Ministry of Education and Science of Ukraine

National University of “Kyiv-Mohyla Academy”

Faculty of Economics

Department of Finance

Bachelor`s thesis

educational degree - bachelor

on the topic: «**ESTIMATION OF POTENTIAL ECONOMIC DEVELOPMENT OF UKRAINE** »

на тему: «**ОЦІНЮВАННЯ ПОТЕНЦІЙНОГО РІВНЯ ЕКОНОМІЧНОГО РОЗВИТКУ УКРАЇНИ** »

Speciality:
072 Finance, banking and insurance

Subtelnyi Mykola Mykolayovych

Scientific supervisor: Faryna O.I.
Candidate of Economic Science, senior lecturer

Reviewer**:** Tsapin A.O**.**
PhD, Deputy Head of Research Unit for Monetary Policy and Economic Analysis Department in National Bank of Ukraine

Bachelor`s thesis is assessed with a grade

«_____»

Secretary of the EC_____

«____» _____ 2021 p.

Kyiv 2021

TABLE OF CONTENTS

INTRODUCTION

Countries` input differences, such as labour`s amount or quality or capital abundance within the economy, make impact on pace of economic development. Even though there are multiple variants for estimations of country`s potential economic development, remaining question is whether domestic quality of institutions make significant influence on economic growth and whether such indicators are useful in understanding cross-country difference.[33] In addition, the point is whether country`s political and social situation defines country`s potential growth.

To start with, potential level of economic development is the theoretical set of assumptions about the country`s available capacity of capital and labour to produce value added goods and services and further components that are included into GDP. It describes the optimal level of country`s output with given its inputs considering that all units are used at the most effective level and rationally. But, nowadays, there is not any unified protocol of how potential GDP should be estimated, since there are multiple approaches of how to compute potential level of economic development and which factors to include into the models.[11]

Still, potential GDP estimates are core for policymakers, since it can be described as an optimistic scenario of development and benefits during making decisions regarding adjustments in monetary policy. Correctly estimated gap leads to better future projections and plans about stimulating or holding economy`s development to prevent recession or overheat. Largely, estimations depend on how institutions are developed in the country and what is its economic environment.

Thus, understanding the factors that have impact on the country`s economy, especially its potential level of development, could be important to understand the major economical drivers on country`s welfare. Furthermore, such models are useful to define optimal vector for development of the country. In addition, the research will be focused on finding the correlation between institutional development and its potential growth.

The theory of institutionalism states that its development pushes country to grow due to higher production capabilities and effectiveness. However, there are still unstated solid effect of development of institutions on the performance of economies.[8]

As a result, it is important to understand the role of institutions in forming potential GDP as a one of the most important data to plan and forecast monetary policy and economy`s development and status.

Aim. This work aims to test how institutional development correlates with potential level of economic development and to derive conclusions based on gained results for Ukraine, which estimates are below not only world average, but its peers of development as well. In the work each country will be considered in time frame of 2000-2019, regressed by institutional variables (estimates, provided by World Bank in their annual report) and controlling variables (macroeconomic indicators to describe economic environment). The further presented models are focussed on statistical significance of tested regressors and the signs of coefficients to derive logical explanations. To provide conclusions the example of Ukraine is described and analysed.

Task. Compound regressions using statistical application R and provide logical conclusions.

Object. The thesis paper specifies on the correlations between estimate of development of institutions and countries potential GDP data.

Subject. Work`s subjects are 5 macroeconomic indicators and 4 institutional estimations and potential output growth of 61 countries during 2000-2019 period.

Structure. The work consists out of three chapters: Literature Review, Materials and Methods and Results. The chapter “Literature Review” summarises theoretical concept of potential GDP, its importance and other research of impact of institutions on potential growth. “Materials and Methods” describes the selected regressors for models, approaches of used models and methodology of regressions. “Result” presents and summarises the outputs of model, derives logical conclusions and describes Ukrainian institutional development status and its impact for potential growth.

Keywords: potential output, potential growth estimation, institutionalism, institution development, Ukraine.

LITERATURE REVIEW

Considering the importance of potential GDP estimations, as it was presented in introduction section, it is a useful measure for monetary policy. That is why potential GDP estimations are common to use within policymakers. For instance, calculations of output gap, which are obviously based on potential and real GDP data, indicate whether the economy is in need of further stimulus or vice versa – restrictions.

Nevertheless, potential GDP can be also considered as an estimate to compare cross-country differences and define reasons for this. This work is aimed to find how institutional development benefits in looking for countries difference and how the institutional improvement reflects on economic development. Institutional status does not only define the country`s "quality", but also its abilities to run efficient policies to avoid recessions or other economic uncertainties.

Based on the output gap data the authorities are able to enforce macroeconomic policies to mitigate high inflation or further crisis. As a result, the change of the output gap indicates how the country is performing based on the given inputs.

For example, when there is a positive output gap (real GDP is greater that potential output), that means the economy is working above its capabilities. Such tendency points to higher aggregated demand and overheats the economy, which results in further recession.

When the negative output gap is present, this illustrates that economy is not using its full capacities: many people are jobless, capital is not working and so on. This pushes the government to stimulate the economy in order to increase its output level.

The Figure 1.1 summarises the economic cycle with given potential and real GDP. 4 phases are depicted on the Figure to illustrate the output gap. First and second phases are dealing with positive GDP gap (real exceeds potential). The first stage is about growing positive gap, which can be associated with overheating economy. While the second phase is still about positive difference, but it is decreasing. This stage is the beginning of the recession.[11]

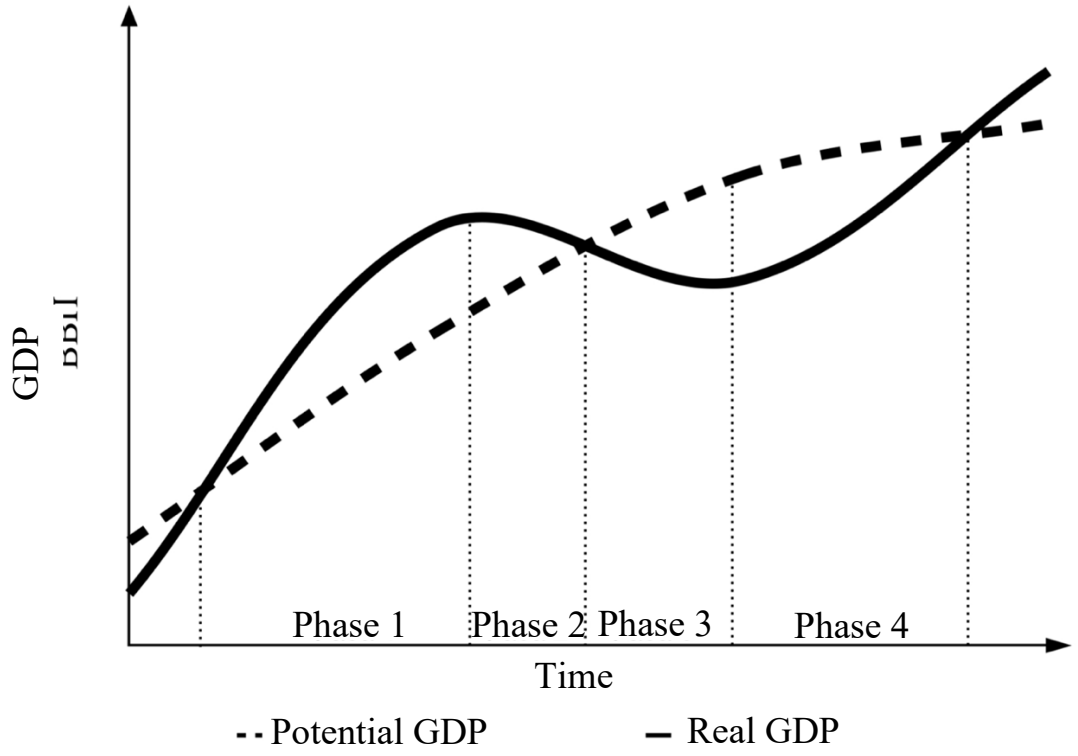

Figure 1.1 – Four phases of economic cycle

Source: composed by author based on [11]

Stages 3 and 4 are about negative output gap (potential GDP is estimated to be bigger than real). The third stage is the continue of previous outburst recession. As a result, the economy tends to be in further decreasing status. Stage 4 – indicates the end of underperformance and development of the country. The main factors that will characterise these stages will be higher unemployment rates and increased prices. This can lead to central banks setting down the interest rates for economy stimulus.

Taking into considerations the examples of using the potential output data and how tricky it might be the example by Federal Reserve Bank of Saint Louis of how the estimates might differ throughout the time is provided.

So, according to Congressional Budget Office (CBO) estimations of 2007 on potential GDP level resulted in huge output gap assumption (around -9.9%) in 2009:Q1 as a consequence of 2008 crisis. However, with the sequence of time the new estimates of potential U.S. GDP data in 2011 showed lower level of theoretical growth. As a result, at that time the GDP gap was estimated to be lower (approximately -7.1%). In both cases it was clear that the economy was down to its projected trends. The remained question

was whether the true level of potential GDP was upper or lower, since it was important to find out the further development of country.

As a result, in different points of time, for obvious reasons, different outcomes of estimations are possible. But still the potential GDP measures will remain to be the representation of the "perfect world" and this will remain the orient for economy`s equilibrium.

Even if the estimations might be far from the theoretical true ones, they are essential for policymakers to understand the performance of the country. Plenty of research describe how wrong estimations affect wrong decisions and their results. The next example supports the previous argument of how the changes in estimations result in biased understanding of economic phase. For instance, in 2018 the new article of how too pessimistic expectations on potential GDP resulted in less effective policies. It was stated that before crisis of 2008 the economy of U.S. was close to the potential output estimation (Figure 1.2). However, in post crisis period the hypothesises of potential GDP were decreasing with the sequence of time. Consequently, with the new measures in 2017 it was assumed that the output gap was narrowing that points to equalising economy.[12]

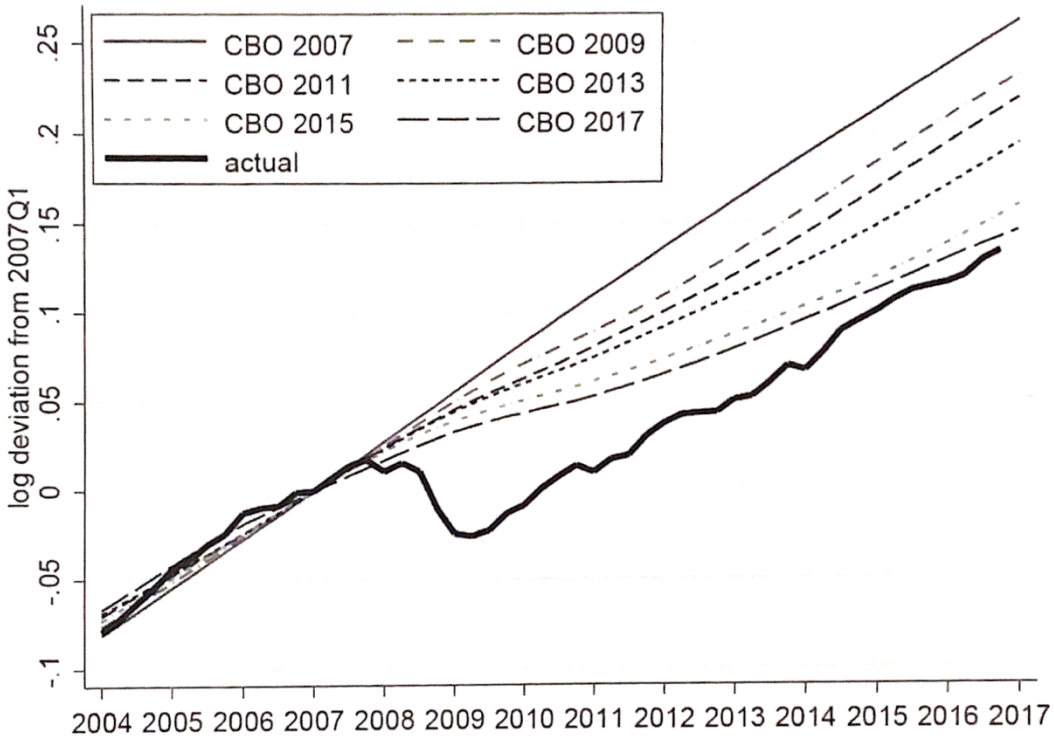

Figure 1.2 – Revisions in CBO estimates of U.S. Potential GDP

Source: CBPP website [12]

The inappropriate measurements for potential GDP caused monetary policymakers to proceed with stringing interest rate parallelly with continuing low inflation and low rates of employment. That provoked the pushback in economy. In addition, it was also estimated that this resulted in trillion dollars loses with each passing year.

Another point of view is that with new crisis occurring governments start working on new reforms in order to develop better institutions. In the theory of institutionalism, it is stated that well developed institutions within the country provokes its sustainable growth and makes grounds for further developments.[8]

The early studies of institutionalism as an economic school took place in 19th century in Germany with following branches in United States of 20th century. It might be argued that early development of institutionalism resulted in highly developed countries in Europe and America.

In his works, Karl Polanyi considered institutions as part of economy created as a tool to amortise economical fluctuations, unite its branches and form future vector for development. He also argued that social aspect of country is a core factor to influence the country`s development. Even though such relations might be hidden and unobserved due to historical reasons, nowadays there are feasible methods to control such interconnections. For instance, modern ways to estimate institutional development to characterise cross-country difference enables to model such relations, but they are hard to be done and there is always a dilemma of accuracy of data.

Still, there is barely enough literature which considers the impact of institutions on potential GDP. There are basically two reasons: firstly, it is hard to estimate the development of institutions (as well as potential GDP); secondly, institutions do not volatile in short term. But do well developed institutions provoke potential GDP growth or is there any dependence, it is a tough question to answer.

This research will focus on searching for the dependence of potential economy growth with the performance of countries institutions such as: political stability, abidance of law, control of corruption and authority effectiveness. It is believed that institutional development makes bases for economic growth. Furthermore, from historical point of

view institutional advance proving to be one of the factors to enable country`s growth and it inhibits development otherwise. [38]

There are also evidence and research which include institutional estimates as regressors to explain actual economic growth. Those are believed to be as a kind of additional factors of production.

As a result, considering institutional quality as a factor of productivity than it might be assumed that countries with initial higher institutional development are to have faster growth in long-term matters. However, there is still an open question whether the institutional development makes significance in short run.[10]

Even though the potential GDP estimates largely depend on the assumptions of economy`s capabilities, estimates on development of institutions bring more positive presumptions on factors of production. For instance, countries with higher level of institutions are more likely to bring new technological advances (one of the components for Cobb-Douglas function). Moreover, this would also mean higher likelihood of human higher development. These facts again push to logical conclusion that institutional development stimulates higher growth, potential GDP as well.

On the Figure 1.3 depicts the level of institutional development in Ukraine comparing to its peers (countries with close level of development) and world`s average. The Figure points out that Ukraine is relatively underperforming even its closest peers. Thus, it may be assumed as a reason to consider that its development of institutions to be one of the important factors to higher economic development as well.

On Figure 1.3 peers are 5 countries with similar characteristics of economy (of controlling variables): Kyrgyz Republic, Georgia, Moldova and India.

Still, there are some divided opinions on the interlinkage between institutions and development. For example, the development of institutions opens broader prospects for country`s economy. On the other hand, it is argued that as soon as country reaches high level of institutions, it peaks its performance and in short run this decreases the growth trend.[8]

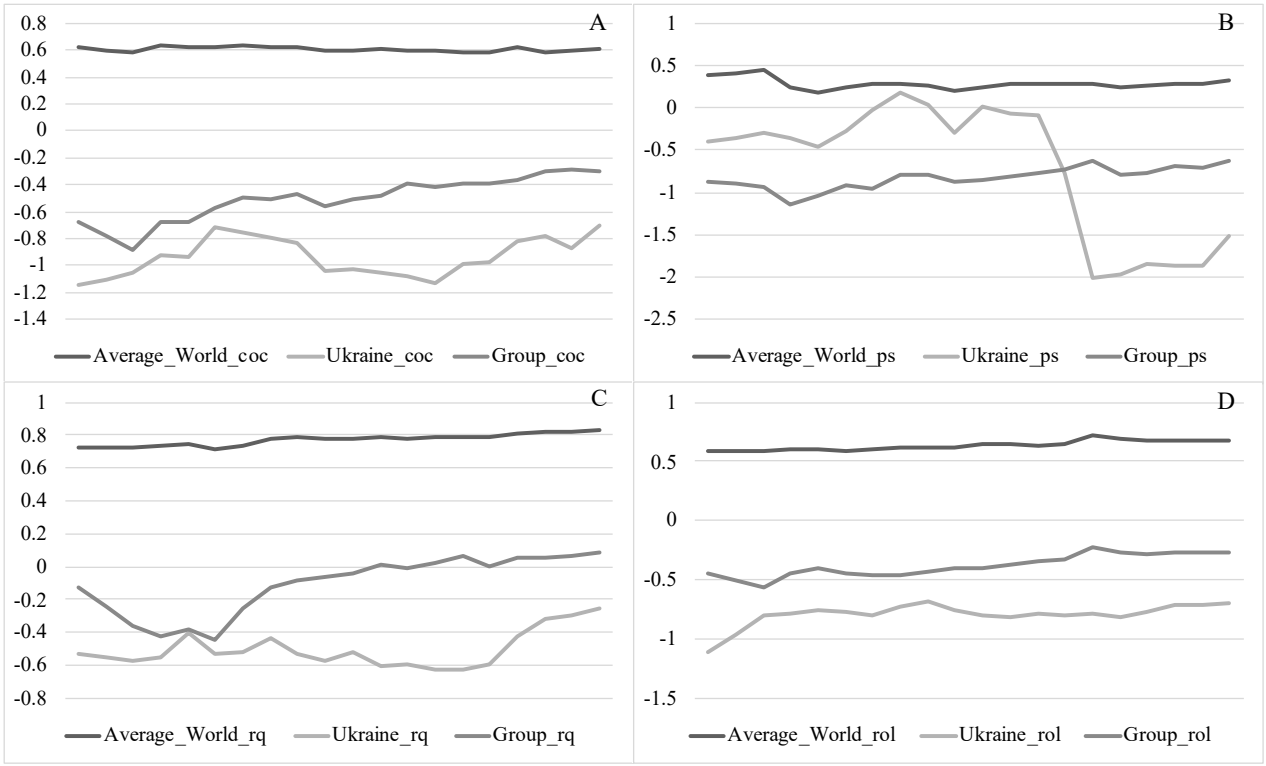

Figure 1.3 – Institutional indicators of Ukraine comparing to world and peers: A– Control of Corruption, B – Political Stability, C – Regulatory Quality, D – Rule of Law

Source: composed by author based on own calculations [37]

This work is aiming to consider potential economic growth rates across different countries and their institutional development to provide conclusions. Furthermore, Institutional level of Ukraine is to be considered to derive the results of its potential growth.

Taking into account the theoretical intuition behind the potential GDP, Potential level of economic output is considered to be one of the most advantageous data for macroeconomic forecasting. Potential GDP can be also discussed as a key-factor for monetary policy and future economic expectations.

Indeed, there is no solid definition for this term. For instance, accordingly to Organisation for Economic Co-operation and Development potential GDP is classified as a level of economic development, which is exceeded with a constant level of inflation.[16]

On the other hand, the Congressional Budget Office of U.S. clarifies this term as economy`s maximum sustainable output with given natural unemployment rate, labour supply measures, capital abundance estimation and productivity ratios. [4]

In contrast, most of the literature resources in Ukraine interpret the level of potential level of economic development as an economical state which is achieved by full engagement of country`s labour force. [39]

As it comes obvious from previously mentioned definitions, there is no solid explanation to potential output. Even though, generalising those sentences, this term is used to describe country`s ability to achieve such a level of relative measurement that will mean the economy`s development when all resources (both labour and capital) are used effectively, rationally and at full capacity with given stable level of inflation or consumer prices.

Potential GDP is not an exact number that is to be calculated. Thus, it should be estimated with multiple assumptions as well. As a result, even two estimations of past period of the same economy but done in different time period can variate due to different approaches, new data releases or other factors. For example, those factors can be different government policies, technological advances, disasters and so on. [2]

In other words, talking about world`s potential level of economic development, this could be paraphrased as “ideal economy”. In addition, the trend of potential GDP for a country can be considered as an optimistic scenario to grow. However, it eliminates the effect of economic shocks or turbulence, it still depicts the vector for future development and economy`s capabilities for growth. In perfect scenario, potential output is to be estimated based on all available data to describe its environment such as:

a) production resources (labour, capital, land, infrastructure, natural sources, technological advances and so on);
b) how extensively those factors are used with given stable prices;
c) general productivity of mentioned factors;
d) and other features.

Another point to be mentioned is about the trend of this variable. Taking into account that world`s population is constantly increasing, technological progress is in motion that boosts the productivity and globalisation processes, it comes obvious that the trendline for potential GDP is positively directed.[26] In addition, the previously mentioned factors also provoke the supply and demand power in economy.

Still, there are plenty of examples when potential GDP decreases, but this is a short-term situation. For instance, political instability, war, crisis or natural disaster are typical causes for the decrease. Furthermore, a drop in in potential output may be consequence of a long-term economic recession, when, for instance, any of capital is getting old with no renovation or negative balance of migration.

Taking into account ways to estimate the potential level of economic development, there are multiple of them. The most standard model to calculate is the Cobb-Douglas function. For this formula labour force, capital abundance and coefficient of technical advance should be estimated as well. As a result, with changes into what inputs are discovered more by time result in changes of previous estimates of potential output.[22]

For instance, the Figure 1.4 depicts three results from modelling the potential GDP estimation. Those calculations are done by three different institution (different approaches and assumptions as well), so as it might be observed that this resulted in different measures. Even though they might be debated whether the difference is significant or not, still that would merely depend on the purposes of such research and ways the data will be used for.

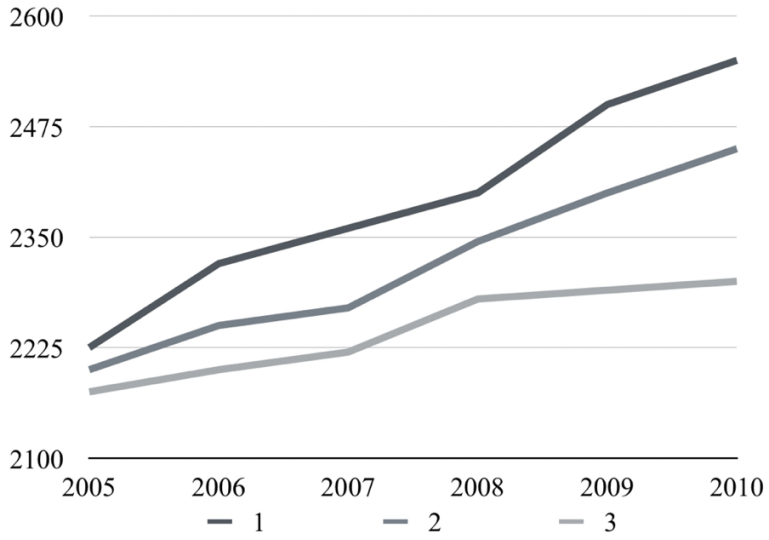

Figure 1.4 – Estimation of potential GDP in Germany: 1 – linear regression of potential gross productivity and natural unemployment; 2 – autoregression model of potential gross productivity and natural unemployment; 3 – method for forecasting the potential gross productivity and natural unemployment in European Union

Source: composed by author based on [22]

On the other hand, the Figure 1.5 represents five curves with percentage change of the German output gap. Again, the picture summarises different approaches for estimating the change of the potential output. Indeed, in such case the results are correlating much better. What is more, the approaches to calculate the absolute values of potential output may have been different, in relative expression they perfectly depicted the main moments to analyse to economy`s phase of cycle.

As it might be observed, using the relative expression of data regarding the potential GDP results in more common data which leads to hypothesis that it could be treated as a true data and more reliable for policies.

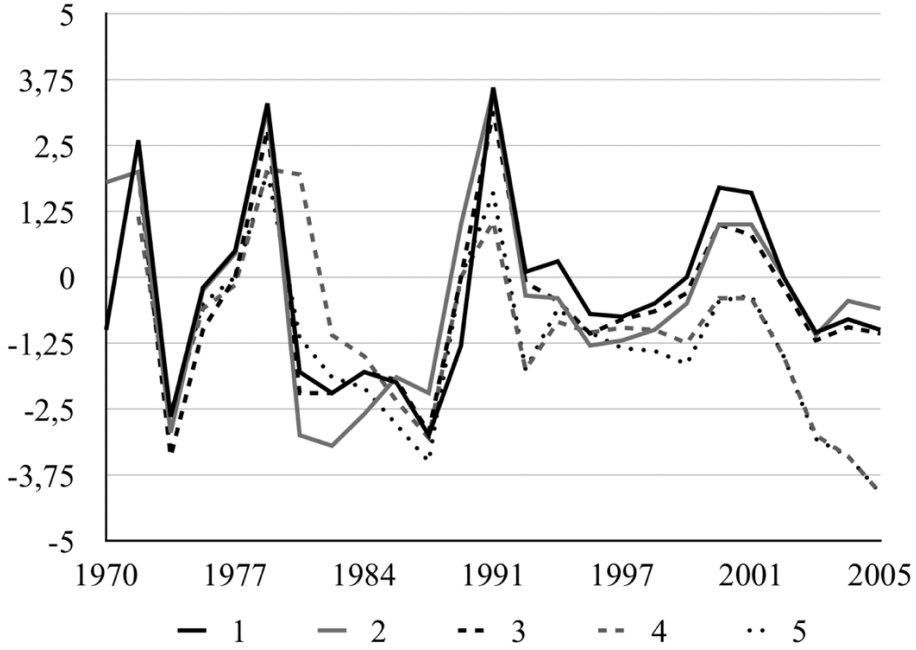

Figure 1.5 – German output gap (percentage change): 1 – by usage of Hodrick-Prescott filter, $\lambda = 100$; 2 – according to EU Commission estimates; 3 – using Hodrick-Prescott filter for production function, potential working time, and labour force and Kalman filter for natural unemployment measure; 4 – using Hodrick-Prescott filter for production function, potential working time, Kalman filter for natural unemployment measure without random deviation and production linear regression; 5 – using Hodrick-Prescott filter for production function, potential working time, Kalman filter for natural unemployment measure with random deviation and production linear regression

Source: composed by author based on [22]

METHODS AND MATERIALS

In order to analyse the correlation of the institutional development of country and its potential economic growth 61 countries (which represents approximately 85% of world`s economy) with time rage of 20 years (2000-2019) were taken into account to compose a balanced panel model. As a result, the main model will be based on 1220 observations, with 9 regressors. The Equation 2.1 represent the formula for conducting the model.

$$Y_{i,t} = u_i + Institute_{i,t} + Macro_{i,t} + e_{i,t}\,, \qquad (2.1)$$

where $Y_{i,t}$ – the dependent variable (potential GDP growth) for country *i* in the period *t*;

u_i – constant for country *i;*

$Institute_{i,t}$ – institutional variables for country *i* in the period *t;*

$Macro_{i,t}$ – controlling (macroeconomic) variables for country *i* in the period *t;*

$e_{i,t}$ – error terms for country *i* in the period *t*.

Since estimation of potential GDP is a complex study due to data miss or inadequate results, this research suggests observing this variable in marginal expression. For this reason, the observed variable is expressed as an annual change of potential output for each country.

As a dependent variable for regressions, each country`s growth was calculated based on their potential output data (only for country-partners of the Organisation for Economic Co-operation and Development, whose potential GDP is given).[16] For countries, whose potential output is not estimated, further calculations were done including further procedures, describes on Figure 2.1.

For the countries with no data on potential output the annual data on real GDP in LCU were filtered with Hodrick-Prescott (HP) filter [3]. The intuition behind this step was to vanish the influence of cycles of economy in order to omit great volatilities of GDP. This filter is a commonly used tool in macroeconomics to extract the trend features in timeseries variables. In addition, GDP data was taken in local currencies in order to

eliminate the influence or currency volatility, as this factor is considered with another regressor.

Figure 2.1 – The procedure of calculations for GDP growth trend based on real output data

Source: composed by author based on own calculations

To visualise the effect and importance of filtering the GDP data an example of Chile is provided (Figure 2.2). As it can be observed the true (potential) growth is stable with no significant difference in its change. In case of taking the actual growth of real GDP, which is unsteady, it may cause insignificant results and, what is more important, it will not be the focus of the study.

As it was said previously, HP filter derives the kind of trend for GDP growth which is considered to be one of the mostly used approaches to estimate the potential GDP growth for countries, which data is absent.

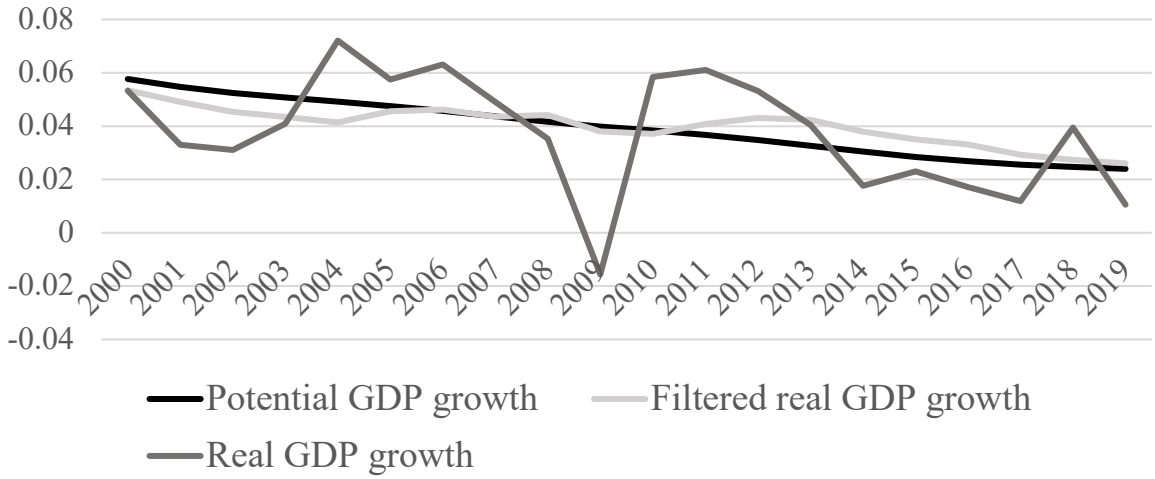

Figure 2.2 – Comparison of Potential, real and filtered real GDP growths estimations for Chile

Source: composed by author based on own calculations and [36]

With the combination of these two blocks of GDP growth data the dependent variable GDP_growth is calculated as it is described in the equation (2.2):

$$GDP_{growth} = Y_t/Y_{t-1} - 1\,, \qquad (2.2)$$

where *Y* denotes filtered output (potential output or nominal, depending on country) and *t* marks the period. Consequently, the variable GDP_growth describes country`s relative change in its output compared to previous period.

Considering the factors, that are taken into account to analyse their correlation with the dependent variable, they have been selected based on both economical and institutional prospects. Such approach is useful in order to describe country`s potential with given development of institutes, society and economic reasons.

To compute into the model variables that denote institutional development of country four indicators were considered. These four are the results of estimation conducted by World Bank in their Worldwide Governance Indicators Dataset.[37] They are taken into the model in order to check their correlation with countries potential development. They are believed to have positive impact on the dependent variable.

In addition, there are 6 presented indicators in the World Governance Indicators Dataset, however, only 4 of them were selected further for the research and the model. This is basically due to absence of correlation with the observed variable, conflicts in statistical stability with other variables or absence of data.

To start with, the first institutional variable to be tested was “Control of Corruption” (Control_of_corruption in the model). This indicates countries abilities to tackle and combat any forms of corruption by public authorities or to what extent the government and public powers is controlled by certain circles of people with intentions to lobby private interests. Corruption is believed to have negative impact on country`s doing. Consequently, the hypothesis 6 (H6) is based on assumption that the more the government tackle corruption the more prospects for development are present (H6: $c6 > 0$). [37]

Next included variable “Political Stability” (Political_stability in the model) is considered to describe country`s ability to perform better with a given political certainty.

The indicator reflects to the probability of any kind of protests, political inner wars, destabilisation or even overthrown government by other unconstitutional powers. Considering these facts, the next hypothesis is dealing with a direct effect of this factor (H7: $c7 > 0$). Generally speaking, the less likelihood of any disruptions into the governmental system the faster country is to grow.[37]

In addition to previously mentioned factors, the next aspect that should be explained by estimations is the efficiency of governmental regulation. For this reason, a variable from WDI Dataset "Regulatory Quality" (Regulatory_quality in the model) is included. This estimation denotes to what extent the government is able to set and achieve its goals. It is important that this estimation considers not only plans and formulations of future governments steps, but also its implementations. As a result, the hypothesis for this factor remained the same as for previous two (H8: $c8 > 0$).[37]

In addition to this, another estimate from this World Bank`s dataset was considered – "Government Effectiveness". This indicator has the same approach to estimate institutional quality of the country, taking into account its quality public and civil services, effectiveness of governmental strategy and credibility to country`s policies. However, this variable was excluded due to high correlation with Regulatory Quality and its statistical insignificance within the model.

The last institutional variable that was included into the research is the "Rule of Law" (Rule_of_law in the model). It describes to what extent investors, business units or other private individuals can be confident in abidance of the official rules, contract enforcement, social and legal rights. This variable also considers abidance of law by police, public poverties, courts and other institutions, as well as the ratio of crime and violence. This variable is also presumed to have a positive influence on the GDP_growth variable (H9: $c9 > 0$).[37]

An alternative to "Rule of Law" variable was considered within the research, which is called "Voice and Accountability". Even though it describes the degree of freedom in society: media freedom, freedom for authority election and so on; this variable is tightened with how the law works in the country. And as in the case of Government

Effectiveness, Voice and Accountability estimates performed statistically insignificant and thus were not included into the research.

The table below (Table 2.1) summarises the issued hypothesises on selected institutional variables. To sup up, all hypothesises regarding institutional factors are assumed to have positive impact on potential growth. These presumptions stand for theory of institutionalism: the better institutions are functioning – the faster economy develops.

Table 2.1 – Summary of hypothesises on institutional factors

No.	Factor	Expected impact	Hypothesis
6	Control of Corruption	positive	H6: $\beta 6 > 0$
7	Political Stability	positive	H7: $\beta 7 > 0$
8	Regulatory Quality	positive	H8: $\beta 8 > 0$
9	Rule of Law	positive	H9: $\beta 9 > 0$

Source: composed by author based on own calculations

For institutional factors the same descriptive analysis primarily was conducted (Table 2.2). This includes clustering observations for three groups by ranging their potential output growth. For each group average and standard deviation were derived.

The intuition behind this step was identical to one, that was done for macroeconomic factors. Primary described factors pushed for further testing for variables and decision whether to include them into the model.

As it can be observed none of variables obtains trend of growing averages beyond the clusters. However, standard deviation is relatively high, so no solid conclusions have been made.

In addition, after every variable had being checked on heteroscedasticity following results were derived (Figure 2.4). The Breusch-Pagan test for heteroscedasticity with variables “Control of Corruption”, “Regulatory Quality” and “Rule of Law” showed negative results (Figure 2.3).

Table 2.2 – Description of institutional factors

Indicator	Economy growth	Control of Corruption	Political Stability	Regulatory Quality	Rule of Law
All observations					
Observations number	1220	1220	1220	1220	1220
Average	0.046	0.605	0.286	0.771	0.635
Standard deviation	0.030	1.086	0.875	0.813	0.987
33% of observation with lowest growth					
Average	0.019	0.727	0.422	0.848	0.783
Standard deviation	0.014	1.058	0.744	0.773	0.961
33% of observations with moderate growth					
Average	0.043	0.523	0.147	0.715	0.516
Standard deviation	0.005	1.124	0.904	0.850	1.044
33% of observations with highest growth					
Average	0.076	0.566	0.288	0.750	0.607
Standard deviation	0.028	1.066	0.943	0.810	0.935

Source: composed by author based on own calculations

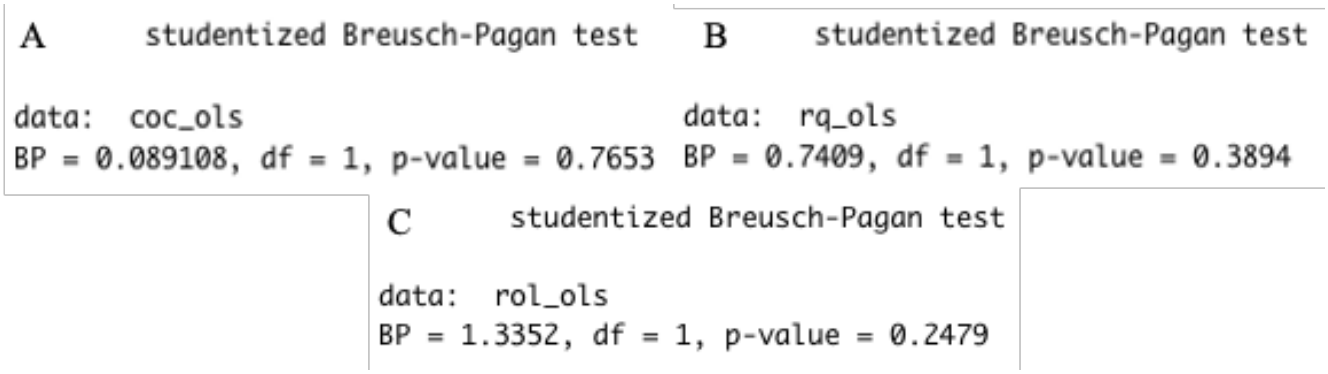

Figure 2.3 – The Breusch-Pagan Test on heteroscedasticity of A – "Control of Corruption", B – "Regulatory Quality", C – "Rule of Law" regressors

Source: composed by author based on own calculations

However, heteroscedasticity was detected within the “Political Stability” variable (Figure 2.4). As a result, GLS model was run to compare the statistical significance with the OLS model (Figure 2.5). Consequently, based on the results, the coefficients do not differ greatly, so further panel data model will use this variable with no restrictions.

```
        studentized Breusch-Pagan test

data:  ps_ols
BP = 8.7864, df = 1, p-value = 0.003035
```

Figure 2.4 – The Breusch-Pagan Test on heteroscedasticity of “Political Stability” regressor

Source: composed by author based on own calculations

The models are also compounded based on controlling variables to describe the macroeconomic environment. This is done to differentiate the economies with their given development. What is more, since the model approach is to describe the change in potential estimations with time changing, institutional variables are less volatile, as a result, this will not bring enough explanatory power.

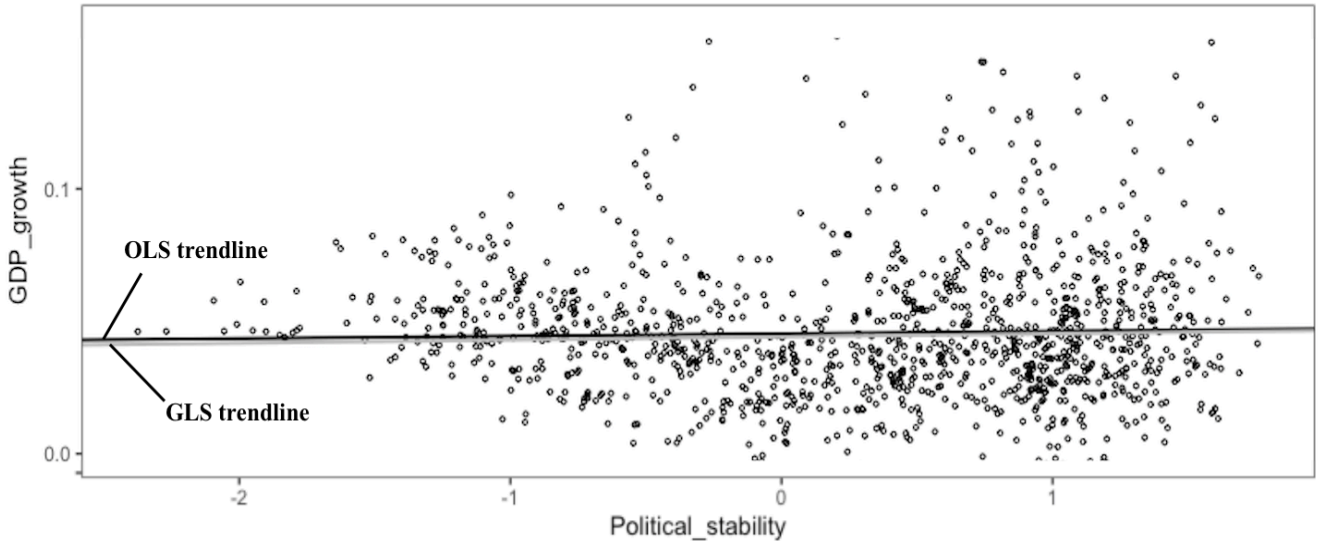

Figure 2.5 – Trendlines based on GLS model (grey) and OLS model (black)

Source: composed by author based on own calculations

Considering macroeconomic factors, there were selected 5 of them to describe countries` economic structure, trade activity and their size. For the models they will be considered to be controlling factors to make model more sufficient.[35]

The first factor that was considered is Economy_size which denotes the share of country`s economy in world`s one and is obtained based on the data from IMF`s publication "World Economic Outlook" with an information of GDP based on purchasing-power-parity share of world total. For our model this variable is to describe not just countries capacity or abilities to produce more, but it describes country relatively to others. For this variable a hypothesis is issued Economy_size to have negative effect on the growth of potential GDP due to possible marginal (H1: $\beta 1 < 0$).[33]

The Price_level_ratio is included into the model as an indicator that denotes general economic situation in countries. The variable is taken from the database of the World Bank named "Price level ratio of PPP conversion factor (GDP) to market exchange rate", where it is described as a variable that estimates to what extent the price level changes across countries based on the volumes of units of a common currency needed to buy the same aggregated list of products. For the model this variable will describe country`s economic strength, at the same moment this might mean that the country has been reaching its maximum and developing on its "edge" (H2: $\beta 2 < 0$).[31]

Another point of view to consider the prospects for economy`s higher development pace is to take into account its volume of investments into the country. On this purpose the variable "Total investment" from World Economic Outlook Report by IMF was considered. In the model it is indicated as Total_investmet_to_GDP. Since this variable is a share of all investments expressed in local currency units in the country`s GDP, it describes relative abundance of investments in this country. So, the hypothesis for this variable is that it has a positive impact on an observed variable (H3: $\beta 3 > 0$).[35]

The indicator Gov_presence describes the proportion of governmental expenditures relatively to the country`s output. This variable is based on indicator from World Economic Outlook Report by IMF as well and is named "General government total expenditure". This indicator assumes total expense and the net acquisition of nonfinancial assets. In this research it is presumed this variable to have a negative impact on GDP_growth (H4: $\beta 4 < 0$). This due to the fact that the more country controls the markets the less economic freedom is in this country. As a result, it slows down the potential growth of the economy.[34]

Next variable to be considered in the model is Trade_to_GDP. This describes the economy`s openness to foreign markets, its dependence on trading with outer producers and its output structure. In the data frame of the model this variable is based on indicator "Trade (% of GDP)". According to its description, it indicated the total sum of exports and imports of all goods and services. And since trade is a key component for calculating GDP, it is assumed to have a positive impact on GDP_growth as well (H5: $\beta 5 > 0$) (Table 2.3). To sum up, this will denote that the more share of trade in GDP is present the more likely country is able to potentially grow faster.[35]

Table 2.3 – Summary of hypothesises on macroeconomic factors

Number	Factor	Expected impact	Hypothesis
1	Size of economy	negative	H1: $\beta 1 < 0$
2	Price level ratio	positive	H2: $\beta 2 < 0$
3	Total investment	positive	H3: $\beta 3 > 0$
4	General governmental total expenditure	negative	H4: $\beta 4 < 0$
5	Trade (% of GDP)	positive	H5: $\beta 5 > 0$

Source: composed by author based on own calculations

On the Table 2.4 below the descriptive statistics of selected indicators are presented. Based on this description the primary conclusion of indicators` impact can be done. The table depicts how the variables changes on average in the three groups of countries: with the lowest, average and highest potential growth.

For each variable in the table the average and its standard deviation are calculated to analyse the trends of dependent variable with regressors changing. As a result, the provided hypothesises previously are held within the trends provided. This mean that positive influence of price level ratio, total investment and trade share are being spotted in this descriptive table.

Table 2.4 – Description of macroeconomic factors

Indicator	**Economy growth**	**Size of economy**	**Price level ratio**	**Total investment**	**General government total expenditure**	**Trade (% of GDP)**
All observations						
Observations number	1220	1220	1220	1220	1220	1220
Average	0.05	0.0138	0.71	23.79	36.70	93.16
Standard deviation	0.03	0.03	0.33	5.37	10.58	65.18
33% of observation with lowest growth						
Average	0.02	0.0137	0.80	21.76	40.96	85.46
Standard deviation	0.01	0.02	0.31	3.74	9.53	46.96
33% of observations with moderate growth						
Average	0.04	0.0115	0.67	23.29	34.96	93.20
Standard deviation	0.005	0.03	0.33	4.66	10.70	65.41
33% of observations with highest growth						
Average	0.08	0.0164	0.64	26.31	34.17	100.82
Standard deviation	0.03	0.04	0.33	6.36	10.17	78.63

Source: composed by author based on own calculations

Regarding the general government total expenditure, it was also observed that there is a suspicion for a negative correlation, which supports the hypothesis about this regressor (H4: $\beta 4<0$). On the other hand, the variable "Size of economy" signals about statistical insignificance. The average fluctuates among countries` clusters, while its standard deviation increases, on this occasion, the regressor was tested for heteroscedasticity and performed negative result (Figure 2.6). As a result, it was included into the model with no further specifications.

```
        studentized Breusch-Pagan test

data:  econ_size_ols
BP = 0.034099, df = 1, p-value = 0.8535
```

Figure 2.6 – Breusch-Pagan on heteroscedasticity of Economy_size regressor

Source: composed by author based on own calculations

Since all other macroeconomic factors performed with no suspicions for heteroscedasticity, the further research will be based on five selected variables to describe macroeconomic environment in the country as controlling factors. The further discussion is to argue the selection of institutional regressors and their importance for the model.

To sum up, all four institutional and 5 macroeconomic factors will be included into the main models and be tested on their further statistical significance to derive correct conclusions. As a result, the model will be based on 9 regressors: 4 institutional and 5 macroeconomic. Such approach is aimed to understand the correlation between potential countries` growth and its current economic situation. In addition, the model will test the correlation of governmental effectiveness and its impact on economy`s development.

As it was mentioned previously, the research is conducted based on 1220 observations, with 61 countries for 20 years in RStudio statistical tool. Composing a balanced panel model required a Hausman test to define whether the data requires Fixed or Random Effects approach (Figure 2.7). Based on given results, the model will be estimated using Fixed Effects approach. Later, the work will include also pooled OLS models, binary choice and GLS models.

```
        Hausman Test

data:  GDP_growth ~ Economy_size + Price_level_ratio + Total_investment_to_GDP +  ...
chisq = 164.29, df = 10, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent
```

Figure 2.7 – The Hausman Test on Fixed or Random Effect panel data model

Source: composed by author based on own calculations

To sum up, this chapter discussed all variables that will be tested for correlation with an observed variable, the intuition behind selecting and using them. It was also discovered how the model will be run, their structure and hypothesises to be tested.

RESULTS

With described and tested for heteroscedasticity explanatory variables and explained approach of researching the dependent one, the next model will be the main one. The main model (Figure 3.1) includes all selected regressors to check on hypothesises and look for further potential needed experiments.

Sample	2000-2019
Dependent variable	Potential GDP growth
Variables:	
Intercept	–
Control of Corruption	1.55e-02***
Political stability	5.72e-03*
Regulatory quality	-8.94e-02*
Rule of Law	-1.94e-02***
Economy size	-5.16e-01***
Price level ratio	-3.08e-e02***
Total investment (% of GDP)	2.20e-03***
Government presence	-2.37e-03***
Trade (% of GDP)	-2.12e-04***
Observations	1220
Number of countries	61
Country FE	Yes
Model specification	OLS
R^2	0.327
***p<0.01, **p<0.05, *p<0.1	

Figure 3.1 – Main panel model results with Fixed Effects

Source: composed by author based on own calculations

As it is observed from the model output, all coefficients are statistically significant with the level of confidence in range of 95-100%. The R^2 ratio is 0.32, which can be argued to be low, but the aim of the research is primarily to observe the correlation and influence of factors. As a result, even with relatively low R^2 ratio a good explanatory of the model can be considered, and the significance of explanatory and dependent variables cannot be denied.

Based on the derived model the hypothesises, described in the "Materials and methods" chapter, are compared with received results (Table 3.1). As a result, four factors ("Price level ratio", "Trade (% of GDP)", "Regulatory Quality" and "Rule of Law") demonstrated outputs that contradicts issued assumptions.

Table 3.1 – Comparing hypothesises with further results

Factor	**Hypothesis**	**Result**	**Accepted/denied hypothesis**
Size of economy	H1: $\beta 1 < 0$	-0.51625	Accepted
Price level ratio	H2: $\beta 2 < 0$	-0.03077	Accepted
Total investment	H3: $\beta 3 > 0$	0.00219	Accepted
General governmental total expenditure	H4: $\beta 4 < 0$	-0.00237	Accepted
Trade (% of GDP)	H5: $\beta 5 > 0$	-0.00021	Denied
Control of Corruption	H6: $\beta 6 > 0$	0.01554	Accepted
Political Stability	H7: $\beta 7 > 0$	0.00572	Accepted
Regulatory Quality	H8: $\beta 8 > 0$	-0.00894	Denied
Rule of Law	H9: $\beta 9 > 0$	-0.01939	Denied

Source: composed by author based on own calculations

To start making conclusions, the explanation to denied hypothesises have to be written down. Firstly, macroeconomic factors will be briefly discussed with deeper research into institutional factors, as a key-focus of this examination. Additionally, to test factors by running pooled models, countries were also classified into two groups: advanced and emerging countries. This clustering was done based on classification by United Nations.[14]

Even though the variable "Trade (% to GDP)" was assumed to have positive impact on potential growth, in Fixed Effect model it turned out to be with negative coefficient sign. However, by running pooled OLS model it performed with the positive effect. Still,

the variable showed linearly in country fixed effect model trough out the time. This can be explained that with the sequence of time more advance countries trade more, while the marginal expression of potential GDP decreases. In later models it will be performed that more advanced countries tend to grow slower rather than developing.

Taking back focus on institutional factors, where two signed for positive effect and two other – negative. That is a very debatable issue, as even from descriptive table in the previous chapter they showed weak impact. Though, further models will be based on pooled and panel models with different sets of variables to find and explain outcomes.

To structure the research, the institutional factors were grouped in two types: with negative and positive signs in the model. Then all of them were tested for correlation with each other. Running ahead, a high correlation among those factors is expected. This is due to the fact that country develop one institution by improving other. For example, if country was highly estimated through a “Rule of Law” variable, there is higher possibility that there will be higher level of corruption. Because the law is abided, corruption is to be eliminated from such economy. These also result in higher level of regulatory quality estimation and so on.

Even with highly correlated variables, each one can explain the dependent variable better. For this reason, not only R^2 will be in focus, but adjusted R^2 as well, since the last one includes the estimation of model`s explanation, if extra explanatory variable is added. The first variable to be checked for correctness is “Control of Corruption”.

Firstly, the binary choice model was built to define how “Control of Corruption” works for the developments of the country. Additionally, it will be tested which group of countries (advanced or emerging) are more likely to have bigger potential growth. The intuition behind this step is to define whether the fact that the country is developed will influence its capability to grow faster and the level of institutional effectiveness. In case of situation, when developed countries grow slower and have better institutional estimates, the reverse influence of such variables can be observed.

On Figure 3.2 the binary choice model is presented, where Advanced_economy stands for a dependent variable (1 – developed country, 0 – developing), with

Control_of_corruption as an explanatory one. And as it can be seen: the higher the control of corruption – the more likely this country is a developed one.

Sample	2000-2019
Dependent variable	Potential GDP growth
Variables:	
Intercept	-1.414***
Control of Corruption	1.517***
Observations	1220
Number of countries	61
Country FE	No
Model specification	Binary, probit
R^2	0.57
***p<0.01, **p<0.05, *p<0.1	

Figure 3.2 – Binary choice model of impact of "Control of Corruption" on country`s development

Source: composed by author based on own calculations

Additionally, the composed model is a probit approach with a R^2 ratio at approximately 57%. This points to a moderate correlation. Next step is to observe how country potential growth correlates with the development of economy (Figure 3.3).

Making a conclusion of this step, it should be said that this is also a binary choice model (Probit) with pooled data. As a result, it should be mentioned that in this case a negative correlation is observed. Even though this correlation is too weak (R^2 is calculated to be 1.2% only), the coefficient is still significant. Thus, this effect should not be ignored.

Another step is to run a pooled OLS model to check the sign of coefficient to make further conclusions (Figure 3.4). This is basically to study general correlation of potential growth and indicators, since in panel model the countries` differences and time impact is included. Pooled data vanishes these effects and tests observations as cross-sectional.

Sample	2000-2019
Dependent variable	Potential GDP growth
Variables:	
Intercept	0.027
Control of Corruption	-5.668***
Observations	1220
Number of countries	61
Country FE	No
Model specification	Binary, probit
R^2	0.01
***p<0.01, **p<0.05, *p<0.1	

Figure 3.3 – Binary choice model of how potential growth impacts the development of economy

Source: composed by author based on own calculations

Sample	2000-2019
Dependent variable	Potential GDP growth
Variables:	
Intercept	5.428e-03
Control of Corruption	2.405e-03**
Political stability	–
Regulatory quality	–
Rule of Law	–
Economy size	-6.88e-02*
Price level ratio	–
Total investment (% of GDP	2.283e-03***
Government presence	-4.640e-04***
Trade (% of GDP)	2.610e-05*
Observations	1220
Number of countries	61
Country FE	No
Model specification	OLS
R^2	0.22
***p<0.01, **p<0.05, *p<0.1	

Figure 3.4 – Pooled OLS to test correlation of potential growth and "Control of corruption"

Source: composed by author based on own calculations

In addition, two next figures depict the results of two other examinations. There were two pooled OLS models with same approaches to test Control_of_corruption even if controlling variables are excluded for two groups: developed and developing economies (Figures 3.5 and 3.6).

Sample	2000-2019
Dependent variable	Potential GDP growth
Variables:	
Intercept	–
Control of Corruption	0.0294***
Political stability	0.0134**
Regulatory quality	0.0065
Rule of Law	-0.0363**
Economy size	–
Price level ratio	–
Total investment (% of GDP	–
Government presence	–
Trade (% of GDP)	–
Observations	500
Number of countries	25
Country FE	Yes
Model specification	OLS
R^2	0.055
***p<0.01, **p<0.05, *p<0.1	

Figure 3.5 – Panel model to test correlation of potential growth and "Control of corruption" among advanced countries

Source: composed by author based on own calculations

In both models the tested variable is statistically significant with positive effect, which means that there is indeed some of direct impact. However, even the R^2 is relatively low (R^2 = 5% within advanced countries and 8% within emerging countries), still the impact of those variables should not be ignored.

As a result, based on received results, it can be stated that there is some positive correlation between potential growth and control of corruption. From all run models, only positive influence was observed. So, it will be concluded that even with low explanation

power for dependent variable, “Control of Corruption” will be included into the main model. As a result, the hypothesis about positive impact is proved.

Sample	2000-2019
Dependent variable	Potential GDP growth
Variables:	
Intercept	–
Control of Corruption	0.0173**
Political stability	0.0138***
Regulatory quality	0.0004
Rule of Law	-0.0485***
Economy size	–
Price level ratio	–
Total investment (% of GDP	–
Government presence	–
Trade (% of GDP)	–
Observations	720
Number of countries	36
Country FE	Yes
Model specification	OLS
R^2	0.078
***p<0.01, **p<0.05, *p<0.1	

Figure 3.6 – Panel model to test correlation of potential growth and “Control of corruption” among emerging countries

Source: composed by author based on own calculations

Moving to “Political Stability” variable, it also performed with a positive effect. On this occasion, it was assumed that it will be engaged in the model with the same channel of influence on potential GDP growth. This assumption is based on high correlation of political stability and control of corruption estimations (0.78). But it should be taken into account that this correlation represents the fact that countries with higher political stability have better control over corruption. Indeed, testing political stability estimation in the same way as with “Control of Corruption” showed that these two variables have the same effect in the model to explain the potential growth. But there will be further discussion on this variable.

Next focus of the examination is “Rule of Law” factor. It showed a negative sign of coefficient, which contradicts the issued hypothesis.

To start with, the “Rule of Law” variable will be run with different combinations of institutional factors. The intuition behind this step is to examine whether there are just conflicts between the variables or there is truly negative effect. On the table 3.2 the summarised results of five panel models are depicted with multiple combinations of institutional factors.

Table 3.2 – Summary of panel models with focus on “Rule of Law” factor

№	**Included variables**	**Coefficient of Rule_of_Law**	**Sign of the coefficient**	**R^2**
1	Control_of_corruption Political_stability Regulatory_quality Rule_of_law	-0.048	negative	0.0658
2	Political_stability Control_of_corruption Rule_of_law	-0.0476	negative	0.0657
3	Control_of_corruption Regulatory_quality Rule_of_law	-0.041	negative	0.0454
4	Control_of_corruption Rule_of_law	-0.0394	negative	0.0451
5	Rule_of_law	-0.0245	negative	0.027

Source: composed by author based on own calculations

As it can be observed, in all mentioned cases the variable performed with a negative sign. Since it is a panel model, that means that “Rule of Law” throughout the observed period of time slows down the economy`s potential growth.

Even though, on next figures the pooled OLS models will be presented. They will also stand for vanishing countries` difference effect. As a result, it will be examined

whether rule of law make any importance to the potential growth at a point, not in a time loop.

So, next hypothesises will be dealing with obtaining again negative coefficient signs for “Rule of Law” variable. If this will become true, this variable will be tested separately with emerging and advanced countries as well. Next steps will be dealing with binomial models too. This will bring the research to the point to make a final decision on this variable.

Following to the pooled models, the results are presented on Table 3.3. But due to the fact that in only few of models the variable was statistically significant, its influence cannot be stated. However, in cases when it was indeed significant, the sign of coefficient was always negative.

Table 3.3 – Summary of OLS models with focus on “Rule of Law” factor

№	Included variables	Coefficient of Rule_of_Law	Sign of the coefficient	p-value	R^2
1	Control_of_corruption Political_stability Regulatory_quality Rule_of_law	-0.0099	negative	0.01	0.011
2	Political_stability Control_of_corruption Rule_of_law	-0.005	negative	0.13	0.006
3	Control_of_corruption Regulatory_quality Rule_of_law	-0.007	negative	0.08	0.005
4	Control_of_corruption Rule_of_law	-0.002	negative	0.57	0.0005
5	Rule_of_law	-0.0006	negative	0.45	0.00004

Source: composed by author based on own calculations

From the table above, it is obvious that estimating the influence of rule of law on potential GDP growth with Fixed Effects results in poor conclusions. Even though this

variable is sufficient in the panel data model, it does not give explanation to simple OLS models.

Running identical binary choice model (how "Rule of Law" influence the possibility that the country is developed or developing) resulted in similar results as it was in case of estimations for control of corruption estimations (Figure 3.7).

Sample	2000-2019
Dependent variable	Potential GDP growth
Variables:	
Intercept	-1.898***
Rule of Law	1.859***
Observations	1220
Number of countries	61
Country FE	No
Model specification	Binary, probit
R^2	0.58
***p<0.01, **p<0.05, *p<0.1	

Figure 3.7 – Binary choice model of impact of "Rule of Law" on country`s development

Source: composed by author based on own calculations

With 58% of R^2 ration, this means that, as in the case of "Control of corruption" factor, higher estimation of law abidance in the country means that more likely this country is developed. Having said this, it would be a logical conclusion for Rule_of_Law to have negative sign as well in the main model. But it should be taken into account that in panel data model the influence is observed in the time loop. In pooled data models the factor of time is eliminated, and all observations are calculated like in cross-sectional model.

Other steps regarding testing whether the focused coefficient is truly negative are dealing with looking at how this variable performs with dropping other variables.

Firstly, it was tried to drop out "Control of Corruption" variable. As it was mentioned previously, it was found that Rule_of_law and Control_of_corruption correlates. The expectation is that "Rule of Law" factor will become positive as

Control_of_corruption is eliminated. The Figure 3.8 summarises the output of a run regression. It is the same main panel data model, with one variable dropped.

Sample	2000-2019
Dependent variable	Potential GDP growth
Variables:	
Intercept	–
Control of Corruption	–
Political stability	5.53e-03*
Regulatory quality	-4.40e-03
Rule of Law	-1.20e-02*
Economy size	-4.75e-01***
Price level ratio	-3.23e-e02***
Total investment (% of GDP	2.28e-03***
Government presence	-2.37e-03***
Trade (% of GDP)	-2.09e-04***
Observations	1220
Number of countries	61
Country FE	Yes
Model specification	OLS
R^2	0.327
***p<0.01, **p<0.05, *p<0.1	

Figure 3.8 – Model with variable "Control of Corruption" excluded

Source: composed by author based on own calculations

As a result, the negative sign of coefficient remained to be present. What is more, it might be observed that another factor (regulatory quality estimation) lost its statistical significance, which of course was not expected. Indeed, it was assumed that dropping one coefficient will result in statistical significance of other, but they will change totally by the level of dropped factor.

In case of dropping "Rule of Law" from the main model resulted it identical results: one of the variables lost its significance and other variables change by the level of "Rule of Law" coefficient (Figure 3.9). As it was in the previous example, the sign of remained coefficients has not changed, but decreased slightly.

Sample	2000-2019
Dependent variable	Potential GDP growth
Variables:	
Intercept	–
Control of Corruption	9.96e-03*
Political stability	3.48E-03
Regulatory quality	-1.59e-02***
Rule of Law	–
Economy size	-5.01e-01***
Price level ratio	-3.32e-e02***
Total investment (% of GDP	2.33e-03***
Government presence	-2.46e-03***
Trade (% of GDP)	-2.15e-04***
Observations	1220
Number of countries	61
Country FE	Yes
Model specification	OLS
R^2	0.327
***p<0.01, **p<0.05, *p<0.1	

Figure 3.9 – Model with variable "Rule of Law" excluded

Source: composed by author based on own calculations

The same results were gained after omitting "Regulatory Quality" and "Political Stability" ratios. The following procedures were dealing with testing for the correlations of all institutional variables. The results, which pointed to constant positive correlations, moved to the conclusion that there can be a positive multicollinearity. However, in this case variables would have lost its statistical significance. Moreover, R^2 ratios also increased, so all institutional variables are included with the coefficient signs as they are stated in the main model.

In conclusion to institutional variables, they can be split up into 2 groups: 1 – with estimations of control of corruption and political stability; 2 – regulatory quality and rule of law estimates. These groups can be considered as complimentary, and even though they did not sharply increase the explanation of the model, their significance is proved to be sufficient. Thus, their effect should not be ignored.

As a result, it is proved for institutional development to have significance in influencing the potential GDP growth. Still, the remained question is why “Regulatory Quality” and “Rule of Law” regressors point to negative correlation. This can be explained by sort of data and sample size. It may be argued that 20 years of observations is small to make conclusions, but even conducted pooled OLS models performed same results. Thus, it can be considered that positive effect might better work for countries with initial low development of institutions.

Still, it was observed that political stability and controlling corruption indicators solidly proved to have positive effect on potential growth. This also can be explained that these variables describe the country from the point of view, when less money are stollen from economy and there is more confidence in the future. Particularly, those effects are important for development of Ukraine which is known to have frequently revolutions (1991, 2003-2004, 2013-2014 years) and other destabilising actions.

For example, controlling corruption and improving political stability (after considerable fall in 2014) in long run may increase Ukrainian potential growth by increasing confidence of investors which results in higher investments into economy. Consequently, investing factor was also proved to increase the potential growth. Nevertheless, taking into consideration the Rule of Law and Regulatory Qualities indicators and their impacts, it might be discussed why their coefficients are below zero as well. It was assumed to have two possible explanations: 1) those two indicators consider the abidance of law and partially how bureaucratic country is; 2) it is tough to explain short-term correlation of both estimates.

By first explanation it is meant that abidance of law might limit the freedom of economic development slowing this down. Another possible explanation is dealing with the fact that this data demands more time range (it is available from 2000). In short run, the institution`s development does not change significantly, as these are long processes. As a result, the effect is present and it is significant, but the impact is an open question, even if Rule of Law showed inverse correlation in multiple models. Furthermore, as it was discussed in Literature Review section, institutions might be considered as factors of production. This means that their effect might be inversed due to indirect impact.

CONCLUSIONS

To make a conclusion, the work is aimed to observe correlation between country`s institutional development and its potential economic development. The first chapter "Literature Review" theoretical background, importance and role of potential GDP was considered. The examples showed how potential GDP is used for monetary planning and consequences of miscalculations. It was also discussed the influence of institutionalism in modern economies as well as impact of institutional development on country`s potential growth. As it was reviewed, Karl Polanyi considered institutions as part of economy created as a tool to amortise economical fluctuations, unite its branches and form future vector for development. Thus, their impact must be sufficient for long-term development. In addition, newer articles present that institutional development makes bases for economic growth. Furthermore, from historical point of view institutional advance proving to be one of the factors to enable country`s growth and it inhibits development otherwise.

The "Methods and Materials" section provided the used approaches and variables considered to conduct the regressions. In general, the presented models were calculated based on panel data which consists out of 61 countries with 20 years of observations (2000 – 2019) which resulted in 1220 total observations with country fixed effects. For testing the correlation of institutional indicators and potential economic growth 9 indicators were considered (4 – institutional and 5 – controlling (macroeconomic)). All variables were tested on heteroscedasticity and in case of positive result, GLS models were run with further conclusions.

The last chapter "Results" summarises the procedures and outputs of models and provides conclusions of explanatory variables` impacts on potential country`s growth. As a result, it is proved for institutional development to have significance in influencing the potential GDP growth. Even though that the explanatory power of institutional variables was not strong enough, they have statistical significance. This is the result of model specification: in panel model institutional variables were to define the u_i-term (zero coefficient), which indicates a kind of the initial level of country`s growth. Due to the fact

that institutional variables are to some extent time-irrelevant (they do not fluctuate throughout the time), such variables are not sufficient to control GDP growth rates. Still, their influence should not be ignored.

It was also found that higher institutions` estimates are more likely among developed countries. What is more, by adding institutional variables resulted in positive impact of two variables and two others performed with negative coefficients. As a result, 4 institutional variables were split into two groups, which can be considered as complimentary. Their effect should not be ignored, even though they did not sharply increase the explanation of the model.

Still, as it was observed from figure in the first chapter, Ukraine is far under world`s trends of institutional development. As a result, Ukraine has vectors for developing, not only from economic point of view, but also from the point of view of institutionalism.

Furthermore, it is hard to define the most crucial indicator for institutional development from the presented models due to data type and model specifics. And taking into account conclusions of research results, it should be mentioned that developed institutions are more likely for developed countries. What is more, considering the fact that institutions may be considered as an additional factor to increase the efficiency of production in the country and knowing the level of Ukrainian institution estimations, it should be mentioned the importance of institutional development in long-term run.

As a result, this research proves the importance of institutionalism as a one of the factors that impacts the potential growth. And based on panel models, it is possible to explain potential level of development in the country, but as it was described, due to the fact that institution indicators do not fluctuate significantly from year to year, it is impossible to explain changes of potential GDP growth in time on high level. Still, those variables are to define cross-country difference.

REFERENCES

1. Acemoglu, D., & Robinson, J. A. (2013). Economics versus Politics: Pitfalls of Policy Advice (No. 02). JOURNAL OF ECONOMIC PERSPECTIVES. https://www.aeaweb.org/articles?id=10.1257/jep.27.2.173
2. Actual and Potential GDP (measured in constant 2005 dollars). (2013). https://files.stlouisfed.org/files/htdocs/publications/es/images/ES1211Chart.pdf
3. Araujo, F., Areosa, M. B. M., & Rodrigues Neto, J. A. (2003, February). r-filters: a Hodrick-Prescott Filter Generalization. Banco Central Do Brasil. https://www.bcb.gov.br/pec/wps/ingl/wps69.pdf
4. Askari, M. (2018, August). PBO's Approach to Measuring Potential GDP. Parliamentary Budget Officer in Canada. https://www.pbo-dpb.gc.ca/web/default/files/Documents/Reports/2018/Potential%20GDP/Measuring_Potential_GDP_EN.pdf
5. Barkanov, B. (2019). Institutionalism | social science. Encyclopedia Britannica. https://www.britannica.com/topic/institutionalism
6. Bianco, N. (2018, February). FACTORS AFFECTING THE PRICE LEVEL RATIO ACROSS COUNTRIES, WITH A FOCUS ON SMALL STATES (ISSN 1024–6282). University of Malta. https://www.um.edu.mt/library/oar/bitstream/123456789/40556/1/Factors_affecting_the_price_level_ratio_across_countries_with_a_focus_on_small_states.pdf
7. Blaug, M. (2009, December). The Methodology of Economics. Cambridge University Press. https://www.cambridge.org/core/books/methodology-of-economics/A02870A52E4F457D4EFBAA3242BAE541
8. Bruinshoofd, A. (2016, January 20). Institutional quality and economic performance. RaboResearch - Economic Research. https://economics.rabobank.com/publications/2016/january/institutional-quality-and-economic-performance/

9. Budget and Economic Data | Congressional Budget Office. (2021). CBO Web-Site. https://www.cbo.gov/data/budget-economic-data#6
10. CBPP. (2018). Real-Time Estimates of Potential GDP: Should the Fed Really Be Hitting the Brakes? https://www.cbpp.org/recent-revisions-in-cbo-estimates-of-us-potential-output
11. Ciucci, M., & Zoppe, A. (2017). Potential output estimates and their role in the EU fiscal policy surveillance. Economic Governance Support Unit.
12. Coibion, O., Gorodnichenko, Y., & Ulate, M. (2018, January). Real-Time Estimates of Potential GDP: Should the Fed Really Be Hitting the Brakes? CBPP. https://www.cbpp.org/research/full-employment/real-time-estimates-of-potential-gdp-should-the-fed-really-be-hitting-the
13. Control of corruption indicator. (n.d.). Millennium Challenge Corporation USA. https://www.mcc.gov/who-we-select/indicator/control-of-corruption-indicator
14. Data sources, country classifications and aggregation methodology. (2014). World Economic Situation and Prospects. https://she.mumc.maastrichtuniversity.nl/sites/intranet.mumc.maastrichtuniversity.nl/files/she_mumc_maastrichtuniversity_nl/2014_wesp_country_classification.pdf
15. Dickinson, P. (2020, March 3). Germany and Poland compete for Ukrainian migrant workers. Atlantic Council. https://www.atlanticcouncil.org/blogs/ukrainealert/germany-and-poland-compete-for-ukrainian-migrant-workers/
16. Directorate, O. S. (2021). OECD Glossary of Statistical Terms - Potential gross domestic product (GDP) Definition. OECD. https://stats.oecd.org/glossary/detail.asp?ID=2094
17. Economics 101: What Is Potential GDP and Why Does It Matter in Business and Economics? (2012). MasterClass. https://www.masterclass.com/articles/economics-101-what-is-potential-gdp-and-why-does-it-matter-in-business-and-economics#what-happens-when-real-gdp-falls-short-of-potential-gdp

18. Fernández, E. (2013, May). Potential GDP and the output gap: what do they measure and what do they depend on? CaixaBank. https://www.caixabankresearch.com/en/economics-markets/activity-growth/potential-gdp-and-output-gap-what-do-they-measure-and-what-do
19. Gavin, W. T. (2012). What Is Potential GDP and Why Does It Matter? (No. 11). Federal Reserve Bank of St. Louis. https://files.stlouisfed.org/files/htdocs/publications/es/12/ES_2012-04-20.pdf
20. Girardi, D., Meloni, W. P., & Stirati, A. (2018, February). Persistent Effects of Autonomous Demand Expansions. SSRN Electronic Journal INET. https://www.researchgate.net/publication/327256313_Persistent_Effects_of_Autonomous_Demand_Expansions
21. Global Economic Prospects. (2021, January). World Bank. https://www.worldbank.org/en/publication/global-economic-prospects
22. Horn, G. A., Logeay, C., & Tober, S. (2007, February 2). Estimating Germany's Potential Output. Federal Reserve Bank of St. Louis. https://ideas.repec.org/p/imk/wpaper/02-2007.html
23. Horn, G., Logeay, C., & Tober, S. (2007). Estimating Germany's Potential Output (No. 02–2007). https://econpapers.repec.org/paper/imkwpaper/02-2007.htm
24. Krugman, P. (2018, February). It's Baaack, Twenty Years Later. https://www.gc.cuny.edu/CUNY_GC/media/LISCenter/pkrugman/Its-baaack.pdf
25. Medina, L., & Schneider, F. (2018, January). Shadow Economies Around the World: What Did We Learn Over the Last 20 Years? IMF. https://www.imf.org/en/Publications/WP/Issues/2018/01/25/Shadow-Economies-Around-the-World-What-Did-We-Learn-Over-the-Last-20-Years-45583
26. Navarini, L., & Zoppe, A. (2020, February). Potential output estimates and their role in the EU fiscal policy surveillance. Economic Governance Support Unit. https://www.europarl.europa.eu/RegData/etudes/BRIE/2016/574407/IPOL_BRI(2016)574407_EN.pdf
27. NIELSEN, K. (2007, September). INSTITUTIONAL ECONOMICS, SOCIAL CAPITAL AND THE NEGOTIATED ECONOMY – A SCANDINAVIAN

APPROACH TO ECONOMIC THEORY (No. 11). UniversityofLondon. https://www.altersocietal.org/documents/pekeanewsletter/Nielsen-En-NL11.pdf

28. Owng, M. (2016). What Is Potential GDP and How Is It Measured? https://www.stlouisfed.org/on-the-economy/2016/january/potential-output-how-measured
29. Pettinger, T. (2019, August). Effect of lower interest rates. https://www.economicshelp.org/blog/3417/interest-rates/effect-of-lower-interest-rates/
30. Potential GDP data for Eurozone. (2019). European Commission. https://ec.europa.eu/economy_finance/ameco/Include/Query.cfm?serie=OVGOV&trn=1&agg=0&unite=0&ref=0&nomserie=Potential%20gross%20domestdo%20product%20at%202015%20reference%20levels&lstCntry=%27EA19%27&lstYear=2018,2017,2016,2015,2014,2013,2012,2011,2010,2009,2008,2002,2006,2005,2004,2003,2002,2001,2000&code_serie=%27OVGDP%27,%27AVGDGP%27&selection=1&timeAxis=0
31. Price level ratio of PPP conversion factor (GDP) to market exchange rate | Data Catalog. (2020). WorldBank. https://datacatalog.worldbank.org/price-level-ratio-ppp-conversion-factor-gdp-market-exchange-rate
32. Ravn, M. O., & Uhlig, H. (2002, March). ON ADJUSTING THE HODRICK-PRESCOTT FILTER FOR THE FREQUENCY OF OBSERVATIONS (84(2)). The Review of Economics and Statistics. https://home.uchicago.edu/~huhlig/papers/uhlig.ravn.res.2002.pdf
33. TRENDS IN POTENTIAL OUTPUT. (2011, January). ECB. Monthly Bulletin. https://www.ecb.europa.eu/pub/pdf/other/art2_mb201101en_pp73-85en.pdf
34. Tullock, G. (2000). Government Spending. Library of Economics and Liberty. https://www.econlib.org/library/Enc1/GovernmentSpending.html
35. World Development Indicators | DataBank. (2021). WorldBank. https://databank.worldbank.org/source/world-development-indicators

36. World Economic Outlook, database. (2020, October). IMF. https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
37. Worldwide Governance Indicators | DataBank. (2021). WorldBank. https://databank.worldbank.org/source/worldwide-governance-indicators
38. Acemoglu, D., Reed, T., & Robinson, J. (2013). Economic Development and Elite Control of Civil Society in Sierra Leone. Journal of Political Economy. https://economics.mit.edu/faculty/acemoglu/data/chiefs
39. Ashvanian, S. K. (2009). Economics. Part 2. KNEU.