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Political development and economic performance in the last 200 years

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ABSTRACT

The aim of the paper is to verify whether there has been a causal relationship between economic performance and the quality of political environment in the last 200 years. Mainly, the paper explores the bi-directorial causality for the period of 1821–2016. To attain the aim, the paper uses Granger causality test. The differences between the individual regions (Europe, Latin America and former British colonies) are taken into consideration. Economic performance is expressed as annual growth rate of GDP per capita (taken from Maddison Project Database); the quality of political environment is associated with the Electoral Democracy Index and the Liberal Democracy Index (from the V-Dem Project).

The paper offers three findings. Firstly, the results indicate that a statistically significant relationship between economic performance and political development was identified for the researched period. Secondly, bi-directorial causality was peculiar to the European countries, whereas the linkage was not identified within other regions. Thirdly, the results for the sub-periods confirm the previous conclusions with two additions. The quality of political environment and economic performance did not interact with each other in the period of 1821–1870 across all three regions, while in the period after World War II, bi-directorial causal relationship could also exist in the Latin American economies.

KEYWORDS

economic performance, political development, modernization theory, granger causality

JEL CLASSIFICATION INDICES

O17, O43, P26

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1. INTRODUCTION

> *"Economic growth and the development of freedom are complementary processes of societal development. Economic growth provides the resources (and leisure) to support more complex societies; and it is unlikely to persist in the long run without the development of political and civil liberties."* (North 1993: 1)

The interaction between political development and economic growth has been extensively described in the theoretical and empirical literature. This paper provides a perspective on their interaction over the last 200 years (1821–2016), the epoch since the Industrial Revolution (Western Europe) and the establishment of modern nation states (Western Europe, Latin America and the United States) to present. The analysis of the long-term relationship between political environment and economic performance is the main contribution of the article, because most of empirical literature focuses only on the period after World War (WW) II. In addition, the interaction is researched within individual sub-periods bounded by major economic and political events (the First and Second Industrial Revolutions, the WW I, the WW II), which allows us to take into account the impact of changing economic and political conditions in the world economy. Besides observing the long-run relationship, the paper also observes the influence of geographical differences. Specifically, the paper focuses on the European and Latin American economies due to data availability with the inclusion of several former British colonies.

The main aim of the paper is to verify whether there has been a causal relationship between economic performance and the quality of political environment in the last 200 years. The first section provides a survey of the current theoretical and empirical literature. The used variables, the Granger causality test and the sample of the observed countries are described in Methodology. The Results section includes the Granger causality test and the main outputs from the Impulse Response Functions. Conclusions summarise the major findings.

2. LITERATURE REVIEW

2.1. Political environment and economic performance

The arguments about the impact of democracy on economic growth are described in Alfano – Baraldi (2016) and Knutsen (2012). Two empirical articles, Przeworski – Limongi (1993) and Doucouliagos – Ulubaşoğlu (2008) presented for an introductory determination of the relation between political regime and economic growth. The first summarizes empirical research for the period of 1960–1990 (21 articles), whereas the second evaluates 84 research articles published between 1980 and 2005. Przeworski – Limongi (1993: 60) stated that democratic systems support economic growth according to 38% of the papers, whilst the other 38% articles suggested that higher economic growth is achieved by the authoritarian countries, and the remaining 24% research outputs did not find a statistically significant influence.

According to majority of the *most recent* papers, there are no relations between democracy and economic growth (e.g., Jong-A-Pin 2009; Persson – Tabellini 2006; 2009). On the other hand, Papaioannou – Siourounis (2008), Pinho – Madaleno (2009), Yanovskiy – Shulgin (2013), Aisen – Veiga (2013) and Murphy – O'Reilly (2019) concluded the relation exists, but the effect

is ambiguous. Aisen – Veiga (2013) and Murphy – O'Reilly (2019) discovered a negative effect, whereas Papaioannou – Siourounis (2008), Pinho – Madaleno (2009), and Yanovskiy – Shulgin (2013) identified a positive effect. Doucouliagose – Ulubaşoğlu (2008: 62) identified four groups of results:

- a positive and statistically significant effect (27%),
- a positive and statistically insignificant impact (37%),
- a negative and insignificant influence (21%), and
- a negative and statistically significant influence (15%).

Additionally, the mentioned contributions offer four basic explanations of the ambiguous and insignificant influence of political regime.

- The countries usually execute democratic reforms when they are relatively less developed, which means that they achieve a higher level of economic development during an implementation of democratic reforms, but the growth rate is lower due to the convergence effect (Acemoglu et al. 2008; Pinho – Madaleno 2009; Bednar 2019).
- The long-term results are determined by historical developments and a differentiation of the individual influences is difficult (Acemoglu et al. 2008). This finding is confirmed by the results of the meta-analysis by Colagrossi et al. (2020). Persson – Tabellini (2006) also provided several examples of insufficient differentiation (e.g., democratizations and economic liberalizations, different forms of democratic government and electoral systems, expected and actual political reforms).
- The empirical literature uses parametric estimates which underestimate the effect of political regime on economic growth due to the heterogeneity of the individual regimes. Therefore, Persson – Tabellini (2009) suggested the use of non-parametric estimates. Alfano – Baraldi (2016) identified an inverted U shape relation.
- Almeida – Ferreira (2002) noted that a higher average economic growth in authoritarian regimes may give a greater variability in the output of individual countries, because in the authoritarian regimes' outlier values are more frequent.

2.2. Economic performance and political development

The influence of economic performance on political development (democratisation) can be called "Modernization theory". This is based on the idea that "*democracy is related to the state of economic development, since the more well-to-do a nation, the greater the chances that it will sustain democracy*" (Lipset 1959: 75). Lipset stated four socio-economic requisites supporting democracy – wealth, industrialisation, urbanisation and education. The empirical literature has primarily focused on testing wealth (GDP per capita) as the main factor of the modernization theory, e.g., Hadenius – Teorell (2005), Acemoglu et al. (2008, 2009), Cervellati et al. (2014) and Jung – Sunde (2014). These articles can be summarized by Broderstad (2018), according to which the results of meta-analysis indicate that economic level does not affect democratization; on the other hand, it is possible to observe that higher economic level prevents a return to an authoritarian regime.

Focusing on the changes in economic performance, as the main theme of the paper, Huntington (1993) and Acemoglu – Robinson (2005) stated that a long-run stagnation or recession

leads to a loss of legitimacy of an authoritarian regime, and so, increases the probability of the regime collapse. The transition to a democratic regime will be more likely if there is higher income inequality in the country (Dorsch – Maarek 2020). On the other hand, according to Gasiorowski (1995) and Knutsen (2014), economic recession inflicts fall on any regime regardless of the type of political arrangement; in other words, economic growth supports any political regime (Doorenspleet 2004). Lipset (1959: 89) considered the development of the middle-class to be the transmission channel within the Modernization theory. The standard explanation is described in Acemoglu – Robinson (2005). The authors explained that the middle-class balances income differences between elites and poor masses. Specifically, the middle-class tries to keep the elites out of danger and at the same time seeks to minimize the revolutionary tendencies of the poor masses, which is best done in a democratic system. Zak – Feng (2003) added that a transition from the authoritarian to the democratic regime will take place if a sufficient number of middle-class members become rich or poor. In the first case, the middle-class will require a higher share of political participation (democratization), while in the latter case, the anti-government or anti-regime riots may occur. The findings are empirically verified by Barro (1999) and Loayza et al. (2012).

To sum up the section, we cite the findings of Murtin – Wacziarg (2014), who stated that in the period of 1870–2000, economic development had a significant influence on the changes in political regimes, whereas the impact of changes in political environment on economic development was minimal.

3. METHODOLOGY

We are working with the changes in economic performance instead of the impact of economic level (the most commonly used variable in the context of the Modernization theory). Economic performance is expressed as an annual percentage growth rate of real GDP per capita, in international 2011 dollars taken from the Maddison Project Database (Bolt et al. 2018). The variable is in growth form because of stationarity, which is a necessary condition for the use of the Granger causality.

As the indicators of the quality of political environment, the paper uses two indices of the V-Dem Project (Coppedge et al. 2019; Pemstein et al. 2019), the Electoral Democracy Index (EDI) and the Liberal Democracy Index (LDI). EDI interconnects the Minimalist Conception of Democracy (Schumpeter 1942) with the concept of Polyarchy (Dahl 1989) and evaluates five essential parts of electoral democracy: freedom of association (v2x_frassoc_thick), clean elections (v2xel_frefair), freedom of expression (v2x_freexp_thick), suffrage (v2x_suffr), and elected officials (v2x_elecoff). EDI is expressed in the logarithmic functional form due to stationarity (proxy *lnEDI*). It was selected instead of the most used indicator in empirical literature, Polity2 (the Polity IV Project; Marshall et al. 2017), since the Polity2 index includes time invariant series (e.g., Australia and New Zealand). EDI offers an additional advantage by allowing for tracking the political development since 1789, thus distinguishing it from other indicators of the political environment which evaluate a much shorter period, such as the end of the WW II (the Democracy-Dictatorship Index), the 1970s (the Freedom in World), or the 1990s (the Democracy Barometer or the Voice and Accountability of the Governance Matters). Finally, let us mention that the concept of electoral democracy is linked to several research constraints (e.g., Hadenius – Teorell 2005; Persson – Tabellini 2006).

LDI is employed as an alternative indicator of political environment. It evaluates level of political environment according to eight criteria, five essential characteristics of electoral democracy (see above) and three constitutional liberal principles, namely equality before law and individual liberties (v2xcl_rol), judicial constraints on the executive (v2x_jucon) and legislative constraints on the executive (v2xlg_legcon). The importance of the constitutional liberal principles for social development is comprehensively described in Zakaria (2003). LDI is also expressed in the logarithmic functional form due to stationarity (proxy *lnLDI*). The possibilities and limitations of other indices of the V-Dem concept can be found in Coppedge et al. (2016).

To achieve our aim, we use the Granger causality test. The analysis has three parts. Firstly, the occurrence of unit root is tested by the Levin-Lin-Chu test. The test has null hypothesis that panels are nonstationary. In the case of non-stationarity (see Table 8 in Appendix), the variable is expressed as a percentage change (proxies *GrowthlnEDI* and *GrowthlnLDI*), which ensures stationarity. Secondly, the Breusch-Pagan LM test for cross-sectional correlation is employed. In the case of cross-sectional dependence (see Table 9 in Appendix), the computations are added by the bootstrap procedure. Thirdly, the paper employs the Dumitrescu – Hurlin (2012) procedure instead of the panel VAR approach (Abrigo – Love 2016; empirically used by Murphy – O'Reilly 2019) because the observed panel data are heterogeneous (Lopez – Weber 2017). The lag structure of panel data is selected according to the Akaike information criterion. The standard Granger causality model for two variables can be expressed by the following equations:

$$Growth_{i,t} = \sum_{n=1}^{p} \beta_1 Growth_{i,t-n} + \sum_{n-1}^{p} \beta_2 lnEDI_{i,t-n} + \varepsilon_{i,t} \quad (1)$$

$$lnEDI_{i,t} = \sum_{n=1}^{p} \beta_1 lnEDI_{i,t-n} + \sum_{n-1}^{p} \beta_2 Growth_{i,t-n} + \varepsilon_{i,t} \quad (2)$$

$$Growth_{i,t} = \sum_{n=1}^{p} \beta_1 Growth_{i,t-n} + \sum_{n-1}^{p} \beta_2 lnLDI_{i,t-n} + \varepsilon_{i,t} \quad (3)$$

$$lnLDI_{i,t} = \sum_{n=1}^{p} \beta_1 lnLDI_{i,t-n} + \sum_{n-1}^{p} \beta_2 Growth_{i,t-n} + \varepsilon_{i,t} \quad (4)$$

where $Growth_{i,t}$ is the annual percentage growth rate of real GDP per capita (Bolt et al. 2018), $lnEDI_{i,t}$ is the EDI (Coppedge et al. 2019; Pemstein et al. 2019) in the logarithmic functional form, $lnLDI_{i,t}$, is the LDI (Coppedge et al. 2019; Pemstein et al. 2019) in the logarithmic functional form and ε_t is an unobserved error term.

As already mentioned more than one time, our paper focuses on the epoch from 1821 to 2016. Due to significant economic and political changes in the 19th and 20th centuries, the Granger causality is tested for three periods: the first period (1821–2016) covers the development since the Industrial Revolution and the inception of global international trade, the second period (1871–2016) includes the Second Industrial Revolution and the first wave of democratization with the emergence of the modern nation states, and the third period (1925–2016)

covers the interwar period and the first reverse wave of de-democratization. This approach has three advantages. 1) It is possible to monitor more countries. 2) The fundamental research limitations associated with the fact that the results depend on different time periods are overcome (for details see Colagrossi et al. 2020). Also, the approach limits the possibility of biasing results due to the fact that both researched processes run at the same time (Tang 2008: 119). 3) The three different periods ensure robustness of results. Within robustness check, six periods are researched, four sub-periods bounded by major political and economic events (1821–1870; 1871–1924; 1925–1945; 1946–2016) and two periods with the number of countries from the previous period (1871–2016; 1925–2016).

This paper analyses 8 (1821–2016), 22 (1871–2016) and 38 (1925–2016) countries in three regions (Europe, Latin America and the former British colonies). The individual economies are selected based on two criteria, independence at the beginning of the reporting period and data availability. At the same time, it should be added that the other 9 states are not included because they meet only either the first (Bulgaria, Czechoslovakia, Hungary, Poland and Russia) or the second (India, Indonesia, Malaysia and Sri Lanka) criterion. The list of countries included in each period is presented in Table 1. The basic descriptive statistics considering regional differences are presented in Appendix Tables 5–7.

Table 1. List of countries in the sample

Periods	Regions	Countries	No.
1821–2016	Europe	Denmark, France, Netherlands, Sweden and United Kingdom	8
	Latin America	Chile and Peru	
	Former British colonies	United States	
1871–2016	Europe	Austria, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom	22
	Latin America	Brazil, Chile, Colombia, Peru, Uruguay and Venezuela	
	Former British colonies	Canada and the United States	
1925–2016	Europe	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Romania, Spain, Sweden, Switzerland and United Kingdom	38
	Latin America	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Peru, Panama, Uruguay and Venezuela	
	Former British colonies	Australia, Canada, New Zealand, South Africa and the United States	

4. RESULTS

4.1. Mutual relationship between political environment and economic performance

It is demonstrated for the period of 1925–2016 by two graphs (Fig. 1).[1] On the left side, the correlation between the average level of the Electoral Democracy Index and the average economic growth for 38 countries is shown. One can see a positive linkage, there is a group of European countries (e.g., Austria, Finland, Germany, Ireland, Norway and Sweden) with a high level of political environment and economic growth, and on the other hand, there are also the Latin American economies (e.g., Argentina, Bolivia, Cuba, El Salvador and Nicaragua) with low level of political environment and economic growth. On the right side, the level of political environment

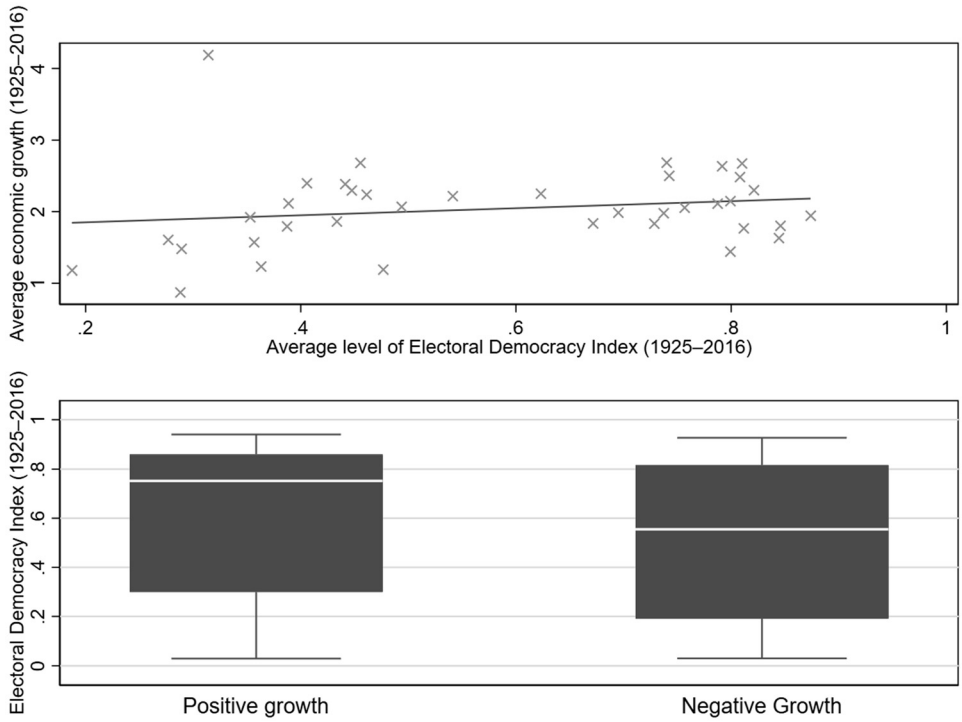

Fig. 1. Interaction between political environment and economic performance for the period of 1925–2016

Notes: Upper side – axis X (average level of the Electoral Democracy Index), axis Y (average economic growth); Lower side – axis X (positive and negative growth of GDP per capita), axis Y (the Electoral Democracy Index).

Source: Bolt et al. (2018); Coppedge et al. (2019).

[1]This period was chosen for the graphical presentation of the researched relationship because it includes the largest number of surveyed countries (38). The graphical outputs for the remaining two periods would be very similar.

is presented depending on the period of positive and negative growth of GDP per capita. One can see the level of political environment is higher during the times of positive economic growth.

4.2. Results of the Granger causality

Table 2 is divided into three parts by the researched period, specifically, 1821–2016, 1871–2016, and 1925–2016. The results of the Levin-Lin-Chu test (Table 8 in Appendix) indicate that panel data for both analysed proxies are stationary with one exception, proxy lnEDI within former British colonies. For this reason, the variable is expressed as a percentage change in the case of former British colonies. The results of the Breusch-Pagan LM test (Table 9 in Appendix) suggest that there is cross-sectional dependence in panel data, which implies that the bootstrapping methodology proposed by Emirmahmutoglu – Kose (2011) should be used to obtain the appropriate critical values (Dumitrescu – Hurlin 2012: 1458). In accordance with the Stata default command setting, 1,000 bootstrap replications are executed. Table 2 shows Z-bar statistics instead of Z-bar tilde statistics since T is higher than N (Lopez – Weber 2017). In the case of former British colonies for the period of 1821–2016, the Granger causality test based on the VAR model is employed because there is only one country (the United States), which means the time-series are analysed.

The results for the periods of 1821–2016 and 1871–2016 indicate that a significant bi-directorial causality was identified in the total sample of countries, which means that a statistically significant relation in the last two hundred years can be observed. In the case of influence of political environment on economic performance, the finding is in accordance with Yanovskiy – Shulgin (2013) and Madsen et al. (2015) in the case of reverse causality, the results confirm the conclusions of Kennedy (2010).

Simultaneously, the statistically significant relation between economic performance and political development was peculiar to the European countries, whereas within the other regions the linkage was not identified (Latin America and former British colonies). In the case of Latin America, the statistical non-existence of the researched relationship often appears in the empirical literature (e.g., Landman 1999; Heo – Tan 2001),[2] and simultaneously, simple statistics tests (e.g., OLS or *t*-test) also show that the linkage can be identified only in the case of Peru. The diversity of empirical outcomes for the European and Latin American states can be also explained by the so-called political capital (Comeau 2003; Gerring et al. 2005), which means that the importance of democracy has a cumulative impact. In other words, the linkage is greater in the European countries because they have had much longer democratic experience than the Latin American economies. But it is also important to add that the explanation cannot be used in the case of differences between the European countries and the selected former British colonies, which are long-term democracies. In this case, the statistically insignificant interaction may be due to the fact that the selected former British colonies (Canada and the United States) have experienced only one type of political arrangement (democracy or more precisely liberal democracy), therefore, the changes in political environment are minimal. Last but not least, the findings suggest that the mutual influencing is lagged from four to five years.

[2]It should be added that both cited papers focused only on the second half of the 20th century: Heo – Tan (2001) analysed the period from the 1950s–1980s, whereas Landman (1999) researched the period from the 1970s–1990s.

Table 2. Pairwise Granger-causality test for the Electoral Democracy Index and real GDP per capita growth rate

Region	1821–2016 (8 countries)			1871–2016 (22 countries)			1925–2016 (38 countries)		
	Lag	lnEDI => Growth	Growth => lnEDI	Lag	lnEDI => Growth	Growth => lnEDI	Lag	lnEDI => Growth	Growth => lnEDI
Total	5	0.00 (14.43)	0.01 (8.03)	5/4	0.00 (19.49)	0.01 (10.97)	3/2	0.00 (13.62)	0.02 (7.98)
Europe	5	0.01 (16.43)	0.01 (10.01)	5	0.00 (23.39)	0.02 (12.79)	5	0.00 (26.5)	0.00 (16.79)
Latin America	3/2	0.00 (5.11)±	0.89 (–0.14)	1/2	0.97 (0.04)	0.86 (0.18)	1/2	0.41 (0.88)	0.02 (2.79)
Former British colonies	1*	0.97 (0.01)+	0.42 (0.65)+	1*	0.12 (1.11)	0.84 (0.2)±	3*/1*	0.62 (–0.54)	0.44 (–0.75)±

Notes: The Dumitrescu-Hurlin causality test, *P*-value (Z-bar); *Growth* – annual percentage growth rate of real GDP per capita; *lnEDI* – the Electoral Democracy Index in the logarithmic functional form; Lag – number of lags; ± no "bootstrap"; * percentage growth rate of the Electoral Democracy Index in logarithmic functional form (*GrowthlnEDI*); + *P*-value (Chi2).
Source: Author's own calculations.

The results for the period of 1925–2016 are very similar to the previous ones, since the bi-directorial causality was identified both within the total sample of countries and within the European economies. On the other hand, there are two important differences. First of all, the Modernization theory can be identified within the Latin American countries. Secondly, the lag orders are very similar for the Latin American countries and former British colonies, whereas in the case of the total sample of countries and European economies there is a higher dispersion: the observed variables are mutually affected with a lag from two to five years.

4.3. Impulse response function (IRF) for the total sample of countries

First of all, the outputs for the influence of political development are introduced and, subsequently, the results for a reverse impact are shown by Fig. 2.[3] The charts are sorted by the researched periods.

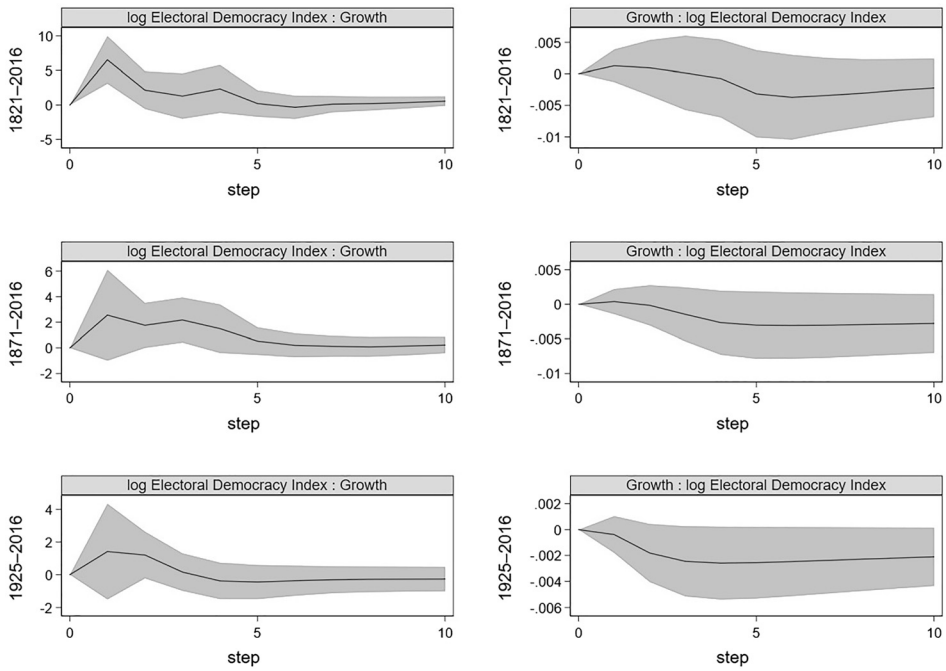

Fig. 2. Impulse Response Functions for the total sample of countries for periods 1821–2016, 1871–2016 and 1925–2016
***Notes*: Left side – Impulse (*lnEDI*) response (*Growth*); Right side – Impulse (*Growth*) response (*lnEDI*).**
***Source*: Author's own calculations.**

[3]This graphic output has only a limited informative ability, since the underlying calculations are used from the panel VAR model that assumes homogeneous panel data. On the other hand, these graphical expressions enable us to analyse how the researched variables are mutually influenced.

In the case of the influence of the changes in political environment on economic performance, one can see that the main positive impact is lagged by two or three years while the effects gradually disappear over the four or five-years horizon. Expressed numerically, the average growth in the first five years ranges from 0.4% (1925–2016) over 1.7% (1871–2016) to 2.5% (1821–2016). The lower influence in the 20th and early 21st centuries is due to the inclusion of other countries, especially the Latin American economies, in which the impact of political environment on economic performance is lower compared to the European countries. The graphic outputs suggest that political development has had a greater impact on economic performance than vice versa, thereby the finding is different from Murtin – Wacziarg (2014).

In the case of reverse causality, the effect of higher economic performance remains negative with a minimal impact, namely, the value of the Electoral Democracy Index in the logarithmic functional form would decrease on average by 0.001 in the first five years and the five-year cumulative decrease would be from 0.001 (1821–2016) over 0.006 (1871–2016) to 0.009 (1925–2016).

4.4. Relationship within the sub-periods

Each researched period is divided into two parts, so Table 3 presents the results for six periods, four sub-periods bounded by major political and economic events (1821–1870; 1871–1924; 1925–1945; 1946–2016) and two researched periods with the number of countries from the previous period (1871–2016; 1925–2016). In the case of period of 1925–1945 and the total sample of countries, the Granger causality test proceeds from panel VAR model, since there is a different panel data structure (N is higher than T). For the same reason, the Pesaran-test for cross-sectional dependence was executed instead of the Breusch-Pagan LM test for cross-sectional correlation.

Comparing the four sub-periods, one can see that the results for the period of 1821–1870 are considerably dissimilar to the other periods. For instance, there is no statistically significant bi-directorial causality and we can only identify the influence of political development on economic performance within the European countries. Statistical significance can be explained by the fact that the main political changes, particularly expansion of franchise and gradual democratization of the political regimes, occurred after 1871, which means outside the observed period (Acemoglu – Robinson 2000). In the case of the periods of 1871–1924 and 1925–1945, which means the periods from the Second Industrial Revolution to the end of the WW II, the outputs indicate that there was a mutual relationship between the level of political environment and economic performance within the total sample of countries and within the European economies. By contrast, the results for the Latin American countries are ambiguous and within the former British colonies one can only see the influence of the political environment on economic performance. Moreover, it is necessary to add that the influence was not identified both in the following period (1945–2016) and the researched periods (1871–2016 and 1925–2016). Focusing on the last observed period (1945–2016), which means since the WW II to present, one can see that the bi-directorial causality can be identified also in the Latin American countries. This finding differs from the aforementioned literature (see *footnote 2*); on the other hand, some authors detected a statistically significant effect of political development on economic performance, both positive (Feng 1995) and negative (Krieckhaus 2006). Moreover, in this period we can observe an important decrease in the lag orders, from five to one or two.

Table 3. Pairwise Granger-causality test for the Electoral Democracy Index and real GDP per capita growth rate in sub-periods

Region	Lag	lnEDI => Growth	Growth => lnEDI	Lag	lnEDI => Growth	Growth => lnEDI
8 countries (1821–2016)	*1821–1870*			*1871–2016*		
Total	2/1	0.45 (0.76)±	0.42 (0.81)	5	0.00 (15.16)	0.01 (10.18)
Europe	2*/1*	0.05 (1.96)±	0.37 (0.84)	5	0.00 (18.01)	0.01 (13.14)
Latin America	1	0.81 (–0.23)±	0.49 (–0.65)	3/2	0.00 (4.57)±	0.93 (–0.09)
Former British colonies	2	0.99 (0.05)	0.68 (0.77)	1	0.97 (0.01)	0.42 (0.65)
22 countries (1871–2016)	*1871–1924*			*1925–2016*		
Total	3*/5*	0.00 (8.51)	0.00 (12.72)	5/2	0.00 (15.38)	0.00 (6.57)
Europe	3*/5*	0.00 (9.96)	0.00 (11.97)	5/2	0.00 (19.84)	0.04 (8.01)
Latin America	1/3	0.67 (–0.42)±	0.00 (6.08)	1/2	0.37 (0.86)	0.85 (0.21)
Former British colonies	1*/2*	0.09 (1.43)	0.16 (1.37)±	1*	0.47 (–0.67)	0.53 (–0.62)±
38 countries (1925–2016)	*1925–1945*			*1946–2016*		
Total	5**	0.00 (21.73)	0.00 (6.07)	1*	0.08 (2.27)	0.00 (17.79)
Europe	5	0.00 (10.63)	0.00 (5.28)	1*/4*	0.05 (3.05)	0.01 (4.97)
Latin America	1/2	0.00 (7.97)	0.17 (10.79)	1/2	0.04 (2.58)	0.00 (5.58)
Former British colonies	5/1	0.02 (2.31)	0.85 (0.18)	1*	0.67 (–0.44)	0.22 (–1.24)±

Notes: The Dumitrescu-Hurlin causality test, *P*-value (Z-bar); *Growth* – annual percentage growth rate of real GDP per capita; *lnEDI* – the Electoral Democracy Index in the logarithmic functional form; Lag – number of lags; ± no "bootstrap"; * percentage growth rate of the Electoral Democracy Index in logarithmic functional form (*GrowthlnEDI*); ** the Granger causality test based on the panel VAR model, *P*-value (Chi2).
Source: Author's own calculations.

Table 4. Pairwise Granger-causality test for the Liberal Democracy Index and real GDP per capita growth rate

Region	Lag	lnLDI => Growth	Growth => lnLDI	Lag	lnLDI => Growth	Growth => lnLDI	Lag	lnLDI => Growth	Growth => lnLDI
8 countries (1821–2016)	*1821–2016*			*1821–1870*			*1871–2016*		
Total	5/4	0.00 (17.5)	0.00 (11.16)	2	0.88 (0.31)	0.36 (0.88)	5/4	0.00 (17.63)	0.01 (9.95)
Europe	5/4	0.00 (20.78)	0.00 (15.02)	2*/1*	0.05 (1.91) ±	0.59 (0.56)	5/4	0.00 (21.11)	0.00 (13.65)
Latin America	3/2	0.01 (4.35)	0.32 (–0.99)	1	0.97 (–0.04)	0.76 (–0.31)	3/2	0.00 (3.85)±	0.32 (–0.97)
Former British colonies	1*	0.91 (0.01)+	0.49 (0.48)+	2*	0.11 (4.45)	0.04 (6.22)	1*	0.99 (0.02)	0.86 (0.37)
22 countries (1871–2016)	*1871–2016*			*1871–1924*			*1925–2016*		
Total	5/4	0.00 (22.92)	0.02 (11.91)	2/3	0.01 (4.72)	0.00 (7.95)	5/4	0.00 (26.31)	0.02 (15.16)
Europe	5/4	0.00 (28.35)	0.00 (15.01)	4/5	0.00 (7.77)	0.00 (10.57)	5/4	0.00 (32.53)	0.02 (18.89)
Latin America	1/2	0.45 (0.75)	0.41 (–0.93)	5*/1*	0.00 (4.23)	0.00 (4.77)	1/3	0.32 (0.98)	0.59 (–0.65)
Former British colonies	1*	0.87 (–0.17)	0.92 (–0.1) ±	1*	0.11 (1.26)	0.05 (2.12)	1*	0.23 (–0.92)	0.37 (–0.89)
38 countries (1925–2016)	*1925–2016*			*1925–1945*			*1946–2016*		
Total	3/4	0.00 (15.84)	0.02 (13.42)	5**	0.00 (19.93)	0.51 (4.25)	1*	0.22 (1.35)	0.00 (12.26)
Europe	5/4	0.00 (29.89)	0.01 (17.26)	5	0.19 (8.76)	0.29 (5.98)	1*	0.04 (3.02)	0.00 (18.73)
Latin America	3*/2*	0.38 (1.02)	0.37 (1.01)	5	0.31 (5.87)	0.06 (12.41)	1*/2*	0.07 (2.08)	0.02 (4.69)
Former British colonies	3*/1*	0.09 (–1.74)	0.14 (–1.43)	5	0.88 (0.47) ±	0.52 (–0.64)±	1*	0.39 (–0.86)	0.11 (–1.44)

Notes: The Dumitrescu-Hurlin causality test, *P*-value (Z-bar); *Growth* – annual percentage growth rate of real GDP per capita; *lnLDI* – the Liberal Democracy Index in the logarithmic functional form; Lag – number of lags; ± no "bootstrap"; * percentage growth rate of the Liberal Democracy Index in logarithmic functional form (*GrowthlnLDI*); + *P*-value (Chi2).
Source: Author's own calculations.

To sum up, the results for the periods which were analysed in the previous section with a higher sample of economies (1871–2016 and 1925–2016) confirm the previous findings, so it can be argued that a bi-directorial causal link between political development and economic performance has existed within the total sample of countries and within the European economies, particularly since 1871 to the present.

4.5. Robustness check using the Liberal Democracy Index

It is an alternative indicator considering constitutional liberal principles. The results presented in Table 4 are very similar to the previous findings, which is caused *inter alia* by the fact that the correlation coefficient between the EDI and the LDI ranges from 0.95 to 0.97 across the periods. In all three periods, there may be a causal relationship between economic performance and the level of political environment, but the finding is strongly conditioned by geographical and temporal influences. Because if we compare individual regions, then we can see a statistically significant link within the European countries, while statistical insignificance is clearly predominant in the case of Latin America or the former British colonies. Taking into account the individual sub-periods, it can be observed that in the European countries it is not possible to identify a causal relationship only in the period between the First and the Second Industrial Revolution, and also, in the interwar period. On the other hand, in the case of Latin America, a bilateral causal link might exist only in the period of 1871–1924 and after the WW II. In conclusion, we should mention that the delayed impact of the variables varies between four and five years, which means that the changes in the political environment or economic performance have a very delayed impact (Tang 2008).

5. CONCLUSIONS

The main aim of the research was to verify whether there has been a causal relationship between the economic performance and the level of political environment in the last 200 years, specifically, it explored the bi-directorial causality for the period from 1821 to 2016. To achieve the aim, we used Granger causality test. The causality was tested by the Dumitrescu – Hurlin (2012) procedure due to heterogeneous panel data. The differences between the individual regions (Europe, Latin America and former British colonies) were taken into consideration. The economic performance was expressed as the annual percentage growth rate of GDP per capita (using the figures of the Maddison Project Database) while the level of political environment was associated with the Electoral Democracy Index and the Liberal Democracy Index (the V-Dem Project). Robustness check was performed by testing the mutual relationship in the sub-periods bounded by major economic and political events (the First and Second Industrial Revolutions, the WW I and the WW II) and by inclusion of the Liberal Democracy Index.

The paper had three findings. Firstly, a statistically significant relation between economic performance and political development was identified for the researched period. Secondly, the bi-directorial causality was peculiar to the European countries, whereas within the other regions the linkage was not identified (Latin America and former British colonies). Thirdly, the results for the sub-periods confirmed the previous conclusions with two additions; the level of political environment and economic performance did not interact with each other in the

period of 1821–1870 across all three regions, while in the period after WW II, the bi-directorial causal relationship could exist also in the Latin American economies. Summarizing, we conclude that the interconnection is mainly conditioned by geographical differences, while different periods are much less important than the literature assumes (Krieckhaus 2004; Colagrossi et al. 2020).

The presented results include three limitations. Firstly, the paper focuses on the last 200 years, which means that the African and Asian states are not included, so the analysis was conducted only for the European and Latin American countries supplemented by a few selected former British colonies. Moreover, the geographical differences significantly influence the statistical significance of the researched relationship, which is also confirmed by our results. Secondly, the paper prefers the analysis of long time series, therefore, economic performance (annual percentage change of GDP per capita) was employed instead of economic growth (typically expressed as five-year average growth). Thirdly, the Granger causality test requires stationary data, therefore economic performance (annual percentage change of GDP per capita) was used instead of economic level (GDP per capita).

Finally, let us mention that future research should focus on complementing factors affecting both political development and economic growth, such as the impact of economic level, human capital, income inequality or political instability.

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APPENDIX

Table 5. Descriptive statistics (1821–2016)

	Obs.	Mean	Std. Dev.	Min	Max
Growth_Total	1,568	1.65	5.12	–33.45	65.89
Growth_Europe	980	1.59	4.74	–33.45	65.89
Growth_LatinAmerica	392	1.74	6.28	–27.97	23.39
Growth_Former BritishColonies	196	1.76	4.30	–15.11	13.59
lnEDI_Total	1,568	–0.85	0.63	–2.94	–0.05
lnEDI_Europe	980	–0.70	0.59	–2.45	–0.05
lnEDI_LatinAmerica	392	–1.31	0.61	–2.94	–0.10
lnEDI_Former BritishCololonies	196	–0.67	0.36	–1.13	–0.07
GrowthlnEDI_Former BritishColonies	195	–0.80	8.09	–34.80	57.15
lnLDI_Total	1,568	–1.01	0.73	–3.38	–0.09
lnLDI_Europe	980	–0.76	0.55	–2.81	–0.09
lnLDI_LatinAmerica	392	–1.73	0.77	–3.38	–0.17
lnLDI_Former BritishCololonies	196	–0.79	0.37	–1.29	–0.11
GrowthlnLDI_Former BritishColonies	195	–0.78	6.20	–25.22	46.55

Notes: *Growth* (percentage growth rate of real GDP per capita); *lnEDI* (the Electoral Democracy Index in logarithmic functional form); *GrowthlnEDI* (percentage growth rate of the Electoral Democracy Index in logarithmic functional form); *lnLDI* (the Liberal Democracy Index in logarithmic functional form); *GrowthlnLDI* (percentage growth rate of the Liberal Democracy Index in logarithmic functional form).
Source: Author's own calculations.

Table 6. Descriptive statistics (1871–2016)

	Obs.	Mean	Std. Dev.	Min	Max
Growth_Total	3,212	1.86	5.82	–58.47	68.57
Growth_Europe	2,044	1.91	5.84	–58.47	68.57
Growth_LatinAmerica	876	1.68	6.08	–27.97	25.02
Growth_Former BritishColonies	292	1.97	4.79	–16.78	16.24
lnEDI_Total	3,212	–0.85	0.76	–3.63	–0.06
lnEDI_Europe	2,044	–0.73	0.71	–3.16	–0.06
lnEDI_LatinAmerica	876	–1.25	0.81	–3.63	–0.07
lnEDI_Former BritishCololonies	292	–0.48	0.31	–1.12	–0.07

(continued)

Table 6. Continued

	Obs.	Mean	Std. Dev.	Min	Max
GrowthlnEDI_Former BritishColonies	290	–1.18	6.38	–36.99	27.52
lnLDI_Total	3,210	–1.04	0.86	–4.51	–0.09
lnLDI_Europe	2,042	–0.87	0.80	–4.51	–0.09
lnLDI_LatinAmerica	876	–1.59	0.88	–3.61	–0.13
lnLDI_Former BritishCololonies	292	–0.61	0.33	–1.15	–0.11
GrowthlnLDI_Former BritishColonies	290	–0.87	6.94	–26.22	46.55

Notes: *Growth* (percentage growth rate of real GDP per capita); *lnEDI* (the Electoral Democracy Index in logarithmic functional form); *GrowthlnEDI* (percentage growth rate of the Electoral Democracy Index in logarithmic functional form); *lnLDI* (the Liberal Democracy Index in logarithmic functional form); *GrowthlnLDI* (percentage growth rate of the Liberal Democracy Index in logarithmic functional form).
Source: Author's own calculations.

Table 7. Descriptive statistics (1925–2016)

	Obs.	Mean	Std. Dev.	Min	Max
Growth_Total	3,496	2.04	6.15	–58.47	173.54
Growth_Europe	1,564	2.36	7.17	–58.47	173.54
Growth_LatinAmerica	1,472	1.76	5.47	–34.47	34.67
Growth_Former BritishColonies	460	1.83	3.96	–16.78	17.74
lnEDI_Total	3,496	–0.78	0.79	–3.52	–0.06
lnEDI_Europe	1,564	–0.54	0.75	–3.16	–0.06
lnEDI_LatinAmerica	1,472	–1.14	0.77	–3.52	–0.07
lnEDI_Former BritishCololonies	460	–0.42	0.46	–1.65	–0.07
GrowthlnEDI_Former BritishColonies	460	0.52	5.16	–11.81	92.95
lnLDI_Total	3,496	–1.08	1.03	–4.51	–0.09
lnLDI_Europe	1,564	–0.73	0.93	–4.51	–0.09
lnLDI_LatinAmerica	1,472	–1.60	0.99	–3.61	–0.13
GrowthlnLDI_LatinAmerica	1,456	0.07	17.36	–90.94	256.57
lnLDI_Former BritishCololonies	460	–0.60	0.66	–2.38	–0.11
GrowthlnLDI_Former BritishColonies	455	–0.70	7.76	–53.64	46.55

Notes: *Growth* (percentage growth rate of real GDP per capita); *lnEDI* (the Electoral Democracy Index in logarithmic functional form); *GrowthlnEDI* (percentage growth rate of the Electoral Democracy Index in logarithmic functional form); *lnLDI* (the Liberal Democracy Index in logarithmic functional form); *GrowthlnLDI* (percentage growth rate of the Liberal Democracy Index in logarithmic functional form).
Source: Author's own calculations.

Table 8. Panel unit root test results (1821–2016; 1871–2016; 1925–2016)

	Growth	lnEDI	GrowthlnEDI	lnLDI	GrowthlnLDI
1821–2016					
Total	0.00 (–29.46)	0.00 (–3.5)	–	0.00 (–3.41)	–
Europe	0.00 (–24.83)	0.00 (–2.44)	–	0.00 (–2.64)	–
Latin America	0.00 (–12.9)	0.02 (–2.17)	–	0.01 (–2.21)	–
Former British colonies	0.00 (–12.16)±	0.49 (–2.18)±	0.00 (–11.63)±	0.00 (–11.63)	–
1871–2016					
Total	0.00 (–36.2)	0.00 (–3.73)	–	0.01 (–2.48)	–
Europe	0.00 (–31.02)	0.00 (–3.35)	–	0.04 (–1.79)	–
Latin America	0.00 (–16.36)	0.05 (–1.64)	–	0.07 (–1.44)	–
Former British colonies	0.00 (–9.66)	0.34 (–0.42)	0.00 (–10.33)	0.13 (–1.12)	0.00 (–12.23)
1925–2016					
Total	0.00 (–29.23)	0.00 (–3.9)	–	0.00 (–2.42)	–
Europe	0.00 (–20.15)	0.00 (–3.87)	–	0.03 (–1.97)	–
Latin America	0.00 (–17.98)	0.02 (–1.98)	–	0.09 (–1.33)	0.00 (–19.6)
Former British colonies	0.00 (–11.25)	0.44 (–0.15)	0.00 (–12.87)	0.22 (–0.77)	0.00 (–14.13)

Notes: The Levin-Lin-Chu test, *P*-value (*t*-test); ± the Dickey-Fuller test, *P*-value (*t*-test); *Growth* (percentage growth rate of real GDP per capita); *lnEDI* (the Electoral Democracy Index in logarithmic functional form); *GrowthlnEDI* (percentage growth rate of the Electoral Democracy Index in logarithmic functional form); *lnLDI* (the Liberal Democracy Index in logarithmic functional form); *GrowthlnLDI* (percentage growth rate of the Liberal Democracy Index in logarithmic functional form).
Source: Author's own calculations.

Table 9. Cross-sectional dependence test results (1821–2016; 1871–2016; 1925–2016)

	lnEDI => Growth	Growth => lnEDI	lnLDI => Growth	Growth => lnLDI
1821–2016				
Total	0.00 (317.6)	0.00 (2,279.9)	0.00 (317.9)	0.00 (2,262.9)
Europe	0.00 (233.9)	0.00 (1,299.3)	0.00 (231.4)	0.00 (1,315.2)
Latin America	0.11 (2.7)	0.00 (20.9)	0.08 (2.9)	0.00 (28.4)
Former British colonies	–	–	–	–

	lnEDI => Growth	Growth => lnEDI	GrowthlnEDI => Growth	Growth => GrowthlnEDI	lnLDI => Growth	Growth => lnLDI	GrowthlnLDI => Growth	Growth => GrowthlnLDI
1871–2016								
Total	0.00 (1,765.0)	0.00 (11,354.2)	–	–	0.00 (1,783.8)	0.00 (10,623.9)	–	–
Europe	0.00 (1,206.9)	0.00 (5,381.2)	–	–	0.00 (1,223.9)	0.00 (5,190.9)	–	–
Latin America	0.00 (91.4)	0.00 (488.7)	–	–	0.00 (91.2)	0.00 (456.3)	–	–
Former British colonies	–	–	0.00 (50.2)	0.98 (0.01)	–	–	0.00 (51.5)	0.85 (0.03)
1925–2016								
Total	0.00 (3,876.1)	0.00 (23,367.5)	–	–	0.00 (3,872.2)	0.00 (23,147.5)	–	–
Europe	0.00 (1,607.4)	0.00 (5,588.4)	–	–	0.00 (1,619.2)	0.00 (5,602.6)	–	–
Latin America	0.00 (558.2)	0.0 (3,690.2)	–	–	–	–	0.00 (570.9)	0.00 (229.2)
Former British colonies	–	–	0.00 (178.9)	0.33 (11.3)	–	–	0.00 (179.4)	0.02 (20.9)

Notes: The Breusch-Pagan LM test for cross-sectional correlation, *P*-value (Chi2); *Growth* (percentage growth rate of real GDP per capita); *lnEDI* (the Electoral Democracy Index in logarithmic functional form); *GrowthlnEDI* (percentage growth rate of the Electoral Democracy Index in logarithmic functional form); *lnLDI* (the Liberal Democracy Index in logarithmic functional form); *GrowthlnLDI* (percentage growth rate of the Liberal Democracy Index in logarithmic functional form).

Source: Author's own calculations.