CHARLES UNIVERSITY IN PRAGUE

FACULTY OF SOCIAL SCIENCES

Institute**: international studies**

Exploring the Impact of Brexit on European Capital Markets and Tax Policies: A Comparative Analysis of Tax Reforms in Central and Eastern European Countries

2021 **DIAN YUAN**

CHARLES UNIVERSITY IN PRAGUE

FACULTY OF SOCIAL SCIENCES

Institute: **international studies**

Dian Yuan

Exploring the Impact of Brexit on European Capital Markets and Tax Policies: A Comparative Analysis of Tax Reforms in Central and Eastern European Countries

Master thesis

Prague 2021

Author: Dian Yuan

Supervisor: prof. Karel Svoboda, Ph.D.

Academic Year: 2019/2021

Program: IMESS (International master's in economy, State and Society)

Word Count: 20206

Abstract

From the United Kingdom's Brexit on June 23, 2016, to the formal Brexit on January 30, 2020, there has been a large amount of academic literature discussing the possible effects of Brexit. Among them, the literature on the impact of Brexit on tax policy reforms and capital markets in EU countries is too numerous to enumerate. However, the current research literature lacks a discussion of Central and Eastern European countries, and there is even less research on the link between capital markets and tax policy reforms. This article assumes that the impact of Brexit on the capital markets of CEE countries will cause the government to turn to tax increases to increase fiscal revenue. Three hypotheses are proposed under this assumption. In addition, the empirical research in this article uses the combination of the Poisson model and the Heckman selection model to conduct regression research on the overall taxation of CEE countries, changes in direct and indirect taxation tax policies and bond interest rates, government changes, and political parties left or right. It is concluded that Brexit has no significant impact on the capital markets of CEE countries, and has not caused enough shocks that the government will turn to the government to increase revenue by issuing more tax increases. And Brexit reforms the taxation policy of CEE countries more from the government level. It is concluded that during the Brexit period, the government may be considering changes related to Brexit taxation, so more tax reduction policies will be issued to ease the pressure.

Abstrakt

Od britského brexitu 23. června 2016 až po formální brexit 30. ledna 2020 se o možném dopadu brexitu diskutovalo velké množství odborné literatury. Mezi nimi je příliš mnoho literatury o dopadu brexitu na reformy daňové politiky a kapitálové trhy v zemích EU. V současné výzkumné literatuře však chybí diskuse o zemích střední a východní Evropy a existuje ještě menší výzkum vztahu mezi kapitálovými trhy a reformami daňové politiky. Tento článek předpokládá, že dopad brexitu na kapitálové trhy zemí střední a východní Evropy způsobí, že se vláda obrátí ke zvýšení daní, aby zvýšila fiskální příjmy. Za tohoto předpokladu jsou navrženy tři hypotézy. Empirický výzkum v tomto článku navíc využívá kombinaci Poissonova modelu a Heckmanova modelu výběru k provedení regresního výzkumu celkového zdanění zemí střední a východní Evropy, změn v daňové a přímé daňové politice a úrokových sazbách

dluhopisů, vládních změn a politické strany vlevo nebo vpravo. Byl vyvozen závěr, že brexit nemá významný dopad na kapitálové trhy zemí střední a východní Evropy a nezpůsobil dostatečné šoky, aby se vláda obrátila na vládu, aby zvýšila příjmy vydáním většího zvýšení daní. A brexit reformuje daňovou politiku zemí střední a východní Evropy více na úrovni vlády. Byl učiněn závěr, že během období brexitu může vláda uvažovat o změnách týkajících se zdanění brexitu, proto bude vydán větší počet politik snižování daní, aby se tlak zmírnil.

Keywords

Brexit; tax reform; capital markets; Central and Eastern European countries (CEE); European Union; Partisanship; bond interest rates;

Klíčová slova

Brexit; daňová reforma; kapitálové trhy; země střední a východní Evropy (CEE); Evropská unie; stranické právo; úrokové sazby dluhopisů;

Declaration of Authorship

1. The author hereby declares that he compiled this thesis independently, using only the listed resources and literature.

2. The author hereby declares that all the sources and literature used have been properly cited.

3. The author hereby declares that the thesis has not been used to obtain a different or the same degree.

Prague … **27/07/2021** **Dian Yuan**

Acknowledgments

The author would like to thank my thesis supervisor Karel Svoboda for commenting on my methodology in the early stages of writing my thesis. Secondly, I would like to thank the tutor for his patience and correction in my writing process. Finally, I feel that all the teachers during the two years of studying at Charles University in Prague and UCL, thank you for your careful guidance.

Content

List of Tables and Illustrative Material

Chapter1: Introduction

According to (Adeoye, 2020), the European Union(EU) was created in November 1993 by the Maastricht Treaty, which originated from the prologue of gradual integration since 1945. More importantly, the EU is a political and economic union formed between European countries and formulates its own policies on the economic, social laws, and national security issues of participating member states. In addition, Archick (2017) further believes that EU member states have concentrated sovereignty in certain policy areas and coordinated laws on a wide range of economic and political issues, so the EU member states have formed a unique partnership. Specifically, the European Union is the latest stage of the European integration process that began after World War II. It was originally initiated by six Western European countries to promote peace, security, and economic development. According to (Wilde, 2017), after the initial formation of the European Union, it further helped small countries cope with the challenges they may face, such as economic growth, negotiations with major powers, and weakening of the sovereignty of major powers. In addition, according to (Borovina, 2016), based on formulating and conceiving the tax policies of EU member states, on the one hand, it is necessary to meet the government's own requirements and on the other hand to achieve the goals set by the European Community Treaty. At present, based on the principle of free movement of goods, services, capital, and labour, the European Union has formulated unified and coordinated tax policies in the field of indirect taxation, and partly in the field of direct taxation; therefore, EU member states need to comply with the priority conditions of the EU's founding treaty Relative freedom to formulate the operating rules of the country's taxation system. Therefore, EU member states should avoid adopting discriminatory taxation measures, as this may result in unfavourable treatment of people, goods and services or capital from other member states). Sometimes, differences between national tax systems can restrict the free flow of internal markets. For this reason, a certain degree of tax coordination at the EU level is very necessary. Because tax coordination can be done spontaneously (through market forces), through active actions at the EU level (implementation of common policies, coordination of policies, coordination of legislation, etc.) or through passive actions of the European Court of Justice (prohibition of member states' Certain behaviours that do not comply with EU regulations). In the absence of tax uniformity, negative effects may occur, such as the erosion of the national tax base, the provision of public services

and goods at a sub-optimal level, and unexpected changes in the tax structure. Member States, and distortions in the allocation of resources at the single market level. Therefore, Brexit will break away from the EU's control, so it will restore its own freedom to formulate tax policies. Therefore, according to (Ottaviano *et al.*, 2014), in January 2013, British Prime Minister David Cameron promised to hold a referendum on EU membership in 2017. Furthermore, according to Chang(2018), on June 23, 2016, the United Kingdom held a referendum on Brexit. Britain supported the referendum with a small majority, overcoming opposition from Scotland and Wales. Furthermore, according to Grabczuk, Huculová and Kutlu(2019), if Britain leaves the European Union (EU), it will undoubtedly have a major impact on the European economic and political situation. In addition, the impact of Britain's decision to leave the EU has in turn triggered a lot of discussions on various aspects of solutions after Brexit. More importantly, According to Dhingra *et al.*(2016), the result of the referendum on Britain's departure from the EU will directly affect the future relationship between Britain and its largest trading partner, the European Union. Since Britain joined the EU, it has greatly reduced the cost of trade between Britain and other European countries. Among them, the most obvious manifestation is the existence of a customs union among EU member states, which indicates that all tariff barriers within the EU have been removed, allowing free trade in goods and services between EU member states. Moreover, due to the continuous efforts of the European Union to try to establish a "single market" within Europe (single market refers to the name of an integrated European economy formed by removing economic barriers between EU member states), the establishment of the single market has achieved the goal of reducing trade costs by reducing non-tariff barriers (Dhingra *et al.*, 2016). Specifically, non-tariff barriers refer to a series of measures to increase trade costs, such as border control, rules of origin inspection, transnational differences in product standards and safety regulations, and anti-dumping threats. The reduction of trade barriers has increased trade between the UK and the EU. From the statistics, before Britain joined the European Economic Community (EEC) in 1973, about one-third of Britain's trade was with the European Economic Community. By 2014, the other 27 EU member states in the EU accounted for 45% of UK exports and 53% of UK imports (ONS, 2015). EU exports account for 13% of British national income. Eurosceptics (Morris, 2013) believes that after Brexit, trade with EU countries will not be severely affected by exiting the EU, because the UK provides sufficient

bargaining power for the EU's trade deficit and allows both parties to negotiate free trade agreements, like the UK Enjoy Norway or Switzerland. Secondly, after Brexit, the UK can also negotiate and formulate new trade agreements to expand trade with non-EU countries without being subject to restrictions imposed by other EU member states. Finally, after Brexit, another country can be exempted from regulatory burdens and costs associated with EU membership. However, supporters of EU accession (Springford and Tilford, 2014) oppose it. They believe that it is unrealistic to expect the same terms of trade as small countries such as Norway or Switzerland after Brexit. And after Brexit, the UK's ability to reach trade agreements with other countries will be weakened, instead of being strengthened outside the EU and completely exaggerating the EU's regulatory costs. In addition, (Harari and Thompson, 2013) also believe that there are many other aspects of the impact of Brexit that need to be further considered in detail.

At present, various reports have carried out scenario analysis on the potential impact of Brexit on the British economy and other countries. Some reports, such as (Begg, 2017; Ebell, Warren, 2016; UK Treasury, 2016a; UK Treasury, 2016b; UK Government, 2017; Minford et al., 2015; Ottaviano *et al.*, 2014)) etc. interestingly pointed out the high cost of Brexit. However, it must be clearly understood that these analyses usually show direct consequences, and these effects also have indirect effects that last for a long time. Even today, this will result in lower estimates and development prospects in the UK, a decline in existing investments, and a negative impact on the current and future financial conditions of households and businesses and the national budget. In addition, it is certain that Britain's economic partners will also feel the impact of Brexit. For example, Chen *et al.*(2018) shows that in 2017 that the Irish region is facing the most serious consequences of Brexit because of the long-term trade integration between Ireland and the United Kingdom and therefore will face a certain degree of Brexit risk. Therefore, these two economies are more susceptible to the risk of Brexit than the rest of the European Union. But according to Chen *et al.*(2018), in their 2017 study, countries closest to the United Kingdom—such as Belgium and the Netherlands, and countries with large trade volumes, such as Germany and France—will also be affected by the greater economic impact of Brexit. Although research and analysis believe that the EU region or industry will suffer greater losses due to Brexit, for the rest of Europe, the economic impact of Brexit does not seem to be as far-reaching as the political

impact. In the long term. Brexit may mean the beginning of the end of European integration, especially if the UK shows that it can live well without the EU (Strawiński, 2016). Brexit may weaken the structure of the international security system based on international organizations such as the European Union and NATO and may also lead to the beginning of a split (Palowski, 2016). So far, there have been many academic studies on the EU and other developed economies on Brexit. However, there are still very few studies on the impact of Brexit on the under-developed economies, especially the capital markets and tax reforms of Central and Eastern European countries (CEEs). Therefore, in this article, CEEs will be the main research objects. According to Cichowicz and Rollnik-Sadowska(2018), in the usual sense, the term CEE refers to a group of countries, including Albania, Bulgaria, Croatia, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovakia and Slovenia. These countries are not only connected by a common geographic location, but they are also similar in their common history related to the communist system. The research objects of this article are 11 Central and Eastern European countries (except Albania) that have joined the European Union.

It is well known that the EU is considered a complex and confusing tool, even for those who are well versed in its systems, procedures and laws. Correspondingly, EU taxation laws are also very complicated (Daly, 2016). More importantly, (Freedman, 2017) believes that taxation is the basis for the debate on Brexit issues. Specifically, (Freedman, 2017) further stated that any type of Brexit seems likely to increase tax-related administrative burdens and costs, especially value-added tax (VAT) and customs duties. On the other hand, some scholars believe that the United Kingdom’s departure from the European Union will give it a certain degree of flexibility in terms of value-added tax rates, which provides conditions for freely granting exemptions and reductions for value-added tax and direct taxes. For this reason, some people believe that the UK after Brexit may become a "tax haven", with low tax rates and other incentives to encourage foreign investment in need. In addition, according to Lierse and Seelkopf (2016), even in the case of good economic and financial conditions, it is very difficult to simultaneously meet the needs of the financial market and citizens' demands for low or fair taxation. More importantly, Díaz (2016) shows that one of the main industries in the UK is the financial industry, and this industry accounts for more than 10% of the UK's GDP. Moreover, according to (Dhingra *et al.*, 2016), after the UK

announced Brexit, all EU countries lost their income. Specifically, the overall GDP decline in the UK is between 26 billion and 55 billion pounds, which is about twice the total loss of income of 12 to 28 billion pounds in other EU countries. Income growth in non-EU countries is smaller. Therefore, analogy to the research background of the global financial crisis in Lierse and Seelkopf (2016) in 2008, this dissertation intends to explore whether the capital market and tax reforms of the EU member states, especially the cee countries, will have adverse effects and the extent in the context of Brexit. In this dissertation, I will study the government's tax policy response when international capital becomes expensive. The focus of this thesis is to provide information on whether the UK's departure from the EU during the negotiation period (2016-2020) will have an adverse impact on the taxation policies of CEE countries and the capital market and the extent to which it will be. Specifically, the main basis of this study is that once access to international capital is restricted, the government will turn to domestic taxpayers to obtain public income. If the results of the research are contrary to the foundation, then applying for Brexit has not made international capital expensive, that is, Brexit has not had a strong impact on the capital markets of CEE countries. The purpose of this paper is to provide data and facts that show the pros and cons of Brexit, and to give readers a clear understanding of the country's entire process of exiting the European Union.

This dissertation will be divided into seven chapters. The first chapter is the introduction. In this chapter, the background knowledge and motivation of the research topic of this thesis are introduced through a preliminary summary and summary of the literature, and the structure of this article is clearly listed in this chapter. The second chapter is a detailed introduction to the background knowledge of the research topics discussed in this article and a detailed explanation of the concepts used in this article. Specifically, this chapter will provide a detailed background introduction to the Brexit process, tax reforms in CEE countries, and capital market overviews in CEE countries based on the current literature. The third chapter is a literature review, dialectical analysis and summary of the literature related to the research topic of this thesis so far. Specifically, it analyses the impact that Brexit may have on the taxation policy reform of CEE countries and the capital market. Secondly, integrating the current literature, linking the capital market with tax reform from multiple angles. The fourth chapter describes the theoretical background support for the empirical research in this article

and proposes three research hypotheses based on this theory. Chapter 5 will describe the data and methodology used in this article in detail. In the data, this chapter will describe the independent variables and dependent variables in detail. In addition, for the methodology part, we will first summarize the methodology used in the current literature for related research in this article. A logical explanation of the methodology of qualitative, quantitative and the combination of qualitative and quantitative. Secondly, according to the previous summary of the methodology, we choose the methodology suitable for the study of this article. In addition, for the econometric model used in this article, Poisson and Heckman Selection Model are described in detail. Chapter 6 is a detailed analysis and discussion of the model calculation results. In this chapter, the measurement results of the analysis are combined with the descriptive statistics described above. Chapter 7 is a comprehensive analysis of the full text, summarizing all chapters. In addition, the research questions (purposes) and goals to be achieved in this thesis are as follows:

1.1 Research Question

Does Brexit have a strong negative impact on the capital markets of Central and Eastern European countries so that the government tends to enact more tax increases to obtain fiscal revenue? If not, what factors have affected the changes in the taxation policies of Central and Eastern European countries during Brexit?

1.2 Objectives

a. A detailed explanation of the Brexit agenda up to the present.
b. A detailed introduction to the tax reforms and capital markets of EU countries, especially CEE countries.
c. Hypothesis on the impact of Brexit on tax reforms and capital markets in CEE countries.
d. A detailed analysis of the impact of Brexit on the capital market and taxation policies and the literature review on the link between the capital market and taxation policies and detailed to the Central and Eastern European countries.
e. According to the research interest of this article, appropriately select the required variables and corresponding data, and find an econometric model suitable for the research topic of this dissertation.
f. Analysis the results after combining the model with the corresponding data.

g. Combining the statistical results obtained by the econometric model and descriptive statistics to answer the research questions raised.

Chapter2: Background

2.1 The Brexit Development Agenda

The origin of the European Union is the European Economic Community (EEC) established by the Rome Treaty in 1957, whose purpose is to establish a common market. The treaty was signed by Germany, France, Italy, Luxembourg, the Netherlands and Belgium. The European Union (EU) is an international government organization dedicated to achieving regional economic integration. Today, the European Union is made up of 28 European countries, including the United Kingdom, which joined in 1973(Díaz, 2016).According to Chang(2018), on June 23, 2016, the United Kingdom held a referendum on Brexit. In the end, Britain supported the referendum with a small majority, overcoming the opposition of Scotland and Wales. However, with the formal launch of Brexit, there are more uncertainties in the future of British social, political and economic development. The consequences will depend on the outcome of the negotiations. Kapidžić (2020) pointed out that one of the important events in modern history must be the Brexit referendum held in 2016, and the final withdrawal of the United Kingdom from the European Union took place on January 31, 2020. During this period, many research articles and books have written papers on this topic and put forward some influences on further research. The main research hypothesis is whether the Brexit negotiations will redefine Britain's foreign policy towards Europe, which has been approved after numerous studies have been confirmed, focusing on immigration, security, economy and foreign trade, as well as travel and cargo transportation. Withdrawal of the United Kingdom, more often referred to as Brexit, is a mixture of the two words Britain and withdrawal. This agenda was officially started on March 29, 2017, followed by an initiative of the British government. Prior to this, a referendum on whether the United Kingdom should leave the European Union was held in June 2016. 52% of British residents voted to leave the European Union (EU), while 48% of British residents voted to stay in the European Union (Kapidžić, 2020). According to Kapidžić (2020), the event of Brexit has triggered numerous debates between the European Union and the United Kingdom itself and other countries in the world. Brexit is a long-term process. It raises a variety of issues related to the economy, immigration,

and residents' rights, and these issues may also change over time and circumstances. (Dhingra *et al.*, 2016) further proposed that since about half of the UK's trade is within the EU, the EU is considered the UK's largest trading partner. Therefore, on the topic of Brexit, one of the biggest questions related to researchers is related to British trade. Specifically, the main concerns and disputes are related to goods and services. Additionally, there are differences in opinions regarding Britain's withdrawal from the European Union. For example, David Cameron, the former prime minister of the United Kingdom, is the main voice supporting the British stay in Europe and claimed that if Britain's membership conditions are adjusted, the country will have a "special" status and benefit Sort out various immigration and other issues. In addition, Barack Obama (former President of the United States of America) also supports the idea of staying in the European Union with countries such as Germany and France (Hunt & Wheeler, 2016). In addition, there are many ongoing discussions regarding Britain's withdrawal from the European Union and the one-year transition period, but it may be extended. More importantly, with the withdrawal of the United Kingdom, the European Union has lost approximately 66 million residents and lost one of the largest countries among other EU member states.

In addition, from a constitutional point of view, according to (White, 2021), in the constitution of the United Kingdom (UK), the British Parliament will not be bound by a written constitution that is a deeper and higher law. Because as it should, parliament is sovereign. In addition, in law, the parliament is the sovereign, not "we the people." In these respects, although Britain is a democracy, it is not a democratic constitutional government like many other democracies. In these democracies, the elected legislature is subject to a deep-rooted superior law, and the law itself has democratic legitimacy because it is created by the "people". But for many people who support "Brexit", joining the EU undermines the UK's traditional (unwritten) constitution. The reason is that in their view, the British Parliament is subject to EU law. According to (Blick, 2019: 150-151; British government, 2017: 13), this is the theme of the Brexit white paper formulated by the British and British government in 2017: Britain's withdrawal from the European Union and the establishment of a new partnership with the European Union. In addition, some academic analyses have similar views: "Withdrawal from the European Union 45 years after Britain's accession to the European Union will mean that the British Parliament will regain its sovereignty from the European Union and its

central position in decision-making on key political decisions (McConalogue, 2019: 443). According to this view, Brexit has restored parliamentary sovereignty and thus reaffirmed the traditional constitution. Related to this is that some researchers, for example (Baldini et al., 2020) believe that Brexit represents the revival of the "Westminster model". However, Brexit has put additional pressure on some already unstable parts of the British Constitution. Therefore, it may stimulate major constitutional changes.

In the short term, Cubells and Latorre(2021) believes that the trade cooperation agreement signed between the UK and the EU on December 24, 2020 is not a normal trade agreement. Because trade agreements should have been designed to make trade easier and cheaper by bringing countries closer together. However, the newly signed trade agreement pushes the signing of the two parties further. It ended frictionless trade between the United Kingdom (UK) and its largest trading partner (i.e., the European Union or the European Union), causing additional costs and more bureaucracy. This agreement is unprecedented because it is the only EU trade agreement that eliminate various tariffs and quotas. But the agreement is a far cry from the previous British relationship in the internal market and customs union. It has the limitations of most trade agreements, that is, it covers very little in key areas such as trade, sanitary and phytosanitary measures, technical barriers to trade, mutual recognition of professional qualifications, or financial services. In order to consider areas of cooperation that are in the common interests of both parties, the establishment of the "Technical Barriers to Trade Committee" was established. In fact, in some of these areas, such as financial services or sanitary and phytosanitary measures, the final relationship still needs to be further determined.

Regarding the impact of Brexit on taxation, from a general perspective, according to March Budget (2016), the UK announced before Brexit that the corporate tax rate will drop to 17% by 2020, and the UK does not need to wait for Brexit to adopt a competitive agenda in certain taxation areas. Freedman(2017) also further stated that since the EU has never unified corporate tax, the UK corporate tax rate can be further reduced regardless of whether the UK decides to stay in the EU. Therefore, some scholars believe that Brexit will not eliminate the tension between tax competitiveness and opposition to tax avoidance. More importantly, from a factual perspective, it is necessary to reach a coordinated arrangement with other countries (including the entire

EU and individual EU member states). It is proposed (Boffey, 2017) that this may represent the need to impose real freedom on the UK's freedom to formulate tax incentives. limits. In this way, Brexit may impose restrictions on the UK's corporate tax system, just like the case of EU member states.

2.2 The CEE Countries Taxation Reforms

First, introduce some introduction to the concept of taxation. According to Sanni(2007), taxation is a compulsory tax imposed on an entity or its property by the government that has power; taxation is a universal invention; there are only two certainties-death and taxation; taxation is the relationship between the government and the government. The price of social security among the ruled; taxation is the oxygen of each country and a prerequisite for national prosperity; taxation is a tool of social engineering-it can be used to stimulate overall or sectoral economic growth. Under the conditions of a market economy, private savings are needed to provide funds to establish new businesses and expand existing new businesses. Taxation is an area of EU policy in which the tension between attachment and coordination is very serious (Hashimzade and Myles, 2013). Moreover, according to (Grdinić, Drezgić and Blažić, 2017), in the past two decades, the analysis of the influence of various fiscal variables on economic growth has aroused the research interest of many scholars in the fields of economic theory and practice. Over time, more and more attention has been turned to designing a tax system, which will promote economic growth and employment at a certain level of tax revenue. Moreover, Maja Grdinic, Sasa Drezgic (2017) also agrees that taxation policy, as an integral part of fiscal policy, plays an important role in achieving different goals of economic growth and development in any country. Furthermore, Grdinić, Drezgić and Blažić (2017) continue to point out that in the economic literature, there are plenty of studies on how and to what extent changes in tax structure affect GDP and long-term economic growth. The reason is that economic growth is a prerequisite for improving general living conditions. Unfortunately, taxation policies often emphasize taxation reforms that do not consider the economic impact of taxation changes. In other words, these increases are usually aimed at increasing tax revenue and do not predict the impact on economic growth. For this reason, the research of Grdinić, Drezgić and Blažić (2017) believes that studying the short-term and long-term effects of tax structure and specific tax forms on economic growth is an obvious research direction. However, just as (Gordon and Li, 2005) found through research that the tax policies of developing

countries are in sharp contrast with those of developed countries, it is in line with the research hypothesis that the impact of tax structure on economic growth depends on the level of development of a particular country. In addition, the impact of taxation level and structure on the activities of economic entities will be reflected in all aspects of living standards. Therefore, in response to this situation, many countries, especially the more developed countries, were largely driven by the 2008 financial crisis and began to carry out structural reforms in their taxation systems. What needs to be clear is that the different recommendations of the European Commission and the International Monetary Fund, as well as different empirical studies of samples of developed OECD economies, are the basis for realizing tax reform. However, except for advanced economies (OECD or EU-15), many less-developed countries have achieved or are still carrying out tax reforms. Regarding the reasons behind, Maja Grdinic, Sasa Drezgic (2017) believes that the basic problem of tax reforms in these less developed countries is the lack of empirical research results on the impact of tax policy changes on overall economic activities. Specifically, Grdinić, Drezgić and Blažić (2017) believe that most of the empirical research on the economic impact of the above tax structure is for developed countries, usually OECD economies, therefore, they set the research object as CEE countries. The empirical method used in their research is based on (Arnold, 2008)' seminal paper, which uses a data set of OECD economies. In order to study the relationship between taxation and economic growth in CEE countries, Grdinić, Drezgić and Blažić (2017) studied 20 Central and Eastern European countries (EU-13 and selected former USSR countries) from 1990 to 2010 . Their research results reveal that the impact of tax structure on economic growth is significantly different between advanced economies and emerging economies. In addition, they also found that the tax structure of the observed country's impact on economic growth is significantly different from the tax structure of the developed industrial countries of the OECD. Different forms of taxation show similarities in their impact on economic growth (direct tax on economic growth). Growth has a negative impact). However, there are also significant differences (in the case of other tax forms). Based on their results, they put forward the hypothesis that the impact of relevant macroeconomic variables is more important for CEE countries than for developed OECD industrial countries. Their research conclusions and results provide a basis for further research on the interdependence between taxation structure and economic growth. Likewise, the empirical research of

Maja Grdinic, Sasa Drezgic (2017) also found that, as CEE countries are developing countries and more developed countries, there are not only differences in economic, social and political characteristics, but also differences in tax structure, so it is necessary to carry out Empirical research to prove that tax reforms in developing countries cannot blindly follow the same principles as tax reforms in developed countries. In addition to empirical evidence of the negative impact of specific taxes on economic growth, other factors should also be considered in the process of implementing specific tax reforms. Particularly, it is necessary to consider the interaction between taxation and another economic policy tool, market financial conditions, political conditions and other conditions that are important for decision-making.

2.3 The CEE Countries Capital Markets

First, an overview of the concept of the capital market. According to Sanni(2007), the capital market as a platform for buying and selling (or trading) long-term financial instruments. The money market mainly provides short-term funds, unlike the capital market. The capital market is to provide funds for enterprises and governments to meet their long-term capital needs. For example, the purpose of raising funds includes capital expansion, acquisition of new technologies, and financing of fixed investments such as buildings, factories, bridges, and so on. Doubts about the efficient market hypothesis (EMH) proposed by Fama (1965, 1970) still exist today (Škrinjarić, 2019). In the same time, (Škrinjarić, 2019)further proposed that one of the challenges faced by EMH is different events that affect stock prices, returns, and volatility changes. Harvey *et al.*(2014) proves that there are more than 300 factors that affect stock price changes, including economics, politics, and society. In the past few years, some major events have been affecting Europe, and the Brexit dispute has made the European Union one of the most influential disputes. It is estimated that the economic consequences of Brexit are huge. Specifically, the total economic cost in the third quarter of 2017 was as high as 1.5% of GDP; by 2018, the total of these costs exceeded 60 billion pounds(Born *et al.*, 2017). Since the financial market, especially today's stock market, reacts strongly to many different events that are constantly occurring, it is still a difficult task for investors to conduct good portfolio management (Škrinjarić, 2019).

According to (Zaharia, 2021), due to the impact of the global financial crisis and the current economic environment, capital markets are playing an increasingly important role in the international arena. Specifically, the main function of the capital market is

to provide investors with long-term funds at a competitive cost. Additionally, according to (Köke, Jens; Schröder, 2002), by definition, the capital market is a fairly new phenomenon for CEE countries that embraced capitalism more than ten years ago. Köke and Schröder(2003) further elaborated that the stock exchanges in CEE countries are relatively small emerging markets. Specifically, the largest trading market in the CEE countries is the Warsaw Stock Exchange, which is only comparable to the Vienna Stock Exchange, the smallest exchange in Western Europe in terms of scale and market trading volume. Most other CEE countries stock exchanges, such as Tallinn, Riga or Bratislava, are still in their infancy and are among the smallest exchanges in the world. Therefore, overall, the stock markets of CEE countries currently account for no more than 0.2% of the world's stock market capitalization. Moreover, Köke and Schröder(2003) argued that the development of stock exchanges and financial industries in CEE countries is still relatively unfavourable. The CEE Stock Exchange-the only exception is the Warsaw Stock Exchange-is underdeveloped compared to its Western counterparts and is less important to the domestic economy of CEE countries, especially corporate financing. Specifically, for the derivatives market, it only exists in Poland and Hungary. As trade-in derivatives are particularly active in Poland, this demonstrates the dominant position of the Polish stock market in the entire region. Due to a variety of reasons, the stock exchanges of CEE countries are under pressure. More specifically, the first stock exchange in CEE countries opened in the early 1990s, and the last was established in the mid-1990s. Given the short history of its development, it is not surprising that the capital markets in Central and Eastern Europe continue to be relatively small. More importantly, according to (Harrison, Barry, Lupu, Radu, Lupu, 2010), after 1990, the importance of the CEE stock market gradually increased. The reason is that the CEE stock market is gradually being used as a diversification tool for foreign investors, and it is generally expected that they will integrate into the European capital market. There are more and more academic discussions about the development of CEE country stock markets. These documents tend to analyse the performance and integration characteristics of CEE country markets. On the other hand, many documents also tend to analyse the characteristics of diversification and risk management.

Therefore, (Škrinjarić, 2019)'s research is to empirically evaluate the impact of the Brexit referendum on the returns and volatility of CEE markets. His research results show that in 2016, the world's major stock markets reacted significantly to the Brexit

referendum. Therefore, it is important to continuously evaluate the stock market's response to major political, economic and other events in order to obtain a clearer understanding of future expectations. This is not only important for policy makers, but also facilitates the adjustment of (macro) economic policy measures related to financial market and overall economic stability; at the same time, it also applies to (international) investors in the process of investment portfolio and risk management. Most importantly, according to (Škrinjarić, 2019), the CEE stock market is mainly in developing countries and has not been sufficiently studied in many aspects of portfolio management and finance. In addition, the impact of the Brexit referendum on different stock markets has been explored in the past three years. Particularly, most existing studies have observed the reaction of developed markets to the Brexit referendum. However, regarding the impact on the markets of Central and Eastern Europe and Southeast Europe, there are still gaps in the academic literature. Since existing research shows that the degree of integration between Central and Eastern Europe and developed countries is higher than before, Škrinjarić(2019)proposed that it is reasonable to assume that the impact of the Brexit referendum will also affect the Central and Eastern European markets. Compared with more developed markets, one of the reasons for the gap in these markets may be that these markets are less liquid. As a result, less liquid markets will become less popular with investors and detailed research. In addition, (Köke, Jens; Schröder, 2002) also pointed out that the Central and Eastern European market is less important to its domestic economy and corporate financing. In addition, in the empirical literature, Škrinjarić(2019)found that these markets usually provide the possibility for a certain degree of international diversification. This shows that if the positive effects of Brexit can be found in these markets, then international investors can get some hedging investment possibilities in these markets because of their relevance to more developed markets (still a bit) Lower.

Chapter3: Literature Review

3.1 Literature Review of the Possible Impact of Brexit on Taxation Reforms

According to (Daly, 2016), in the era of high capital flow and globalization, taxation is an obvious area, and more importantly, the exercise of national sovereignty in taxation will have an impact on other countries. However, as a foundation, it is necessary to understand the taxation power of the state. What needs to be understood is that the EU's taxation development is gradual and relatively restrained and is generally introduced

through the unanimous agreement of member states. More specifically, according to Hashimzade and Myles(2013), the EU Constitution proposed in 2004 provides a clear vision for the future development of the EU. Furthermore, Borovina (2016) stated that the Treaty of Rome discussed the concept of European tax policy for the first time in terms of building the European Economic Community (EEC). Although there is no single model for taxation policies in EU countries, there are certain characteristics of taxation concepts that all national authorities will encounter. These countries are part of the European Union in the process of conceiving, adopting and implementing community policies. Moreover, Borovina (2016) further emphasized that taxation policy is one of the few important tools that the governments of EU countries can use for the national economy. In more detail, according to (OECD, 2010), there are many factors that affect a country's economic growth. These include, but are not limited to, the economic growth rate of its main trading partners, the country's innovation capabilities, the availability of venture capital, the amount and type of investment, the level of entrepreneurs, the mobility and level of labour, the flexibility of the labour market. Among them, (OECD, 2010) shows that the tax system is likely to affect many of the above factors, so it plays a vital role. Although the tax system is primarily designed to raise funds for public expenditures, it still has many other functions(OECD, 2010). More specific, the tax system is also used to promote other goals such as achieving fairness and solving economic and social problems. Taxes must be set up to achieve the goal of minimizing taxpayers' compliance costs and government management costs. In addition, tax avoidance and tax evasion must be avoided at the same time. In addition, taxation also includes the way of designing and combining different taxation tools to generate income (hereafter referred to as tax structure). The impact of tax level and tax structure on the economic behaviour of agents is likely to be reflected in the overall standard of living. Recognizing this, in the past few decades, many countries have adjusted and reformed their taxation systems. The next part will summarize the discussion in the literature of the four independent variables that will be used in this study. The following summary is mainly based on the current academic literature on the changes that will occur to the four types of taxes after Brexit. The main purpose is to discuss the impact on the UK and EU. The impact of the four types of taxes in CEE countries needs to be appropriately supplemented by the research results of this article due to the gaps in the literature.

Income tax: According to (Deloitte Legal Rechtsanwaltsgesellschaft mbH, 2020), In terms of taxation, after Brexit, the income tax and laws including but not limited to all regulations, transfer prices, indirect taxes and foreign trade must be properly handled. After the termination of EU membership, the UK relationship benefits granted by the Direct Tax Directives (Parent Subsidiary Directive, Interest and Royalties Directive, and Merger Directive) will no longer apply. In addition, since the main laws are no longer applicable, the corresponding national rules that extend tax benefits to the territory of the EU/EEA will no longer apply.

Excise taxes: Based on the common consumption tax system under EU law, it is impossible to carry out cross-border transportation of goods subject to consumption tax after Brexit. The previous IT process EMCS will no longer be applicable to the entire transport to and from the UK. Instead, import and export procedures under the Customs Law and consumption tax standards must be applied(Deloitte Legal Rechtsanwaltsgesellschaft mbH, 2020).

Value-added tax: According to(Kanwal D. P. Singh, 2017), VAT accounted for 22% of the 2014-15 tax. In 1977, the European Union unified the value-added tax measures through the EU Value-Added Tax Directive, which promoted trade between EU member states. Kanwal D. P. Singh(2017) further proposed that at least in the first few years after Brexit, the VAT system after Brexit is likely to continue to apply to the United Kingdom, and some technological changes will be carried out. Over time, the UK will have full flexibility to make the required changes to its value-added tax system, or the zero-tax rate may be extended. After that, the main interest rate may change. New rules must be formulated to distinguish between supplies entering and leaving EU member states. According to (Deloitte Legal Rechtsanwaltsgesellschaft mbH, 2020), the value-added tax treatment of cross-border movement of goods between the EU and the UK will also change. Specifically, tax-free intra-Community supplies and intra-Community acquisitions from the EU will now become imports and exports. The UK will not be able to enter the EU's "one-stop" mechanism. Due to the changes between the EU VAT law and the new UK VAT law, there will be a risk of double taxation or double non-taxation. Companies will no longer have a comfort zone for VAT-related procedures. This will depend on negotiations with the European Commission, and the exact changes are difficult to predict. Import VAT may be levied on goods entering the EU from the UK, which may cause cash flow problems for the company. The

administration and structure of managing VAT registration will change. Looking at all the issues, the UK may or may not maintain a VAT system that is basically consistent with the EU system. These changes in the value-added tax assessment will require adjustments to the company's accounting system and the reporting of value-added tax turnover. In addition, any changes in UK registration requirements should be carefully reviewed(Deloitte Legal Rechtsanwaltsgesellschaft mbH, 2020).

Company tax: According to (Deloitte, 2016), there are company law directives and accounting directives in the European Union. Some tax definitions rely on company law, and some reports rely on accounting directives. In the short term, the company law and accounting directives, as well as the EU's recommendations on the definition of small, medium and micro enterprises, will probably not change. However, after leaving the EU, the UK can change them if it wants to. In addition, after Brexit, the UK will no longer need to apply the IFRS recognized by the EU but can use IFRS. Moreover, according to Kanwal D. P. Singh(2017), the principle of fiscal neutrality and the basic freedom of movement of capital, personnel and services can prove that the UK's direct tax system is in line with EU law. Over the years, the United Kingdom has adopted multiple amendments to its tax law to meet the requirements of EU law. The European Court of Justice's ruling has also affected the UK's taxation system, such as its controlled foreign company rules. After Brexit, if the UK continues to follow the European Economic Area, it can enjoy the benefits of the EU's basic freedoms. But if the UK does not become part of the European Economic Area, the tax laws will need to be revised to distinguish between UK taxpayers and non-UK taxpayers. It is currently impossible to predict the extent of these revisions. (Kanwal D. P. Singh, 2017) believes that if the British government restores the previous tax system and favors domestic companies, it will affect the jurisdiction of multinational companies and foreign companies in the UK.

3.2 Literature Review of the Possible Impact of Brexit on Capital Markets

The following are the results of existing research on the impact of the Brexit referendum on global stock markets. Wright (2016) research uses questionnaires to investigate the potential impact of Brexit on EU capital markets. Among them, the main survey results believe that: Brexit may cause great damage to the EU's current efforts to encourage the development of deeper and more effective capital markets and reduce the European economy's efforts to bank loans. This will have a significant impact on market

participants and directly affect investors, issuers, and the economic development of the UK and other parts of the European Union. Secondly, the UK has a dominant position in the capital market with Europe and the two are highly correlated. For example, more than three-quarters of capital market operations in the 27 EU countries are conducted outside the UK. Therefore, it may be a complicated, long and expensive process to eliminate this interdependence. Moreover, the UK's vote to leave the European Union may cause serious confusion and uncertainty in the market and the entire industry in the early stage, leading to a reduction in capital activities and cross-border investment. Furthermore, it is mentioned in the Wright (2016) research that some respondents mentioned that the economies of scale in the single market are good, allowing them to provide a wider range of services to more customers at a lower cost; while the EU as a whole A broad and consistent regulatory framework can reduce costs and complexity; the free flow of labour has also opened more talent pools. Therefore, in order to retain access to the single market as a "third country", the UK may have to retain many regulations. Respondents worry that the UK and EU's overtime rules will be different, which will increase costs, and may question the possibility of the UK's future entry into the single market. Furthermore, (Quaye *et al.*, 2016)'s research method is to read newspaper articles and compare and analyse the index value and price of different financial assets, and extensively analyse the impact of the Brexit referendum on stocks, banks, bonds and other markets. Their research conclusions are as follows: After the Brexit referendum, the FTSE 250 Index fell 7.2% on the second day, the FTSE 100 Index fell 3.2%, the Dow Jones Index fell 3.4%, the Nasdaq Index fell 4.12%, and the Hang Seng Index fell. 2.9%, the Topix Index fell 7.3%, the Stoxx Europe 600 Index fell 7%, ASX fell 3.2%, DAX fell 7%, CAC fell 8% and FTMIB fell 12%. From the falling values, we can see that the response of these major indexes is very large. In addition, the author also found that the pound exchange rate also reacted strongly to other major currencies.

In addition, Amewu et al. (2016) applied the usual ESM method to estimate the abnormal return sequence of listed companies in the United States, the United Kingdom, China, Japan, Germany, and South Africa through standardized tests and non-parametric tests (symbolic tests) by using market models. The time span is 315 days before the Brexit referendum and 15 days after the referendum on June 23, 2016. Their results showed that only the Chinese market reacted positively to the incident; While

other markets experienced significant declines in the return sequence, every market except the German and British markets rebounded to their value before the event day on day +2. In addition, the research of (Dadurkevicius and Jansonaite, 2017) proves that because the capital market belongs to different industries, the results will be different. Their research method is to model the implied volatility index of the FTSE 100 index by using political uncertainty variables, binary variables, and Google search results for the term Brexit. And the author also pays attention to more companies that are industry- and sales-oriented and apply ESM methods. The research results show that due to political uncertainty, risks increase before the event; due to the different characteristics of the industry where the returns belong, the return sequence also has different reactions. Furthermore, Research by (Bohdalová and Greguš, 2017) shows that, in general, the Brexit referendum had a significant positive impact. Their research method is to use a quantile regression method that includes the dual variables of Brexit. Their study observed larger European markets (including Germany, France, Ireland, Spain) and larger emerging markets (Poland and Turkey). The time period of the study was from early 2000 to February 2017. The results of the study show that, specifically, the Brexit referendum has the greatest impact on the Spanish capital market, while it has the least impact on the Polish capital market. The author interprets the positive results as the observed increase in linkages between markets. Moreover, the study of (Bouoiyour and Selmi, 2016) explored the impact of Brexit uncertainty on the stock markets of the United Kingdom, Germany and France by using frequency-domain causality tests and quantile regression methods. Their research is mainly to analyse the return and volatility index of the corresponding stock market. Likewise, because the author's research is aimed at the overall uncertainty in the entire process from the Brexit (Kurecic and Kokotovic, 2018) referendum to Brexit, and includes Google search results and Twitter tweets, the time period of their research is from January 2010 to July 2015. Their empirical research conclusions are Brexit has the greatest impact on the German capital market, followed by France and the UK market. Additionally, the study by is based on the application unit breakthrough test on 12 stock indexes in the United States, the United Kingdom, Russia, China, South America, Hong Kong, Europe, and Japan. The research time range is from May 2016 to 2017. July. Their research observed several dates related to political uncertainty and included them in the structural breakthrough test of the stock index series, including the Brexit referendum. The results

showed that, except for the Hang Seng Index and the JSE Index, all other indexes had a structural break on July 24, 2016. The author therefore concludes that the Brexit referendum therefore had a negative impact on the selected World Index. The research of (Burdekin, Hughson and Gu, 2018) also came to similar conclusions. They focused on researching different stock returns across the world (64 countries/regions) from January to June 2016. The author uses the national stock index and the world market index as a factor in the model to estimate the abnormal return sequence. They used regression analysis, which included a binary variable for the date of the Brexit referendum. Their research conclusions show that the abnormal returns in most of the countries they analysed are negative, and the PIIGS countries (Portugal, Italy, Ireland, Greece, and Spain) are most affected. Similar conclusions are confirmed by the research of (Sultonov and Jehan, 2018). Their research focuses on the reaction of the Japanese foreign exchange market and stock market to the Brexit referendum (and the US presidential election). Apply the MGARCH method to the return series (the data time series used is daily data from February 9, 2016, to March 24, 2017). Specifically, the author calculated the difference between the average returns before and after the important date, as well as the dynamic conditional correlation before and after the event. All observed sequences have changed significantly after the event, which means that uncertain political events are reflected in the Japanese stock market and foreign exchange market. Therefore, through the study of a series of related literature, the results are mixed. Most studies have found that the Brexit referendum has a negative impact on global stock market returns, and a small number of stock markets and other financial assets have some hedging possibilities. As there are still gaps in the literature on Central and Eastern European countries, this study will focus on these countries to obtain some preliminary insights.

3.3 Literature Review of the Impact of Brexit on Capital Markets and Tax Reforms

This part will focus on the impact of capital liberalization on tax policy formulation. The focus is to explore the relationship between the two. According to Škrinjarić(2019), it is precisely because the major resolution of Brexit involves the interests of decision makers, investors and other economic entities in international trade. Therefore, the impact of the Brexit referendum has become the focus of attention of many countries,

especially European countries. Since the Brexit agenda was put forward, academic literature has also paid more and more attention to this topic.

According to Zeitschrift *et al.*(2011), in capitalist democracies, government depends on the trust of voters. However, if we want to maintain this confidence, it will not only depend on the performance of the real economy but will increasingly depend on the confidence of the financial market. Even in the best case, it is difficult to meet these conditions at the same time. Specifically, Lierse and Seelkopf(2016)further explained that even if financial and economic conditions are good, meeting the needs of the financial market is very difficult for you. In addition, the government must also satisfy citizens' demand for low taxes and fair taxation. The research of Lierse and Seelkopf(2016) focuses on the changes in the capital market after the economic crisis and the formulation of tax policies. The research of Lierse and Seelkopf(2016) shows that after the 2008 financial crisis, due to financial market pressure, capitalist democracies have little political space to manipulate and redistribute politics when fiscal pressure is high. The background of his research is that financial pressure limits the government's tax policy response. Based on this, the study used data on changes in the taxation policies of EU countries from 2008 to 2010. Its research shows that the huge economic pressure brought about by the 2008 financial crisis forced European member states to face economic uncertainty and fiscal pressure. In addition, his research also mentioned that with the outbreak of the economic and financial crisis in 2008, the economic growth rate dropped sharply, and the unemployment rate also soared. At the same time, EU member states have spent a lot of income to rescue financial institutions, stimulate the economy and maintain social safety nets. As a result, this has led to a significant increase in expenditure and debt levels. These economic developments have brought uncertainty to the financial market, and investors worry that the government will not be able to repay loans. Therefore, the research of Lierse and Seelkopf(2016) found that between 2008 and 2009, the average bond yield of the EU soared by about 10%. This puts EU member states, especially those countries with particularly bad economic prospects (such as Lithuania and Latvia) under pressure to act and adjust their economies.

The following literature review will show that academics also have many suspicions and discussions on the important matter of Brexit. Therefore, whether Brexit will also have a negative impact on the financial markets of EU member states, especially less

economically developed countries (such as CEE countries), and whether the impact of taxation policies will have a similar negative impact as the 2008 financial crisis is the research focus of this dissertation. Brexit is a major issue affecting the world, especially the economies of European countries, and its impact can also be compared to the 2008 financial crisis. Specifically, Freedman (2017) believes that taxation is the basis for discussing Brexit. Any type of Brexit seems likely to increase the administrative burden and costs associated with taxes, especially value-added tax (VAT) and customs duties. On the other hand, Brexit will give the United Kingdom a certain degree of flexibility in terms of value-added tax rates, free to grant exemptions and exemptions for value-added tax and direct taxes. This has led some people to suggest that after Brexit, the UK may become a "tax haven" due to low tax rates and other incentives to encourage foreign investment, which will undoubtedly increase demand. On the other hand, Wright (2016) recorded that for Brexit, New Finance believes that Europe needs bigger and better capital markets to help promote its recovery and growth. One of the messages clearly conveyed in the report is that the UK voted to withdraw from the European Union. The current efforts of the entire European Union to encourage the development of capital markets and reduce the European economy's dependence on bank loans may be greatly reduced. More importantly, according to Daly (2016), the European Union is a complex and confusing tool, even for people who are proficient in its systems, procedures, and acquisitions. Daly (2016) further believes that the impact of the UK's decision to withdraw from the EU has in turn triggered many problems related to the UK's post-Brexit solution. Many people speculate about what this will look like, whether the UK will continue to accept EU tax laws, and whether the EU will adjust its tax policy. According to the above-mentioned literature on the impact of Brexit on taxation policies and capital markets, the current impact of Brexit on taxation is considered to increase the tax burden, and it will also have a negative impact on the capital market. Combined with previous analysis, Brexit will have the greatest negative impact on European capital markets, which may cause investors to lose confidence in European capital markets to a large extent. The key hypothesis of Lierse and Seelkopf (2016)' research is that due to the impact of the financial crisis, the government has lost its fiscal credibility and cannot obtain low-cost credit from the capital market. It will turn to other sources (mainly taxation) to fulfil its fiscal obligations. In the research of this paper, based on this hypothesis, the impact of Brexit on the capital markets and tax

policies of Central and Eastern European countries is studied. For this research, the three hypotheses of this article will be listed next. Through the above-mentioned literature review, it can be concluded that all sectors of society have different concerns and discussions on changes in the EU capital market and the Brexit tax policy.

In the study, by comparing a series of public policy documents, the two main lines of taxation adjustment in the context of financial integration can basically be determined: one is to emphasize domestic systems and politics, and the other is to emphasize economic needs. Specifically, the group that emphasizes domestic institutions and politics believes that labor organizations, the left and right wings of government (Cusack, 1997; Garrett, 1998; Garrett and Mitchell, 2001; Bradley et al., 2003) and decision-making systems determine policy outcomes (Hallerberg and Basinger, 1998; Clark and Ha Le Berg, 2000; Gunhof, 2007; Hayes, 2009). In contrast, scholars of the functionalist school emphasized that growth rates, debt levels, and trade and capital openness limit the government's room for maneuver (Genschel, 2002; Swank and Steinmo, 2002; Genschel, 2004). Although based on a series of empirical analysis, it is not believed that the above two schools are mutually exclusive and control some political variables, but the research focus of this article is the discussion of political economy of external constraints. As mentioned earlier, many governments, especially the Eurozone governments, although unable to independently adjust their monetary policies, they still have a certain degree of freedom, that is, they can adjust their fiscal policies according to their own preferences and macroeconomic development. . In addition, according to (for example, Andrews, 1994; Cerny, 1994), there has been a large amount of literature discussing how government revenue and expenditure decisions are affected by international market sentiment. According to (Stanmore, 1994; Roderick, 1997); Swank, 2006), if the country does not want to take the risk of capital flight, but instead wants to attract investors, then the theory of tax competition predicts that there will be a race to the bottom, or a tax system Will converge around a single policy model. Therefore, because capital will withdraw from the country, which will hinder domestic prosperity and economic growth, high taxes and progressive taxation are considered unsustainable. Similarly, because the progressive tax system is less affected by competitive pressures, a shift from direct tax to indirect tax is likely to occur (Rixen, 2008). In other words, the internationalization of the capital market will limit the government's tax options. In addition, although many related scholars have

measured the degree of tax changes caused by capital liberalization, the results are far from homogenization (e.g., Garrett and Mitchell (2001); Swank and Steinmo, 2002; Kemmerling, 2010, etc.). Specifically, according to a study by Swank and Steinmo (2002), tax cuts systematically followed the increase in capital mobility and trade openness between 1981 and 1995. However, Garrett and Mitchell (2001) concluded that capital mobility is neither related to lower capital tax rates, capital nor labor and consumption tax rates. Therefore, from the current research, the impact of capital liberalization on the national tax system is still uncertain. According to (Swank, 2002; Plümper et al., 2009), for the uncertain reasons for the impact of capital liberalization, the impact of measurement is usually small and depends on the specification of the model. Two main deficiencies can explain the lack of clear findings. First, it is necessary to better operate the tax policy of the dependent variable government. The current literature tends to analyse tax rates and income, which are affected by other factors that are not directly related to political decision-making. Although the tax rate is a better policy indicator than income, scholars often ignore changes in the base, so the current literature often only captures half of the situation. Therefore, in the empirical research of this article, this trap is overcome by collecting information about the number and direction of tax rates and base changes (tax cuts and tax increases) implemented during the Brexit period (about the taxes adopted by CEE countries during the Brexit period). For an overview of the measures, see Table 1). Second, scholars control different macroeconomic constraints due to tax cuts based on factors such as capital or trade opening, debt levels, deficits, and growth rates. Specifically, according to Garrett and Lange (1991), variables such as unemployment, GDP, and trade opening are controlled as economic constraints. Basinger and Hallerberg (2004) regard capital control, lagging growth and inflation as the main macroeconomic determinants. Although the above macroeconomic variables are not selected randomly, the selection of these different control variables can indicate that these macroeconomic variables need to be selected with full consideration. In this article, we will determine the selection of appropriate macroeconomic variables to discuss how these variables ultimately affect the tax policy formulation, tax cuts and tax increases of Central and Eastern European countries. However, because Brexit was announced in June 2016, and Brexit was officially announced on January 30, 2020, it is a topic of high academic discussion and related research topics are relatively new. There are few documents on

the capital market and taxation policy formulation of EU countries, especially Central and Eastern European countries, and Brexit. I hope my research can make some contributions to related research topics.

Table 1 Changes in the Tax Base and Tax Rate of CEE Countries from 2016 to 2019
***Source:*(Commission, 2017);(Commission, 2018);(Commission, 2019);(Commission, 2020)**

	Base Changes				Rate Changes			
Year	2016	2017	2018	2019	2016	2017	2018	2019
Direct taxes	32	21	27	25	15	9	13	10
PIT	18	13	11	15	6	5	9	6
CIT	14	8	16	10	9	4	4	4
Indirect taxes	15	6	9	5	37	29	18	27
VAT	10	2	3	4	16	9	7	10
Excises	5	4	6	1	21	20	11	17
Sum	47	27	36	30	52	38	31	37
Total	140				158			

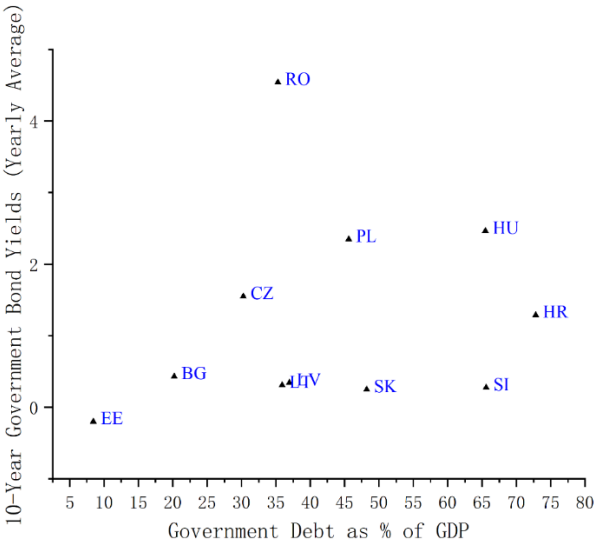

Figure 1 The relationship between CEE country debt levels and government bond yields in 2019. Data source: Eurostat and European Central Bank.

Figure 1 shows the relationship between the debt levels of CEE member countries as a percentage of GDP and government bond yields in 2019. It shows that despite the low debt levels of some countries, bond yields are significantly higher than other countries. The graph shows that high levels of public debt do not necessarily force a country to consolidate its finances. For example, Romania's debt levels are relatively low, but international investors charge a high premium for buying their bonds. This finding shows that bond yields also consider many other macroeconomic variables and the confidence and sentiment of international investors. In other words, compared with the macroeconomic variables considered by most scholars in their analysis, bond yields

indeed represent a more comprehensive measurement standard. In fact, bonds can adjust these macroeconomic pressures and market expectations, thereby linking the capital market with government policy decisions. According to (Andrews, 1994; Cerny, 1994), the importance of linking capital markets with government decision-making is not new. However, due to the lack of accurate judgments on the impact of Brexit on the capital markets of CEE countries in the current literature, it is assumed that Brexit will In the case of a huge impact on the capital markets of CEE countries, and under these conditions, investors lose confidence in fiscal sustainability, this article will propose hypotheses for this connection.

Chapter4: The theoretical framework

Azzimonti et al. (2011) believe that since the 1970s, the increase in financial integration has provided the government with new capital supplies. However, according to (Cerny, 1994; Scharpf, 2000), the increase in financial integration will also limit National policy capacity. Specifically, the government must not only act in accordance with the requirements and needs of domestic voters, but also actively respond to the expectations of the international capital market. In addition, the government also needs to make credible commitments to policies in order to maintain or obtain more international financing opportunities. In order to obtain opportunities, it is necessary to rely on the positive evaluation of investors. If the government cannot maintain fiscal discipline, it is likely to be severely punished by market participants who charge an interest premium. Therefore, failure to meet such market demands will have a serious impact on credit costs or public liquidity. For investors in long-term sovereign bonds, they tend to seek huge profits and evaluate potential economies based on returns and risks. For example, through the research of Mosley (2000), the relationship between the government and the capital market is very complicated: Although the government will be subject to pressure from the need to please the market and formulate relative policies, the government is in other policy areas (including taxation). There is still room. However, when the default risk does not exist, Mosley's (2000) research results appear to be more applicable to developed countries, but when the default risk is prominent, the impact of the financial market will be more extensive (Mosley, 2000, p. 766). Therefore, when the impact of Brexit on the capital market is uncertain, it is very important to analyse and evaluate the impact of the capital market. However, since there is few research on CEE countries in relevant subject literature, it is particularly important to analyse the

impact of the capital market on CEE countries. In addition, according to Lierse and Seelkopf(2016), because the market price of new capital is higher, the government is often more likely to turn to taxpayers to obtain the necessary income. In this case, it is not enough to cut expenditures. Increasing taxes is a necessary condition for improving public balance in the short term. It will also increase deficit reduction efforts to restore market confidence and reduce bond yields. Therefore, governments with high bond yields have no room for tax cuts and need to increase taxes. They don't like to do this in times of stability because they are afraid of revenge from voters. Figure 2 illustrates the tax policy reform responses of CEE countries during the Brexit period.

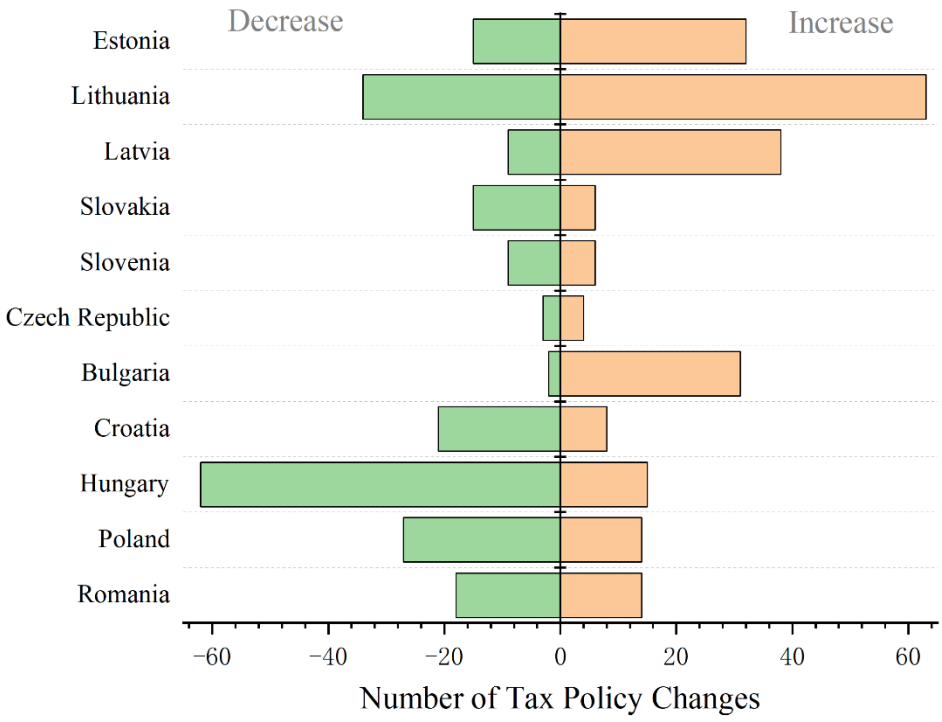

Figure 2 The number of tax changes by country/region from 2016 to 2019, sorted by bond yield. Sort by rising bond yield. Source: (Commission, 2017); (Commission, 2018); (Commission, 2019); (Commission, 2020).

Figure 2 shows that no matter how high or low bond yields are, the governments of CEE countries have increased or cut some taxes accordingly. Specifically, for countries with low bond yields, such as Estonia, Lithuania, Lativa, Slovakia, Slovenia, and the Czech Republic, during the Brexit period from 2016 to 2019, they introduced more tax policy reforms. Tend to increase taxes. For countries with higher bond yields, such as Croatia, Hungary, Poland and Romania, their tax policy reforms often adopted substantial tax cuts. Therefore, it can be analysed from the comprehensive chart that

during the Brexit period, the tax increase introduced by the CEE government with high bond interest rates is indeed significantly higher than that of other governments. Therefore, for countries with higher bond yields, overall tax changes are also higher. Due to the dependence on the financial market, the government's policy decisions are largely based on the financial market. When policy decisions and economic prospects are inconsistent with investors' expectations, bond interest rates will be high. Therefore, the government will adjust and implement policy changes according to the situation in order to meet the needs of investors. In addition, as loans in the capital market become too expensive, the government will be more likely to increase taxes. Although in reality, voters may retaliate and elect a new government, politicians will resume tax increases because the government can no longer obtain cheap international financing due to the collapse of the capital market. On the contrary, lower bond interest rates indicate investors' recognition of government policy actions, which will reduce the pressure of government economic adjustments. However, they are free to cut taxes and gain support from voters because they can borrow funds at low prices in the capital market. In other words, differences in interest rates may result in different economic responses among EU member states. In short, this article assumes that the liberalization of the capital market will not have an equal impact on all governments. Compared with countries with lower bond interest rates, governments that bear bond premiums have implemented more tax policy changes. Although the theory of this article focuses on the upward pressure of bond yields on tax policy choices, the insights generated in the tax competition literature also apply to our arguments. In other words, governments that can lower taxes due to good bond ratings will do so to maintain competitiveness, attract investment, and promote economic growth. In addition, they are more likely to reduce direct taxes rather than indirect taxes because they are more likely to stimulate growth (Rixen, 2008; OECD, 2010). Vice versa, governments under greater pressure would rather increase indirect taxes than direct taxes to meet their spending needs. As the EU's interest rate differential has been widening since 2008, the financial crisis provided impetus to test these claims. In order to verify whether Brexit will also produce a drastic stimulus to the financial market, this article will put forward the hypothesis of this empirical analysis based on Lierse and Seelkopf(2016) on the relationship between tax reform and capital markets under the financial crisis. If the final empirical results prove to be in line with the proposed assumptions, it can prove that Brexit will have a huge

impact on the capital markets of the governments of CEE countries, leading to the need for governments to turn to taxation to increase fiscal revenue. If the results of this empirical analysis cannot meet the hypotheses proposed, it means that Brexit has not had a dramatic impact on the capital markets of CEE countries.

Hypothesis 1: The higher the bond rate, the more tax adjustments a government is likely to implement.

Hypothesis 2: The higher the bond rate, the more likely are governments to adopt tax increases in order to obtain capital.

Hypothesis 3: The higher the bond rate, the more likely are governments to increase indirect taxes instead of direct ones.

Chapter5: Data and Methodology

In order to explore the impact of Brexit on the government's fiscal response, this article chooses to analyse a unique data set on changes in EU tax policy (Commission, 2017)*;*(Commission, 2018)*;*(Commission, 2019)*;*(Commission, 2020). The data collected from these data sets include the number and types of overall taxation, direct taxation and indirect taxation policy changes, as well as the tax combination implemented by the CEE governments from 2016 to 2019. The unit of analysis in this article is the country year. In the following, this chapter will include the database selected for the empirical analysis of this paper, the selected independent variables, the dependent variables, a literature review of the methodology, and a detailed discussion of the econometric model for empirical analysis.

5.1 Data

According to ((Mahon, 2004); (HANNA LIERSE, 2012), tax policy is not a concept that can be simply measured. So far, with some notable exceptions, scholars tend to pay more attention to the output of tax policy rather than the policy choice itself, because only the data of the former are easily available. Since this paper tends to study political processes rather than purely economic results, this may not have much to do with active government politics, so this paper chooses the second strategy. This paper collects Central and Eastern European countries (except Albania) that have joined the European Union. Therefore, the research objects are 11 Central and Eastern European countries: Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia, and three Baltic countries: Estonia, Latvia and Lithuania. In addition, this research collected

data on changes in tax policy during the period of Brexit, that is, from 2016 to 2019. Collect the required dependent variable data from the data "European Tax Trends" reported. (Commission, 2017)*;*(Commission, 2018)*;*(Commission, 2019)*;*(Commission, 2020). four-year report. From the above report, collect the number of tax policies promulgated for all types of taxes, direct taxes and indirect taxes in CEE countries from 2016 to 2019 and count them. Since the focus of this study is to study the time period from before the 2016 Brexit referendum to the final announcement of Brexit, the data time is selected from January 1, 2016, to December 31, 2019. Therefore, the analysis during this period can exclude the possible impact of covid-19 on the result data (because the impact of covid-19 on the world started after 2020).

5.1.1 Dependent Variable

The dependent variables used in this dissertation are the increase and decrease counts of the four main types of taxes in eleven countries in Central and Eastern European countries (except Albania, which lacks various data) from 2016 to 2019. All data comes from the four official reports of "taxation trends in the European union in 2016, 2017, 2018, 2019" released by the European Union((Commission, 2017)*;*(Commission, 2018)*;*(Commission, 2019)*;*(Commission, 2020)*)*. The four main taxes used in this dissertation are personal income tax (referred to as PIT), corporate income tax (referred to as CIT), value-added tax (referred to as VAT), and Excise tax (referred to as EX). According to Lierse and Seelkopf(2016), because the theoretical focus of this research is on the political response to Brexit, rather than discussing the impact of Brexit on the entire tax system. Therefore, using count variables as tax policy changes is the best measure. For example, let us compare the tax rate changes and income impact of the Czech government in 2019. The Czech government reduced the value-added tax rate in 2019, while the corporate tax rate remained unchanged. However, it can be observed from the Czech Tax revenues by main taxes, 2019 (in% of total taxation and in% of GDP) disclosed in the report that compared with the 2020 report, it can be observed that the Czech Republic's VAT revenue decreased after the VAT rate was adjusted. And the income from corporate taxation increased. Therefore, it can be analysed from this example that income measurement indicators are usually affected by changes in the business cycle, rather than by actual policy decisions. Therefore, income data is not used in this study, because this paper is more interested in government policy decisions. In addition, the data in the study not only considers tax rate changes, but also other

policy decisions, such as tax base and rate. Specifically, table 1 reflects the distribution of policy responses in the two dimensions of base and rate. In general, changes in interest rates compared with changes in bases, changes in interest rates accounted for more of the reforms implemented by governments in Central and Eastern Europe (158 changes), and changes in bases (140 changes) are only the same as changes in interest rates. Furthermore, it can be seen from table1 that base changes are most used in the field of direct taxation, accounting for 105, accounting for about 35% of all reforms. In contrast, in the field of indirect taxes, corresponding to Excises, the base changes are not so obvious. Nevertheless, the total amount of tax rate changes and base changes indicates the importance of tax changes other than tax rates.

The table describes the main tax changes made by the Bulgarian and Romanian governments from 2016 to 2019 and how they converted tax policy changes into the count data used in the study. The table also further clarifies the dependent variables used. In addition, Lierse and Seelkopf(2016)mentioned when using this method for data research: Although this count data does not consider the range difference, they allow the joint measurement of base and rate changes. In general, Lierse and Seelkopf(2016) believe that the counting variables recorded by this method are more inclusive than the frequently used tax rate data.

The figure shows the specific increase and decrease of each of the four tax policies studied and the total amount of change. In general, except for Excise, the changes in the rest of the tax categories are basically reduced than increased (the increase and decrease of the total amount and CIT are similar). It can be seen from the figure that the CEE government is more focused on direct taxes. It can be observed from the figure that there are more changes in PIT, followed by CIT. Among them, the policy of excises tax is less targeted. In addition, through the study of the four tax policy change reports, it is possible to observe the changes in the number and direction of tax policies of all taxes and all CEE countries. For example, in 2019, the Czech Republic lowered its value-added tax rate from 15% to 10%. Both Estonia and Latvia adjusted environmental-related excise tax rates; for Croatia, the PIT tax rate will be reduced in 2019, and the CIT and VAT tax rates will also be reduced. For Lithuania, the PIT tax rate and the VAT tax rate were increased in 2019(Commission, 2019).

In the empirical analysis, the number of changes in the overall tax and the percentage of increase in the total change are used as dependent variables. Specifically, the

operations are carried out for the overall changes and changes in direct taxes (including CIT and PIT) and indirect taxes (including VAT and Excises). By collecting relevant data, we can fully understand how the government will respond to pressure from the international capital market during Brexit. Next, the independent variables used in this empirical study will be elaborated.

Table 2 Examples of dependent variable counting (take Bulgaria and Romania as examples)

	Bulgaria				Romania			
	Description of the tax change	Change	Count variable	Date	Description of the tax change	Change	Count variable	Date
PIT								
2016	Reduction of the scope of tax exempted income by introducing taxation for winnings and prizes received from participation in games of chance which are not considered to be gambling under the Gambling Act or under the law of another country - an EU member state or country - part of the EEA Agreement, in which profits are determined randomly.	Base increase	+1	Legislation: 06-12-2016 In force from: 01-01-2017	For the monthly taxable income obtained from pensions : Increase the amount of monthly exempt pension allowance from RON 1 050 to RON 2 000, and pensioners are exempt from payment of social healthcare contributions (health contribution for pension income will be acquitted from the state budget).	Base increase	+1	Announcement: 11.2016 Legislation: 06.01.2017 In force from: 01.02.2017
2017	N/A	N/A	0		Increase in personal deductions granted to individuals with a gross monthly income of up to RON 1 930 inclusive, as well as up to RON 3 600. For a monthly gross income exceeding RON 3 600, no personal deduction is granted.	Base decrease	-1	Legislation: 08-11-2017 In force from: 01-01-2018
2018	N/A	N/A	0		N/A	N/A	0	
2019	N/A	N/A	0		N/A	N/A	0	
CIT								
2016	Introduction of obligatory electronic submission of tax returns under the Corporate Income Tax Act.	Neutral	0	Legislation: 06-12-2016 In force from:				
2017	N/A	N/A	0		Increase of the turnover threshold for application of the micro-enterprise tax regime from EUR 500 000 per year to EUR 1 000 000 per year.	Base increase	+1	Legislation: 08-11-2017 In force from: 01-01-2018
2018	Introduction of a new provision on the Interest limitation rule (art. 43a CITA) under implementation of part of the provisions of Directive (EC) 2016/1164.	N/A	0	Legislation: 27-11-2018 In force from: 01-01-2019	The establishment of a tax rule, according to which micro-enterprises can opt for the payment of corporation tax provided they have a minimum share capital of RON 45 000 lei (about EUR 10000 euro) and have at least two employees	N/A	0	Legislation: 29-03-2018 In force from: 01-04-2018
2019	Introduction in the national legislation of the anti-tax avoidance provisions of the Council Directive (EU) 2016/1164 in respect of the exit taxation rules.	Base increase	+1	Legislation: 06-12-2019 In force from: 01-01-2020	N/A	N/A	0	
VAT								
2016	Introduction of VAT exemption for the free of charge provision of foodstuffs close to their expiry date and marked as «donation, not for sale» to nonprofit legal entities who are registered as food bank operators and perform humanitarian activity.	Base decrease	-1	Legislation: 08-11-2016 In force from: 01-01-2017	Introduction of a special regime for agricultural activities regarding VAT.	N/A	0	Legislation: 06.12.2016 In force from: 01.01.2017
2017	N/A	N/A	0		Introduction of a special regime for agricultural activities regarding VAT.	N/A	0	Legislation: 27-12-2017 In force from:
2018	N/A	N/A	0		VAT rate reduction for accommodation, restaurants, catering, gyms from 9 % to 5 %.	Rate decrease	-1	Legislation: 04-10-2018 In force from:
2019	N/A	N/A	0		VAT rate reduction for ecological agriculture and traditional products from 9% to 5%.	Rate decrease	-1	Legislation: 14-05-2019 In force from:
Excise Tax								
2016	Change in the ratio between specific and proportional excise duty rates on cigarettes - specific excise is increased from BGN 70 to BGN 101 per 1 000 pieces and proportional is decreased accordingly to reach the minimum EU levels as of 1 January 2018 (27 % from retail price for 2017 and 28 % from retail price for 2018).	Rate increase	+1	Legislation: 06-12-2016 In force from: 01-01-2017	Removal from the scope of excise duty of the excise on other goods (luxury products, coffees) and the tax on crude oil from domestic production.	N/A	0	Legislation: 08.09.2015 In force from: 01.01.2016
2017	Change in the ratio between specific and proportional excise duty rates on cigarettes - specific excise is increased from BGN 101 to BGN 109 per 1 000 pieces and proportional is decreased accordingly from 28 % to 25 % from retail price for 2018 to reach the minimum EU levels as of 1 January 2018 EUR 90 (BGN 177) per 1 000.	Rate increase	+1	Legislation: 04-08-2017 In force from: 01-01-2018	Increase of the excise duty on energy products gradually.	Rate increase	+1	Legislation: 30-09-2017 In force from: 15-09-2017
2018	N/A	N/A	0		N/A	N/A	0	
2019	Introduction of obligation for authorised warehouse keepers to use video surveillance system and control of all processes taking place in the tax warehouses (in the cases of production and warehousing of energy products under CN codes 2710 12 to 2710 20, ethyl alcohol and tobacco products).	N/A	N/A	Legislation: 06-12-2019 In force from: 01-01-2020	Increase the tobacco excise level from RON 483.74 per 1,000 cigarettes to RON 503.97 per 1,000 cigarettes	Rate increase	+1	Legislation: 31-12-2019 In force from: 01-02-2020

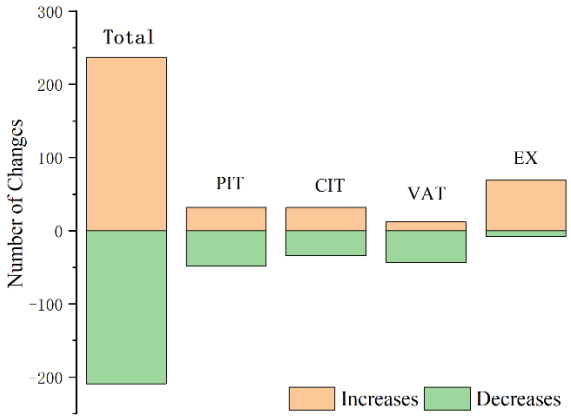

Figure 3 Number of changes 2016-2019, by tax type. *Source:* (Commission, 2017);(Commission, 2018);(Commission, 2019);(Commission, 2020).

5.1.2 Independent Variable

This dissertation aims to determine whether and how market pressures affect tax policy decisions during Brexit. Because the impact of Brexit on CEE countries is not

homogenous, studying this period provides a suitable motivation for testing the hypotheses proposed in this article. In this empirical study, the 10-year government bond yield will be used to represent the strength of the crisis in each member country. This indicator measures the interest rate the government must pay for funds in the financial market. Specifically, the higher the risk, the lower the probability that investors believe that the loan will be repaid in full on time, and the higher the rate of return. The high interest rates reflect the strong market pressure of their respective governments, that is, they can no longer obtain low-cost financing from the market. Therefore, the government that cannot obtain financing from the market will need to ask taxpayers for help and show the government's commitment to future fiscal discipline, in the hope of achieving the goal of restoring normal bond interest rates. According to (Codogno et al., 2003), 10-year bonds are fresh and long-term capital that the government mainly relies on. Therefore, in this study, 10-year bonds are used instead of bonds with shorter maturities, because they are the most traded government bonds in the Eurozone and are therefore the standard measure of choice.

In addition, this study will use the ratio of the yield to the average EU bond yield, that is, the difference between the yield and the EU average bond yield, as an empirical indicator of the relative cost of borrowing in the capital market. Due to the possible endogenous issues, this empirical study uses the average bond yield from July to June of the following year, so it includes the six months of the previous year and the six months of this year. This trade-off allows the market pressure to be properly measured, so it can be close enough to the current event, which is important for government policy, but at the same time early enough to illustrate the correct sequence of events.

Bond yields reflect other commonly used variables. These variables are usually used to measure economic pressures at the national level and internationally, such as unemployment, inflation, growth, or deficits. In addition, according to Lierse and Seelkopf(2016), bond interest rates reflect the capital market pressures faced by the government and are superior to deficit and debt ratios.

Although bond yield is the main theoretical focus of this study, because this indicator explains the strength of the impact of Brexit on each country, in this empirical study, two political control variables are added to the main model. Among them, the first is the government’s party relationship, which is measured on a scale between 0 (left) and 10 (right) and weighted by the share of coalition government seats (for example: Döring

and Manow, 2011, Hooghe et al., 2010 den). According to the above-mentioned literature, in general, right-wing parties are more likely to advocate tax cuts, especially for working capital, while left-wing parties are more likely to increase taxes, at least for progressive direct taxes. The second political variable is the introduction of a dummy variable for government change that lags one year behind. Because according to (Franzese, 2002, p. 95), the new government is expected to reward their voters through tax cuts. Next, a Brexit dummy variable is also included in the main model, which has a value of 1 from 2017 to 2019 and a value of 0 in 2016. The Brexit dummy variable measures the overall impact of Brexit on all CEE countries. 2016 is the reference year before Brexit, because a series of tax policy adjustments were officially promulgated and effective in 2017. In addition, a dummy variable of Eurozone membership is included in the model. This variable is used to explain the possibility that government members led by the European Monetary Union are unable to respond to monetary policy in order to take more fiscal measures to respond.

As mentioned in the literature review in Chapter 3, smaller countries are usually more affected by international financial markets, but smaller countries tend to benefit more from tax competition than larger countries. Since the government can choose not only to increase revenue, but also to reduce expenditure, two variables are added to the main model to deal with this substitution effect. In the robustness test, indicators including government expenditure, dependency ratio, and fiscal index are introduced. Since this affects the estimated value (expenditure is also determined by the same independent variable. In addition, according to (Plümper et al., 2009), the most pressing structural spending constraint in advanced economies is the number of elderly people who may rely on government spending. To measure the impact on Central and Eastern European countries, the dependency ratio is added to the main model to more indirectly measure expenditure constraints. The dependency ratio is an indicator year that measures the ratio of the population over 65 to the working-age population (15-64 years old) (United Nations). Finally, this model also includes controlling differences in national fiscal rules to show how easy it is to change tax policies. Because some scholars (i.e., Poterba, 1993) have shown that strong fiscal rules have an impact on the speed and nature of fiscal adjustment. Therefore, the fiscal regulation index (EU) provided by the European Union is also included in the model. This indicator considers five related aspects: the legal basis of the rule, the space for modifying the target, the mechanism for monitoring

compliance and rule enforcement, the existence of a predefined enforcement mechanism, and the media visibility of the rule. Specifically, the higher the index, the more likely it is for a country to take more timely and comprehensive measures to respond to the crisis in order to restore budget discipline and achieve macroeconomic stability. The data again comes from Eurostat.

5.2 Methodology

5.2.1 Methodological summary and comparison of related research issues

Before explaining the methodology used in this paper, this section will summarize the methodology in the current literature involved in exploring the use of Brexit for capital market and tax policy changes and compare those methodology critically.

According to (Díaz, 2016) the purpose of the research is to explore the impact of Brexit on the UK's financial sector. The methodology used in this article is Content Analysis. According to (Díaz, 2016), content analysis is an objective research method that searches for concepts or keywords by analysing the information contained in one or more documents. Then, based on the number of times the concepts or keywords are mentioned, you can infer their importance in the context. In his research, he explored research questions through the analysis of keywords in a series of reports published by the United Kingdom and the European Union. However, according to (Díaz, 2016), because Brexit was a relatively new research topic at the time, there were fewer relevant articles, and many search results for keywords were irrelevant. Therefore, the conclusions drawn do not have strong representativeness. Furthermore, Maja Grdinic, Sasa Drezgic(2017) also used qualitative research methods. Explore the tax structure and economic growth proposals and reforms of Central and Eastern European countries through a literature review. Therefore, the main purpose of this thesis is to provide opinions to discuss research questions. In addition, (Adeoye, 2020)'s research theme is to explore the impact of Brexit and the European Union on the markets of developing countries. The methodology used is an exploratory research method. Specifically, it will use graphs to perform statistical analysis on available data to explain the trend and volume of trade relations between ECOWAS countries and the United Kingdom and the European Union. The study uses data on trade flows of various countries extracted from Euro statistics. The data also comes from the 2020 IMF World Economic Outlook database/report. Its research is supplemented by extensive desk review research. (Adeoye, 2020)'s research method combines some data analysis, but it still belongs to

the category of qualitative research. Since econometric models are not used for estimation, their research will lack selected variables and fail to estimate the relationship between variables, which will lead to a lack of rigor in the analysis results that rely only on descriptive statistics. Moreover, Kendrick (2016) studied the subject of "sovereignty issues, taxation and the Brexit referendum", by summarizing the current literature on the debt of Brexit and combining the theories of sovereignty and harmonisation. It analyses Brexit and taxation from a qualitative methodological perspective. In addition, the research theme of England(2020) is to study the impact of Brexit from the perspective of neofunctionalism. The research explores the trajectory of the Brexit crisis because of neo-functionalism in order to understand how European integration occurs in the 21st century. The study first explored the current situation since the beginning of the 2016 crisis, the degree of public opinion changes, and the impact of this on other EU member states. After that, the paper also explored the lack of understanding associated with modern European integration and the relative gaps in the literature left after the decline of neofunctionalism. Subsequently, the paper examines the crisis from the perspective of neo-functionalism and develops a theoretical understanding of the crisis as a method to understand the relevance of the theory to the modern context, as well to quantify and rationalize irrationality. Therefore, this article also uses a qualitative approach to study the impact of Brexit by combining theory and context.

Additionally, according to recent literature (listed in Jiang and Yifan, 2014), the empirical analysis is based on the use of several econometric methods. These econometric methods all calculate and estimate the relevant variables selected in the model. Accordingly, the research of Jiang and Yifan(2014) adopts an empirical analysis method. The research purpose of Jiang and Yifan(2014) is to explore the relationship between tax structures and economic growth in CEE countries. Its research method is to use empirical research, collect the panels of 20 Central and Eastern European countries from 1990 to 20, and use the most relevant and latest methods to conduct dynamic panel regression analysis. Moreover, according to (Harrison, 2010), their research uses panel data to analyse the statistical characteristics of the stock market dynamics in Central and Eastern Europe. By studying the stock market indexes during 1994-2006, the purpose is to determine their dynamic characteristics in panel data analysis. The data collected comes from DataStream. In addition, it focuses on 10

emerging countries from the CEE region, including Slovenia, Slovak Republic, Estonia, Latvia, Lithuania, Bulgaria, Czech Republic, Romania, Hungary and Poland. The research theme of Kurecic and Kokotovic(2018) is an empirical analysis of the impact of the Brexit referendum and post-referendum events on some stock exchange indexes. The study extracted the opening prices of 12 different stock indexes from May 10, 2016, to July 26, 2017. By using Chow (1960)'s structural fracture test version for empirical analysis. Specifically, its research is done by implementing standard ordinary least squares (OLS) regression, in which the corresponding stock index is used as the dependent variable, and the lag of the stock index is used as the explanatory variable. Similarly, the research theme of (Bouoiyour and Selmi, 2016) is to explore whether the uncertainty of Brexit will harm the UK and European stock markets. The study used QR models and frequency-domain causality tests to assess the response of UK and EU stock returns. The research was collected from the DataStream database. The stock market price data uses weekly data from January 2010 to July 2015 (268 observations in total) and is used for stock prices in the United Kingdom (FTSE 100), Germany (DAX 30) and France (CAC 40). In addition, the purpose of (Škrinjarić, 2019)' research is to explore the response of the stock market to Brexit: selected cases of Central and Western Europe and Western Europe stock markets. Research is to use empirical research methods combined with econometric models to evaluate the impact of any type of event on stock returns. According to (Kizys and Pierdzioch, 2011), the subject of his research is to explore the sharp collapse of the stock markets of Central and Eastern European countries during the 2008 financial crisis. The purpose of the research is to find out whether the reason for the stock market crash in Central and Eastern European countries is the deteriorating international connection of fundamentals or the international spillover effect of speculative bubbles. Therefore, the study estimates a state space model that decomposes the stock market indices of three Central and Eastern European countries (Czech Republic, Hungary, and Poland) into fundamental and speculative bubbles. Then, they used co-integration analysis techniques to study the long-term link between fundamentals and speculative bubbles. The research topic of Onofrei, Cărăuşu and Lupu(2019) is to study the role of CEE countries' macroeconomic environment in shaping the linkage of capital markets. The study used wavelet analysis to provide a general analytical framework for testing the phenomenon of contagion and interdependence between the German and British markets. The research and analysis is

also carried out by means of quantitative models to analyse the linkage and contagion relationship between the capital markets, which are based on the stock index samples estimated using the closing price of each state's currency transaction. The research theme of Born *et al.*(2017) is to explore the economic consequences of the Brexit referendum. The analytical method they use relies on a systematic, completely data-driven approach, which is a synthetic control technique in the empirical macroeconomics toolbox. Through the research and comparison of a series of related research methodologies, after fully understanding the characteristics and advantages and disadvantages of each research method, it can be clear that only relying on qualitative or quantitative analysis alone cannot comprehensively analyse and research problems. For example, according to (S, 2012), the focus of the research is to explore whether politics is important for European taxes during the crisis. The specific research question is to find out how the government responds to the fiscal pressure caused by the crisis and whether the left-wing and right-wing governments have chosen different tax policies. The study included tax changes adopted by 27 European member states over a three-year period. In addition, the research of (S, 2012) is divided into two steps and involves a mixture of quantitative and qualitative evidence. First, its research is based on the political and economic variables just outlined to evaluate the government's tax response to quantitative analysis. The total amount of change, the direction of change (total increase and decrease) and the type of change are directly and indirectly analysed, and each tax type is quantitatively analysed. Secondly, combine qualitative analysis based on quantitative results, because only quantitative data cannot know the tax changes corresponding to specific countries in specific years. However, through the summary and comparison of the relevant literature on the research issues of this thesis, there is no literature that has been found in the context of Brexit, using relevant econometric models, that is, empirical research to link tax reform and capital markets. However, when analysing and comparing related methodologies, the research method of Lierse and Seelkopf(2016) provides a breakthrough for the methodology of this dissertation. The research of Lierse and Seelkopf(2016) shows that after the 2008 financial crisis, due to financial market pressure, capitalist democracies have little political space to manipulate and redistribute politics when fiscal pressure is high. Therefore, they introduced new data on EU tax policy changes from 2008 to 2010, showing that financial pressure limited the government's tax policy response. Moreover,

they used the Poisson and Heckman model to estimate when conducting empirical research. The research focus of this paper is also more on the government's tax policy response to the situation of Brexit. Therefore, in the research process of this thesis, not only the methodology used in (S, 2012) (a combination of quantitative and qualitative analysis) and the selection of variables (analysis of the political level) were used for reference. In addition, this paper follows the research method of Lierse and Seelkopf(2016), which uses Poisson and Heckman models for estimation.

5.2.2 Poisson and Heckman Selection Model

As mentioned in the data section above, this study uses two different econometric models to estimate the influence of independent variables on different versions of dependent variables: the total number of overall tax changes, the total number of direct and indirect tax changes, and the percentages of these three variables increase.

According to (Sellers, Borle and Shmueli, 2012), in recent years, with the advancement of technology, the demand for data collection and storage has increased dramatically, so counting data has been widely used in many disciplines. Furthermore, Sellers, Borle and Shmueli(2012)further proposed that the most popular counting data modelling distribution is the Poisson distribution. In practical applications, the use of Poisson distribution to model counting data is widely distributed. Although the Poisson model is very popular for modelling count data, many real data do not follow the assumption of equal dispersion (that is, the mean and variance are equal) based on the Poisson distribution. Therefore, the early result is the popularity of the negative binomial distribution, which can capture excessive dispersion. Although the initial use of the negative binomial distribution did bring some computational challenges, but today such problems no longer occur, and most statistical software packages include negative binomial distribution and regression.

Therefore, the Poisson model is first used in the empirical research of this thesis. Accordingly, the empirical research of this paper first focuses on the number of tax changes. Since this is a counting variable, the Poisson model will be run first. By viewing the estimated descriptive statistics and goodness-of-fit checks, it can be confirmed that the running Poisson model is not over-dispersed. Therefore, the first step is to choose the Poisson model instead of negative binomial regression. The purpose of running the Poisson model is to find the independent variables that have a significant impact on the number of tax changes in this step. In order to explore the

independent variables that affect the direction of tax changes, the Heckman selection model is introduced in the second step to reduce Poisson the significant variables in the model are selected to exclude their influence and then further researched.

After running the Poisson model, continue to introduce the Heckman selection model. According to Puhani(2000), selection problems often appear in the wide application of econometrics. Furthermore, Marchenko and Genton(2012) also stated that, in practice, the sample selection is often determined based on the partial observability of the results of interest in the research. In the case of sample selection, even after controlling for the explanatory variables, the observed data cannot represent a random sample in the population. In other words, data is not lost randomly. Therefore, standard analysis using only complete cases will lead to biased results. The Heckman selection model introduces a sample selection model to analyse such data. Heckman (1974) introduced the classic sample selection model in the mid-1970s, when he proposed a parameter estimation method under the assumption of bivariate normality between Y* and U*. The main criticism of the method proposed by Heckman is the sensitivity of parameter estimation to the assumption of normality, which is often violated in practice. This led Heckman to develop a more robust estimation program called Heckman in the late 1970s. The two-step (TS) estimator (Heckman 1979). Through a series of verifications, it is found that both estimation methods are sensitive to the high correlation between the outcome variable and the selection equation, which is often encountered in practice (for example, see (Puhani, 2000) and its references).

After running the Poisson model to study the amount of tax changes, it is necessary to study the relationship of variables that affect the direction of tax changes. Therefore, a variable is generated at this step to measure the percentage increase in total change. Considering that not all governments have implemented tax reforms, especially the two types of taxes, direct and indirect taxes, the Heckman selection model is run at this step. There are two steps when running the Heckman model. First, generate three new dummy variables for Total tax change, direct tax change and indirect tax change (that is, total dummy, direct dummy, and indirect dummy). The setting of the dummy variable is as follows: Analyse the influence of the significant independent variable estimated in the Poisson model on the dependent variable (tax change) in the model. If the independent variable has an impact on the dependent variable, that is, there is a change, then the dummy variable is taken It is 1, otherwise it is 0. The second step of

the Heckman selection model is to correct for the selection effect and estimate the effect of all independent variables on the percentage increase. For all models, rho shows that the errors from the selection and direction equations are related, so we implemented the Heckman model correctly instead of two separate models in two stages. Furthermore, apply these estimates to changes in the general taxation system and changes in direct and indirect taxes. In view of the short time frame set by this empirical study, Brexit dummy is sufficient to absorb the influence of changes over time. In general, unlike most of the studies cited in this article, we have observed much more countries than we have observed in the years, so this study focuses on the cross-sectional aspects of CEE countries' policy responses during Brexit.

Chapter6: Results and Discussion

Table 3 Descriptive statistics for empirical research

Variable	Obs	Mean	SD	Min	Max
Total changes	44	10.14	8.476	0	40
Direct changes	44	3.455	3.985	0	19
Indirect changes	44	3.318	3.138	0	12
Total % increases	44	0.457	0.314	0	1
Direct % increases	44	0.243	0.32	0	1
Indirect % changes	44	0.471	0.413	0	1
Total Δ dummy	44	0.841	0.37	0	1
Direct Δ dummy	44	0.795	0.408	0	1
Indirect Δ dummy	44	0.75	0.438	0	1
Ratio government bond yields(June)	44	0.62	0.549	-0.14	1.97
Partisanship	44	6.291	1.648	2.9	9.4
Lagged government change	44	0.182	0.39	0	1
Brexit dummy	44	0.75	0.438	0	1
Euro area dummy	44	0.455	0.504	0	1
Ratio government bond yields(yearly)	44	1.573	1.382	-0.33	4.69
Δ Ratio government bond yields	44	-0.173	0.438	-0.89	1
Population	44	9.319	10.51	1.31	37.97
Dependency ratio	44	53.76	4.775	45.2	67.5
Δ Government expenditure	44	-0.467	1.49	-5.72	1.65
Fiscal rule index	44	1.455	0.909	-0.99	3.01

After announcing Brexit, CEE countries adjust their tax systems to stimulate economic activity and/or consolidate public finances. From 2016 to 2019, the tax policy change report issued by the EU can be analysed. From 2016 to 2018, CEE countries have implemented tax increase measures in general. The reason for the tax increase can be analysed as the government receives from the financial market. The pressure on loans to become more and more expensive, so governments are increasingly choosing to increase taxes to obtain capital. In other words, the interest rate that the government must pay in exchange for capital in the financial market therefore strongly affects the

economic response in terms of the amount and direction of tax changes. The empirical research in this article agrees with previous research that emphasized that socio-economic pressures are the key policy determinants (see the "Capital Market and Tax Policy Making" section). In other words, when the government loses its fiscal credibility, the government often needs to make strong reform commitments, and the theory that it increasingly seeks public funds from taxpayers is correct. In the following, the findings of the empirical model will be discussed in more detail by combining the theoretical propositions put forward: First, a detailed explanation of the overall amount of tax changes is required before investigating the tax portfolio.

Table 4 shows the regression results between the total number of changes in all taxes, direct taxes and indirect taxes, and the selected variables obtained from the Poisson model. First, analyse the first column. The first column of Table 4 lists the results of the effects of bond interest rates, party relations, lagging new governments, and euro dummy variables on the overall tax changes implemented by Central and Eastern European countries. Calculations in the Poisson model show that the amount of tax adjustment depends on variables other than bond interest rates. This result shows that the number of tax adjustments has no significant relationship with bond interest rates but is affected by political factors. Among them, the influence of changes in party affiliation and changes in total tax revenue is significant and positive. This shows that the position of political parties in Central and Eastern European countries has a direct and positive impact on changes in taxation policies. In other words, the left and right composition of the government has a positive and significant response to the policy during the analysis period, which is consistent with earlier research (Garrett and Lange, 1991). This shows that during the Brexit period, the nature of the political parties of various governments directly affects the adjustment of their taxation policies. Second, changes in the number of euro dummy variables and tax adjustments are also significant positive effects. This shows that whether Central and Eastern European countries have a direct impact on tax policy adjustments in the Eurozone. The relationship between the Brexit dummy and the lagging new government and tax policy adjustments is significant but negative. This shows that whether the Central and Eastern European countries are in the period of Brexit and whether they change government leaders does have a direct impact on taxation policies, but it is not a positive impact. This is contrary to the empirical results of Lierse and Seelkopf(2016). Their research believes that under

the influence of the financial crisis, the changed government will add more tax changes to win support. In addition, it can be seen from the data that the impact of bond interest rates on tax changes is positive but not significant. This can indicate that during the Brexit period, the capital markets of CEE countries were affected to a certain extent, so the government turned to taxation to obtain more fiscal revenue. However, what is inconsistent with the expected hypothesis 1 is that from the results of the Poisson model of empirical research, the effect of bond interest rates on the total tax revenue changes of Central and Eastern European countries is not significant. So this overturns Hypothesis 1. From the results, it can be preliminarily inferred that the impact of Brexit on the capital markets of Central and Eastern European countries is not significant, and its impact cannot be compared with the impact of the 2008 financial crisis on the capital markets. This shows that Brexit has had a certain impact on the capital markets of CEE countries, but the impact does not constitute a complete loss of low loans from the capital markets so that the government needs to rely more on taxes to increase fiscal revenue. Therefore, a preliminary judgment can be drawn on the impact of all the above variables on the number of tax policies issued by CEE countries during the 2016-2019 Brexit period. The changes in the tax policy of CEE countries during the Brexit period are more at the national political level.

Then analyse the two columns of number of direct tax change and number of indirect tax change listed in table3. By analysing the data, it can be concluded that for the adjustment of CEE countries' direct taxes from 2016 to 2019, both Lagged new government and Euro dummy have had a significant impact on their changes. Among them, the former is consistent with the number of total tax change and has a significant but negative impact. This can show that changing government leaders has not stimulated the government to introduce more tax policy changes. The latter indicates that being in the Eurozone has had a significant and positive impact on the promulgation of direct taxes. And whether it is in the euro area or not in the euro area will have an impact on tax policy changes that needs further research. The impact of the variable bond interest rate on the reform of direct taxation is consistent with the previous impact on the number of changes in the overall tax policy. In addition, for indirect taxes, only Brexit dummy has a significant impact on the number of indirect tax changes and is negative. This shows that whether it is within the Brexit time period has a significant impact on the adjustment of indirect tax policies. After explaining the results of the first

Poisson model run, the results obtained by the Heckman selection model will be explained and analysed. All relevant results are listed in table5.

Table 4 Poisson model for number of changes

	Number of total changes	Number of direct changes	Number of indirect changes
Bond yield ratio	0.174	0.353	-0.0506
	(0.152)	(0.282)	(0.247)
Partidsanship	0.0786**	0.0736	0.0435
	(0.0352)	(0.0588)	(0.0627)
Lagged new government	-0.303*	-0.662**	0.239
	(0.155)	(0.304)	(0.233)
Brexit dummy	-0.222**	-0.245	-0.540***
	(0.105)	(0.177)	(0.176)
Euro dummy	0.455***	0.830***	0.172
	(0.158)	(0.287)	(0.269)
Observations	44	44	44

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant not reported.

Table 5 Heckman selection model for percentage of increases

		Total Changes	Direct Changes	Indirect changes
% increase	Bond yield ratio	-0.370**	-0.024	-0.019
		(-2.60)	(-0.13)	(-0.06)
	Partidsanship	0.032	0.099	0.072
		(0.39)	(1.47)	(1.01)
	Lagged new government	0.252	-0.111	5.195
		(0.73)	(-0.60)	(0.81)
	Euro dummy	-0.134	0.250	0.600
		(-0.71)	(1.05)	(0.76)
Selection	Partidsanship	-0.149	0.122	0.007
		(-0.81)	(0.74)	(0.04)
	Lagged new government	-0.544	-0.192	-1.351**
		(-0.92)	(-0.34)	(-2.26)
	Euro dummy	-0.240	0.230	-0.224
		(-0.43)	(0.43)	(-0.37)
	Brexit dummy	0.190	0.323	-
		(0.36)	(0.66)	
	Observations	44	44	44

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant not reported.

The Heckman selection model can better help understand whether the government of a country with a higher bond interest rate will respond with more taxation than a country with a lower bond interest rate when charging a bond premium. The hypothesis 2 established in the previous article believes that the increase in the risk of default will restrict the government's access to financing from the international finance or capital market or make the cost too high, causing the government to switch to other channels such as taxation to obtain funding sources. Table 5 lists the statistical results of Heckman's choice model on the overall, direct and indirect taxation policy changes.

The calculation results of this model are inconsistent with Hypothesis 2 and Hypothesis 3. When the government bond yield is higher, the government adopts fewer tax increase policies for the overall taxation of CEE countries. As for direct taxes and indirect taxes, when the yield of government bonds is higher, the government adopts fewer changes in policies to increase direct taxes or indirect taxes. In other words, for CEE countries during the Brexit period, when the capital market has been hit to a certain extent and bond interest rates have risen, the government will indeed adopt strategies to adjust tax policies. However, for countries with high bond interest rates, the government's tax adjustment is more of a tax reduction policy. This further proves that the capital markets of CEE countries did not suffer a major impact during the Brexit period. Instead, governments whose capital markets have been impacted hope to adopt more tax cuts (indirect taxes or indirect taxes) to deal with it. Regarding other variables, the Brexit dummy is positive in the result of the Heckman selection model operation. This can show that Brexit has indeed forced CEE governments to make tax policy adjustments. In addition, according to the data listed in Table 5, it can be analysed that the two political variables of partnership and the new government did not significantly affect tax increases. First, regarding partisanship, early research (Garrett, 1998; Garrett and Mitchell, 2001) suggested that governments with a strong left in parliament are more inclined to choose more progressive and redistributive measures to reduce the tax burden of the poor. However, the empirical research findings in this article do not support this. In contrast, the results show that when the government is facing fiscal pressure, they tend to increase revenue through types of taxes other than direct taxes or indirect taxes. In other words, the analysis neither shows the overall redistributive impact, nor does it show countries with strong left wing in parliament. Second, the statistical results obtained did not provide any evidence for the theory that the new government is more likely to raise taxes as implied by the political business cycle in taxation (Nordhaus, 1975). This shows that fiscal pressure will only increase the overall level of fiscal adjustment, but the new government is as likely to increase taxes as it is to reduce taxes, so it is impossible to make accurate judgments. In general, policy adjustments related to tax increases are affected by market pressure measured by government bond interest rates. But for CEE countries, when the capital market is under pressure, fewer policies have been issued to increase taxation. On the other hand, political and structural factors play only a secondary role during Brexit. Specifically,

the left and right composition of the government seems to have no influence on the policy response during the analysis period, but it is consistent with the results of recent research (Hays, 2003, 2009). The new government made more tax policy changes based on their election promises.

Robustness Check

After running the Poisson model and the Heckman selection model completely, this paper immediately added several different independent variables and dependent variables. Several robustness checks were performed on the Poisson Model and the Heckman Selection Model to illustrate the accuracy of the empirical results. sex. The four control variables of the ratio of the population over 65 to the working-age population (15-64 years old) (United Nations); national fiscal rules; total government expenditure and dependency ratio were added to the robustness check. In general, the findings of this article are robust to different measurements of dependent variables and changes in control variables. Tables A1-A6 in the appendix illustrate each dependent variable (the amount of change and percentage increase in total tax, direct tax and indirect tax change). The bond yield has a negative and significant impact on the proportion of tax increase policy adjustments. But for some models, it has little meaning and may introduce too much noise in the data. Consistent with the argument when the independent variables were introduced in the data part, governments with a higher degree of dependence will face structural spending needs, and therefore will implement more tax reforms. In addition, in terms of overall taxation, all model tests on direct taxation and indirect taxation reforms have concluded that the existence of fiscal rules has a significant positive impact on changes in taxation policies. In addition, in the stability test of all taxation and direct taxation policy reforms of the Poisson Model, government expenditures also showed a significant impact. The results of the study show that bond interest rates can affect economic response and limit taxation options in capitalist democracies. The higher the bond interest rate, the more the government can adjust the economy, reflecting reliable policy commitments and efforts to regain international financing. But the higher the bond interest rate, it does not prove that the government will increase taxes to increase fiscal revenue.

Chapter7: Conclusion

Between the United Kingdom's withdrawal from the European Union in the referendum on June 23, 2016, and the formal announcement of Brexit on January 30, 2020, amount

of research papers has emerged to discuss the possible impact of Brexit on all aspects of society. Among them, there are more and more research on Brexit's impact on the capital market or Brexit's tax policy. Some scholars believe that Brexit will have an impact on the EU and CEE capital markets, while other scholars believe that it will benefit the capital market, while others believe that it will not have a significant impact. In addition, regarding the impact of Brexit on taxation policies, some scholars believe that Brexit will make the United Kingdom a "tax haven", while others believe that it may cause greater tax burdens on the United Kingdom and the EU. Therefore, academics have not yet reached a definite conclusion on this issue. In addition, although there are many academic studies on the capital market and tax reforms that discuss Brexit. But so far, there is almost no research that links tax policy reform with capital markets, especially research on CEE countries. Therefore, after a series of identifications, this thesis selects CEE countries as the research object. The specific country selection is the 11 Central and Eastern European countries that have joined the EU, including Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia, and three Baltic countries: Estonia, Latvia and Lithuania.

Secondly, because this thesis wants to simultaneously explore the impact of Brexit on capital markets and taxation reforms in CEE countries. Therefore, this article refers to the research of Lierse and Seelkopf (2016), whose research background is that the subprime mortgage crisis triggered by the financial crisis in 2008 produced a strong stimulus to the EU capital market, resulting in the failure of EU governments to obtain low loans from the capital market. And hope to obtain capital by raising taxes. That is, countries with high bond interest rates represent greater pressure on the capital market and are therefore more likely to obtain fiscal revenue by increasing taxes. In order to link the capital market with tax reform, this dissertation's research theory assumes that Brexit will strongly stimulate the capital markets of CEE countries, causing the government to be unable to obtain low loans from the capital market. Taxes to obtain fiscal revenue. And use bond interest rates to measure market pressure, and then introduce a series of macro variables, such as the change of government, the political stance of the left or the right, and whether it is in the euro zone and other factors to consider. If the result is consistent with the setting, it proves that Brexit has indeed had a strong impact (negative impact) on the capital markets of CEE countries, and the analysis of the final model can derive the factors that have an impact on tax reform.

In addition, in order to achieve the purpose of the research, after a dialectical analysis and comparison of the methodology used in a series of related research papers, this paper refers to the research methods used in (S, 2012) and Lierse and Seelkopf (2016) and the Choice of variables. For the choice of variables, this article uses bond interest rates as the main independent variable for research, and bond interest rates as an indicator of market pressure to measure whether the capital markets of CEE countries have been impacted under the impact of Brexit. The remaining independent variables were introduced into the government change, the euro zone dummy, Brexit dummy, and political party left or right as the independent variables of the model selection. Secondly, the choice of dependent variables is mainly to study the relationship between the capital market and tax policy changes. Therefore, for the dependent variable, the European Tax Trends Report (2016 to 2019) issued by the European Union (Commission, 2017)*;*(Commission, 2018)*;*(Commission, 2019)*;*(Commission, 2020). The statistical methods are shown in the table 2 shown. Specifically, this paper uses the method shown in Figure 2 to count all tax types, direct tax and indirect tax related policies, as well as tax increase and tax reduction policies in CEE countries from 2016 to 2019. The numbers are counted separately. For the research method, the Poisson model and Heckman selection model are used. Poisson model is used to study the relationship between number of Total tax change, number of direct tax change and number of indirect tax change and the independent variables. For the Heckman selection model, it is to study the relationship between the ratio of tax increase policies to the respective taxes and the selected variables among all taxes, direct taxes and indirect taxes.

By running the Poisson model and Heckman Selection Model empirical research and analysis, the results obtained are contrary to the set hypothesis. First, from the results of the empirical research run by the Poisson model, it can be concluded that for CEE countries during the Brexit period, the impact of bond interest rates on the overall taxation and direct tax policy changes is positive, but not significant. The effect of bond interest rates on the introduction of taxation is negative and not significant. From the results of this study, it can be concluded that the impact of Brexit on the capital markets of CEE countries is not significant, and it has not caused a strong impact. In addition, the calculation result of the Poisson model shows that government-related political factors have a significant impact on the tax policy reforms of CEE countries during Brexit. Specifically, whether a party is on the left or the right and whether it is in the

euro area will have a significant and positive impact on the overall tax policy, but whether it is left or right and whether it is in the euro area or not in the euro area will have a significant and positive impact. The significant impact remains to be discussed in the next step. The change of government will have a significant and negative impact on the number of overall taxation policies and the number of direct taxation policies. This shows that the change of government during Brexit will reduce the number of tax-related policies issued. This may be since the government is more cautious in formulating tax policies related to overall taxation and direct taxation during Brexit. In addition, whether it is within the Brexit time period has a significant but negative impact on the number of overall tax policies and the number of brief tax policies. This shows that the Brexit period has reduced the tax-related policies issued by CEE countries, which is consistent with the results of previous government changes.

Secondly, the empirical research results obtained from running the Heckman selection model can be analysed. As far as the tax increase tax policy accounts for the total tax change, the government bond interest rate has a significant but negative impact on the tax increase measures. This shows that CEE countries with high bond yields during the Brexit period will choose more tax reduction policies. This is contrary to the hypothesis 2 set in advance. From the results listed in the Heckman Selection Model, we can see that the government bond interest rate has no obvious impact on direct taxes and indirect taxes. Therefore, the research results of the empirical model are not consistent with the pre-set hypothesis 3. In addition, the results obtained through the Heckman Selection Model can further prove that Brexit did not have a severe impact on the capital markets of CEE countries. Therefore, it can be determined that the event of Brexit did not cause significant impact on the capital markets of CEE countries during Brexit. Impact. A comprehensive analysis of the Poisson model and the empirical results after the Heckman Selection Model runs shows that Brexit did not have a significant impact on the capital markets of CEE countries from 2016 to 2019, and Brexit has a major impact on tax policy adjustments in CEE countries More is reflected in the political level. Specifically, changes in the government during Brexit and whether they are in the Eurozone will have a significant impact on the number of tax policies issued by CEE countries. The bond yield will significantly affect the change of tax policy, but it is notably reflected in the policy formulation of tax reduction.

In general, based on the above conclusions, the research in this article answers the research questions raised at the beginning of this article. That is, during the period of Brexit, that is, from 2016 to 2019, empirical analysis proves that the impact of Brexit on the capital markets of Central and Eastern European countries is not significant, while Brexit is more important for the formulation of tax policies in Central and Eastern European countries. The influence of politics. Through the analysis of the results of this research, in future research, we can also provide better proof for the conclusion. Specifically, in the future, in order to prove the correctness of the research in this article, we can refer to more effective variables selected in relevant literature and introduce more variables into the regression model to verify the variables that may result from changes in tax policy. In addition, the choice of models can be wider, and the model that best reflects the research results can be selected during continuous research. Secondly, because according to the research results, the impact of bond interest rates on overall tax changes is significant. Therefore, the classification of taxes (such as tariffs) can be expanded in subsequent research, and it is not limited to the study of direct taxes and indirect taxes. It will be more representative to introduce other taxes into the research category.

References

Adeoye, B. W. (2020) 'The Effect of Brexit and the European Union on Markets in Developing Countries.', *Tanzania Economic Review*, 10(2), pp. 97–115. Available at: http://login.ezproxy.ub.unimaas.nl/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=149260334&site=ehost-live&scope=site.

Amewu, Godfred, Jones Odei Mensah, and Paul Alagidede. 2016. Reaction of global stock markets to Brexit. Journal ofAfrican Political Economy & Development 1: 40–55.

Arnold, J. (2008) 'Do Tax Structures Affect Aggregate Economic Growth? Empirical Evidence form a Panel of OECD Countries', *OECD Economics Department Working Papers*, (643), pp. 1–28. Available at: http://www.oecd-ilibrary.org/economics/do-tax-structures-affect-aggregate-economic-growth_236001777843.

Baldini, Gianfranco, Edoardo Bressanelli and Emanuele Massetti (2020) Back to the Westminster model? The Brexit process and the UK political system. International Political Science Review, this issue.

Begg, I. (2017). Making sense of the costs and benefits of Brexit: challenges for economist. Atlantic Economic Journal. ISSN 01974254

Blick, Andrew (2019) Stretching the Constitution: The Brexit Shock in Historic Perspective. Oxford: Hart. (E-book version.)

Bohdalová, M. and Greguš, M. (2017) 'The Impacts of Brexit on European Equity Markets', *Financial Assets and Investing*, 8(2), pp. 5–18. doi: 10.5817/fai2017-2-1.

Born, B. *et al.* (2017) 'The Economic Consequences of the Brexit Vote', *CEPR Discussion Papers*.

Borovina, C. C. (2016) 'the Tax Policy Within the European Union: Concepts, Institutions, Trends and Challenges', *Annals - Economy Series*, 3(3), pp. 230–235.

Boffey, D. (2017), 'Netherlands "Will Block UK–EU Deal Without Tax Avoidance Measures"', The Guardian, 14 January.

Bouoiyour, J. and Selmi, R. (2016) 'Is uncertainty over Brexit damaging the UK and European equities?', *Munich Personal RePEc Archive*, (70520), p. 25. Available at: https://mpra.ub.uni-muenchen.de/70520/.

Burdekin, R. C. K., Hughson, E. and Gu, J. (2018) 'A first look at Brexit and global equity markets', *Applied Economics Letters*, 25(2), pp. 136–140. doi: 10.1080/13504851.2017.1302057.

Chang, W. W. (2018) 'Brexit and its economic consequences', *World Economy*, 41(9), pp. 2349–2373. doi: 10.1111/twec.12685.

Chen, W. *et al.* (2018) 'The continental divide? Economic exposure to Brexit in regions and countries on both sides of The Channel', *Papers in Regional Science*, 97(1), pp. 25–54. doi: 10.1111/pirs.12334.

Cichowicz, E. and Rollnik-Sadowska, E. (2018) 'Inclusive growth in CEE countries as a determinant of sustainable development', *Sustainability (Switzerland)*, 10(11), pp. 1–23. doi: 10.3390/su10113973.

Commission, E. (2017) *Taxation trends in the European Union, i: p.32*. doi: 10.2778/30295.

Commission, E. (2018) *Taxation trends in the European Union, i: p.32*. doi: 10.2778/708899.

Commission, E. (2019) *Taxation trends in the European Union, i: p.32*. doi: 10.2778/279809.

Commission, E. (2020) *Taxation trends in the European Union, i: p.32*. doi: 10.2778/49030.

Codogno, L., Favero, C. and Missale, A. (2003) Yield spreads on EMU government bonds. Economic Policy, October 18(37): 503–532.

Cubells, J. F. and Latorre, M. C. (2021) 'Brexit deal done! A detailed micro- and macroeconomic analysis of its fallout', *Economic Systems Research*. Routledge, 33(2), pp. 171–196. doi: 10.1080/09535314.2021.1887089.

Chow, G.C. 1960. Test of Equality between Sets of Coefficients in two Linear Regressions. Econometrica, 28 (3), 591-605.

Dadurkevicius, M. and Jansonaite, A. (2017) *Effects of Prescheduled Political Events on Stock Markets: the Case of Brexit*, *SSE Riga Student Research Papers*.

Daly, S. (2016) 'The taxing consequences of Brexit', *King's Law Journal*. Taylor & Francis, 27(3), pp. 463–472. doi: 10.1080/09615768.2016.1249110.

Deloitte (2016) 'UK leaving the EU: Tax Briefing', (June). Available at: https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/tax/deloite-uk-eu-tax-briefing.pdf.

Deloitte Legal Rechtsanwaltsgesellschaft mbH (2020) 'Brexit: Legal and Tax Implications', pp. 1–17. Available at: http://www2.deloitte.com/dl/en/pages/legal/articles/brexit-legal-and-tax-implications.html.

Döring, H. and Manow, P. (2011) Parliament and Government Composition Database (ParlGov): An Infrastructure for Empirical Information on Parties, Elections and Governments in Modern Democracies. Version 11/07.

Dhingra, S. *et al.* (no date) 'The consequences of Brexit for UK trade and living standards CEP BREXIT ANALYSIS NO. 2 The consequences of Brexit for UK trade and living standards'.

Díaz, M. I. (2016) 'the Impact of Brexit on the Uk Financial Sector', (June), p. 49.

Ebell, M., & Warren, J. (2016). The long-term economic impact of leaving the EU. National Institute Economic Review, 236.

England, P. (2020) 'The Impact of Brexit', *A Practitioner's Guide to European Patent Law*. doi: 10.5040/9781509928637.ch-015.

Freedman, J. (2017) 'Tax and Brexit', *Oxford Review of Economic Policy*, 33(January), pp. S79–S90. doi: 10.1093/oxrep/grx020.

Gordon, R. and Li, W. (2005) 'Tax Structure in Developing Countries ':, *Nber Working Paper Series*, (11267), pp. 2–6.

Grabczuk, K., Huculová, E. and Kutlu, A. (2019) *European dilemmas of the Brexit era*.

Grdinić, M., Drezgić, S. and Blažić, H. (2017) 'An empirical analysis of the relationship between tax structures and economic growth in CEE countries', *Ekonomicky casopis*, 65(5), pp. 426–447.

Harrison, Barry, Lupu, Radu, Lupu, I. (2010) 'Statistical Properties of the CEE Stock Market Dynamics. A Panel Data Analysis', *Romanian Economic Journal*, (37), pp. 43–54.

Harvey, C. R. *et al.* (2014) . . . 'AND THE CROSS-SECTION OF EXPECTED RETURNS'.

Hashimzade, N. and Myles, G. (2013) 'The european union constitution and the development of tax policy', *eJournal of Tax Research*, 11(3), pp. 321–341.

Harari, D., and G. Thompson (2013): "The economic impact of EU membership on the UK," Commons library standard note, Commons Library.

Heckman, J. J. (1974), "Shadow Prices, Market Wages, and Labor Supply," Econometrica, 42, 679–694. [304,305,313]———(1979), "Sample Selection Bias as a Specification Error," Econometrica, 47, 153–161. [304,305]

Hooghe, L. et al (2010) Reliability and validity of measuring party positions: The Chapel Hill expert surveys of 2002 and 2006. European Journal ofPolitical Research. 49(5): 687–703.

HM Government (2017). The United Kingdom's Exit from and New Partnership with the European Union. CM 9417. London: HMSO.

HM Treasury (2016a). HM Treasury analysis: the long economic impact of EU membership and the alternatives. Cm 9250. London: HM Treasury.

HM Treasury (2016b). HM Treasury analysis: the immediate economic impact of leaving the EU. Cm 9292. London: HM Treasury.

HM Government (2017) The United Kingdom's Exit from and New Partnership with the European Union. London: Stationery Office. Available at: https://assets.publishing.service.gov.uk/government/uploads/ system/uploads/attachment_data/file/589191/The_United_Kingdoms_exit_from_and_partnership_ with_the_EU_Web.pdf

Jiang, Q. and Yifan, Y. (2014) *Legal research in international and EU tax law*, *European taxation*.

Kanwal D. P. Singh, D. (2017) 'Tax Implications of Brexit – The Road Ahead', *Kathmandu School of Law Review*, pp. 39–48. doi: 10.46985/jms.v5i1.165.

Kapidžić, P. D. (2020) 'The Brexit negotiations 2016-2020 : redefining the United Kingdom ' s foreign policy towards Europe MASTER THESIS Candidate : Kovačević Fatima Index number : 1054 Mentor :'

Kendrick, M. (2016) 'A question of sovereignty: Tax and the Brexit referendum', *King's Law Journal*. Taylor & Francis, 27(3), pp. 366–374. doi: 10.1080/09615768.2016.1258112.

Kizys, R. and Pierdzioch, C. (2011) 'The financial crisis and the stock markets of the CEE countries', *Finance a Uver - Czech Journal of Economics and Finance*, 61(2), pp. 153–172.

Köke, Jens; Schröder, M. (2002) 'The future of Eastern European capital markets'.

Köke, J. and Schröder, M. (2003) 'The prospects of capital markets in Central and Eastern Europe', *Eastern European Economics*, 41(4), pp. 5–37. doi: 10.1080/00128775.2003.11041052.

Kurecic, P. and Kokotovic, F. (2018) 'Empirical Analysis of the Impact of Brexit Referendum and Post-Referendum Events on Selected Stock Exchange Indexes', *South East European Journal of Economics and Business*, 13(1), pp. 7–16. doi: 10.2478/jeb-2018-0001.

Lierse, H. and Seelkopf, L. (2016) 'Capital markets and tax policy making: A comparative analysis of European tax reforms since the crisis', *Comparative European Politics*, 14(5), pp. 686–716. doi: 10.1057/cep.2014.48.

Mahon, J. E. (2020) 'Tax Reforms and Income Distribution in Latin America', *The Great Gap*, (June), pp. 313–347. doi: 10.5325/j.ctv14gp9cw.14.

Maja Grdinic, Sasa Drezgic, J. S. (2017) 'TAX STRUCTURE AND ECONOMIC GROWTH RECOMMENDATIONS AND REFORMS IN CEE COUNTRIES', *23rd International Scientific Conference on Economic and Social Development*, (September), pp. 196–210.

Marchenko, Y. V. and Genton, M. G. (2012) 'A heckman selection-t model', *Journal of the American Statistical Association*, 107(497), pp. 304–317. doi: 10.1080/01621459.2012.656011.

March Budget 2016, Chancellor George Osborne, available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/508193/HMT_Budget_2016_Web_Accessible.pdf

McConalogue, Jim (2019) The British Constitution Resettled? Parliamentary Sovereignty after the EU Referendum. British Journal of Political Science 21(2): 438–458.

Morris, N. (2013): “Former Chancellor Nigel Lawson calls for UK to leave European Union,” Discussion paper, The Independent.

Minford, P., Gupta, S., Le, V., Mahambare, V., & Xu, Y. (2015). Should Britain leave the EU? An economic analysis of a troubled relationship (Second ed.). London: Institute of Economic Affairs.

OECD (2010) *Tax Policy Reform and Economic Growth*, *Tax Policy and Economic Growth*. Available at: http://www.oecd.org/dataoecd/34/49/46617652.pdf.

Onofrei, M., Cărăuşu, D. N. and Lupu, D. (2019) ‘The role of the macroeconomic environment in shaping capital market co-movement in C.E.E. countries’, *Economic Research-Ekonomska Istrazivanja* . Routledge, 32(1), pp. 3813–3834. doi: 10.1080/1331677X.2019.1675525.

ONS (2015) ‘How Important is the European Union to UK Trade and Investment?’, Office for National Statistics, 26 June.

Ottaviano, G. I. P. *et al.* (2014) ‘The Costs and Benefits of Leaving the EU’, *SSRN Electronic Journal*, (472). doi: 10.2139/ssrn.2506664.

Palowski, J. (2016). Brexit początkiem końca NATO i UE? Konsekwencje dla bezpieczeństwa. Defence24, 23 czerwca. Retrived from http://www.defence24.pl/brexit-poczatkiem-koncanato-i-ue-konsekwencje-dla-bezpieczenstwa [accessed 10.06.2018].Puhani, P. A. (2000) ‘The Heckman correction for sample selection and its critique’, *Journal of Economic Surveys*, 14(1), pp. 53–68. doi: 10.1111/1467-6419.00104.

Plümper, T., Troeger, V.W. and Winner, H. (2009) Why is there no race to the bottom in capital taxation? International Studies Quarterly 53(3): 761–786.

Poterba, J.M. (1993) State Responses to Fiscal Stress: The Effects of Budgetary Institutions and Politics. NBRE Working Paper Series, No. 4375, pp. 1–31.

Quaye, I. *et al.* (2016) ‘Review of Stock Markets’ Reaction to New Events: Evidence from Brexit’, *Journal of Financial Risk Management*, 05(04), pp. 281–314. doi: 10.4236/jfrm.2016.54025.

S, H. L. (2012) ‘European taxation during the crisis : does politics matter ? Author (s): HANNA LIERSE Source : Journal of Public Policy , December 2012 , Vol . 32 , No . 3 (December 2012), pp . Published by : Cambridge University Press Stable URL : https://www.jstor.’, 32(3), pp. 207–230. doi: 10.1017/SO.

Sanni, A. (2007) ‘Tax Reform in the Capital Market: A welcome Development.’, *Ogun State Internal Revenue Service Seminar*, pp. 1–25.

Sellers, K. F., Borle, S. and Shmueli, G. (2012) ‘The COM-Poisson model for count data: A survey of methods and applications’, *Applied Stochastic Models in Business and Industry*, 28(2), pp. 104–116. doi: 10.1002/asmb.918.

Škrinjarić, T. (2019) ‘Stock market reactions to brexit: Case of selected CEE and SEE stock markets’, *International Journal of Financial Studies*, 7(1). doi: 10.3390/ijfs7010007.

Springford, J., and S. Tilford (2014): “The Great British trade-off,” Discussion paper, Centre for European Reform.

Strawiński, P. (2016). Życie po Brexicie. Forbe., 24.06. Retrived from https://www.forbes.pl/wiadomosci/brexit-jakie-beda-skutkiwyjscia-wielkiej-brytanii-z-ue/qgrxtrb [accessed 10.06.2018].

Sultonov, M. and Jehan, S. N. (2018) ‘Dynamic Linkages between Japan’s Foreign Exchange and Stock Markets: Response to the Brexit Referendum and the 2016 U.S. Presidential

Election', *Journal of Risk and Financial Management*, 11(3), p. 34. doi: 10.3390/jrfm11030034.

White, S. (2021) 'Brexit and the future of the UK constitution', *International Political Science Review*. doi: 10.1177/0192512121995133.

Wright, W. (2016) 'The potential impact of Brexit on European capital markets', *New Financial*, (April). Available at: https://newfinancial.org/wp-content/uploads/2016/04/The-potential-impact-of-Brexit-on-European-capital-markets-New-Financial-April-2016-v11.pdf.

Zaharia, A. (2021) 'Estimation of correlation between capital markets. analysing the impact of crises on the central and eastern european markets', pp. 61–78.

Zeitschrift, S. *et al.* (2011) 'Monetary Union , Fiscal Crisis and the Pre-emption of Democracy Author (s): Fritz W . Scharpf REFERENCES Linked references are available on JSTOR for this article : You may need to log in to JSTOR to access the linked references . Monetary Union , Fisca', 9(2), pp. 163–198.

Appendix

Table A 1 Poisson model for number of total tax changes – Robustness check 1

	No controls	Controls 1	Controls 2	Controls 3	Controls 4	Yearly ratio	Δ ratio
Government bond yield	-0.105	0.274*	-0.037	0.196	0.367**	1.227***	-0.286
	(-1.18)	(1.70)	(-0.20)	(1.30)	(2.33)	(3.43)	(-0.44)
Partidsanship	—	0.123***	0.077**	0.062*	0.047	-0.005	-0.020
		(2.83)	(2.20)	-1.71	(1.24)	(-0.05)	(-0.10)
Lagged Government change	—	-0.290*	-0.245	-0.372**	-0.572***	-0.252	0.319
		(-1.88)	(-1.57)	(-2.33)	(-3.35)	(-0.70)	(0.51)
Brexit dummy	—	-0.227**	-0.150	-0.401***	-0.263**	-0.199	0.307
		(-2.17)	(-1.35)	(-2.97)	(-2.52)	(-0.71)	(0.49)
Euro area dummy	—	0.446***	0.339**	0.428***	0.444***	-0.530	-0.710
		(2.82)	(2.02)	(2.72)	(2.81)	(-1.11)	(-0.95)
Population	—	-0.013*	—	—	—	—	—
		(-1.77)					
Dependency ratio	—	—	-0.029**	—	—	—	—
			(-1.99)				
Govt.expenditure	—	—	—	0.092**	—	—	—
				(2.06)			
Fiscal rule index	—	—	—	—	0.367***	—	—
					(6.15)		
Observations	44	44	44	44	44	44	44

z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A 2 Heckman selection model for percentage of total tax increases – Robustness check 2

		No controls	Controls 1	Controls 2	Controls 3	Controls 4	Yearly ratio	Δ ratio
% increase	Government bond yield	-0.244**	-0.346**	-0.096	-0.367**	-0.261**	2.433***	-0.010
		(-2.50)	(-2.25)	(-0.59)	(-2.53)	(-2.34)	(39.05)	(-0.08)
	Partidsanship	—	0.037	-0.046	0.015	-0.041	-0.162***	0.091
			(0.44)	(-0.57)	(0.14)	(-0.63)	(-4.45)	(1.26)
	Lagged Government change	—	0.225	-0.151	0.188	-0.050	-0.620***	0.599*
			(0.64)	(-0.44)	(0.44)	(-0.18)	(-4.12)	(2.01)
	Euro area dummy	—	-0.144	-0.061	-0.165	-0.220	-0.248***	-0.085
			(-0.75)	(-0.35)	(-0.74)	(-1.52)	(-3.00)	(-0.52)
	Population	—	-0.003	—	—	—	—	—
			(-0.46)					
	Dependency ratio	—	—	0.032**	—	—	—	—
				(2.73)				
	Govt.expenditure	—	—	—	0.012	—	—	—
					(0.27)			
	Fiscal rule index	—	—	—	—	0.206***	—	—
						(4.80)		
Selection	Partidsanship	-0.149	-0.149	-0.149	-0.149	-0.149	-0.149	-0.149
		(-0.81)	(-0.81)	(-0.81)	(-0.81)	(-0.81)	(-0.81)	(-0.81)
	Lagged Government change	-0.544	-0.544	-0.544	-0.544	-0.544	-0.544	-0.544
		(-0.92)	(-0.92)	(-0.92)	(-0.92)	(-0.92)	(-0.92)	(-0.92)
	Brexit dummy	0.190	0.190	0.190	0.190	0.190	0.190	0.190
		(0.36)	(0.36)	(0.36)	(0.36)	(0.36)	(0.36)	(0.36)
	Euro area dummy	-0.240	-0.240	-0.240	-0.240	-0.240	-0.240	-0.240
		(-0.43)	(-0.43)	(-0.43)	(-0.43)	(-0.43)	(-0.43)	(-0.43)
	Observations	44	44	44	44	44	44	44

z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A 3 Poisson model for number of direct tax changes – Robustness check 3

	No controls	Controls 1	Controls 2	Controls 3	Controls 4	Yearly ratio	Δ ratio
Government bond yield	-0.284*	0.090	-0.437	0.393	0.546*	1.227***	-0.286
	(-1.80)	(0.29)	(-1.27)	(1.41)	(1.86)	(3.43)	(-0.44)
Partidsanship	—	-0.023	0.083	0.049	0.044	-0.005	-0.020
		(-0.33)	(1.45)	(0.81)	(0.70)	(-0.05)	(-0.10)
Lagged Government change	—	-0.651**	-0.430	-0.764**	-0.916***	-0.252	0.319
		(-2.15)	(-1.44)	(-2.43)	(-2.75)	(-0.70)	(0.51)
Brexit dummy	—	-0.237	0.061	-0.485**	-0.279	-0.199	0.307
		(-1.34)	(0.31)	(-2.14)	(-1.57)	(-0.71)	(0.49)
Euro area dummy	—	0.861***	0.558*	0.796***	0.816***	-0.530	-0.710
		(2.95)	(1.82)	(2.80)	(2.84)	(-1.11)	(-0.95)
Population	—	0.029**	—	—	—	—	—
		(2.38)					
Dependency ratio	—	—	-0.122***	—	—	—	—
			(-3.69)				
Govt.expenditure	—	—	—	0.129*	—	—	—
				(1.65)			
Fiscal rule index	—	—	—	—	0.337***	—	—
					(3.22)		
Observations	44	44	44	44	44	44	44

z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A 4 Heckman selection model for percentage of direct tax increases – Robustness check 4

		No controls	Controls 1	Controls 2	Controls 3	Controls 4	Yearly ratio	Δ ratio
% increase	Government bond yield	0.004	-0.071	0.033	-0.013	0.052	2.437***	-0.013
		(0.05)	(-0.41)	(0.16)	(-0.08)	(0.33)	(36.88)	(-0.11)
	Partidsanship		0.019	0.057	0.056	0.045	0.096***	-0.083
			(0.25)	(0.82)	(0.80)	(0.72)	(3.54)	(-1.60)
	Lagged Government change		-0.033	-0.050	-0.051	-0.142	-0.022	0.185
			(-0.20)	(-0.29)	(-0.28)	(-0.86)	(-0.33)	(1.44)
	Euro area dummy		0.079	0.140	0.099	0.109	0.184**	-0.373**
			(0.39)	(0.59)	(0.48)	(0.56)	(2.20)	(-2.35)
	Population		0.007					
			(0.90)					
	Dependency ratio			0.006				
				(0.40)				
	Govt.expenditure				0.015			
					(0.29)			
	Fiscal rule index					0.132**		
						(2.18)		
Selection	Partidsanship	0.122	0.122	0.122	0.122	0.122	0.122	0.122
		(0.74)	(0.74)	(0.74)	(0.74)	(0.74)	(0.74)	(0.74)
	Lagged Government change	-0.192	-0.192	-0.192	-0.192	-0.192	-0.192	-0.192
		(-0.34)	(-0.34)	(-0.34)	(-0.34)	(-0.34)	(-0.34)	(-0.34)
	Brexit dummy	0.323	0.323	0.323	0.323	0.323	0.323	0.323
		(0.66)	(0.66)	(0.66)	(0.66)	(0.66)	(0.66)	(0.66)
	Euro area dummy	0.230	0.230	0.230	0.230	0.230	0.230	0.230
		(0.43)	(0.43)	(0.43)	(0.43)	(0.43)	(0.43)	(0.43)
	Observations	44	44	44	44	44	44	44

z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A 5 Poisson model for number of indirect tax changes – Robustness check 5

	No controls	Controls 1	Controls 2	Controls 3	Controls 4	Yearly ratio	Δ ratio
Government bond yield	-0.063	0.171	-0.472	-0.046	-0.009	1.227***	-0.286
	(-0.41)	(0.64)	(-1.61)	(-0.19)	(-0.03)	(3.43)	(-0.44)
Partidsanship	—	0.139*	0.038	0.037	0.019	-0.005	-0.020
	—	(1.81)	(0.62)	(0.58)	(0.29)	(-0.05)	(-0.10)
Lagged Government change	—	0.295	0.336	0.214	0.123	-0.252	0.319
	—	(1.26)	(1.46)	(0.90)	(0.50)	(-0.70)	(0.51)
Brexit dummy	—	-0.563***	-0.355*	-0.612***	-0.569***	-0.199	0.307
	—	(-3.18)	(-1.86)	(-2.67)	(-3.23)	(-0.71)	(0.49)
Euro area dummy	—	0.147	-0.053	0.157	0.118	-0.530	-0.710
	—	(0.55)	(-0.19)	(0.58)	(0.44)	(-1.11)	(-0.95)
Population	—	-0.032**	—	—	—	—	—
	—	(-2.17)	—	—	—	—	—
Dependency ratio	—	—	-0.066**	—	—	—	—
	—	—	(-2.53)	—	—	—	—
Govt.expenditure	—	—	—	0.036	—	—	—
	—	—	—	(0.48)	—	—	—
Fiscal rule index	—	—	—	—	0.184*	—	—
	—	—	—	—	(1.88)	—	—
Observations	44	44	44	44	44	44	44

z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A 6 Heckman selection model for percentage of indirect tax increases – Robustness check 6

		No controls	Controls 1	Controls 2	Controls 3	Controls 4	Yearly ratio	Δ ratio
% increase	Government bond yield	0.032	-0.214	-0.386	0.066	0.356	2.384***	-0.098
		(0.21)	(-0.82)	(-0.95)	(0.27)	(1.24)	(31.47)	(-0.66)
	Partidsanship	—	0.068	0.133**	0.103	0.119**	0.012	-0.028
			(0.97)	(2.24)	(1.65)	(2.12)	(0.62)	(-0.77)
	Lagged Government change	—	0.099	2.130	-2.401	-9.086	0.644	0.455
			(0.02)	(0.36)	(-0.48)	(-1.53)	(0.41)	(0.15)
	Euro area dummy	—	0.239	0.276	-0.076	-0.761	0.108	-0.414
			(0.37)	(0.40)	(-0.11)	(-1.03)	(0.51)	(-1.00)
	Population	—	0.020	—	—	—	—	—
			(1.69)					
	Dependency ratio	—	—	-0.031	—	—	—	—
				(-1.14)				
	Govt.expenditure	—	—	—	0.121	—	—	—
					(1.38)			
	Fiscal rule index	—	—	—		0.257**	—	—
						(2.08)		
Selection	Partidsanship	0.007	0.007	0.007	0.007	0.007	0.007	0.007
		(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
	Lagged Government change	-1.351**	-1.351**	-1.351**	-1.351**	-1.351**	-1.351**	-1.351**
		(-2.26)	(-2.26)	(-2.26)	(-2.26)	(-2.26)	(-2.26)	(-2.26)
	Brexit dummy	—	—	—	—	—	—	—
	Euro area dummy	-0.224	-0.224	-0.224	-0.224	-0.224	-0.224	-0.224
		(-0.37)	(-0.37)	(-0.37)	(-0.37)	(-0.37)	(-0.37)	(-0.37)
	Observations	33	33	33	33	33	33	33

z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1