*Montenegrin Journal of Economics*

Vol. 13, No. 3 (2017), 135-148

# Fiscal Consolidation Start and its Determinants Analysis Within European Member Countries

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## ARTICLE INFO

Received June 19, 2017
Revised from August 12, 2017
Accepted August, 30, 2017
Available online September 15, 2017

*JEL classification:*

H30, H61, H87

*DOI:* 10.14254/1800-5845/2017.13-3.11

*Keywords:*

start of consolidation,
fiscal consolidation episodes,
determinants of consolidation start,
panel regression model,
EU member countries

## ABSTRACT

*Purpose*: The purpose of the research from the theoretical point of view is to define the "*start of fiscal consolidation*" and to clarify the effects of selected determinants on its initiation. The purpose of the paper, in an empirical context, is to empirically assess the impact of selected determinants on the start of consolidation in the EU member states in 1995-2015 using quantitative economics. The paper was developed within the project VEGA 1/0967/15. *Methodology*: The empirical assessment of the research objective is divided into four phases: (1) creation of research review using EBHC methodology, (2) identification of "start" of fiscal consolidation within selected period, (3) panel econometric analysis: model specification, quantification of model's parameters and model verification and (4) research assessment and discussion. Within the analysis, the traditional, specific and general methods were used (systemic review according to EBHC methodology, content analysis, panel regression analysis, synthesis). *Approach*: Approach identifies "start" of consolidation episodes using selected identification rules. Using the panel regression analysis (OLS, FEM and REM models) approach the statistically significant macroeconomic, fiscal, political and other determinants and quantification of the polarity of their impact on the fiscal consolidation start were analysed. *Findings*: Based on the performed econometric analysis can be stated that the start of consolidation is significantly determined by initial macroeconomic and fiscal situation in the country which are captured by the size of output gap and GDP growth as well as the size of CAPB, budget expenditure and the revenue side. Political and other determinants (such as crisis) can also influence the start of consolidation episodes..

## INTRODUCTION

Most countries have been, over the last thirty years, struggling with high public deficits and rising public debts (Rother et al., 2010). Historically, public finance development is illustrated by the European Commission (2000) that state that the fiscal consolidation has been part of the fiscal evolution of European countries since the 1980s (European Commission, 2007). As stated by the

OECD (2009), fiscal consolidation is still present in countries and is necessary due to rising expenditures related to the aging trend of the population and due to the risk of private investment pushing out effect through government spending on programs supporting economic growth. In addition to these factors, has been as one of the most important reasons for the fiscal consolidation considered the priority for public finances stabilization in order to ensure the sustainability of public finances. Issues aimed at fiscal consolidation are for these reasons more than desirable, what contributes to the fact that the topic is up to date and has come into the spotlight of a large number of the literature and empirical studies (Afonso and Jalles, 2016; Bröthaler and Getzner, 2015; Mirdala, 2013; Alesina and Ardagna, 2013; Nickel, Rother and Zimmermann, 2010; etc.).

Fiscal consolidation can be defined as a specific policy focused on public finance stabilization through the reduction of initial public finance deficit and accumulated debt, and thus without the negative effects on the economic growth (eg Yang, Fidrmuc and Ghosh, 2015; OECD, 2011; European Commission, 2007; Kumar et al., 2007; etc.). The success of fiscal consolidation can be assessed through the changes in the level of deficit or debt, changes in the indicators that are linked to GDP or it can be connected to the achievement of a pre-set economic growth values (Alesina and Ardagna, 2010). As stated in the theoretical and empirical research, Guichard, Kennedy, Wurzel and André (2007), OECD (2007), or the European Commission (2007), the consolidation episode includes four attributes that affect the overall success of the consolidation process. Individual attributes, among which the start of consolidation, length or duration, size and intensity of consolidation can be included, can indirectly, positively or negatively affect various factors (e.g. Yang, Fidrmuc and Ghosh, 2015; European Commission, 2007; etc.) determining the consolidation process success. Therefore it is essential in the process of a successful consolidation process to identify those significant determinants of mentioned attributes of fiscal consolidation and include them into a consolidation process..

## 1. RESEARCH OBJECTIVE, DATA AND METHODOLOGY

Main objective of the paper is, based on the theoretical knowledge and empirical research results about the consolidation start and its determinants, using methods of quantitative economy, to empirically assess the impact of selected consolidation determinants in European member countries during the 1995-2015 period.

In line with the main objective is the paper divided into two main parts. The first part of the paper is focused on the definition of the "start of consolidation" attribute and the literature research, carried out in line with the EBHC methodology, on empirical identification of the consolidation start. At the same time, the research in its first part focused on identification of the consolidation episodes beginning by using the selected criteria. The second part of the paper is focused on analysis and evaluation of the selected determinants impact on the "start of consolidation" using a panel regression model for the EU member states 1995-2015. Based on the theoretical background about the expected effects of the individual determinants acquired from the literature review is the second part focused on the analysis of the statistically significant variables and quantification of the polarity of their impact.

The research first part was carried out in few steps: (i) collection of secondary scientific sources, their processing and systemisation (full-text scientific databases), (ii) they creation of research review using EBHC methodology, (iii) creation of a database from secondary sources (Ameco; time span 1995-2015) and (iv) identification of “start” of fiscal consolidation episodes. The research second part was carried out in those steps: (j) collection of secondary scientific sources, their processing and systemisation (full-text scientific databases), (jj) the creation of research review using EBHC methodology and the summarization of knowledge, (jjj) creation of a database from secondary sources (Ameco; Eurostat, ECB statistics and Norwegian Centre for Research Data (NCRD; time span: 1995-2015)) and (jv) performance of econometric analysis: model specification, quantification of model’s parameters and model verification and (jjv) research assessment and discussion. The main research method used in the paper is analytic-synthetic method. In line with the mentioned methodology following general methods were used: in-depth research, analysis, comparison, induction and synthesis. Also mathematical and statistical methods, including graphical and numerical data description were used. As a specific econometric method was the panel regression model used. The panel regression model was selected based on the character of the model's variables, which are combination of cross-sectional and time series data of the 28 EU countries.

The econometric model has been designed so that it takes into account the relevant variables for a correct estimation of a causal connection between endogenous variable "start of consolidation" *(StC)* and exogenous macroeconomic *(*$MACR_{k_{i,t}}$*)*, fiscal *(*$FISC_{l_{i,t}}$*)*, political *(*$POL_{j_{i,t}}$*)* and other determinants *(*$OTH_{p_{i,t}}$*) (1)*.

$$StC_{i,t} = \beta_0 + \sum_{k=1}^{m} \beta_k \, MACR_{k_{i,t}} + \sum_{l=m+1}^{n} \beta_l \, FISC_{l_{i,t}} + \sum_{j=n+1}^{r} \beta_j \, POL_{j_{i,t}} + \sum_{p=r+1}^{s} \beta_u \, OTH_{p_{i,t}} + \varepsilon_{i,t} \quad (1)$$

During the econometric analysis four types of models were performed (Ordinary Least-Squares Regression Model (OLS), OLS model with dummy variables for countries and years, Fixed Effects Model (FEM) and Random Effects Model (REM)). The selection of the final appropriate regression model was based on statistical significance tests that were applied (F-test of the statistical significance of the individual components, Hausman test, Panel Lagrange Multiplier test (PLM test)). The econometric verification was carried out in the form of verification of the basic Gauss-Markov theorem: (i) verifying the existence of correlation between individual panels (Pesaranov test) and (ii) verifying the existence of serial correlation for panel models (Breusch-Godfrey/Wooldridge test). The economic verification showed feasibility of the model, based on the econometric assumptions.

## 2. START OF FISCAL CONSOLIDATION PROCESS: THEORETICAL ASPECTS AND EMPIRICAL MEASURES

In the context of a theoretical definition, as the start of consolidation may be considered a year in which the effects of consolidation measures, implemented in the current or in the immediately preceding year, have taken place. The empirical concept of the fiscal consolidation within the structural models concept is justified by characteristics and determination of the so called "fiscal episodes" or "fiscal adjustments". Empirical researches (e.g. Alesina and Ardagna, 2010, 2012; Afonso, 2010; Rother et al., 2010; Barrios et al., 2010; Guichard et al., 2007; etc.) dealing with the fiscal adjustments characterize the fiscal consolidation as the time-limited episode characterized by a measurable change in the selected indicator.

In order to gain knowledge about the identification of the beginning of fiscal consolidation a research in line with EBHC methodology was conducted. The overview of relevant studies was obtained by screening the available full-text scientific databases ScienceDirect, SAGE Journals, EBSCO, ProQuest and DOAJ databases during the period 1990-2016 with search criteria and inclusion criteria within the research Mihóková, Harčariková and Martinková (2016). Within the systematic review two main researches: European Commission (2007) and Alesina and Ardagna (2010) were chosen. Studies by Guichard et al. (2007) and Gnangnon (2011) represented the theoretical background on the empirical approach, which was focused on "start of fiscal episodes" identification. Based on the systemic review, carried out in order to identify a "start of fiscal episodes" the following rules were used:

- *An improvement of the cyclically adjusted primary balance (CAPB) of at least 1.5 % of GDP in one single year. This consolidation is called a "cold shower" (CD).*
- *An improvement of the cyclically adjusted primary balance (CAPB) of at least 1.5 % of GDP over a period of three years where in each single year the improvement of the CAPB is less than 1.5 % of GDP and the CAPB does not deteriorate by more than 0.5 % of GDP compared to the year before. This consolidation is called a "gradual consolidation" (GC).*

The results of "fiscal consolidation start" analysis (Table 1) illustrates that the start of cold shower consolidations were concentrated into the pre-crisis period 1996-1999, which confirms that strong fiscal efforts have characterised the second half of the 1990s. The beginning of the 20th century was influenced by a economic slowdown, therefore deficit has increased in EU as a whole. Therefore, the start of fiscal consolidation episodes occurred invariably in the first five years after the year 2000. The highest concentration of the fiscal episodes' starts was during the crisis period in 2009/2010-2014. The crisis period was characterised by a pattern of abrupt and sizeable consolidations. As Barrios et al. (2010) or European Commission (2007) state that, the "cold shower" consolidations may be more effective for high and sharply rising debt levels and in a low-growth environment.

The results also point out, that consolidation efforts were characterised by steady step changes of annual adjustment only in 10 EU member countries. The start of the gradual type of consolidation was concentrated in two pre-crisis periods: 1996-1998, 2003-2006, in five countries (old member countries) and in crisis period 2009-2015 in five countries (mainly new member countries). In general, years of consolidations start suggest a trend of strengthening of efforts to increase the fiscal discipline in EU Member countries.

Table 1. The start of fiscal consolidation episodes within EU Member countries

| *Type of consolidation* | | | | | |
|---|---|---|---|---|---|
| Year | *CD* | *GC* | Year | *CD* | *GC* |
| 1995 | - | - | 2006 | BE | DE, ES |
| 1996 | BG, DE, ES, FR, NL, AT, FI, SE | BE, IE | 2007 | IE, CY, HU | DE |
| 1997 | IT, AT, RO, UK | BE, IE | 2008 | HU | LV |
| 1998 | LT, SK, FI, UK | BE, IE | 2009 | EE, HU, MT | CZ, LV |
| 1999 | LT, HU, MT | - | 2010 | EL, ES, LT, RO | CZ, LV |
| 2000 | DE, IE, FI | - | 2011 | DE, IE, EL, LV, PL, RO, SK, UK | CZ, AT |
| 2001 | BG, AT, SK | - | 2012 | BG, IE, HR, IT, CY, LT, HU, PL, RO, SI | AT |
| 2002 | - | - | 2013 | CZ, DK, IE, ES, CY, NL, SK, UK | HR, AT |
| 2003 | IE, HU, SK | DE, NL | 2014 | DK, EL,SI | HR |
| 2004 | CZ, MT | DE, ES, NL | 2015 | BG, CY, AT | HR, UK |
| 2005 | DK, EL, LU, AT | DE, ES, NL | 2016 | EL | UK |

Source: Authors' calculations according to Ameco

## 2.1 Determinants of fiscal consolidation start

The first impulse for fiscal consolidation is determined by several factors that can have a positive or negative impact on the attribute and are the subject of several studies. OECD (2007) economic analyses confirm that the initial budget size plays an important role at the start of the consolidation process (with a cyclically adjusted primary deficit of 2% of potential GDP is a country up to 13% more likely to start a consolidation than a one with balanced original budget). During the 1990s, they have proved that the fall in interest rates led to the release of the primary budget position. From a political point of view, elections play a crucial role for the consolidation beginning. The probability of starting a fiscal consolidation is significantly higher just after public elections (Molnár, 2012; Guichard et al., 2007). Larch and Turrini (2008) suggest that the impulse for consolidation can be a certain level of unemployment and political factors (parliamentary elections, political power of the ruling party, etc.). The probability of initiating fiscal consolidation increases with the power of nominal fiscal rules and the quality of budgetary procedures. Auerbach and Gorodnichenko (2012) predict that if fiscal consolidation starts in the recession, the recession will remain for the entire period of the adjustment. This is why it is needed to predict and implement consolidation adjustments in advance. Rawdanowicz (2014) found that in the case of immediate start of consolidation, the debt-to-GDP ratio change would only be reflected after seven or eight years.

## 2.2 Determinants of fiscal consolidation start: the review of research

Determinants of the fiscal consolidation start were processed through a systematic review of literature in line with the Evidence-Based Healthcare (EBHC) approach. The lessons learned from the studies that are considered relevant were summarized using an explicit method (Petticrew and Roberts, 2006). The main purpose of the systematic review was to identify the main determinants of the "start of fiscal consolidation" attribute and to summarize the factors that may be significant on the basis of the conducted research. The purpose of the review was to find out their expected effect on the start of the consolidation process, to examine the used methodological procedures, their positives and negatives, specific quantitative methods, in order to design a model and empirically verify and evaluate the influence of determinants on the studied attribute in the EU countries.

A systematic review of the research was done for all attributes (start, length, range and intensity) and determinants together. The review was conducted in electronic full text databases: BASE, RePEc, ScienceDirect, SageJournals database and EBSCO. Search in the specified databases was performed according to a predefined search strategy *("fiscal consolidation" OR "fiscal episode" AND "start" OR "fiscal consolidation" OR "fiscal episode" AND "duration" OR "fiscal consolidation" OR "fiscal episode" AND "length" OR "fiscal consolidation" OR "fiscal episode" AND "size" OR "fiscal consolidation" OR "fiscal episode" AND "intensity" OR "fiscal consolidation" OR "fiscal episode" AND "determinant" OR "determinants"*). The search strategy had to meet predefined so-called limiting criteria (year of publication 2006-2017, free access, European publications or EU countries, English language, form: publication: chapter, book, or working paper).

Relevant researches have been subject to quality assessment according to*: (1) the extent of the theoretical base, (2) the degree of generalization of research, and (3) the origin of the research (original research or follow-up research)*. Due to the time and scope constraints, 15 studies were subjected to the detailed evaluation criteria. Within the critical assessment these attributes were tracked: time period and country coverage, parameters and determinants, research methodology, and research results.

The subject of the survey was the "start of fiscal consolidation" and its determinants. Therefore, was the focus of the review pointed on researches within the subject under consideration (altogether 6). An overview of the research is illustrated in Table 2. Researchers analysed were published in 2007-2015 and were predominant in OECD countries. Certain studies have modified the countries databases due to unavailability of some data.

Table 2. Outcomes of systemic review

| *Reseacrh* | *Time span and countries* | *Parameter and determinants* |
|---|---|---|
| Arin, Müller and Reich (2013) | 1975-2009<br>20 OECD countries | *Fiscal variables:* change of the primary budget, changes in the shares of individual types of taxes, subsidies, changes in the commitments. *Macroeconomic variables:* change in unemployment, inflation, interest rate, export, import, etc. *Policy variables:* corruption index, population over 65, government orientation, government fragmentation index. |

| | | |
|---|---|---|
| | *Methodology of the resrearch* | |
| | Average of Bayesian Model (BMA) for Linear Regression Model. | |
| | *Research results* | |
| | Consolidation is driven by the existence of a strong government that is supported by monetary policy by its authority and by social security spending cuts. | |
| Molnár (2012) | 1960-2009<br>28 OECD countries | Variables reflecting: *Fiscal conditions*: debt-to-GDP ratio, debt change, budget balance, *external conditions*: OECD balance; *Monetary environment*: nominal exchange rate, inflation, long-term interest rates, interest rate differential, exchange rate mechanism, euro area component, *political conditions*: political cycle, ruling party, overall *economic environment*: GDP growth rate, *consolidation composition*: budget revenue and expenditure components according to IMF |
| | CAPB assuming unchanged unemployment rate in relation to the previous year. | |
| | An analysis of past consolidation episodes confirms that debt stabilization is effective through the use of the expenditure based consolidation method or through a combination with the revenue method. The government should focus on its fiscal rules adherence. | |
| Alesina and Ardagna (2012) | 1970-2010<br>21 OECD countries | *Fiscal, macroeconomic and political variables.* |
| | Empirical estimates of the fiscal policy effects, respectively of the main real GDP components. | |
| | Fiscal correction on the expenditure-side has a greater tendency to succeed. Fiscal spending exerts less negative impacts on the economy as a whole than revenue fiscal adjustments. Certain policy combinations can bring economic growth through consolidation. | |
| Larch and Turrini (2011) | 1970-2010<br>EU countries | Variables of *initial economic and tax conditions*: extent and amount of expenditure, fiscal adjustments. *Other variables* divided into groups: composition of fiscal adjustments, other fiscal factors, political factors, fiscal management and structural reforms. |
| | Individual regressions | |
| | For severe initial fiscal problems, the probability of successful consolidation is significantly high. The lasting effect of consolidation is the result from expenditure based consolidation rather than the revenue one. | |
| Alesina and Ardagna (2010) | 1970-2010<br>OECD countries | *Fiscal and macroeconomic variables*: range of fiscal packages, their composition. |
| | Identification of major changes in fiscal policy. Monitoring or fiscal balances are correlated with macroeconomic results. CAPB measurement. | |
| | Fiscal incentives based on tax cuts are more likely to result in economic growth than spending cuts. Income tax is to be reduced, although it does not necessarily mean an increase in household consumption. The increase in savings could strengthen the financial sector, investment projects focused on infrastructure. Maintaining fiscal stability through spending cuts is difficult because the spending costs can rise faster than the tax revenues. | |
| Ardagna (2009) | 1970-2006<br>OECD countries | *Macroeconomic variables*: ratio of debt, deficit, expenditure to GDP, public investment, public revenue, tax revenue. *Fiscal variables*: long-term interest rate, inflation, exchange rate, unemployment rate, GDP growth. |

| | |
|---|---|
| | An equation describing the government's ability to address the fiscal imbalance problem in combination with economic growth equations. |
| | The success of consolidation depends on the extent of fiscal consolidation, but not on its composition. The indicator of GDP growth is important, but its higher values do not mean a success of fiscal stabilization. Political orientation and government power are important factors. Ultimately, it is shown that successful fiscal consolidation is not the result of a monetary policy or exchange rate. |

Source: Authors

The review of the researches has proven that the topic of consolidation determinants is the object of interest of past and current researches. The analysis pointed out that in the researches prevail OECD countries as a sample, wahat creates space for exploring the EU region. The review of the research has also pointed out that there are many differences in the form of time period, research methodology, measurement units, determinants and results. Among all of the analysed researches regarding the determinants a common variable of macroeconomic and fiscal variables was used.

## 2.3 Determinants of the fiscal consolidation start: theoretical aspects of the expected effects

The initial impulse for the consolidation start is determined by a number of factors that may have either a positive or a negative influence on the attribute itself. Based on the empirical research obtained and evaluated in the review, the determinants of the "start of fiscal consolidation" and their predicted impact were identified. In line with evaluated research, Larch and Turrini (2008), Arin, Müller and Reich (2013), Molnár (2012), Alesina and Ardagna (2010, 2012), Ardagna (2009) are the determinants of the fiscal consolidation start divided into four main groups: macroeconomic, fiscal, political and the other factors.

*(1) The first set of variables are macroeconomic determinants ($MACR_{k_{i,t}}$).* As shown by a number of studies (eg Molnár, 2012; Hernandez de Cos and Moral-Benito, 2012; Heylen, Hoebeeck and Buyse, 2012; etc.), fiscal consolidation is significantly affected by the country's initial macroeconomic conditions, that determine the consolidation start, the consolidation period, or the speed of the consolidation process. The macroeconomic factors include: real GDP growth (rGDP;%); output gap (gdpGAP;%); unemployment rate (Unempl;%); investment expenditures (Invest;% GDP); expenditures on personal consumption (S;mld.Eur), private savings, external trade (Openess;%), inflation (Infl;%), government debt interest payments (Dinterest;% GDP), short and long-term interest rates (STinterest, LTineterest;%), exchange rate and structural balance.

Positive pressure on the fiscal consolidation start, in the context of macroeconomic conditions, has a slowdown in real GDP growth, increase in output gap, rise of unemployment, increasing investment expenditures, decline in private spending, adverse balance of payments and openness of the economy, or rising inflation. Another factor behind the consolidation start may be the monetary conditions, such as high interest rate differentials before the consolidation episode can imply the start of a long consolidation. The labour cost and structural balance can have a positive effect.

*(2) The second set of variables represent the fiscal determinants ($FISC_{l_{i,t}}$).* As shown by Molnár (2012), Hernandez de Cos and Moral-Benito (2012), Guichard, Kennedy, Wurzel and André (2007), fiscal factors determine how is going the consolidation be introduced, as well as the composition of fiscal adjustments and the size of consolidation. Certain critical values of the factors in the fiscal variable group may be an incentive for the government to start a fiscal consolidation process. This

usually includes public debt to GDP ratio (Debt;%GDP), deficit to GDP (Def;%GDP), cyclically adjusted balance (CAPB,%), share of expenditures on GDP (Exp;% of GDP), share of revenues on GDP (Rev;%GDP), individual types of expenditures and taxes.

Molnár (2012), the European Commission (2007) considers as a starting impulse of the fiscal consolidation high deficit, as well as a rising debt-to-GDP ratio. The initial monitoring of the budget deficits increases for the country's outlook on increasing indebtedness is very important when managing the country's fiscal policy. The declining tendency of the primary balance indicator, as well as the cyclically adjusted one contributes to the consolidation start. A positive effect on the consolidation start has also the indicator of income to GDP and the individual types of expenditures and taxes.

*(3) The third group of fiscal consolidation factors are the political factors ($POL_{ji,t}$).* Authors such as Molnár (2012) or Ardagna (2009) deal with the political orientation of government power as important factors influencing the success of a fiscal consolidation. Among the political factors, factors such as: the electoral period (ElY, a dummy variable - the year when elections took place, value of 1, the year in which elections were held, value of 0), the government orientation, the political rules in the EU countries at different time periods, fiscal fiscal rules, or the Herfindahl index - the index of the political parties concentration in the Parliament (HI).

Some pressure to consolidation implementation may also come from consolidation activities in neighboring countries. It is also important to recall domestic political conditions. Newly elected governments often tend to introduce new budget rules. Guichard et al. (2007) claims that the EU's political rules introduced in 1992-1997 and budget rules also affected the beginning of the consolidation. The negative impact on the beginning of fiscal consolidation is attributed to the exchange rate, but this indicator is many times losing weight at national level, as in most EU countries the evolution of the Eurozone's common currency, the euro, is monitored against other currencies. The negative effect is also identified for the share of expenditure on GDP, the determination of the right-wing or left-wing government in the country and the Herfindahl index of the political parties concentration in the parliament.

*(4) Other factors ($OTH_{pi,t}$)* that do not belong to any of the above defined groups are included in the last set of factors. Their effect on the success of fiscal consolidation can be significant. Other factors usually include: Crisis (as a dummy variable - the year with a crisis active marked 1, year without it, 0), consolidation composition and consolidation duration.

## 3. DETERMINANTS ANALYSIS OF FISCAL CONSOLIDATION START AND DISCUSSION

The analysis of statistically significant determinants of the "consolidation start" was done through panel regression in EU countries in the 1995-2016 time period. The basic equation expressing the influence of explanatory variables (determinants) on the "start of fiscal consolidation" attribute was defined in the form *(1)*. A model assumption $H_1$ has been assumed: *A positive effect on the "start of fiscal consolidation" for the envisaged macroeconomic, fiscal, political and other determinants, with the exception of the variables: government expenditure in relation to GDP and the Herfindahl index, is expected*. The established assumption was verified in the econometric analysis through four types of models (OLS, OLS model with dummy variables for countries and years, FEM and REM models). The selection of the final appropriate regression model was based on statistical significance tests that were applied. Based on the tests described within the methodology, as an appropriate model was the PLM with the fixed effect on time selected. The significance of all exogenous variables was tested by comparing the probability p-value with the selected level of significance ($\alpha$=0.05). Resulting model was created using the step-wise elimination method where statistically insignificant variables were systemically removed from the model with a respect to the Adjusted R-squared value. The statistical significance of each model as a whole has been assessed based on the Adjusted R-squared value. The criterion was chosen with the intention to balance the econometric models with the same endogenous variable, while the models differ from each other by the number of variables included as well as by the size of the files of the observed data (i.e. the number of the observations). The results of the panel regression with the statistically significant variables within all examined groups, together with the corresponding estimates of the coefficients and statistical significance, are shown in Table 4.

Table 4. Statistically significant determinants of “start” of fiscal consolidation

| | OLS | | | FEM | | REM |
|---|---|---|---|---|---|---|
| | OLS model | Dummy for country | Dummy for years | countries | years | |
| *Macroeconomic variables* | | | | | | |
| rHDP | -0.43033 (0.09480). | -0.66239 (0.01396)* | -0.61140 (0.03284)* | -0.61140 (0.03284)* | -0.66239 (0.0139)* | -0.54232 (0.0387)* |
| hdpGAP | -0.01281 (0.00242)** | -0.00870 (0.0792). | -0.00949 (0.0555). | -0.00949 (0.05552). | -0.00870 (0.0792). | -0.01292 (0.0027)** |
| Unemp | | 0.02245 (0.00130)** | 0.00534 (0.2294). | 0.00533 (0.22945). | 0.02245 (0.0012)** | |
| Openess | | -0.01305 (0.00326)** | | | -0.01305 (0.0032)** | |
| Infl | 0.002997 (0.01382)* | 0.00357 (0.01871)* | 0.00415 (0.0264)* | 0.00415 (0.02640)* | 0.00357 (0.0187)* | 0.00382 (0.0019)** |
| STinterest | | -0.00847 (0.06499). | | | -0.00847 (0.0649). | |
| *Fiscal variables* | | | | | | |
| CAPB | 0.045183 (5.19e-0)*** | 0.07185 (9.93e-0)*** | 0.03619 (0.0004)*** | 0.03619 (0.0004)*** | 0.07185 (9.933e-0)*** | 0.04149 (2.689e-0)*** |
| Exp | 0.02596 (0.00360)** | 0.04172 (0.00397)** | 0.01702 (0.0796). | 0.01702 (0.07966). | 0.04172 (0.00397)** | 0.02397 (0.0075)** |
| Rev | -0.03477 (0.0003)*** | -0.037285 (0.02968)* | -0.02576 (0.0123)* | -0.02576 (0.01236)* | -0.03728 (0.02967)* | -0.03308 (0.0005)*** |
| *Political variables* | | | | | | |
| EiY | | | -0.05852 (0.097920). | -0.05852 (0.09791). | | |
| *Other variables* | | | | | | |
| Crisis | 0.07305 (0.0967). | 0.07280 (0.10146). | | | 0.07280 (0.10145). | |
| Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1 | | | | | | |

Source: Authors' calculations according to output from the R program

Based on the described within the methodology, an appropriate model was the PLM with the fixed effects for years. Among the statistically significant *macroeconomic variables* ($\boldsymbol{MACR}_{k_{i,t}}$), for the start of fiscal consolidation include: real GDP growth rate, GDP output gap, unemployment rate, openness of the economy, inflation and short-term interest rate. The quantitative effect of output gap, inflation and short-term interest rate is negligible, despite their statistical significance. The GDP growth rate, in line with research results, has a negative effect on the start of the consolidation process. Based on the result, a positive growth of the economy under the ceteris paribus condition contributes to a decline in the deficit and debt in the country, which leads to a reduction in efforts to implement the consolidation. The research results are consistent with the research such as Auerbach and Gorodnichenko (2012) who state that during economic expansion is the probability of the start of consolidation lower, while within the consolidation economy tends to stay in the consolidation episode.

As a positive factor, that increases the probability of starting consolidation in the country, is the level of unemployment. According to Larch and Turrini (2008) and Mulas-Granados (2003), the effect of the unemployment rate on the budget is very strong and therefore is the certain level of unemployment the impulse for consolidation. The openness of the economy negatively affects the beginning of the consolidation attribute. The resulting effect is inconsistent with a number of theoretical assumptions of researches (Alesina and Ardagna, 1998; Agnello, Castro and Sousa, 2012, etc.) that state a positive effect. According to the interconnection between EU countries, in particular in recent years by the emergence of monetary union and by relatively free international trade conditions, and the guides of national policies on EU sides, many difficulties can arise when countries perform individual consolidations at national level.

From the set of fiscal variables ($FISC_{l_{i,t}}$) statistical significance has only been demonstrated in the case of the primary balance and the ratio of both expenditures and revenues in relation to GDP. CAPB primary indicator was the variable significant within all implemented models. The results are consistent with a number of foreign surveys where the significance p value was almost zero. As reported by Lodge and Rodriguez-Vives (2013), Guichard et al. (2007) or the European Commission (2007), the CAPB indicator has a positive impact on consolidation, which means that, as Molnár points out (2012), deficit is becoming a major driver of country's need to consolidate. As the regression results showed, a 1pp expenditure on GDP increases the probability of start of consolidation by 4.17%. On the other hand, the increase of 1 pp in revenues on GDP decreses the start of consolidation by 3.72%. The above stated indicators express from the theoretical point of view the composition of consolidation. From the composition of consolidation point of view can be stated that the consolidations put a greater weight on cuts in social spending, and so tend to an increase in the chances of success. Consolidations based on government spending corrections are more successful than consolidation based on the increase of budget revenues. This is in line with the empirical researches (e.g. European Commission, 2007; Alesina and Ardagna, 2010 or Kumar et al., 2007) which state that revenue-based consolidation has a lower likelihood to be successful as the expenditure ones.

In the PLM model with fixed effects for years, the two examined policy variables ($POL_{j_{i,t}}$) (election, Herfindahl index) were excluded due to their low significance during testing. The Herfindahl Index, although its interpretation is still rare among authors, offers a picture of the concentration of political parties in parliament during the election period. The test result is inconsistent with the Lassen theory (2010), which indicates a negative impact on the start of the consolidation.

The presence of the crisis, as the only variable examined within the group of other determinants ($OTH_{p_{i,t}}$), showed its significant impact on the consolidation start. The emergence of the crisis creates pressure on fiscal reforms creation and the recovery of public finances and the economy as a whole. This pressure is reflected as a positive effect on the fiscal consolidation start and its success (Barrios et al., 2010). From the fiscal consolidation start effects point of view, the original assumption of H1 about a positive effect can be except the determinant expenditure to GDP (Guichard et al., 2007; Gnangnon, 2011) and the Herfindahl index (Lassen, 2010) rejected.

## CONCLUSION

The initial impulse for fiscal consolidation is conditioned by a number of determinants that may have either a positive or a negative impact on the attribute itself and so ultimately affect success of the consolidation process. The main objective of the paper was, based on theoretical knowledge and empirical research on the consolidation start and its determinants, to empirically evaluate the impact of selected determinants on the start of consolidation in the EU member states in the time period of 1995-2015 using the methods of quantitative economics.

The theoretical implication of the realised research can be considered as fullfiled as this research provided a synthesis of knowledge and empirical evidence about the “start of fiscal consolidation” attributes and clarifying the effects of macroeconomic, fiscal, political and other determinants on the start of the consolidation episodes based on performed systemic review of research in line with the EBHC methodology. As the theoretical part of the research has proven, the problem of consolidation process determinants is the object of interest of many past, current researches and a space for further analysis exists.

The purpose of the empirical part of the research was using the panel regression analysis (OLS, FEM and REM models) to analyse the statistically significant macroeconomic, fiscal, political and other determinants of “start of fiscal consolidation” and to quantify the polarity of their impact on the fiscal consolidation start in the pre-identified “start” episodes. Analysis also verified the assumption that the “start” of consolidation process is positively influenced by the macroeconomic, fiscal, political and other determinants, except the expenditure to GDP and Herfindahl index variables. Results of performed econometric analysis have shown that that the start of consolidation is significantly determined by initial macroeconomic and fiscal situation in the country which is significantly captured by the size of CAPB, budget expenditure and revenue side the size of HDP growth. Also political and other determinants (such as crisis) can also influence the start of consolidation episodes. Based on the performed econometric analysis can be stated that the final models and findings on the relationship between the “start” of fiscal consolidation and selected determinants are relevant and it can be assumed that the resulting (unexplained) variability of the investigated variables can be explained by random component. In addition, it needs to be noted that the final results of the individual analyses might be affected by several process-related factors such as problems with the biased variables.

The issue of start of consolidation process and its determinants represent an important issue because the first question of interest when exploring the conditions of fiscal consolidations is what triggers them. For a successful fiscal consolidation, that is present in the EU countries from the 80s´, it is essential to identify significant determinants of individual attributes of fiscal consolidation and so include them in the consolidation process. Therefore, the future analysis should concentrate on other attributes (length, duration and intensity of consolidation) and its determinants with consideration and modification of limitations of presented research.

## ACKNOWLEDGEMENT

This paper was processed as an output of a research *project Approaches for fiscal imbalance solution in terms of the EU and in the context of the systemic crisis* registered by the Scientific Grant Agency of Ministry of Education, Science, Research and Sport of the Slovak Republic and the Slovak Academy of Sciences under the registration number *VEGA 1/0967/15*.

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