

UNIVERSITY OF PUBLIC SERVICE
Doctoral School of Public Administration Sciences

Ádám Marton

**Fiscal policy from the perspective of European growth prospects
and macroeconomic imbalances**

Doctoral (PhD) thesis

THESIS BOOK

Supervisor:

Prof. Dr. Péter Halmai

Budapest, 2023

1. The motivation of the choice of topic, the framework of the research

In the almost decade and a half that has passed since the 2008 financial crisis (*Great Recession*), fiscal policy has had to face many challenges. The macroeconomic environment and various imbalances significantly influenced the leeway, efficiency, and stabilization role of the fiscal policy. In this way, it can be stated that the continuous and tendentious formation – which characterizes individual scientific theories and empirical research in general – has also relevantly affected the budgetary policy.

In the years before the crisis, the use of monetary policy was prioritized over fiscal policy. In addition, the assessment of the effectiveness of fiscal policy measures were twofold in relation to crisis management. The unconventional monetary policy which was the main line of crisis management, and zero lower bound (ZLB) that requires them, created new narratives for monetary policy and economics. As a result of the measures, a "propitious" global economic environment characterized by an abundance of liquidity has emerged in recent years, which was interrupted by the Covid-19 pandemic. However, the coronavirus crisis is not a traditional economic shock, but a health crisis, which is related to many sectors of the economy through turbulent effects. These effects, as well as the economic standstill associated with the Great Lockdown highlighted new, high-level dimensions of the state's economic role following various crisis management measures.

The starting point of the research is the changes that took place following the 2008 financial and 2010 sovereign debt crises, as well as the economic environment of the years since then. In addition, the dissertation examines the fiscal policy challenges of the Covid-19 crisis and the post-Covid period, which were still having their effects at the time of the conclusion of the thesis. Moreover, the framework of the dissertation is given and surrounded by the characteristics of macroeconomic imbalances. In addition to the traditional approach, in the period covered by the paper, three heterogeneous world economic environments were present from the point of view of fiscal policy: the credit and debt-constrained phase, the "propitious" phase characterized by an abundance of liquidity, and the Covid and post-Covid period. The various time intervals had different fiscal political opportunities, leeway, and challenges, influencing the efficiency and effectiveness of the measures. These above systems of relations, to be interpreted as individual external conditions and exogenous factors (in some periods as exogenous quantities), enabled, and required the application of various fiscal policy instruments. These methods of fiscal policy, economic policy recommendations and the

effectiveness of the introduced measures were accompanied by a lively discussion by the representatives of the individual theoretical paradigms along the lines of sophisticated models and empirical research, as well as from the policy and decision-making side.

In the context of these findings, the dissertation examines *how the role, impact mechanisms and effectiveness of fiscal policy developed in the deterministic research framework by including two further closely related areas: economic growth and public debt, and what patterns can be observed from the aspect of budgetary policy in different periods and regarding the relationships of various macroeconomic imbalances*. It is necessary to emphasize that the connection of the three areas does not entail a detailed and comprehensive macroeconomic presentation and analysis of all three factors. Economic growth is an essential element of the examination of the relationships between fiscal policy and public debt, so it is considered as a kind of connecting element during the thesis. The micro- and macroeconomic effects caused by public debt appeared along different mechanisms in developed, emerging, and developing economies. As a result of the 2008 financial crisis and crisis management, the increased public debt rates culminated in the 2010 European sovereign debt crisis and the partial Greek state bankruptcy. This resulted in the first debt crisis in a state that can be considered a developed economy in the modern sense, which, through its spillover effects, felt its turbulent effects in the entire European Union, but especially in the peripheral states. The "propitious" world economic environment of the decade that has passed since then – in close connection with the abundance of liquidity caused by unconventional monetary policy measures (for example Quantitative Easing – QE) and near-zero nominal interest rates – has facilitated the financing and sustainability of public debts, thus resulting in relative calm in the world economy. Nevertheless, the increased debt ratios represented only a limited reduction in many countries, and the degree of foreign exposure, as well as the closely related restructuring of the debt, took place in only a few economies. The significance of the topic is also provided by the fact that the active fiscal policy intervention applied to mitigate and eliminate the negative turbulent economic effects caused by the Covid-19 health crisis puts considerable pressure on budget expenditures, while the period of the "Great Lockdown" causes on the revenue side effect of the budget due to the lack of revenues. The budget has been therefore under double pressure. The post-Covid period has additional consequences. Beyond the above two factors, however, public debt ratios relative to GDP are affected by a third effect. From the denominator side, the economic downturn also affects debt ratios in a turbulent way. The fiscal political conditions of the post-Covid period and the ability to finance debt, thereby its sustainability, will be

influenced by the risk-taking willingness of the international investor environment, as well as the evolution of interest rates¹. Both can be considered as exogenous factors in a causal relationship with each other. However, fears about the debt crisis – especially in relation to developing countries – have already appeared. In the short term, however, the economic boom caused by the post-crisis rebound may offset this, but in the medium and long term, it may significantly influence the conditions and economic development of the economy.

Along the logical connection points, the characteristic fiscal political motives of two of the three defined intervals are the main focus of the examinations: *the restrictive fiscal policy direction, that is the fiscal adjustment in the credit and debt limited phase, while the macroeconomic relations of the public debt in the "propitious" time interval characterized by the abundance of liquidity*. In addition, in accordance with the starting point of the research, the third main direction of the dissertation is *macroeconomic imbalances, which focus on two significant units: the pandemic and the aging society*. The section on Covid Economics – in order to accurately identify the individual patterns and the role and efficiency of fiscal policy as a macroeconomic stability mechanism – was linked to the issue of fiscal resilience. The main direction of the examinations – arising from the above connection – is the fiscal political aspects of potential macroeconomic imbalances. The latter is on the issue of Covid Economics, that is – until the conclusion of the thesis – on the features of the active demand-stimulating budgetary policy responding to demand and supply shocks, their debt consequences, and the challenges of the post-Covid period; and focuses on the macroeconomic aspects of an aging society.

Another significant dimension of macroeconomic imbalances is the issue of an aging society, which has characterized developed economies for several decades. Aging can exert its turbulent effects through several different channels, and it also has many relevant aspects of economic policy and social policy. In addition to the fact that it can negatively influence economic growth through its effects, it can also significantly influence the future scope and efficiency of fiscal policy. In connection with these findings, its discussion in the dissertation is necessary and essential, and it also tries to serve the progressive view of the thesis.

¹ It should be emphasized that at the time of the submission of the dissertation, because of the increased inflationary pressure, the monetary policy was characterized by a restrictive approach (and, in the case of most economies, an increase in the interest rate).

Summa summarum, the main focus of the dissertation is the complex synthesis of the trinity of fiscal policy, economic growth and public debt, during which I attempt to comprehensively synthesize the three macroeconomic issues that are in close interaction with each other and have a two-way, relative, but not trivially causal relationship. However, it must be stated that complexity does not glaringly declare a holistic analysis covering all factors and aspects. In case of this dissertation, the comprehensive synthesis indicates that the triad of fiscal policy, economic growth and public debt is credit- and debt-constrained; in the "propitious" phase, which characterized by an abundance of liquidity; and Covid period. I examine them along the lines of involving macroeconomic impact mechanisms and macroeconometric methods. At the same time, economic growth plays a connecting role during the analysis process, its various characteristic features are not discussed in detail. Furthermore, in accordance with the progressive nature of the examinations, I also scrutinize the fiscal political and economic growth effects of the aging society. The summary chart of the logical arc of the dissertation (*Figure 1*) was prepared in close connection with the formulated statements, which serves to identify the points of connection between the individual topics.

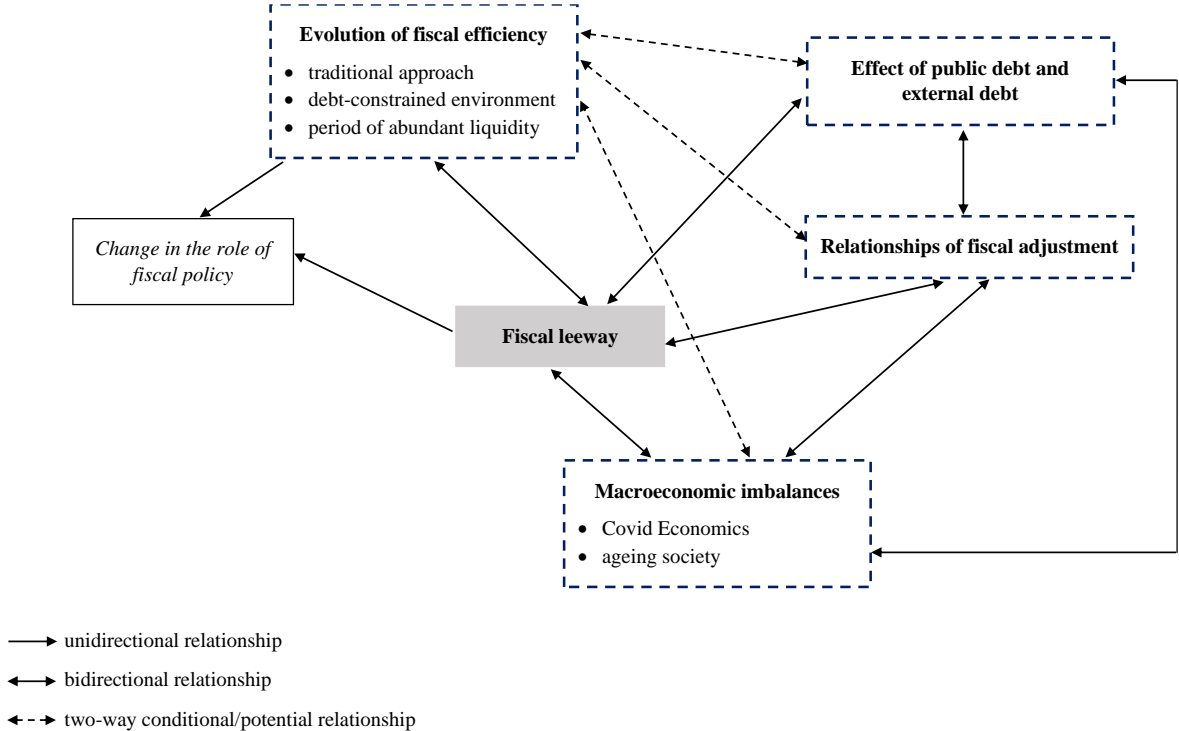


Figure 1: Chart of the logical connection points of the dissertation

Source: own editing

2. Research objectives and the hypotheses of the dissertation

The primary research questions and hypotheses of the thesis were formulated in accordance with the formulated main problem area and main objective of the dissertation – that is how the role, impact mechanisms and efficiency of fiscal policy developed depending on the different macroeconomic challenges following the 2008 and 2010 crises (*Figure 2*).

- Research question 1: *What kind of relationship can be demonstrated between economic growth and public debt in the European Union between 1996-2019?*
- **Hypothesis 1: A non-linear relationship between public debt and economic growth can be demonstrated.**

- Research question 2: *How have the 2010-2012 fiscal adjustment measures influenced the evolution of the debt ratio in the European Union?*
- **Hypothesis 2: The applied adjustments clearly have not led to an actual reduction in the stock of public debt, the growth effect was more significant in the reduction of the debt ratio.**

- Research question 3: *What success criteria can be used to assess the macroeconomic success of the fiscal adjustment?*
- **Hypothesis 3: During the macroeconomic evaluation of the fiscal adjustment, it is necessary to apply at least two success criteria.**

- Research question 4: *How does an aging society affect (i) fiscal policy and (ii) economic growth?*
- **Hypothesis 4: An aging society has a negative impact on (i) fiscal policy and (ii) economic growth through various channels.**

Figure 2: Summary chart of the research questions and hypotheses of the dissertation

Source: own editing

3. The structure of the dissertation

The established structure of the dissertation is intended to support the examination of the formulated research questions and hypotheses. Along these logical considerations, the dissertation is divided into four large dimensions. The *first large block* (*second chapter*) covers the theoretical framework of fiscal policy, which serves as the literary basis for the research of the thesis. In the structural unit, the theoretical connections of fiscal policy are explored along the most important macroeconomic characteristics of the two periods that provide the research framework of the dissertation – the debt-constrained period and the "propitious" global economic environment. However, an essential element of the analysis of the opportunities and challenges arising in the different global economic environment is the identification of the typical aspects and impact mechanisms of the budgetary policy operating in the traditional framework². At the same time, the breakdown of the time series into stages and the separate analysis of the fiscal characteristics serve a dual purpose: on the one hand, a work with a comprehensive approach and a comparative scientific need, which is limited in domestic terminology, describes the fiscal policy in the different international environments following the 2008 financial crisis the evolution of its role and effects. In accordance with this, the first objective of the chapter is to provide a comprehensive picture of the changed fiscal conditions. On the other side, it is intended to serve as a basis for the detailed analysis of public debt, restrictive fiscal measures and macroeconomic imbalances discussed in the further chapters of the thesis.

The *second large block* (*third chapter*) discusses the theoretical and empirical aspects of the macroeconomic relations of public debt. Despite (and because of) the crisis management measures of the 2010 sovereign debt crisis and the favourable world economic environment of recent years, debt ratios that have increased in recent decades have not shown a significant reduction in most economies. However, the period characterized by an abundance of liquidity masked the imbalances, which were further deepened by the turbulent effects caused by the Covid-19 pandemic and the fiscal crisis management, thus raising the levels of public debts to historic heights in the case of many economies. The favourable global economic environment will gradually disappear from the end of 2021 with the restrictive monetary policy direction

² At the same time, it should be noted that the exploration of the traditional theoretical relationships of fiscal policy does not aim at a comprehensive overview of economic history.

applied in parallel with the increased inflation rates, but at the same time the fiscal restriction has still been postponed. With rising interest rates and the escalation of negative events, risk-taking investor behaviour can quickly change. In close connection with this, the aim of the chapter is the complex exploration of the macroeconomic effects of public debt, with regard to the examination of the much-discussed causal relationship between public debt and economic growth, and related to this, the threshold value of the public debt. Although the causal relationship is the main guiding line of the chapter, it is nevertheless only a slice of the discussed topics, and the individual related perspectives are identified along several branches. It is also necessary to emphasize the importance of the role of external debt when identifying growth effects. In the case of an increase in external debt as a relevant factor, negative consequences may also occur in terms of the development of economic growth.

Continuing along this line of thought, the *third large block (fourth chapter)* emphasizes the possibility of reducing the public debt by identifying the growth and political economy aspects of fiscal adjustment. Fiscal consolidation, its effectiveness, and its effective use as a crisis management tool through the associated growth sacrifice have been questioned in connection with the European sovereign debt crisis. In accordance with these findings, it is essential to examine the macroeconomic effects of the adjustment – in close connection with the analysis framework of the public debt – with regard to the effects of growth (Keynesian and non-Keynesian). At the same time, it should be emphasized that the aim of the chapter and the thesis is not a detailed analysis of fiscal sustainability (and the sustainability of public debt) and its questioning. It is also necessary to point out that I consider the fiscal consolidation measures as discretionary measures during the thesis, and I do not examine the effects of the fiscal rules on the budget balance and debt ratio. Parallel to these narrowing in content, the structural unit's further goal is to examine the possibilities of fiscal adjustment in reducing the debt ratio from both a theoretical and empirical point of view. As a related trend, the political economy aspects, and the factors of the success of the fiscal adjustment are also analysed. In parallel with the latter aspect, the criterion of success is also defined.

The *fourth large block (fifth chapter)* is related to the previous arc of the thesis, but still expanding it further, examines macroeconomic imbalances and their challenges from the perspective of fiscal policy. Even before the coronavirus epidemic, the world economic environment was characterized by several macroeconomic and geopolitical uncertainty factors that have/may have fiscal political connections as a potential centre of attention and can result in its transformation and a change in the effectiveness of fiscal measures. It can be classified

here, for example, the projections of the geopolitical demonstration of force of the United States and China in the trade war; the challenges caused by an aging society, the spread of Industry 4.0 achievements and their labour market connections, as well as the different dimensions of sustainability. The Covid-19 pandemic increased the fiscal pressure. Along this logical arc, two large, closely related areas are analysed in detail during the chapter: the impact mechanisms of the pandemic on public debt; and the budgetary and economic growth trends of the aging society. These issues can serve as a critical point in the present and potentially in the future in terms of the development and management of fiscal policy and public debt. In accordance with this statement, their detailed discussion is an essential part of the thesis, and it is also intended to serve its progressive nature. The thesis ends with the structural unit of *the summary and conclusions*, which includes a summary of the conclusions drawn during the examinations and new and innovative results.

4. Applied methodology

In the field of applied methodology, the dissertation tries to present and apply a wide range of quantitative methods to examine the formulated research questions and hypotheses, as well as to ensure the robustness of the results. The purpose of the analyses is twofold: on the one hand (i) it serves to test the hypotheses formulated in connection with the theoretical connections, and on the other hand (ii) it tries to expand the scientific discussion related to the topic. In this connection, during the analysis, it examines the individual problem areas based on several approaches and methods, thereby trying to ensure their robustness.

In general, it can be said that the unit of examination of the thesis are the levels of the European Union: aggregated and member state also. The frequency of the data included in the analyses are annual, and the databases created for each econometric analyses cover cross-sectional, time-series and panel databases. The sources of the data for all analyses were the international databases, primarily the Eurostat, IMF, OECD, and World Bank databases. Figure 3 summarizes the methods of analysis related to each main empirical examination part, discussed separately.



Figure 3: Summary chart of the methodologies used during the investigated relationships

Source: own editing

The first unit focuses on the analysis of the effectiveness and role of fiscal policy in different macroeconomic environments. The dissertation starts from the basic assumption that the macroeconomic characteristics experienced in different periods influence the efficiency and role of fiscal policy in different ways. The raised problem area is analysed through the synthesis of the literature base by revealing the theoretical connections and organizing the results of the relevant empirical studies. During the examinations, a logical arc is formed, as a result of which I examine the change in the effectiveness and role of fiscal policy in three different macroeconomic environments (the traditional approach, the debt-constrained period and the time of liquidity abundance). The examination framework established in this way creates the possibility of a comprehensive comparative analysis, which covers the identification of the

main relevant factors, impact mechanisms and effects, as well as the detailed mapping of the relationship to related variables (for example public debt). The primary goal of this comparative analysis is to develop a theoretical framework to form the basis of the dissertation and for further research questions and related examinations of the dissertation.

The focus of the second unit is on the relationship between public debt (and related external debt) and economic growth. When examining the relationships between the variables, the relevant literature represents heterogeneous results in the examination unit of developed economies. Heterogeneity covers the casual relationship between the debt ratio and economic growth, as well as non-linear relationships between the indicators, that is the relevant factor of whether the debt ratio over a certain threshold is associated with a growth sacrifice. In accordance with this finding, the main direction of the analyses is twofold. On the one hand, it focuses on the existence and direction of causal effects between economic growth and the debt ratio (as well as external debt), and on the other hand, it aims to identify the existence of a non-linear relationship based on a threshold value. In terms of the applied methodology, the analysis of the causal relationships is carried out using the panel Granger causality test on a panel database formed from the member states of the European Union. For the examination between the public debt ratio and economic growth, the established database covers the period between 1995 and 2018, while for external debt and economic growth, the time horizon between 2005 and 2017. Due to the nature of the time series – after it includes the shock related to the 2008 crisis – I also divided the examinations into two parts, that is for the period before and after the 2008 crisis. The analysis of causality serves as the basis for the examination of non-linear effects with threshold regression. The analysis based on threshold regression is primarily based on the sample of the member states of the European Union between 1996 and 2019. However, examinations also include time-series data for individual economies to identify country-specific factors and thresholds.

The dissertation contains three research units related to the problem of fiscal adjustment, which is closely related to the public debt. Their purpose is to provide a comprehensive analysis of the theoretical context of consolidation. The objective of the first examination related to the topic is to reveal the relationships of the non-Keynesian effects of the fiscal adjustment. The basis of the empirical analysis is a database formed from the data of 15 European Union member states between 2004 and 2017 – which include the group of countries called the core countries of the euro area, the peripheral states, and three non-euro area member states (Denmark, the United Kingdom and Sweden) – during which using a panel regression methodology the effects of the

fiscal adjustment on some macroeconomic variables were examined. The objective of the second related analysis is to analyse the impact of the European adjustment measures introduced in connection with the 2010 sovereign debt crisis on the debt ratio in the form of a case study. Accordingly, the growth and debt effects are separated, during which the analysis of the changes in the debt ratios of the European Union member states from 2014 to 2016 was concentrated. The third unit of examination focuses on the success of the fiscal adjustment, which aimed to develop a success criterion based on the comparison of certain success factors used in the literature and their correlations. When testing the success criterion established in this way, the subjects of the examinations are the macroeconomic effects of the adjustment measures introduced in the member states of the European Union between 2010 and 2012.

The last two research units of the dissertation focus on the latest dimensions of macroeconomic imbalances, which cover the fiscal policy contexts caused by the Covid-19 pandemic, as well as the macroeconomic contexts of an aging society. The effects of the pandemic are analysed in detail in the context of a case study, during which the primary goal is to identify the European Union's fiscal policy projections of the Covid-19 epidemic and crisis management – in close connection with the context of public debt. The objective of empirical studies of the macroeconomic effects of an aging society is to identify its effects on fiscal policy and economic growth. The starting point of the examinations is the vector error correction model (VECM), during which the analyses were performed on panel databases formed from the member states of the European Union, as well as on the time series of the individual countries. During the creation of the databases, the available data of each economy formed a bottleneck, thus a narrowed and an expanded panel database will be created. In addition, for the same reason, individual time-series studies can be carried out on the model of Austria, the Czech Republic, the Netherlands, Ireland, Hungary, Portugal, Spain, and Slovenia. The purpose of the VEC model analysis is to examine the fiscal political and economic growth effects of an aging society in a complex framework, and to identify the impact of a shock in the old-age dependency ratio on fiscal and growth variables. In addition to the VEC model, I also used the Generalized Method of Moments (GMM) as a new perspective, to explore the growth relationships of aging as widely as possible. Within this framework, the effects of the old-age dependency ratio on economic growth were analysed by including various variables relevant to aging (for example labour productivity). The examinations are carried out on a panel database established from the data of the 21 member states of the European Union between 2001 and 2019.

5. Summarized conclusions and theses of the dissertation

The findings identified in the first structural unit regarding the effectiveness and role of fiscal policy in different periods serve as a starting point for examining the research questions and hypotheses of the dissertation, as well as for their evaluation. The debt-limited period established in the theoretical framework – in addition to the involvement of many other relevant factors – also led to the examination of the problem area of the public debt. The first formulated research question and hypothesis of the dissertation is related to this topic:

- Research question 1: *What kind of relationship can be demonstrated between economic growth and public debt in the European Union between 1996-2019?*
- **Hypothesis 1: A non-linear relationship between public debt and economic growth can be demonstrated.**

The sovereign debt crisis of 2010 raised the examination of the relationship between public debt and economic growth to the mainstream research directions, even in the examination unit of advanced economies. In the more than a decade that has passed since then, numerous research results have been produced regarding the nature of the relationship between the two variables, however, the individual research results draw an extremely heterogeneous picture and range widely. The lower limit of the interval indicates the absence of the threshold value, while the upper limit indicates the determination of several threshold values. In accordance with this, I examined the nature of the relationship between public debt and economic growth. The analyses took place along two main lines: I conducted panel causality and panel threshold regression studies. Based on the analyses carried out with the panel Granger causality test, it can be stated that between 1995 and 2018 in the member states of the European Union included in the paper, a one-way relationship can be demonstrated between public debt and economic growth, that is public debt has a causal effect on economic growth. If we divide the period into two, it can be stated that before the 2008 crisis there was a relationship similar to the entire period, while after the crisis a two-way relationship can be assumed between the two variables. Based on the results of the panel's causality analysis, it can be established that despite the different debt levels and periods, the public debt ratio had a causal relationship with economic growth.

On the basis of panel threshold regression analyses, it can be established that, based on analyses carried out between 1996 and 2019 on the sample of European Union member states, no threshold above which the debt ratio would negatively affect economic growth can be identified. Based on these, the growth sacrifice does not apply, and in the absence of the threshold value, a non-linear relationship cannot be assumed either. The developed results are partially shaded by the fact that a more heterogeneous picture emerges based on the threshold regressions performed on the time-series data series of each economy during the robustness test, and a threshold value can be assumed in some economies. Based on the above, however, a non-linear relationship between economic growth and the debt ratio cannot be clearly established. In accordance with this, the formulated hypothesis, that is that „*A non-linear relationship between public debt and economic growth can be demonstrated*” was **rejected**, so no thesis can be formulated in this regard. Nevertheless, it can be established that the panel examinations cover up the country-specific factors during the studies between the two variables and the determination of the related threshold value. In accordance with this statement, to get a relevant picture of the conditions of individual economies, it is necessary to take into account country-specific factors such as the debt structure, the economic structure or macroeconomic, institutional and political economic aspects. On the basis of these findings, conclusions drawn based on the application of a uniform criterion value (for example the Maastricht criterion) can lead to distorted results and the introduction of economic policy measures.

Increased debt ratios can exert their effects on the real economy through several channels. After the peak in 2014, public debt to GDP ratios represented a moderate decrease in the European Union. This process was interrupted due to the Covid-19. The pandemic, the related crisis management and recovery have raised debt ratios to historic peaks in most economies. Along these lines, it is necessary and essential to examine the public debt effects of the fiscal adjustment measures between 2010 and 2012 in the European Union, which, in addition to the current debt rates (and relatedly, the breaking point in the trends of the debt trajectories between 2014 and 2019), can serve as a lesson in terms of reducing the stock of public debt. The second formulated research question is related to this:

- Research question 2: *How have the 2010-2012 fiscal adjustment measures influenced the evolution of the debt ratio in the European Union?*
- **Hypothesis 2**: **The applied adjustments clearly have not led to an actual reduction in the stock of public debt, the growth effect was more significant in the reduction of the debt ratio.**

Based on the debt equation, the reduction of public debt rates can be achieved through several factors, for example, primary balance, growth, inflation, and interest rates. In connection with the applied fiscal adjustment measures, in this examination I focused on the effect of the analysis of two factors: the actual reduction of the debt stock and the effect of the increase. In this context, the hypothesis related to the research question was formulated: „*The applied adjustments clearly have not led to an actual reduction in the stock of public debt, the growth effect was more significant in the reduction of the debt ratio*” During the analyses, **I verified the proposed hypothesis**. In accordance with this, it is also possible to formulate a thesis.

Thesis 2: The fiscal adjustment measures applied between 2010-2012 clearly did not lead to an actual reduction of the public debt stock in the European Union. The debt ratio decreased in 23 member states by 2016 (compared to the base year of 2014), of which the actual debt stock showed a decrease in only 8 member states. The denominator (growth) effect – where the growth effect was greater than the effect on the debt stock – prevailed in 21 countries, in which economies the debt ratio also represented a decrease. The decrease in the debt ratio was primarily attributable to the growth effect.

From an empirical point of view, I examined the impact of the latest fiscal adjustments applied in the European Union between 2010-2012 on the debt ratio, in which I analysed the change from 2014 to 2016. This includes that the delay effects of the adjustment measures, as well as the consequences of the initial growth with the recovery period, were also the subject of the examinations. By 2016, the value of the debt ratio decreased in comparison to the base value of 2014 in 23 countries. Based on the results, it can be concluded that the growth (denominator) effect played a greater role in the reduction of the debt ratio in the European Union, the euro area and 21 member states. In contrast, the actual debt stock showed a decrease in only 8 member states. If it is examined from the side of the numerator (change in the actual debt stock), it can be concluded that the numerator effect was a more significant factor in 7 countries, of

which 6 economies showed an increase in the debt stock. From the point of view of fiscal sustainability, an increase in the debt ratio also improves future prospects and mitigates debt risks. However, with a potential macroeconomic or exogenous shock, growth rates may stagnate, and a recession may develop. The decrease in aggregate demand can influence the development of the debt ratio in a multiplicative way through the numerator and denominator effect, which, in addition to the existing levels of the actual debt stock (which can be further increased by discretionary fiscal policy measures), can induce a further rise in the debt ratio to historic highs. This can lead to an increase in risk premiums and problems related to fiscal financing and its sustainability. As a result, it is necessary to reduce the actual debt stock, which leads to the next research question.

In order to reduce the debt stock, it is necessary to introduce the appropriate fiscal adjustment from the economic policy point of view. However, assessing the success of the consolidation is difficult. This is related to the third research question and hypothesis of the thesis, as well as the tests related to them.

- Research question 3: *What success criteria can be used to assess the macroeconomic success of the fiscal adjustment?*
- **Hypothesis 3**: **During the macroeconomic evaluation of the fiscal adjustment, it is necessary to apply at least two success criteria.**

The introduced fiscal adjustments can be judged from macroeconomic and economic policy, political economy, and social aspects. Regarding the evaluation of the macroeconomic success of the adjustments, the international literature draws a heterogeneous picture. It must be stated that success is significantly influenced by the nature of the growth effect, as well as their enforcement. This statement implies that it is difficult to determine the success of a given adjustment by a single success criterion because of indirect and direct effects. In parallel, the third hypothesis of the studies was developed: „*During the macroeconomic evaluation of the fiscal adjustment, it is necessary to apply at least two success criteria.*” I **verified** the formulated hypothesis during the tests, on the basis of which the following thesis was developed.

Thesis 3: The indicator used to evaluate the macroeconomic success of the fiscal adjustment influences the assessment of the measures. This implies that the implementation of at least two success criteria is necessary for the accurate assessment of the given consolidation, which also includes the examination of the impact projected over several years (thereby the delay). In addition, the success criterion must be examined in each case in the context of the given economy, depending on the starting values. These factors are necessary (but not sufficient) conditions for evaluating the success of the adjustment. In parallel, I recommend the use of the cyclically adjusted primary balance and the debt ratio as the two success criteria.

During the examination of the success of fiscal consolidation, the problem area was analysed from both a theoretical and an empirical point of view. The range of indicators used as success criteria, as well as the corresponding threshold values, varies widely in the literature. In general, most research evaluates success based on a single success criterion. On the other hand, during the investigations, there was an argument in favour of the application of the double success criterion, during which the development of the cyclically adjusted primary balance and the change in the debt ratio were used as indicators. (During the determination of the threshold value of the two indicators, two values common in the international literature were used as a basis.) During the empirical analysis of the success criteria, the effects of the fiscal consolidation measures applied in the European Union between 2010-2012 were considered the subject of the analyses. Based on the results, it can be stated that, based on the CAPB criterion, the adjustment was not considered successful in three countries, while, on the other hand, the debt ratio showed a decrease in only two countries, and in most economies the value of the indicator reached its peak in 2014. The latter factor can be traced back to the greater growth sacrifice resulting from the underestimation of the fiscal multiplier, thus the denominator effect, as well as the delay effect. In connection with the evaluation of the success criteria, it must be established that the given success criterion can only be evaluated on a country-specific basis to obtain an unbiased and consistent value. This can be traced back to the fact that the relevant factor for the value of the given indicator is the starting state. In other words, in an economy with relatively better fiscal sustainability, even a smaller increase than the criterion value achieved with a lower CAPB balance can generate a relatively larger effect (which would be evaluated as a failed adjustment under the given conditions), than in the case of a country with a higher deficit, an improvement in the balance exceeding the criterion value, and thus a consolidation deemed successful. A similar finding exists for the debt ratio. Based on these, it can be established that the success of the adjustment can be judged relevantly and without bias

only on the basis of at least two success criteria, taking into account the starting value of the indicators and the country-specific factors of the given economy.

The final research question and hypothesis of the dissertation is intended to examine the current processes and foundations of future inequalities. In this context, it focuses on the aging society.

- Research question 4: *How does an aging society affect (i) fiscal policy and (ii) economic growth?*
- Hypothesis 4: **An aging society has a negative impact on (i) fiscal policy and (ii) economic growth through various channels.**

The issue of the aging society was examined in the dissertation in a complex framework, which extended to the establishment of a theoretical model through the identification of theoretical connections and mechanisms of effect. Furthermore, the developed model was analysed with various empirical analysis techniques. The preliminary hypothesis, according to which "*An aging society has a negative impact on (i) fiscal policy and (ii) economic growth through various channels.*" was **confirmed**. Based on these, the following thesis can be established.

Thesis 4: Based on the developed theoretical model, it can be stated that the aging society exerts its effects on the economy through fiscal and economic growth factors. Based on the tests carried out with the VEC model, it can be stated that the negative effects of an aging society prevail in the case of direct fiscal political effects. During the analysis of economic growth factors, the results obtained with the VEC and GMM models reach a similar conclusion, that is the aging society also has a negative effect on economic growth. In the case of growth factors, however, indirect effects must also be taken into account, that is that negative relationships can be partially or completely mitigated by other economic factors (for example effects arising from the business cycle) and the existence of country-specific effects. However, the latter finding also implies that these negative consequences can be indirectly influenced by targeted economic and social policy measures.

Although the aging society mainly characterizes developed economies, which affects both micro- and macroeconomic processes, it is nevertheless becoming an increasingly relevant

social phenomenon in developing economies as well. The forward-looking nature of the investigations is represented by the fact that this is a typical social situation even today, and it can have a multiplicative effect on the economy in the future. During the dissertation, a complex theoretical model was developed, which divides the channels of an aging society into two groups – fiscal and growth factors – through which it can negatively influence economic processes. The analyses focused on examining these factors using VEC and GMM models. Based on the results of the VEC model, it can be established that the direct fiscal effects were verified, that is the shock in the old-age dependency rate entailed an increase in health and old-age public expenditures. The indirect, that is growth effects examined within the framework of the VEC model represented a heterogeneous pattern, which can be traced back to their nature, that is that these factors are significantly shaped by several other economic factors and country-specific effects. In connection with this finding, economic growth was also examined in another modelling framework, with the GMM model. Based on the results of this examination, it can be stated that the aging society has a significant and direct negative impact on economic growth.

6. New scientific results and recommendations

Based on the results of the research carried out in the dissertation, it can be clearly established that the fiscal policy, its role, and effectiveness in the past period were significantly influenced by the macroeconomic environment and related shocks. Several factors – be it public debt or economic growth – shaped its scope, which will continue to have a potential impact on this branch of economic policy in the future. However, the exogenous shock caused by the pandemic and the related crisis management raised the role of fiscal policy to an even higher level and further increased the level of state involvement in all areas of the economy.

Along the lines of the objectives set out at the beginning of this paper, within the framework of the thesis, there was an effort to examine some aspects of fiscal political efficiency as thoroughly as possible. In accordance with this, the development of fiscal efficiency in different macroeconomic environments was analysed. Fiscal leeway can be considered a relevant factor of efficiency, so the relationship between public debt – as a potential limiting factor – and economic growth was also examined in detail. In addition, I scrutinized various aspects of the fiscal adjustment, with regard to the Keynesian and non-Keynesian effects of the adjustment measures, the possibility of reducing the public debt, and the criteria for success. However, the fiscal leeway can be influenced by factors causing additional turbulent effects, which must be

investigated. In close connection with this, in the dissertation – keeping in mind the progressive approach – I examined the fiscal political and economic growth effects of an aging society.

The new research results identified based on the evaluation of the hypotheses and the formulated theses in the dissertation can be briefly summarized as follows.

1. It can be proved that the fiscal adjustment measures applied between 2010-2012 clearly did not lead to an actual reduction of the public debt stock in the European Union. The decrease in the debt ratio was primarily attributable to the growth effect.
2. It can be proved that the success of the fiscal adjustment requires the application of at least two success criteria, for which two success criteria I recommend the use of the cyclically adjusted primary balance and the debt ratio indicator.
3. It can be proved that the aging society exerts negative effects on the economy through fiscal and economic growth factors. I found that the indirect effects of the growth factors must also be considered, that is that the negative correlations can be partially or completely mitigated by other economic factors (for example effects arising from the business cycle) and the existence of country-specific effects.

Overall, it can be concluded that fiscal efficiency can be significantly influenced by the developed macroeconomic environment and the nature of the shocks. The development of the fiscal leeway can be influenced by the debt limit and the value of the debt ratio. The non-linear relationship between the national debt ratio and economic growth was not verified during the examinations of the dissertation. Nevertheless, the studies contain an additional conclusion and economic policy recommendation. This means that the application of a uniform threshold for the debt ratio can have a distorting effect. In accordance with this, it is also necessary to revise the part of the Maastricht criteria applied in the European Union concerning public debt. It is necessary to examine the debt situation of the given economy in a complex framework because a single threshold value can lead to distorted results. For the complex framework, the following conditions were formulated in the thesis: (i) the examination of the threshold value of the debt ratio should take into account country-specific factors and long-term time series; (ii) a detailed mapping of the real economic conditions of each member state (the European Semester and the range of related country-specific recommendations are already intended to serve this), which puts the sustainability and financing capacity of the debt in a broader context. In this case, the given countries can be evaluated based on a uniform system of indicators (which includes micro- and macroeconomic as well as social and institutional variables). (iii) Considering the

effects of the world economy, which includes the general world economic conditions, risks, and trends, as well as the willingness of investors to take risks, and in connection with this, the global economic assessment of the given economy (for example the application of risk premiums). The outlined complex approach can provide a relevant picture of the country-specific factors of the given economy, as well as the current conditions of the EU and the world economy. In this way, the risks inherent in the position of the debt ratio can be revealed, and they can be mitigated at an early stage through various economic policy measures.

It is also necessary to emphasize that after the processes that have taken place because of the pandemic, the role of the state cannot be expected to decrease in the short and medium term, which means that the priority importance of fiscal policy will remain, and its scope and effectiveness will be a key issue in terms of potential future imbalances and in terms of shock treatment. However, turbulent factors can appear at any time, and as can be seen during the examination of the aging society, they can exert their negative effects. In this context, it is necessary and essential for national economies and the European Union to strengthen their fiscal resilience. In order to improve resilience, economic and social policy measures are also necessary.

7. List of major publications

1. Marton, Á. (2018): A fiskális konszolidáció és az államadósság kapcsolata. Csökkenti vagy növeli az adósságrátát a fiskális kiigazítás. *Pénzügyi Szemle/Public Finance Quarterly*, Vol. 63. No. 1. pp. 24–38.
2. Marton, Á. (2018). Az idősödés problémaköre az Európai Unióban. *Európai Tükör*, Vol. 21. No. 1. pp. 59-79. DOI:10.32559/et.2019.2.2
3. Marton, Á. (2019). *A szuverén adósságválság és az adósságproblémák kérdésköre*. Nemzeti Közszolgálati Egyetem, Közigazgatási Továbbképzési Intézet, Budapest, ISBN: 978-963-498-223-4
4. Marton, Á. (2019). A fiskális kiigazítás sikerességének megítélése – politikai gazdaságtani megközelítés. *Európai Tükör*, Vol. 22. No. 2. pp. 27-44. DOI:10.32559/et.2019.2.2
5. Czeczeli, V., Kolozsi, P. P., Kutasi, G.; Marton, Á. (2020). Gazdasági kitettség és válságállóság exogén sokk esetén : A Covid–19-járvány rövid távú gazdasági hatása az EU-ban. *Pénzügyi Szemle/Public Finance Quarterly* (1963-) 65 : 3 pp. 323-349. , 27 p.

6. Czeczeli, V., Kolozsi, P. P., Kutasi, G., Marton, Á. (2020). *Short-Term Impact of COVID-19 in the Clusters of EU Market Economies*. In: Lovrinović, Ivan; Vidaković, Neven (szerk.) *Macroeconomic Responses to the COVID-19 Pandemic*. Springer International Publishing (2021) pp. 53-84. Paper: Chapter 3, 32 p.
7. Czeczeli, V., Kolozsi, P. P., Kutasi, G., Marton, Á. (2020). *A Covid-19 járvány rövid távú gazdasági hatásainak klaszterelemzése*. In: Koltay, András; Török, Bernát (szerk.) *Járvány sújtotta társadalom: A koronavírus a társadalomtudományok szemüvegén keresztül*. Budapest, Magyarország : Ludovika Egyetemi Kiadó (2021) 594 p. pp. 275-296. , 22 p.
8. Czeczeli, V., Kolozsi, P. P., Kutasi, G., Marton, Á., Várpalotai, V. (2020) *Gazdasági válságkezelés Európában 2020 tavaszán: Rövid távú fiskális válaszlépések a COVID-19 okozta gazdasági kihívásokra*. ISBN: 9789634983361
9. Kutasi, G., Kolozsi, P. P., Czeczeli, V., Marton, Á., (2020). *Variety of European economies and their economic behaviour in the Covid-19 pandemic*. In: Maksym, Bezpatochnyi (szerk.) *Pandemic Economic Crisis: Changes and New Challenges to Society*. Sofia, Bulgária: VUZF Publishing House “St. Grigorii Bogoslov” (2020) 315 p. pp. 141-151., 11 p.
10. Kutasi, G. – Marton, Á. (2020). *Structure of public expenditures and economic growth in the EU*. In: Mészáros, József *Growth Implications of State Budget Income and Expenditure Structure*. Budapest, Magyarország: Gondolat Kiadó (2020) pp. 101-111. , 11 p.
11. Kutasi, G. – Marton, Á. (2020). *The long-term impact of public expenditures on GDP-growth*. *SOCIETY AND ECONOMY* 42: 4 pp. 403-419., 17 p. (2020)
12. Marton, Á. (2020). *Az államadósság felhalmozódását meghatározó tényezők aspektusai*. In: Bihari, E. – Molnár, D. – Szikszai-Németh, K.: *Tavaszi Szél 2019 Konferencia = Spring Wind 2019: Konferenciakötet II*. Budapest, Magyarország: Doktoranduszok Országos Szövetsége (DOSZ) (2020) 604 p. pp. 314-321.
13. Marton, Á. (2021). *The Relationship Between Increased Debt Ratio and Economic Growth in the European Union: The Granger Causality Approach*. *European Mirror*, Vol. 24. No. 1. pp. 77-94. DOI: 10.32559/et.2021.1.4

Curriculum vitae

Ádám Marton was born in Pápa in 1992. He obtained his bachelor's and master's degrees at the Faculty of Business and Economics, University of Pannonia in 2016 in BA International Economics and in 2017 MA in International Economics and Business. His research activity started with his participation in the Scientific Student Conferences, which resulted in the 2017 OTDK Economics Section, Economic Policy I. also achieved ranking.

He started his PhD studies in 2017 in the Economics research field of the Doctoral School of Public Administration Sciences of the National University of Public Service.

Starting from the fall of 2018, he works as a teaching assistant at the Department of Economics and International Economics of the National Public Service University. His educational palette covers many subfields of economics, including Microeconomics, Macroeconomics and Economic Policy, its main teaching and research area is the application of methodological aspects of economics, such as Mathematical Statistics, Cross-sectional, Panel and Time-series Econometrics.

From January 2020, in addition to supporting the work of the department, he actively contributes to the Research Institute of Economy and Competitiveness of NKE as a junior researcher.

His articles have been published in several qualified journals (Public Finance Quarterly, European Mirror, Society and Economy), and several studies are being published. In addition to the above, his writings can also be read on other platforms (for example Portfolio.hu). He participated in several domestic and international conferences.

He participated actively in the KÖFOP, Ludovika Kiemelt Kutatóműhely between 2017-19, as well as the progress of his research activities was also supported by the New National Excellence Program awarded in the 2018/2019 academic year.