

## Correlation Between Fiscal Rules and Sustainable Development of the Visegrad Group Countries

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The research question presented in this analysis focuses on national fiscal rules applicable in the Visegrad Group (also called V4) expressed in the European standardised fiscal rules index and on their impact on the socio-economic policy. The use of fiscal rules as an instrument of fiscal sustainability is manifested by imposing requirements as regards borrowing and the costs of public debt service. A high level of debt can cause social development expenditure to be crowded out, contributing to growing development disparities in social and economic terms.

**Keywords:** fiscal rules, sustainable development, public finance discipline, Visegrad Group.

## Korelacja między regułami fiskalnymi a zrównoważonym rozwojem krajów Grupy Wyszehradzkiej

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W artykule przedstawiono wyniki prowadzonych badań w zakresie wpływu stosowanych reguł fiskalnych na stabilny rozwój na przykładzie krajów Grupy Wyszehradzkiej. Zdecydowano się dokonać badania zależności tych dwóch zmiennych, ponieważ ich wykorzystanie jako instrumentu stabilności fiskalnej objawia się nałożeniem różnego rodzaju ograniczeń związanych ze skalą wydatków, deficytu czy długu publicznego. W przeprowadzonej analizie polityka fiskalna oraz stabilny rozwój są rozpatrywane za pomocą wskaźników dotyczących stanu finansów publicznych, wyników ekonomicznych i wskaźników finansowania zrównoważonego rozwoju.

**Słowa kluczowe:** reguły fiskalne, zrównoważony rozwój, dyscyplina finansów publicznych, Grupa Wyszehradzka.

**JEL:** F4, H5, H6, G01, G18, P34, P52

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## 1. Introduction

The financial crisis that started in 2008 and the resulting economic slow-down contributed to the quest for new legal, economic, and social solutions to ensure sustained stability of the financial system and long-term economic development (Bergman & Hutchison, 2015; Bergman and, Hutchison, & Hougaard, 2016; Djalilov & Holscher, 2016).

We attempt to investigate the impact of fiscal rules on the sustainability of finance among the Visegrad Group countries (V4). We have chosen to analyse the impact of fiscal rules on the socio-economic policy in V4 because its members are neighbouring, Slavic (except Hungary), post-socialist countries where the economic transformation process was highly successful (Wyplosz, 2012, for more detail). The countries use their internal potential and the elements of competitive advantage, and strive for full integration with the EU. Thus far, only Slovakia has joined the monetary union and, consequently, the possible scenarios for the country's economic policy take account of EU-level monetary policy coordination (Juncker, with Tusk, Dijsselbloem, Draghi & Schulz, 2015; Kopits, 2016). It must be kept in mind, however, that upon joining the eurozone, all V4 countries will face a similar challenge sooner or later.

The research question presented in the paper focuses on analysing national fiscal rules applicable in respective V4 countries as expressed in the European standardised fiscal rules index and on their impact on the socio-economic policy in place while identifying any imbalances that occur. We investigate whether national fiscal rules not only influence the condition of public finance, but also contribute to socio-economic change and, if so, to what extent.

The use of fiscal rules as an instrument of fiscal sustainability is manifested by imposing requirements regarding borrowing and the costs of public debt service (Bernanke, 2010). A high level of debt can cause social development expenditure to be crowded out, contributing to growing development disparities in social and economic terms.

Fiscal rules became quite a universally used instrument to prevent an irresponsible fiscal policy, though, on the other hand, it should be also noted that the continuously increasing complexity of the fiscal rules, frequent modifications, and the growing number of exceptions do not favour running a transparent fiscal policy, especially over a long term, which is most desirable (Deutsche Bundesbank, 2015). An attempt was also made on several occasions to empirically evaluate the impact of fiscal rules on the stability of fiscal policy. Such an attempt will be also made, to a limited extent, in the empirical part of this paper. Countries with greater transparency of public finance are characterised by a greater fiscal discipline and, in many cases, also enjoy high economic growth (Kopits, 2001). The key

factor driving the effectiveness of a given fiscal rule is the electorate's political will and/or awareness of the need for fiscal tightening (Balasone & Franco, 2001). Its absence may lead to postponing, suspending, or introducing only partly the legal instruments governing the scope of fiscal policy. Fatas and Mihov (2004), based on a panel model analysis of 48 US states between the years 1963 and 2000, conclude that fiscal rules have a major impact on the government spending elasticity to the business cycle. According to the authors, such a correlation has both positive and negative effects. On the one hand, fiscal policy becomes more destabilising in the states where 'stricter' fiscal rules are in place. Yet, on the other hand, the internal and external restrictions imposed represent an effective limit to discretionary actions, thus smoothening the business cycle. The study results indicate that the latter effect of fiscal rules is stronger, which leads us to conclude that fiscal rules have a major role in limiting cycle volatility.

The purpose of the article is to assess the impact of national fiscal rules on the stability of fiscal policy. We will attempt to prove that an assessment based on the fiscal rule strength index as applied by the European Commission has no significant positive effect on public debt developments in V4 countries (public debt measured as a share of GDP). We will also answer the question of to what extent the economic growth in V4 countries measured with GDP growth depends on the value of fiscal rule index. We believe that fiscal rules are of significance to running a responsible fiscal policy but they should not be contemplated in isolation from quality of life indicators in a given country. We will try to demonstrate that focusing solely on public debt and budget deficit indicators in relation to GDP does not meet the contemporary challenges faced by the socio-economic policy. To address this topic is of special importance amid the ongoing discussions on the new economic paradigms and the role of fiscal policy in stimulating sustainable socio-economic development, especially in countries such as V4, which in terms of development are still catching up with the "old" European Union Member States.

The paper presents the results of research into the impact of the stage of implementation of fiscal rules, measured with the European fiscal rules index, on:

- (1) fiscal sustainability,
- (2) public finance stability,
- (3) sustainable development.

A mixed method combining the results of qualitative and quantitative research will be used to empirically verify the hypotheses related to the research question presented. Qualitative research is based on a descriptive analysis, and quantitative research will include statistical information systemisation based on data analysis, static dependence methodology.

## 2. Sustainable Development Versus Fiscal Sustainability and Public Finance Stability

The European Union, as part of its initiatives (European Commission, 2018), aims to implement economic solutions based on the concept of sustainable development. A document prepared and published by the High-Level Expert Group (European Commission, 2018) *'maps out the challenges and opportunities that the EU faces in developing a sustainable finance policy. It identifies ways in which the financial sector can re-connect with the real economy to support the transition to a more resource-efficient and more circular economy. The group argues that reorienting investment flows into long-term, sustainable projects will also improve the stability of the financial system'*. The document indicates the lines of action aimed to achieve a durable and sustainable development based on efforts to combine economic welfare with environmental and social sustainability. Sustainable development requires a long-term horizon and ensuring long-term funding for the critical infrastructure as well as an adequate response to long-term threats. As part of those actions, it is also concluded that the objective of sustainable development must be supported by sustainability finance. Real economic and financial activities have increasingly overstepped state borders as reflected in a sharp increase in the cross-border liabilities, and made the achievement of these financial system goals even more effective (Rutkauskas, 2015). Such real actions are due to the fact that the financial system is an element of the economic system, which consists of two principal components: public finance sector and market-based finance system (Holscher, 2017). Actions undertaken as part of the sustainability finance concept could contribute to changing the orientation of finance measures and to strengthening the efforts to generate a long-term positive impact on the socio-economic development (Chapman, 2008). Actions undertaken in this field can be exemplified by various types of investments and initiatives generating social and economic benefits. The European Commission has developed a general outline of sustainability standards, in which detailed specifications of financial products standards, the course of the process and information to recipients (labels) were made. (European Commission, 2017). A particular role and importance in this respect is ascribed to public authorities, which use public finance to achieve sustainable development.

Fiscal sustainability is defined in a rather standard way: the fiscal policy is said to be sustainable if the present value of the future primary surpluses equals the current level of debt (Krejdl, 2006). Actions pursued by public finance sector institutions with regard to maintaining fiscal sustainability and public finance stability must be considered, as a rule, from two perspectives: narrow and broad. In a narrow perspective, public finance stability is defined as measures oriented to maintaining budget stability. Their goal

is to maintain budget deficit and public debt below the threshold set by Maastricht criteria (Hagen von & Wolf, 2004). This means that a broadly defined concept of fiscal sustainability is directly related to fiscal policy and to the value and dynamics of public debt.

G. Keliuotytė-Staniulėnienė (2015) distinguishes between three approaches to identifying public finance stability:

- In the first approach, the fiscal balance relates to solvency. It is a current ability to service debts.
- As part of the second approach, sustainable fiscal policy is aimed to ensure an adequate (as required by the legal provisions) debt to GDP ratio.
- The third approach is the broadest one as it takes account of both solvency and of limiting the growth of public debt.

It should be emphasised that public finance stability relates to long-term, multi-aspect actions that are determined by a major impact of external factors, such as, for example, business cycle, monetary policy that takes account of the current and future cost of money and the exchange rate (Cecchetti & Kharroubi, 2012).

Furthermore, when considering public authorities' efforts to maintain public finance stability, attention should be paid to the need for the public sector to always fulfil its principal functions, as well as the prevention of long-term imbalance in public finance. This can be achieved by developing an effective public spending and revenue system for the public finance sector. Fiscal consolidation in case of a rapidly increasing public debt level can clearly be welcomed as a way to restore fiscal sustainability (Bohn, 1998). Also the ratio of public finance revenues and expenditures to GDP (Berti et al., 2016) shows the size of the public sector of the economy. The question arises as to whether the fiscal rules currently applied at the national and European levels enable authorities using this fiscal instrument to achieve the objectives that are inherent in the concept of sustainability development. In this context, it is important to examine whether the instruments applied as part of fiscal rules adopted at the EU and national levels not only contribute to issues related to fiscal sustainability and public finance stability, but whether they take account of elements that are required to achieve sustainability development and finance sustainability.

### **3. Fiscal Rules as an Instrument to Ensure Public Finance Discipline**

In post-communist countries fiscal rules are a tool that fits squarely into the characteristics of a transparent fiscal policy (Agénor & Yilmaz, 2011; Buiter, 2005). This is mainly due to democracy being relatively young and to the lack of well-structured institutional and collegial structures. Of key importance here is the increased predictability of the activities undertaken

within the public sector. Indirectly, the use of fiscal rules can also enforce the implementation of the necessary system reforms and activity of central banks (Dabrowski, 2016; Larch, 2016). The purposes of the rules should be established consistently with their structure, or their scale of impact. Rules often provide the basis of fiscal policy and are intended to discipline public finance and limit its imbalance as well as to promote sustainable economic growth. It remains important to keep in mind that, when it comes to evaluating fiscal sustainability risks, a holistic approach is required, and no simple metric will ever be able in itself to fully capture the ability of a sovereign to honour its debt (Berti et al., 2016).

Fiscal rules are a permanent constraint on fiscal policy through numerical limits on budget aggregates (Kopits & Symanski, 1998). Fiscal rules can be divided into procedural and numerical ones. Procedural rules involve, among others, legislative procedures, establishing proper institutional framework with respect to transparency of the budget process, control and sanction mechanisms (Schaechter, 2012; Calmfors, 2015). Meanwhile, numerical rules consist in setting fiscal thresholds with respect to, first and foremost, public debt, budget deficit, public expenditure and public revenues.

The predominant fiscal rules applied in OECD countries are debt rules (62 countries) and budget balance rules (61 countries). In the early 1990s, only five countries worldwide (Germany, Indonesia, Japan, Luxembourg, and the USA) had in place regulations related to fiscal rules. At the end of 2012, as many as 76 OECD member states had regulations introducing a long-term discipline in the public finance sector (fiscal rules at the level of general government). These included rules implemented at both the national and the supranational levels.

In the European Union, there are two levels of fiscal rule implementation: (1) EU level and (2) national level. At the same time, in many countries, e.g. in Poland, additional constraints on local government borrowing are also used. The purpose of introducing rules at the supranational EU-wide level is to discipline national policies (European Commission, 2006, 2008, 2012, for more detail). The Stability and Growth Pact and its later amendments, or the 'six-pack' and 'two-pack', apply to non-eurozone EU Member States only to a limited extent. For the eurozone countries, these regulations are definitely more rigorous as they introduce monetary sanctions of up to 0.5% of GDP. The Stability and Growth Pact has two arms: preventive and repressive. In its preventive arm, the European Council focused on the provisions strengthening the surveillance of Member States' budget positions and of their economic policy (Fourçans & Warin, 2007). To fulfil those provisions, Member States prepare and submit stabilisation programmes (applicable to the eurozone countries) and convergence programmes (applicable to the other countries). The repressive arm involves the excessive deficit procedure and the attendant sanctions if a eurozone country fails to meet the recommendations of the European Commis-

sion and the European Council (Council of the European Union, 2011). The European Commission annually evaluates the scale and effectiveness of the fiscal rules used by Member States, its opinion being expressed in the form of the standardised fiscal rules index created and monitored by the European Commission. The index is based on the information on the stage of implementation of fiscal rules in a given EU Member State. The basis for its calculation is the fiscal rule strength index (FRSI), which takes account of five principal criteria: (1) the statutory base of the rule, (2) the room for revising objectives, (3) the mechanisms of monitoring compliance and enforcement of the rule, (4) the existence of pre-defined enforcement mechanism, and (5) media visibility of the rule. This methodology was inspired by Deroose, Moulin and Wierds (2005). For the above criteria, results are allocated in the following way for each rule: the compound FRSI is calculated for each rule, aggregating the above results.

If there is no strong theoretical basis or preference as to the weight to be given to each criterion, the index is calculated in many different ways, reflecting various possible weights for the five criteria. The scores for the five criteria are first standardised to ensure they range from 0 to 1. Then, the random weights technique is used, based on the method applied by Sutherland et al. (2005). This technique uses 10,000 sets of randomly generated weights to calculate the index in 10,000 different ways. Random weights come from the even distribution between zero and one, and then are normalised to one. The resulting index distribution reflects the possible range of values while no a priori information is provided about the weight to be given to each of the components. Considering the weights are drawn from an even distribution, and the mean value of the compound index is asymptotically equivalent to the index calculated using identical weights for components, this is a non-weighted arithmetic mean of the criteria.

A stronger anti-cyclical effect of fiscal rules is also demonstrated by the results of studies conducted by Guerguil, Mandon and Tapsoba (2016) and Bergman and Hutchinson (2015).

A similar conclusions is reached by Manasse (2006) based on the results of his study conducted for 49 developed and developing countries for the period from 1970 to 2004. Manasse builds a panel based on the fiscal reaction function. Relying on the paper by Kopits and Symansky (1998) among others, he identifies countries and years where fiscal rules were in effect. Moreover, in our opinion, numerical restrictions imposed on institutions responsible for fiscal policy also contribute, on average, to the deficit going down. Hence, they are an instrument that stabilises fiscal policy both in the short and long term (Kasdin, 2018).

Ayuso-i-Casals et al. (2006), to examine the impact of rules on the fiscal policy in 25 EU countries in the period from 1990 to 2005, construct time-varying indices, comparable between respective countries, reflecting the strength and scope of applicability of respective types of rules (those

imposed on expenditure, revenues, deficit and debt). They create these based on the results of a survey conducted by the European Commission in 2006 (European Commission, 2006) and include respective fiscal rule index sequences as an additional variable in model panels based on the fiscal reaction function. It turns out that while rules applicable to deficit and debt have a marked positive impact on the balance, the impact of expenditure rules on the level of expenditure has proved statistically insignificant.

A detailed and elaborate analysis using this index leads us to infer, among other things, the stabilising impact of fiscal rules in countries where the rules are structured in a way not to disrupt the stabilising function of the fiscal policy (Poterba, 1994, 1996).

Turrini (2008), in turn, focuses on analysing the impact of expenditure rules on fiscal policy. The aim of this study is to verify the assumption that expenditure rules in fact effectively limit the expenditure expansion in the periods of fast economic growth, and to test the hypothesis of their stabilising impact on the fiscal policy. Based on the data from the aforementioned survey conducted by the European Commission, he divides EU Member States into those where, between the years 1990 and 2005, strong and weak expenditure rules were in effect, analysing separately those two groups of countries. This analysis confirms the hypothesis of a significant role of strong expenditure rules in limiting destabilisation of the fiscal policy at times of economic upturn.

The impact of fiscal rules on the broadly defined stabilising function of the fiscal policy was researched from several perspectives before the crisis (Schaechter, Kinda, Budina, & Weber, 2012).

It follows from the analysis of the IMF (2017) dataset that in the early 1990s, of all the EU Member States analysed, only Estonia introduced a numerical fiscal rule, which disciplined the rules of public spending (Bova, Kinda, Muthoora, & Toscani, 2015). In general, in the early 1990s, all over the EU there were only 13 fiscal rules in effect. By contrast, in 2010, 70 numerical fiscal rules were already in place, of which 16 were in the EEC countries analysed (Reuter, 2015; Portes & Wren-Lewis, 2015). As of the end of 2014, the most developed framework for disciplining the fiscal policy was in place in Poland and Slovakia. In these countries, there were four fiscal rules applicable at the end of 2014.

In summary, in the period analysed, the Visegrad Group countries, despite the excessive deficit procedures imposed on them, were quite effective in their attempts to meet the economic integration criteria set out in the Treaty. They definitely had a greater problem meeting the deficit criterion than the one related to public debt. The global financial crisis showed that external factors play a major role in the disturbance in the area of debt financing (issuance of government bonds). Debt management measures taking account of the current and future changes in the external



environment must be oriented to maintaining the balance between the condition of public finance and the market (commercial) aspect. Hence, such balance is defined as measures intended to maintain safety through integrated continued debt servicing and contracting new obligations (e.g. issuing bonds).

The research question in this context is: Do fiscal rules applied by the Visegrad Group countries contribute to efforts to only achieve and maintain the required deficit and debt values, or do they play a role in achieving the optimal level of sustainability finance.

The research sample consists of the V4 member states, which, as European Union Member States, are obliged to apply supranational fiscal rules supported by national solutions at the central and local levels. The years between 2005 and 2016 are adopted as the research period (due to the comparability of data). Data in this period include all full years of those countries' membership of the EU.

The point of departure for the analysis conducted was the pre-defined standardised fiscal rules index and the available data in this respect.

The standardised fiscal rules index values in the period analysed for the Visegrad Group countries compared to the European Union as a whole are presented by data in Figure 1.

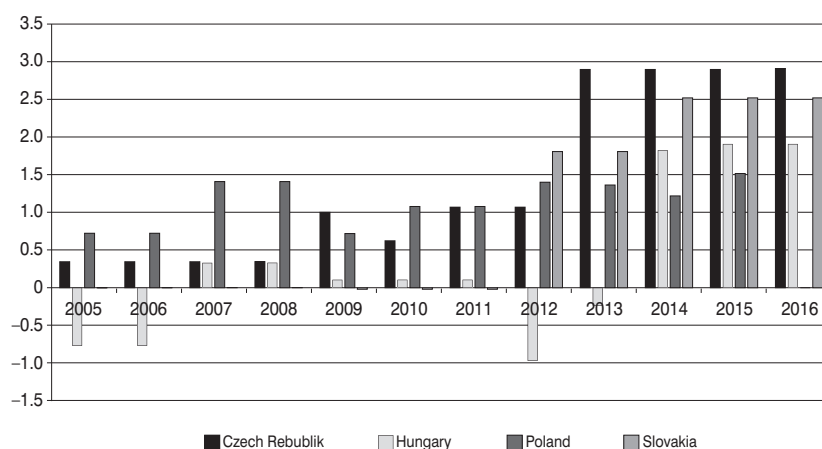


Fig. 1. Standardised fiscal rules index in the years between 2005 and 2016 in the Visegrad Group countries. Source: Own compilation based on the European Commission's data.

The explanatory variables for the fiscal rules index were three variable categories selected based on knowledge of the field (set of potential explanatory variables), and then these were selected using Hellwig's method (Hellwig, 1990).

## 4. Methodology and Data

The first fiscal rule index analysis conducted by us consists in observing the value of this index in respective V4 Member States over the period between 2001 and 2016.

Another element of the analysis applied to fiscal rules in V4 Member States is their impact on budget deficit and public debt developments – this makes a reference to the hypothesis whereby an assessment based on the fiscal rule index as used by the European Commission has no significant effect on public debt developments (measured as a share of GDP).

Considering that a high fiscal rule index should be indicative of high restrictiveness of fiscal rules, it should also reflect a given country's economic situation. A restrictive fiscal policy oriented to reducing the budget deficit and public debt based on the fiscal rules defined may cause a lower economic growth and diminish citizens' quality of life, consequently leading to a crisis. Having that in mind, we will also conduct an analysis of interdependencies between the fiscal rule index and quantities such as public investment and consumption.

The first variable group referred to economic results achieved at a given level of fiscal index, especially: real GDP growth rate, gross domestic product at market prices in millions of euros, final consumption expenditure in millions of euros, final consumption expenditure index 2010 = 100, labour productivity and unit labour costs index 2010 = 100, purchasing power parities (PPPs), price level indices and real expenditures for ESA 2010 aggregates, real expenditure (in PPS\_EU28), and gross capital formation index 2010 = 100. The selected parameters indicating the level of economic development contain the economic growth parameter in real and nominal terms as well as the principal economic aggregates having a major impact on generating this growth.

The second group involves indicators that are directly related to the condition of public finance, on which fiscal rules should have the strongest impact, according to the original assumption. The indicators defined in the Treaty of Maastricht were analysed (deficit and public debt to GDP ratios), broken down into the central government and local government sectors, as well as long-term lines of public intervention, i.e. the ratio of public finance revenues and expenditures to GDP and their structure, as well as financial market's evaluation of the measures adopted by the authorities, in the form of profitability of long-term treasury bonds.

The last group of factors studied refers to issues involving a broadly-defined category measuring sustainability finance. According to theoreticians and practitioners from the OECD, among others, fiscal policy has a direct impact on generating a major part of GDP and creates a real potential for increasing citizens' welfare. To this end, indicators such as the following indices were selected: Gini coefficient, resource productivity and domestic material

consumption (DMC), purchasing power adjusted GDP per capita, people at risk of poverty or social exclusion.

As part of the research activities undertaken, Pearson's  $r$  correlation analysis was first conducted. It is a parametric method to study the relationship between two variables measured on a quantitative scale. Statistically significant results mean that there is a relationship between variables. Relationships between variables can be positive (when one variable increases, so does the other one) or negative (when one variable increases, the other one decreases). Pearson's  $r$  coefficient may have values ranging from  $-1$  to  $1$ . Results close to  $0$  mean no correlation, while results close to  $-1$  and  $1$  mean a strong correlation, a negative and positive one, respectively. The strength of the relationship may be measured with the following intervals:  $0-0.1$  no correlation,  $0.1-0.3$  weak,  $0.3-0.5$  moderate,  $0.5-0.7$  strong,  $0.7-0.9$  very strong,  $0.9-1$  nearly full correlation.

Then, as the next step of research, for variables for which the correlation analysis yielded statistically significant results, series of regression analyses were conducted to study the impact of the standardised fiscal rules index on the other indicators. The regression analysis studies the predictor's impact on the quantitative dependent variable. The significance of the impact is tested by  $t$  statistics and its corresponding level of statistical significance. The standardised coefficient  $\beta$  corresponds to Person's  $r$ . Non-standardised  $B$  coefficient and its SE error can be also presented in the description of results. This coefficient determines by what factor the dependent variable analysed will increase if the level of the standardised fiscal rules index goes up by 1 unit.  $R^2$  determination coefficient is also expressed, which shows the percentage of dependent variable explained by the standardised fiscal rules index. The higher the  $R^2$ , the better the standardised fiscal rules index describes the variation of the indicator analysed.

The results of model studies from this stage are broken down into countries analysed.

A statistically significant impact of the standardised fiscal rules index on a number of financial, economic and social variables was demonstrated for the Czech Republic (Table 1). The strongest positive impact was demonstrated for total general government expenditure in millions of euros (basic research). The 80% variation for total general government expenditure in millions of euros (basic research) was explained by the variation in the standardised fiscal rules index. A negative impact on government bond 10-year yield and local government expenditure as % of GDP was also demonstrated. The standardised fiscal rules index had a very strong effect on government bond 10-year yield in the Czech Republic, this variation being explained at 79%.

The analysis for Hungary also demonstrated a number of variables influenced by the standardised fiscal rules index achieved (Table 1). The strongest positive impact was demonstrated for total general government

	<b>Czech Republic</b>	<b>Hungary</b>	<b>Poland</b>	<b>Slovakia</b>
Standardised fiscal rules index	0.91 (6.83)***	0.71 (3.15)*	0.68 (2.93)*	0.88 (5.92)***
Economic growth indicators				
Real GDP growth rate	-0.18 (-0.59)	0.23 (0.75)	-0.19 (-0.62)	-0.24 (-0.8)
Gross domestic product at market prices in millions of euros	0.58 (2.23)*	0.61 (2.45)*	0.77 (3.83)**	0.67 (2.89)*
Final consumption expenditure in millions of euros	0.58 (2.23)*	0.61 (2.45)*	0.77 (3.83)**	0.67 (2.89)*
Final consumption expenditure index 2010 = 100	0.72 (3.25)**	0.38 (1.31)	0.66 (2.79)*	0.59 (2.3)*
Labour productivity and unit labour costs index	0.7 (3.12)*	0.42 (1.46)	0.66 (2.81)*	0.79 (4.08)**
Purchasing power parities, price level indices and real expenditures for ESA 2010 aggregates, real expenditure	0.84 (4.85)***	0.78 (3.94)**	0.72 (3.24)**	0.82 (4.5)**
Public finance indicators				
Gross capital formation index	0.03 (0.09)	-0.14 (-0.45)	0.82 (4.55)**	0.13 (0.4)
Public debt as a percentage of gross domestic product (GDP)	0.71 (3.2)**	0.26 (0.86)	0.33 (1.1)	0.88 (5.83)***
Percentage of gross domestic product (GDP)	0.08 (0.25)	-0.72 (-3.26)**	-0.55 (-2.08)	0.76 (3.76)**
government bond 10-year yield	-0.89 (-6.16)***	-0.7 (-3.1)*	-0.5 (-1.83)	-0.93 (-7.72)***
Total general government expenditure as % of GDP	-0.15 (-0.47)	-0.3 (-0.99)	-0.75 (-3.56)**	0.49 (1.78)
Total general government expenditure in millions of euros	0.53 (1.88)	0.8 (4.04)**	0.71 (3.06)*	0.71 (3.05)*
Total general government expenditure in millions of euros – public debt transactions	0.44 (1.45)	0.03 (0.09)	0.43 (1.43)	0.9 (6.35)***
Total general government expenditure in millions of euros – general public services	0.34 (1.08)	0.57 (2.11)	0.7 (2.95)*	0.77 (3.62)**
Total general government expenditure in millions of euros – executive and legislative organs, financial and fiscal affairs, external affairs	0.22 (0.68)	0.54 (1.93)	0.8 (3.96)**	0.6 (2.26)

Total general government expenditure in millions of euros – general services	0.31 (0.98)	0.51 (1.79)	0.68 (2.78)*	0.72 (3.09)*
Total general government expenditure in millions of euros – foreign economic aid	-0.15 (-0.46)	-0.3 (-0.93)	0.64 (2.5)*	0.64 (2.53)*
Total general government expenditure in millions of euros – basic research	0.9 (6.03)***	-0.23 (-0.7)	0.77 (3.68)**	0.69 (2.88)*
Total general government expenditure in millions of euros – R&D, general public services	0.51 (1.77)	0.88 (5.61)***	0.14 (0.41)	0.35 (1.13)
Total general government revenue as % of GDP	0.76 (3.67)**	0.56 (2.15)	-0.08 (-0.27)	0.84 (4.89)***
Central government expenditure as % of GDP	-0.26 (-0.85)	0.08 (0.26)	-0.52 (-1.93)	0.3 (1.01)
Central government revenue as % of GDP	0.54 (2.05)	0.61 (2.43)*	-0.09 (-0.29)	0.71 (3.17)**
Local government expenditure as % of GDP	-0.59 (-2.29)*	-0.66 (-2.75)*	-0.46 (-1.64)	0.08 (0.27)
Local government revenue as % of GDP	-0.34 (-1.15)	-0.73 (-3.42)**	-0.22 (-0.7)	0.64 (2.67)*
General Government deficit/surplus as % of GDP	0.52 (1.92)	0.61 (2.4)*	0.58 (2.26)*	0.4 (1.39)
Central government deficit/surplus as % of GDP	0.51 (1.87)	0.59 (2.3)*	0.63 (2.6)*	0.38 (1.28)
Local government deficit/surplus as % of GDP	0.72 (3.25)**	0.22 (0.72)	0.55 (2.06)	0.63 (2.57)*
Social development indicators				
Gini coefficient	-0.37 (-1.26)	-0.04 (-0.12)	-0.67 (-2.85)*	0.80 (4.15)**
Resource productivity and domestic material consumption (DMC)	0.87 (5.66)***	0.23 (0.75)	0.62 (2.49)*	0.88 (5.98)***
Purchasing power adjusted GDP per capita	0.83 (4.74)**	0.77 (3.85)**	0.82 (4.48)**	0.82 (4.5)**
People at risk of poverty or social exclusion	-0.60 (-2.37)*	-0.69 (-3.05)*	-0.66 (-2.76)*	-0.57 (-2.18)

\* p < 0,001; \*\* p < 0,01; \*\*\* p < 0,05.

Tab. 1. Correlation analysis results for economic growth indicators, public finance indicators, social development indicators. Source: Own compilation.

expenditure in millions of euros, and the negative one on general public services, and 78% of the variation of that variable was explained by the variation of the standardised fiscal rules index. Negative impacts were also demonstrated in Hungary on the level of percentage of gross domestic product (GDP), government bond 10-year yield, local government expenditure as a percentage of GDP, local government revenue as a percentage of GDP, and people at risk of poverty or social exclusion. The strongest negative impact was demonstrated for local government revenue, with 54% of its variation explained by the variation of the standardised fiscal rules index.

A number of correlations were also demonstrated for Poland (Table 1). The strongest positive impact was demonstrated for the gross capital formation index and purchasing power adjusted GDP per capita, and 67% of the variability of those indicators was explained by the variability of the standardised fiscal rules index. Meanwhile, the strongest negative relationship was demonstrated for total general government expenditure as a percentage of GDP.

Slovakia was the V4 country for which the largest number of statistically significant correlations with the standardised fiscal rules index was demonstrated (Table 1). The strongest positive relationship was demonstrated for total general government expenditure in millions of euros (public debt transactions). By contrast, the strongest negative relationship for Slovakia was demonstrated for government bond 10-year yield.

The study results obtained indicate that the condition of V4 economies, as well as their financial and economic results, are not only the outcome of the fiscal policy and of the assessment of the condition of public finance. The imbalance of the economic system can also have its roots in the private sector rather than the public sector. Before the outbreak of the crisis in the eurozone it was pointed out (Barrel, 2001; Alves & Afonso, 2007) that, considering the inability to use monetary policy, the acceptable fiscal deficit levels are too weak to effectively absorb asymmetric shocks, and the adjustment required in convergence programmes will have a strong pro-cyclical effect.

## 5. Results

Research conducted in V4 countries into the impact of the fiscal rules index not only on the condition of public finance but, in broader terms, of socio-economic development helped to address the propositions.

This analysis focused, first of all, on the impact of fiscal rules in the V4 countries on GDP growth and the level of its composing economic aggregates.

The results obtained indicate that in all countries analysed statistically, significant and positive trends were observed for nearly all economic growth indicators depending on the standardised fiscal rules index. Such a result

shows that the fiscal rules applied have no negative impact on Visegrad Group countries' economic growth, so the pattern described below did not materialise. If the government increases spending and, at the same time, cuts taxes and does so at the time of recession (when tax revenues are falling), such measures can lead to a growing budget deficit. A deficit increase, in turn, will make it necessary for the government to issue more debt securities which will have to be paid for in the future. If the debt is not paid back on time, it will grow each year, forcing the government to encourage investors to buy new debt securities by increasing their interest rate. This move will increase the yield of treasury debt securities but will make them competitive to investment such as consumer and mortgage loans, car loans, and industrial bonds. This situation may lead to higher costs of credit for other market participants, who, in turn, may contribute to lower household spending, as well as to companies reducing their capital expenditure. When the government has problems paying off the public debt, the interest rate of treasury debt securities may grow too high and then those in power, to cover the deficit, may opt to print more money. However, for this to be possible, one condition must be met: public debt must be denominated in the national currency. This strategy is called 'deficit monetisation'. Its mechanism is precisely the same as that of quantitative easing, but such public debt reduction has little to do with combating deflation as 'monetisation' is only intended to get rid of the debt. Such conduct, when money competes with goods and causes their prices to go up, must lead to inflation, resulting in yet higher interest rates and a higher share of private sector spending going to aid for the public sector. The rules defined in V4 countries do not follow this pattern of thinking about economic growth. Unfortunately, there exists no fiscal stimulus that has only advantages as fiscal policy instruments (unlike monetary policy instruments which can be implemented right away) take time to implement and involve costs of inadequate expenditure and unnecessary legislation designed to get more votes in the election. The results of model research in the V4 countries also confirm this. A flawless fiscal stimulus package should result in higher revenues and faster economic growth in the future, among other things. For the Czech Republic (Table 1) it was demonstrated that the standardised fiscal rules index was strongly and positively correlated with gross domestic product at market prices in millions of euros ( $r = 0.58$ ;  $p < 0.05$ ) and final consumption expenditure in millions of euros ( $r = 0.58$ ;  $p < 0.05$ ). Very strong correlations were also demonstrated for this country between the standardised fiscal rules index and the final consumption expenditure index ( $r = 0.72$ ;  $p < 0.01$ ), the labour productivity and unit labour costs index ( $r = 0.70$ ;  $p < 0.01$ ) and purchasing power parities, price level indices and real expenditures for ESA 2010 aggregates, real expenditure ( $r = 0.84$ ;  $p < 0.001$ ). The analysis for Hungary demonstrated that there was a statistically significant, positive, adequately strong and very strong correlation

between some variables. The standardised fiscal rules index was strongly and positively correlated with gross domestic product at market prices in millions of euros ( $r = 0.61$ ;  $p < 0.05$ ), final consumption expenditure in millions of euros ( $r = 0.61$ ;  $p < 0.05$ ) and purchasing power parities, price level indices and real expenditures for ESA 2010 aggregates, real expenditure ( $r = 0.78$ ;  $p < 0.001$ ). The increase of the standardised fiscal rules index was correlated with the increase of those indicators in Hungary. It is worth noting that no statistically significant correlations were demonstrated for Hungary between the standardised fiscal rules index and the final consumption expenditure index and the labour productivity and unit labour costs index. In Poland, the existence of statistically significant and very strong and strong correlations was demonstrated between the standardised fiscal rules index and gross domestic product at market prices in millions of euros ( $r = 0.77$ ;  $p < 0.01$ ), final consumption expenditure in millions of euros ( $r = 0.77$ ;  $p < 0.01$ ), the final consumption expenditure index ( $r = 0.66$ ;  $p < 0.05$ ), the labour productivity and unit labour costs index ( $r = 0.66$ ;  $p < 0.05$ ) and purchasing power parities, price level indices and real expenditures for ESA 2010 aggregates, real expenditure ( $r = 0.72$ ;  $p < 0.01$ ). The increase of the standardised fiscal rules index was correlated with the increase of the other indicators in Poland. Similarly, it was demonstrated for Slovakia that the level of standardised fiscal rules index was statistically significantly positively and strongly correlated with gross domestic product at market prices in millions of euros ( $r = 0.67$ ;  $p < 0.05$ ), final consumption expenditure in millions of euros ( $r = 0.67$ ;  $p < 0.05$ ), the final consumption expenditure index ( $r = 0.59$ ;  $p < 0.05$ ), the labour productivity and unit labour costs index ( $r = 0.79$ ;  $p < 0.01$ ) and purchasing power parities, price level indices and real expenditures for ESA 2010 aggregates, real expenditure ( $r = 0.82$ ;  $p < 0.001$ ). The increase of the standardised fiscal rules index was correlated with the increase of the other indicators in Slovakia.

Another group of factors directly refers to the impact of the increase of the standardised fiscal rules index on the condition of public finance as it is important to establish whether the main expected outcome for which the rules were defined has been successfully achieved.

The results obtained indicate correlations, with different scales, and these are directly dependent on the type of fiscal rules used by respective countries. The analysis found one correlation shared by all the countries, namely an inverse correlation between the interest rate of long-term securities and the increase of the standardised fiscal rules index. For the Czech Republic (Table 1), negative correlations were also demonstrated between the standardised fiscal rules index and government bond 10-year yield ( $r = 0.89$ ;  $p < 0.001$ ); in Hungary, the standardised fiscal rules index was negatively correlated with the percentage of gross domestic product (GDP) ( $r = 0.80$ ;  $p < 0.01$ ), government bond 10-year yield ( $r = -0.72$ ;  $p < 0.01$ ); for Slovakia, a negative correlation was demonstrated between the standardised fiscal rules index



and government bond 10-year yield ( $r = -0.93$ ;  $p < 0.001$ ); and for Poland, this relationship was the lowest, but it was there ( $r = 0.50$ ). This resulted from public debt rules being implemented or successively strengthened in the respective years. The recent economic crisis and its consequences for public finance in respective countries greatly increased the interest, also in V4, in the rules relating to the level of debt, as in most countries the reduction of debt became one of the main dimensions of the fiscal policy (the results obtained in Pearson's  $r$  model for the Czech Republic demonstrated that there was a statistically significant and positive correlation between the standardised fiscal rules index and public debt as a percentage of gross domestic product (GDP) ( $r = 0.71$ ;  $p < 0.01$ ), Slovakia's debt (GDP)  $r = 0.88$ ;  $p < 0.001$ ; it cannot be concluded that such a correlation exists for Poland and Hungary. Such a research result may suggest that the rules formulated in Slovakia and the Czech Republic fail to meet the expected function, i.e. they do not contribute to stabilising or lowering public debt. The anti-cyclical definition of public debt rules can be strengthened by applying the 'exit clause' by means of discretionary revenues. The research outcome demonstrated that the defined public debt rules in the V4 countries helped avoid negative outcomes for economic growth. Meanwhile, regarding total general government expenditure in millions of euros (basic research), its positive correlation with the standardised fiscal rules index was recorded in three countries. The only exception was Hungary, where the relationships are insignificant. The same potential 'traps' were true for deficit rules, especially with respect to the stabilising function of public finance.

The third category of factors tested in the model involves correlations between standardised fiscal rules and social development indicators. In this matter, we arrive at relationships that confirm diverse outcomes for socio-economic development of respective Visegrad Group countries.

The analysed results of the correlation with the level of the standardised fiscal rules index were statistically significant in both positive and negative terms: the standardised fiscal rules index was statistically and positively correlated with Gini coefficient for Slovakia ( $r = 0.80$ ;  $p < 0.01$ ) and statistically significantly and negatively correlated with the same indicator for Poland ( $r = -0.67$ ;  $p < 0.05$ ). Such a result indicates that the fiscal rules used have a diverse impact on income stratification. An especially interesting case is that of Slovakia, which stands out among the economies analysed. This could be due to this country's joining the monetary union and to the resulting increase in the socio-economic security, being higher than in other countries, which, in the long term has a positive impact on employment stabilisation and income level (Holscher, 2011). Consequently, it can be assumed that the research conducted confirmed that social progress and development is growing, as a rule, in proportion to GDP, but upon reaching a certain level of society's wealth, it is hard to increase social progress by means of economic growth only.

## 6. Conclusions

Sustainability finance includes two main lines of action: the first one is improving the structure used to finance sustainable economic growth favouring social inclusion, especially to finance the society's long-term demand for innovation and infrastructure, and speeding up the transition to a low-emission and resource-efficient economy. In this respect, maintaining long-term stable sources of finance is of key importance. It is obvious that the main determinant in this area is developing proper relationships between demand and supply. Demand for debt determined by behaviour and structure of the debt market confirms a significant role and importance of the financial market (including the monetary policy) in driving the fiscal policy, which is reflected in budget indicators (Hallerberg, Strauch, & von Hagen, 2007). This indication is currently gaining particular importance, as evidenced by active demand-driving measures aimed at shifting weight to domestic markets. This element is directly linked to the second line of action, namely the strengthening of financial stability and asset assessment, especially by improving the assessment and management of major long-term threats as well as intangible value drivers.

The results presented in this analysis indicate that the following correlations can be distinguished for V4 countries in the period analysed: fiscal rules have a significant impact on the way financial markets perceive the fiscal measures adopted by the authorities, which translates into the public-sector cost of capital; the use of fiscal rules does not have a negative impact on real economic growth, meaning that the defined fiscal rules have a pro-growth effect rather than 'cool' the economy; the rules in place are not resistant to economic shocks, they do not protect the public sector against instability at a time of crisis (2009, Poland was an exception); as the impact of fiscal rules (measured with the European Commission's index) on the economic policy gets stronger, the scale of their negative impact on social indicators increases, leading to a greater level of social exclusion and income stratification.

The scale of those correlations varies depending on whether a given state (Slovakia) is a eurozone member or not yet, as is the case of the other three countries. A major factor which the model could not take account of is the state authorities' attitude towards the government's role in the economy and their endorsement of one of the contemporary trends of economic thought. The V4 countries have one crucial characteristic in common: They are countries with relatively young democracies and not yet fully-fledged civic societies.

Two groups of fiscal standards can be distinguished from the perspective of economic theory. The first, fiscal principles, is mostly aimed to limit government spending, budget deficits, and public debt to ensure public finance stability. The second group, fiscal rules, mostly intended to stabilise macroeconomic fluctuation, was introduced as new principles of fiscal

management. When assessing the effectiveness of fiscal rules, focus must be placed on their structure and on their fitness for the socio-economic goals pursued. From an economic policy perspective it would be advisable for the European Commission to take greater account of sustainable development factors when defining the fiscal rules index rather than focusing on amounts relating to GDP, which is far from perfection as a measurement of socio-economic development.

Sustainable development means 'better development' and 'better finance', a development which is sustainable in all of its economic and social aspects with stable public finance. In this context, the challenge facing the contemporary world, especially the European Union Member States, is to allocate the resources available even more efficiently to ensure that they give the best possible result not only in the form of an increasing GDP, but also – and maybe first and foremost – that of improving the population's living standards.

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