0.0014				
	(0.0001)	(0.0010)				
VA	0.0006	0.0134	-0.0024	-0.1958	-0.0038*	-0.0196
	(0.0017)	(0.0429)	(0.0017)	(0.0374)	(0.0020)	(0.0308)
FinFreed			0.0001	0.0017	-0.00003	0.0011
			(0.0001)	(0.0010)	(0.0001)	(0.0008)
Prop rights			0.0023	-0.0001		
			(0.0022)	(0.0097)		
Favoritism			-0.0012	-0.0018	-0.0010	-0.0016
			(0.0016)	(0.0048)	(0.0014)	(0.0032)
Inv protect			0.0009	-0.0035*	0.0007	-0.0045*
			(0.0006)	(0.0020)	(0.0006)	(0.0024)
PS			0.0014	0.0287		
			(0.0015)	(0.0191)		

	(1)	(2)	(3)	(4)	(5)	(6)
GE					0.0036	0.0330
					(0.0031)	(0.0322)
InvFreed					0.0001	-0.0004
					(0.0001)	(0.0007)
TradeFreed					0.0002	0.0008
					(0.0002)	(0.0010)
Number of observations	1005	887	1005	887	1005	887
Number of instruments		58		82		90
Hansen test		0.038		0.045		0.084
Arellano-Bond AR(2) test		0.036		0.047		0.045

Note: Significance depicted respectively – ***: 99% level, **: 95% level, *: 90% level. Standard errors attained in brackets. The models contain time fixed effects, which are excluded from the table.

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Appendix F. Kuznets curve.

Income

T*

0%   100%

Tax rate (%)
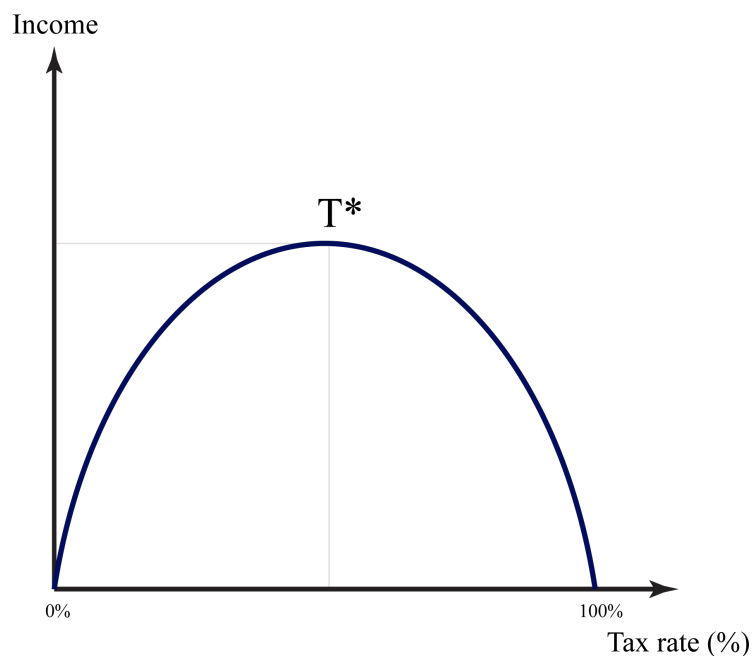
Graph based on the model created by Kuznets (1955).

Appendix G. Contribution analysis for the Baltic States if the level of OECD country average is reached in 2016.

	Estonia		Latvia		Lithuania	
	Difference	Contribution	Difference	Contribution	Difference	Contribution
GE	0.09	0.0011	0.21	0.0025	0.12	0.0014
RQ	-0.46	-0.0658	0.15	0.0220	0.10	0.0140
TaxBurden	-15.10	-0.0076	-18.60	-0.0093	-20.80	-0.0104
MonFreed	-2.63	-0.0034	-3.43	-0.0045	-6.93	-0.0090
TradeFreed	-1.05	-0.0007	-1.05	-0.0007	-1.05	-0.0007
FinFreed	-10.91	-0.0055	9.09	0.0045	-0.91	-0.0005
Auditing	0.39	0.0042	1.53	0.0167	1.36	0.0149
Eff corp boards	0.14	0.0012	0.83	0.0070	0.85	0.0071
Investor protect	0.54	0.0015	-0.76	-0.0021	1.54	0.0043

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