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Long-term relationship between competitiveness and government economic affairs in V4

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The competitiveness of a country depends on internal and external conditions. This paper aims to analyze the relationship between competitiveness and government expenditure in the long run by highlighting the theoretical background. We focus on the government's economic affairs, labor productivity and the global competitiveness index. The reference group was made up of Visegrád Group Countries in the period 2002–2016. We examined panel data with co-integration model. The results verify a long-run relationship between competitiveness measured by unit labor cost and economic affairs.

Keywords: economic affairs, panel ARDL, panel co-integration, V4

1. Introduction

In 2000, the Lisbon Strategy of the European Union set as an aim that the EU would become "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion" (EC 2000) by 2010. In 2005, the European Commission and the European Parliament admitted that these declarations were unrealistic, so the Lisbon Agenda failed. Europe 2020 was the next program with similar objectives. There was a strategy for smart, sustainable and inclusive growth in the EU in the period 2010–2020. The European Commission realized that innovation is the most important factor in achieving their new aims (EC 2010). The EC revised the innovation policy of the EU and established Horizon 2020. "The goal is to ensure Europe produces world-class science and technology, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering solutions to big challenges facing our society" (EC 2014, p. 40). Innovation is an essential factor of increasing competitiveness.

The goal of the present study is to analyze the connection between macro level competitiveness and government economic affairs. Based on the theoretical background, we show the most important connections between government and competition, furthermore we present an empirical model to examine the coherence of government economic affairs and competitiveness both in the short run and in the long run. We focused on the Visegrád Group Countries (V4) in the period 2002 and 2016. We used panel ARDL model in Stata 13.

The paper is organized as follows: Chapter 2 gives the theoretical background, summarizes literature on the possible indicators of competitiveness and examines some macroeconomic connection factors in V4. Chapter 3 shows the methods of empirical examination and describes data acquisition. Chapter 4 contains the results of empirical examination and Chapter 5 constitutes the conclusions.

2. Theoretical background

In a globalizing world, competition and competitiveness and their determinants are controversial questions. Still, government is able to modify the conditions for competition. Competition promotes the decrease of production costs, facilitates more effective allocation, and stimulates companies to increase their innovation potentials and enhance customer satisfaction. As a result, productivity increases (Cincera–Galgau 2005). Interventions of the government are aimed at general legal standards, market structure influence, market protection by competition policy, stimulations of competition, and restrictions of competition (Voszka 2003).

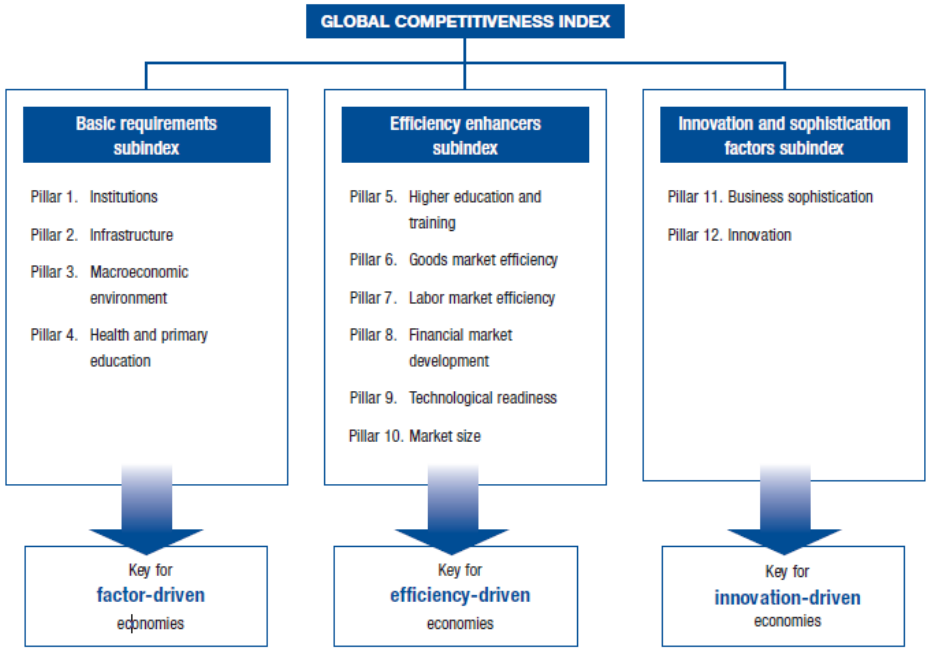
The notions of competition and competitiveness are different, however, and sometimes they might be conflicting. Micro level competitiveness means an inclination to competition and skill in jockeying for position, which can be measured by market share, profitability or other indicators of success (Lengyel 2003). "Competitiveness at the macro-economic level is defined … as a sustained rise in the standards of living" (EC 2009, p. 106)." Macro-economy is more than the sum of economic operators, because government policy-making contributes to the formation of business environment and market structure. In fact, micro and macro level competitiveness advance long-term economic growth. Meanwhile, the international level of competitiveness is a special dimension of capital attractiveness, namely a sum of circumstances constructed by countries which contribute to profitable productivity (Losoncz 2005). In fact, government is the main actor in setting macro level competitiveness. If the power of the government reduces, competitiveness can decrease (Chikán–Czakó 2009, Boros et al. 2012).

In the global market, the competitive advantages of companies derive from their ability to innovate, generate and transfer knowledge (Lengyel 2003) so we analyse these factors in an examination of macro level competitiveness. International organizations have created certain special measures of competitiveness on the national level, for example, the International Institute for Management Development (IMD) publish World Competitiveness Yearbook[14] and the World Economic Forum (WEF) issues its Growth Competitiveness Report.

The WEF published the first international summary of macro level competitiveness in 1979. After that, numerous studies have focused on comparing different countries by competitiveness (Szentes 2012). The WEF uses the Global Competitiveness Index (GCI) to measure macro level competitiveness. As we used this index in our empirical examination, we present a brief description of its framework. The WEF defines competitiveness "as the set of institutions, policies, and factors that determine the level of productivity of an economy, which in turn sets the level of prosperity that the country can achieve" (WEF 2016, p. 4). Nowadays, they use 114 indicators in 12 pillars and 3 sub-indices (Figure 1).

[14] See IMD (2016) for more details.

Figure 1 The framework of the Global Competitiveness Index



Source: WEF (2016, p. 5)

These 12 WEF pillars are: institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labor market efficiency, financial market development, technological readiness, market size, business sophistication and innovation. These pillars summarize 3 sub-indices with different weightings. Countries are classified on the basis of GDP per capita in US dollar (Table 1).

'In the first stage, the economy is factor-driven, and countries compete based on their factor endowments—primarily unskilled labor and natural resources. Maintaining competitiveness at this stage of development hinges primarily on well-functioning public and private institutions (1st pillar), a well-developed infrastructure (2nd pillar), a stable macroeconomic environment (3rd pillar), and a healthy workforce that has received at least a basic education (4th pillar). As a country becomes more competitive, productivity will increase, and wages will rise with advancing development. Countries will then move into the efficiency-driven stage of development, when they must begin to develop more efficient production processes and increase product quality because wages have risen, and they cannot increase prices. At this point, competitiveness is increasingly driven by higher education and training (5th pillar), efficient goods markets (6th pillar), well-functioning labor markets (7th pillar), developed financial markets (8th pillar), the ability to harness the benefits of existing technologies (9th pillar), and a large domestic or foreign market (10th pillar). Finally, as countries move into the innovation-driven stage, wages will have risen by so much that they are able to sustain those higher wages and the associated standard of living only if their businesses are able to compete using the

most sophisticated production processes (11th pillar) and by innovating new ones (12th pillar)' (WEF 2017, p. 319).'

Table 1 Subindex weights and income thresholds for stages of development

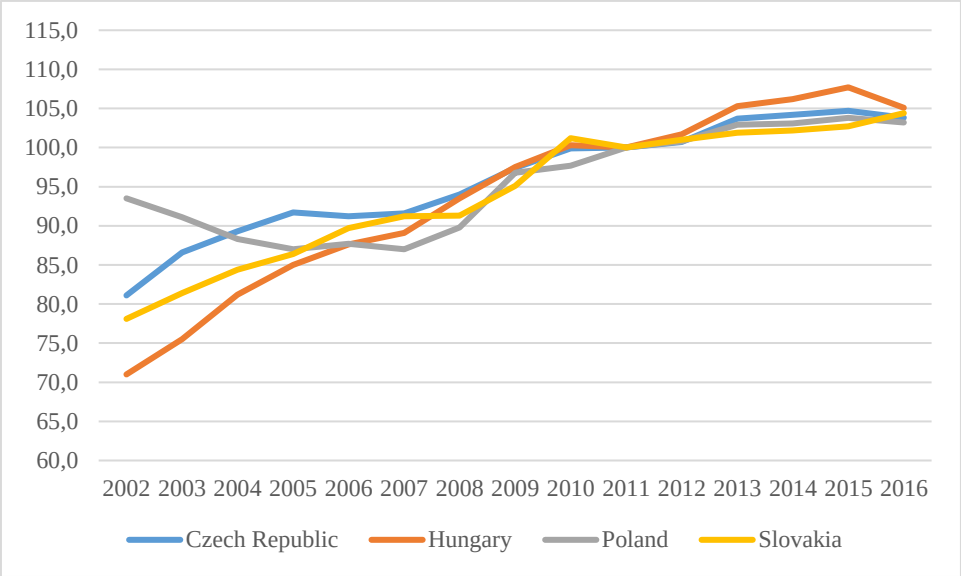
	Stage of development				
	Stage 1: Factor-driven	Transition from stage 1 to stage 2	Stage 2: Efficiency-driven	Transition from stage 2 to stage 3	Stage 3: Innovation-driven
GDP per capita (US dollar) thresholds	<2,000	2,000-2,999	3,000-8,999	9,000-17,000	>17,000
Weight for basic requirements	60	40 - 60	40	20 – 40	20
Weight for efficiency enhancers	35	35 - 50	50	50	50
Weight for innovation and sophistication factor	5	5 - 10	10	10 - 30	30

Note: The Czech Republic is an innovation-driven country, the other V4 countries stay between the 2nd and 3rd stage, therefore the weights of sub-indices are different. Poland 31.7; 50; 18.3; Hungary 30.6; 50; 18.3; Slovakia 21.3; 50, 28.7
Source: WEF (2017, p. 320)

The increased productivity promotes welfare due to economic growth. Competition encourages companies to improve their performance. If the performance improves, the productivity increases (Voszka 2011). Companies enhance their innovation activity, make the organization more cost-effective, and reduce their production costs by competition (Cincera–Galgau 2005). The productivity level could indicate the position of the different countries in international competition. Productivity can be measured by gross value added per worked hour, total factor productivity or GDP per employers (Losoncz 2015). In addition to productivity, the national competitiveness can be evaluated by market share, and costs. Furthermore, job creation, exports, FDI, low wages, stable unit labor cost, a balanced budget or exchange rate are specific local conditions which indicate and support competitiveness (Delgado et al. 2012).

The index of nominal unit labor cost based on person in V4 countries increased before the financial crisis (Figure 2). The dynamic increase was stopped by the financial crisis and after 2009, the data shows a slower increase in V4 countries.

Figure 2 Nominal unit labor cost based on person, index (2002–2016)



Source: Own construction based on EUROSTAT (2018)

The roles of a state are very different and various. One of them is the macroeconomic policy which can modify the fluctuation of a market economy in the short and long-run and can contribute to the prevention of crises. In addition, the extended functions of a state are maintenance of market imperfection and externalities and subservience of sustainable development (Chikán–Czakó 2009). In the long-run the sources of national competitiveness are expenditures on R&D activities, healthcare, education. The effects of expenditure on healthcare and education are visible after decades, but we have data only for the period 2002-2016 so we could not examine the effects on healthcare and education. We use the government's expenditure on economic affairs in the measurement of COFOG[15].

We demonstrate groups of 'economic affairs' (EUROSTAT 2011, p. 155):

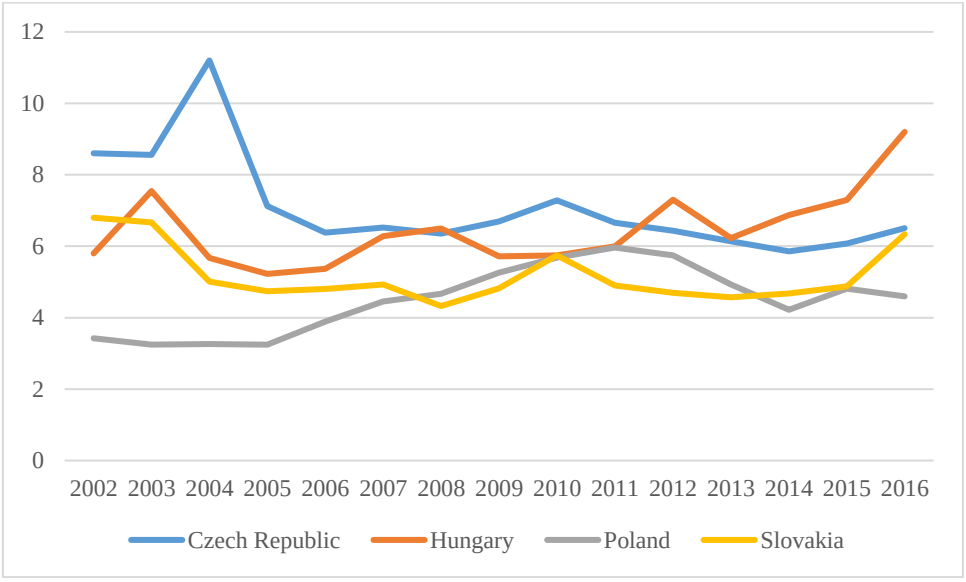
- general economic, commercial and labor affairs,
- agriculture, forestry, fishing and hunting,
- fuel and energy,
- mining, manufacturing and construction,
- transport,
- communication,
- other industries,
- R&D economic affairs,
- economic affairs n.e.c.

The government spending on economic affairs in national currency (nominal value) have increased year-by-year in V4. The time series of economic affairs per GDP shows volatility in the period 2002-2016 (Figure 3). Before the V4 countries joined the EU, the EU had provided pre-accession support for these countries which

[15] See EUROSTAT (2011) for more details.

led to an increase in their economic affairs. After accession to the EU the economic affairs levelled off in each country (except for Poland where it was increasing until 2011). The global financial crisis resulted in a decrease in GDP, therefore the values of this indicator decrease after the crisis.

Figure 3 Economic Affairs, 2002–2016 (% of GDP)



Source: Own construction based on EUROSTAT (2018)

Most of the empirical examinations of competitiveness focus on the micro level, because companies are sources of regional and national competitiveness. In the regional competitiveness aspect, the counties of V4 were categorized in four groups by Lengyel (2017). The first group was ‘strong competitiveness counties’, of which there were eleven Czech counties, and three Polish metropolitan regions. The second group was ‘rising competitive counties’ include five Czech, four Slovakian, five Hungarian and ten Polish counties. The third group was the ‘weak competitive counties’, of which there were two Slovakian, nine Hungarian and twenty Polish counties. The last group was the ‘uncompetitive rural counties’ and included four Hungarian and twenty Polish counties. Comparing the county competitiveness in V4 with the GCI rank of countries, we find that the Czech Republic is the most competitive country out of V4, followed by Poland, Hungary and Slovakia. As mentioned in the introduction, we have focused on macro level competitiveness, and analyzed the long-term relationship between national competitiveness and economic affairs. Table 2 shows the empirical literature review about national competitiveness which analyzed the relationship with other macroeconomic indicators.

Table 2 Selected papers about national competitiveness

Article	Sample	Time horizon	Indicators	Model
Bujanca and Ulman (2015)	40 countries over the world	2012	GCI and Economic Freedom	cross-sectional analysis, robust errors estimation
Ciocanel and Pavelescu (2015)	29 European countries	2008-2013	World Competitiveness Scoreboard and Innovation Union Scoreboard	Pooled-OLS
Clancy et al. (2016)	Ireland, Slovenia, US	1980-2010	Effective terms of trade and government expenditure,	DSGE model
Delgado et al. (2012)	130 countries	2001-2010	Output per potential worker and 120 indicators	Novel methodology for estimating
Despotovic et al. (2013)	European Union	2012	GCI and Global Innovation Index	Linear regression and correlation analysis
Makin and Ratnasiri (2015)	Australia	1998-2013	Non-tradables to tradables index, private spending and government expenditure	Co-integration with structural breaks
Rozmahel et al. (2014)	EU and CEE countries	2000-2012	Real labour productivity, nominal unit labour cost, real effective exchange rate	Cluster analysis

Source: Own construction

Based on the fact that the GCI is a familiar indicator of national competitiveness in most of the articles, the first theoretical model is

$$GCI_{it} = \alpha + \beta EA_{it} + \varepsilon_{it} \qquad (1)$$

where GCI_{it} is the GCI ranking of countries, EA_{it} is the economic affairs of countries and ε_{it} is the error term.

Based on Rozmahel et al. (2014) the second theoretical model with control variables is

$$Unit\_cost_{it} = \alpha + \beta_1 EA_{it} + \beta_2 Patent_{it} + \beta_3 RDE_{it} + \varepsilon_{it} \qquad (2)$$

where $Unit\_cost_{it}$ is the index of nominal unit labour cost based on person, EA_{it} is the economic affairs of countries, $Patent_{it}$ is the number of patents (resident and non-resident), RDE_{it} is the number of researchers and ε_{it} is error term.

3. Data and Methodology

The EU measure government spending with COFOG (Classification of Functions of Government), which categorizes government expenditures by functions. We used this database and chose the Economic Affairs (F04) group to analyze government

spending. The sub-items of F04 are general economic, commercial and labor affairs; agriculture, forestry; fishing and hunting; fuel and energy; mining, manufacturing and construction; transport; communication; other industries, R&D related to economic affairs; economic affairs n.e.c. The R&D and other major source of macro level competitiveness are measured by F04, and therefore we focused on this division of COFOG. If we had a time series spanning several decades, then we could also examine government expenditure on education (F09) and healthcare (F07).

For the measurement of macro-level competitiveness, we can use several indicators (see in Table 2). We chose two of them, Global Competitiveness Index (GCI) and nominal unit labor cost. We introduced these indicators in the theoretical background. The GCI is a composite indicator with qualitative factors, and the nominal unit labor cost is a simply quantitative indicator, and hence we found differences between measurements of national competitiveness.

As control variables we use patent applications, which summarize resistant and non-resistant patents in the countries. If the number of patents increases, then the country become more competitive. 'Patent applications are worldwide patent applications filed through the Patent Cooperation Treaty procedure or with a national patent office' (World Bank 2018).' 'R&D personnel include all persons employed directly on R&D, as well as those providing direct services such as R&D managers, administrators, and clerical staff. Those providing an indirect service, such as canteen and security staff, should be excluded' (OECD 2002, p. 92). 'Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned.' (OECD 2002, p. 93). In the examination we used the following variables (Table 3).

Table 3 Variables and their sources

Variable long name	**Variable short name**	**Unit**	**Source**
Global Competitiveness Index	GCI	Rank	WEF
Nominal unit labor cost based on person	Unit Cost	Index (2010=100%)	Eurostat
Economic Affairs	EA	percent of GDP	Eurostat
Patent applications	Patent	number of resistant and non-resistant	World Bank
Total R&D personnel and researchers	RDE	number	Eurostat

Source: Own construction

Estimates with panel data are more effective than estimates with short time series thanks to a higher number of observations. In the time series data, the power of unit root tests and co-integration tests is weaker than that in the panel data (Shiller–Perron 1985, Otero–Smith 2000). Therefore, if we use panel data to test our theoretical models, the results of estimations will be more exact.

The evidence of long-run equilibrium relationship between competitiveness and economic affairs is demonstrated with co-integration examinations. The definition

of co-integration derives from Granger (1981) and Engle and Granger (1987). Based on this definition we can use co-integration models if two non-stationary processes are co-integrated, to be specific, there is a long-run equilibrium relationship between two non-stationary processes if they have a linear combination which is stationary.

As the unit root tests are sensitive, we used two tests to check robustness of the results: Fisher-ADF (augmented Dickey–Fuller) and Fisher-PP (Phillips–Perron). Fisher tests combine information based on individual unit root tests. They do not require a balanced panel and can use different lag lengths in the individual ADF regressions and can be applied to any other unit root tests. The disadvantage of Fisher tests is that the *p*-values have to be derived by Monte Carlo simulations (Baltagi 2008).

The autoregressive distributed lag bounds testing approach of co-integration (ARDL) has remarkable advantages, therefore it is a more popular method of panel estimations. Firstly, the ARDL procedure can be applied if the regressors are I(1) and/or I(0) and it allows different optimal lags of variables. Secondly, the results of the ARDL procedure are more statistically significant in case of small samples. Thirdly, a single reduced form equation is employed by the ARDL procedure, while the long-run relationships are estimated within a context of system equations by the conventional co-integration procedures (Ozturk–Acaravci 2010).

We use panel co-integration models to examine the long-run relationships between variables. The most popular panel co-integration models are PMG (pooled mean-group estimation) by Pesaran et al. (1999), MG (mean-group estimation) and DFE (dynamic fixed-effects estimation) by Pesaran and Smith (1995). The key difference between these models is whether they allow certain estimated parameters to vary in the cross-sectional units (Szabó 2017). The slopes are fixed and the intercepts are allowed to vary across countries with DFE. If both the slope and intercepts are allowed to vary across countries the MG estimator seems to be more consistent, while the PMG estimator is consistent under the assumption of long-run slope homogeneity. The long-run parameters are provided by the MG estimator for the panel from an average of the long-run parameters from ARDL models for individual countries (Lee–Wang 2015).

Assume an ARDL (p, q1, …qk) dynamic panel specification equation (Blackburne–Frank 2007, p. 198):

$$y_{it} = \sum_{j=1}^{p} \lambda_{ij} y_{i,t-1} + \sum_{j=0}^{q} \delta'_{ij} X_{i,t-j} + \mu_i + \varepsilon_{it} \qquad (3)$$

where the number of groups i=1,2,…, N; the number of periods t = 1,2,…,T; $\mathbf{X}_{it}$ is a $k \times 1$ vector of explanatory variables; δ_{it} are the $k \times 1$ coefficient vectors, λ_{it} are scalars; and μ_i is the group-specific effect. T must be large enough so that the model can be fitted for each group separately. Time trends and other fixed regressors may be included.

Hausman's (1978) specification test is commonly used to define efficiency and the fitting of panel co-integration models. An estimator $\hat{\theta}_1$ which is known to be consistent, is compared with an estimator $\hat{\theta}_2$ which is efficient under the assumption

being tested. The null hypothesis is that the estimator $\hat{\theta}_2$ is indeed an efficient (and consistent) estimator of the true parameters. Assuming this, there should be no systematic difference between the two estimators. If there is a systematic difference in the estimates, it is reasonable to doubt the assumptions on which the efficient estimator is based (StataCorp 2013).

The Hausman statistic is distributed as χ^2 and is computed as

$$H = (\beta_c - \beta_e)'(V_c - V_e)^{-1}(\beta_c - \beta_e) \quad (4)$$

where β_c is the coefficient vector from the consistent estimator, β_e is the coefficient vector from the efficient estimator, V_c is the covariance matrix of the consistent estimator and V_e is the covariance matrix of the efficient estimator (StataCorp 2013). See Baum et al. (2003) for more details.

All variables are transformed into natural logarithms to reduce heteroscedasticity. The annual panel data for Czech Republic, Hungary, Poland and Slovakia are obtained from the GCI database by WEF (2018) and EUROSTAT (2018) for the 2002-2016 period.

Assuming a long-run relationship between variables, the ARDL dynamic panel specification of the first theoretical panel model is

$$GCI_{it} = \delta_{10i} EA_{it} + \delta_{11i} EA_{i,t-1} + \lambda_i GCI_{i,t-1} \mu_i + \varepsilon_{it} \quad (5)$$

The error correction reparametrization of the previous equation is

$$\Delta GCI_{it} = \phi_i (GCI_{i,t-1} - \theta_{0i} - \theta_{1i} EA_{it}) + \delta_{11i} \Delta EA_{it} + \varepsilon_{it} \quad (6)$$

where ϕ_i is error-correction speed of the adjustment parameter and θ_{1i} is the long-run coefficient, θ_{0i} is non-zero mean of the co-integrating relationship and $\phi_i = -(1-\lambda_i), \theta_{0i} = \frac{\mu_i}{1-\lambda_i}, \theta_{1i} = \frac{\delta_{10i}+\delta_{11i}}{1-\lambda_i}$. If the variables exhibit a return to long-run equilibrium, ϕ_i is negative. The economic affairs effect θ_{1i} is negative according to theoretical assumptions, which means that if the government spends more on economic affairs, the GCI rank will be better.

4. Empirical Results

The summary of statistical results of the unit root test in real terms of GCI, economic affairs and unit labor cost are presented in this section. Fisher-ADF tests were conducted at level and at first difference. The Fisher-PP tests are more robust for measuring autocorrelation and heteroscedasticity, therefore we checked data with these tests. The Fisher-PP tests confirmed the results of Fisher-ADF (Table 4).

Table 4 Results of Fisher-ADF test

Variable	Level – I(0) t-statistics	1st Difference I(1) t-statistics
GCI	15.4639 (0.0507)*	
EA	5.9674 (0.6509)	57.5308 (0.0000)***
Unit_cost	10.8824 (0.2085)	32.0904 (0.0001)***
Patent	13.2143 (0.1047)	20.6266 (0.0082)***
RDE	1.2654 (0.9960)	27.2242 (0.0006)***
lnGCI	7.3895 (0.4952)	52.5748 (0.0000)***
lnEA	9.7538 (0.2827)	
lnUnit_cost	19.1983 (0.0138)	14.2305*
lnPatent	11.6322 (0.1684)	38.1121 (0.0000)***
lnRDE	0.8189 (0.9992)	27.2562 (0.0006)***

Note: p-values is parentheses, * Significant at 10% level; **Significant at 5% level, *** Significant at 1% level

Source: Own construction

We use the panel co-integration model because the assumptions of use were confirmed. Based on the unit root test the maximum order of integration can be concluded to be I(1). We used three different estimators in ARDL panel model PMG, MG and DFE. The error correction term was significant by MG and DFE estimators. The MG estimator was shown the most effective by the Hausman test (p-value is 0.8559). Table 5 presents the results of the MG estimation. In the long-term section the coefficient of economic affairs was not significant (p-value is 0.653) therefore the long-run relationship between competitiveness and economic affairs was rejected.

Table 5 Results of long-run and short run ARDL Approach (first model)

	Coefficient	***Std. Error***	***p-value***
Long-run ECT			
EA_L1	0.6584	3.1525	0.835
Short-run			
ECT	–0.4143	0.1736	0.017
EA_D1	–0.3452	0.6551	0.598
_cons	19.5997	12.0419	0.104

Note: dependent variable: GCI rank

Source: Own construction

We examined country level data by the extended model of MG estimation (Table 6). The results of the estimation rejected relationship between competitiveness

and economic affairs in the long-run for the whole panel data, except for Czech Republic and Poland where the results verify the assumptions of the theoretical background in the short run. The coefficient of EA is negative and significant (p-value 0.042 and 0.026). However, the long-run relationship between competitiveness and economic affairs was rejected for all countries, this means that the heterogeneity of countries causes different results and the panel model could not handle this problem.

Table 6 Results of long-run and short run ARDL Approach (extended version of first model)

	Coefficient	***Std. Error***	***p-value***
Czech Republic			
Long-run ECT			
EA_L1	1.6194	1.9068	0.396
Short-run			
ECT	–0.5419	0.2668	0.042
EA_D1	–0.1883	0.9580	0.844
_cons	13.1322	11.1786	0.240
Hungary			
Long-run ECT			
EA_L1	–4.2676	2.3631	0.071
Short-run			
ECT	–0.8468	0.3806	0.026
EA_D1	1.3076	4.5436	0.774
_cons	54.9144	20.1559	0.009
Poland			
Long-run ECT			
EA_L1	9.2065	9.1103	0.312
Short-run			
ECT	–0.1635	0.1243	0.189
EA_D1	–1.8647	1.5018	
_cons	0.9911	9.5672	0.917
Slovakia			
Long-run ECT			
EA_L1	–3.9249	28.7152	0.891
Short-run			
ECT	–0.1051	0.1238	0.396
EA_D1	–0.6353	2.8840	0.826
_cons	9.3608	17.4732	0.592

Note: dependent variable: GCI rank
Source: Own construction

The second theoretical model estimation confirmed the long-run relationship between competitiveness measured by unit labor cost and economic affairs. In this case the most effective estimator was DFE based on the Hausman test. In the section of short-run error correction model (ECT in the tables) the coefficient must be negative and significant, in order to verify a stable long-run relationship. Table 7 shows the results of estimation.

Table 7 Results of long-run and short run ARDL Approach (second model)

	Coefficient	***Std. Error***	***p-value***
Long-run ECT			
EA_L1	3.6415	1.3435	0.007
Patent_L1	–0.0026	0.0009	0.004
RDE_L1	0.0003	0.0001	0.019
Short-run			
ECT	–0.2107	0.0475	0.000
EA_D1	0.2144	0.2728	0.432
Patent_D1	–0.0004	0.0003	0.907
RDE_D1	–0.0001	0.0001	0.544
_cons	15.5585	4.1228	0.000

Note: dependent variable: nominal unit labor cost
Source: Own computation

The positive and significant coefficient of economic affairs might show that the governments support technology and knowledge-intensive sectors. Wages are high in these sectors therefore the nominal unit labor costs were increasing in the period under examination thanks to economic affairs. These ideas are strengthened by the Patent and RDE variable.

5. Conclusion

In the globalization framework, competition and competitiveness are general topics of theoretical and empirical studies. According to the Lisbon Strategy, the aim of EU was to become 'the most competitive and dynamic knowledge-based economy in the world'. The global competitiveness index is one of the most commonly used indicators of national competitiveness. The different levels of competitiveness (micro, macro and international) are linked to each other. Governments influence the national markets and competitiveness in the markets by regulation and support systems. This paper focused on analyzing the relationship between national competitiveness and government's economic expenditures. More specifically, in the first model we focused on the global competitiveness index and economic affairs in V4 countries. In the second model we measured the competitiveness with unit labor cost.

In the study we used panel data because we had a short time period (2002-2016). We had stationary and first difference data, so we used ARDL model. We analyzed panel data by three different estimators PMG, MG and DFE and chose the most effective model using the Hausman test. The MG approach was the most effective when we defined competitiveness with GCI rank. The results of the first ARDL model did not prove the long-run relationship between the GCI rank and economic affairs. When we define competitiveness with index of nominal unit labor cost based on person, DFE estimator was the most fitted approach based on the Hausman test. The results of estimation showed error correction in the long-term and a significant relationship between competitiveness and economic affairs in the long-term.

The results of estimations show that if we use a composite indicator which uses qualitative factors then the short run adjustment was verify. Whatever the reason for country heterogeneity, we might not find long run relationship between macro level competitiveness and economic affairs. These results strengthen the economic theory, which says that there is no practice which works for every country. Countries need different tools to development their competitiveness (in part because of different problems). If we analyze our data with purely quantitative indicators, we discover the long run relationship between macro level competitiveness and economic affairs.

We plan to extend our study with other reference groups which have longer time series then V4 countries, for example the core countries of the EU. The different reference groups may show different or similar results of estimations. We are also considering broadening the variables scale in the next study.

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