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Abstract
of a PhD Thesis
on the topic "The Shadow Economy in Bulgaria in Comparative Terms"

for awarding the educational and scientific degree "Doctor"

in the professional field 3.8 Economics

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Sofia, 2024

The dissertation was discussed and admitted to preliminary discussion at an assembly of the Department of Economics at the Faculty of Economics of Sofia University "St. Kliment Ohridski". At an assembly of the Department on May 17th 2024, the preliminary discussion of the dissertation was held. The dissertation has a total volume of 300 pages, consisting of an introduction, four chapters and a conclusion – 169 pages; references – 21 pages, 4 appendices – 100 pages, list of publications, participation in conferences and acknowledgments – 3 pages. In support of the PhD thesis 26 tables, 2 graphs and 1 figure are included. The bibliography includes 269 sources, 19 of which are in Bulgarian, 245 in English and 6 in Russian. The author is a full-time PhD student and part-time assistant at the Department of Economics at the Faculty of Economics of Sofia University "St. Kliment Ohridski".

CONTENTS

Introduction to the study

Introduction

The phenomenon of the shadow economy is an irrevocable and sustainable part of the economy of every country in the world. Informal activities represent the economy in its natural state: they are considered separately only after the centralization of power and the rise of the state. Research on these activities began later on due to the relatively late separation of the economy as an individual science, accompanied by the gradual enrichment of its tools and the inclusion of new research fields.

The topic of the shadow economy began to make headlines in the 1920s during the Prohibition in the United States because of the smuggling associated with the period. The concept of shadow economy appeared in articles by Boeke, Lewis, Kaldor, and Kagan in the 1950s. The first scientific definition was given by Keith Hart in 1971 when he wrote about the informal sector, referring to the part of the workforce in Ghana that is outside the formal labour market. In the following years, various authors such as Gutmann drew public attention to the problems associated with informal activities. The use of various concepts to designate this part of the economy is noteworthy – shady, grey, informal, coloured, underground, undeclared, and etc. To this day, this issue has not been resolved, as each author prefers a different term, which is defines individually at the beginning of the conducted research.

Research on the informal part of the economy continues to develop. In recent years, many authors have written publications on the topic – Hernando de Soto, Leandro Medina, Benno Thorgler, Kelmanson, and etc. In our country, the publications of Chengelova, Chavdarova, Kamenov, Petranov, the Center for the Study of Democracy, and others stand out. Economists Friedrich Schneider and Colin Williams are the most established authors on the topic at the moment, with numerous articles. Issues related to the shadow economy and its impact on the well-being of each country and its people are a significant element of the public debate, including in Bulgaria.

Relevance of the Study

Despite the development of the research on the topic over the past fifty years, the topic still continues to pose new challenges to researchers and to change over time along with social and economic transformation. In the case of Bulgaria, the shadow economy is of great public importance due to its relatively large size.

Research Thesis

The manifestations of the shadow economy in Bulgaria have a larger scale compared to the European Union, but in terms of their qualitative and structural characteristics in many respects they are similar to the manifestations in other EU member states. Of the countries similar to Bulgaria, the closest in terms of shadow practices are Greece, Croatia, and the Czech Republic. In addition, tax morale which among other factors is a statistically significant factor in the behaviour of individuals, is inhomogeneous in relation to different social groups at community and national level with men, the unemployed, people with children, people experiencing financial difficulties and residents of small settlements most at risk of participating in grey practices.

All this gives grounds for the implementation of appropriately targeted and effective national and supra-national policies for the reduction and prevention of shadow practices in Bulgaria and in the European Union.

Purpose of the Study

The main objectives of the study are to determine and analyse the structural and qualitative characteristics of the shadow economy in Bulgaria in comparative terms, to determine the importance of tax morale for forecasting tax behaviour, as well as to verify the homogeneity of tax morale according to socio-demographic and socio-economic characteristics. Seven entities are selected for making the comparison with Bulgaria: the European Union, the Eurozone, Greece, Romania, Slovakia, Croatia, and the Czech Republic.

For the successful achievement of the defined goals, the following tasks are defined:

1. To review and critically analyse the scientific achievements and available issues in the field of the shadow economy, looking at the development of scientific research on the topic, the evolution of key issues and open topics at the moment.
2. To derive the main structural and qualitative characteristics of the shadow economy in Bulgaria using statistical data.
3. To derive the same key characteristics of the shadow economy in the European Union, the Eurozone, Greece, Romania, Slovakia, Croatia and the Czech Republic through the use of statistical data that allow for comparability, and to compare them with the results obtained for Bulgaria.
4. To summarize and analyse the results obtained on the basis of the comparative analysis between Bulgaria, the EU, the Eurozone, Greece, Romania, Slovakia, Croatia and the Czech Republic.

5. To construct a composite indicator of tax morale for all selected countries by analysing the results obtained for different economic agents, grouped according to the value of the resulting indicator of tax morale.
6. To verify the existence of a statistically significant relationship between tax behaviour and tax morale using regression analysis tools.
7. To check the existence of statistically significant differences in the individual tax morale of economic agents, distinguished into groups based on socio-demographic and socio-economic characteristics.
8. To make a comparative analysis between the results of the statistical tests conducted for Bulgaria and for the EU, the Eurozone, as well as the selected five countries.

Subject and Object of the Study

The subject of this study is the characteristics of the shadow economy in Bulgaria. The object of research in the dissertation is the shadow economy.

Research Methodology

In the development of this study, a set of methodological approaches has been used, which allows the derivation of the structural and qualitative characteristics of the shadow economy, their comparison in the context of different countries, as well as their in-depth analysis.

In first place, the method of systematic literary research is applied, and numerous scientific publications in the field of the shadow economy are examined and systematized. The methods of descriptive and comparative analysis can also be indicated in the PhD thesis, as they allow the comparison of the selected characteristics, and the confirmation of the results obtained by other authors. Moreover, mathematical, statistical and econometric methods are employed.

The quantitative analysis is comprised of the application of statistical analysis on data, obtained from an official survey of the European Union – Eurobarometer. In Chapter II, the empirical study is elaborated by verifying the existence of differences in the average value of key indicators related to the actual and potential manifestation of the shadow economy, as well as to the perception of the shadow economy in each of the countries. In Chapter III, the topics presented in Chapter II are expanded and the chapter presents a regression analysis with three-level models. All models confirm the existence of a statistically significant relationship between tax behaviour and tax morale: both factors determine the presence, size and characteristics of the shadow economy. In Chapter IV, the empirical research examines the homogeneity in tax morale among different groups of respondents in each of the countries. The groups of respondents are separated according to socio-demographic and socio-economic characteristics. The collected

statistical information is mainly processed using Microsoft Excel, PSPP and EViews software packages.

The set goals and objectives are fulfilled sequentially in each of the four chapters of the dissertation. The results obtained allow to highlight the importance of tax morale in combating the shadow economy and the influence of certain socio-demographic characteristics on it. Significant conclusions from the comparative analysis between the eight included entities are also summarized, which creates the basis for the implementation of both national and supranational policies for prevention and limiting the shadow sector. Key research approaches used in the dissertation are the combinations of different techniques for comparative analysis of the characteristics of the shadow economy in the selected countries, as well as the determination of the importance of tax morale for the shadow economy and the factors influencing it.

Limitations of the Study

The research presented in the dissertation has its limitations, allowing for its expansion and continuation. All restrictions can be summarised as follows:

1. For the comparative analysis, eight selected entities were used, and the choice is reasoned in Chapter II. It is possible to include all EU member states separately, as well as to divide the countries into groups based on various criteria.
2. The Eurobarometer survey data used limits the scope of the survey, not allowing for the study of all characteristics of the shadow economy. For example, in Chapter IV, precise consideration of questions related to the financial situation and the exact level of education of respondents is not possible due to the lack of corresponding questions in the survey (topics addressed by other researchers in the field). The limitation is partially overcomed with proxy variables.
3. The tax rate variable used in Chapter III does not determine individual values of the tax rate for each individual respondent, and the data is grouped by country due to the specifics of Eurostat's data.
4. Chapter IV examines several key factors that distinguish groups with different average values of the indicator of tax morale but does not pretend to exhaust all possible socio-demographic characteristics.

Structure

The dissertation consists of an introduction, four chapters, a conclusion and contributions, a list of publications, appendices and a list of references.

Chapter I presents a detailed overview of the development of the concept of the shadow economy, as well as of the issues presented in international and Bulgarian scientific literature.

The literature review begins with opening the issue related to the establishment of a precise terminology to indicate and specify the scope of the shadow economy. Furthermore, the chapter presents the estimation methods for the size of the shadow economy, which brings depth in the complexity of this phenomenon. A review of the key studies focusing on the relationship between the shadow economy and economic development, as well as on tax morale, is done. In this way, the research niches that the current dissertation can fill, as well as the current research methods, are outlined. The first chapter of the dissertation ends with an overview of the scientific research in which Bulgaria is included. This review allows for the identification of unexplored aspects of the shadow sector in the country and the opportunities for their consideration.

Chapter II introduces the entities with which the comparative analysis will be conducted (Bulgaria, the EU, the Eurozone, Greece, Romania, Slovakia, Croatia, and the Czech Republic) and reasons their choice. Key manifestations of the shadow sector are identified and compared, and its main structural and qualitative characteristics in terms of supply and demand are outlined.

Chapter III presents the methodology for compiling a tax morale indicator and makes a comparative analysis between different groups of respondents with different values of the tax morale indicator by country. The chapter ends with a regression analysis proving the existence of a statistically significant relationship between tax morale and tax behaviour.

Chapter IV examines tax morality in depth: respondents are classified into different groups according to selected socio-demographic and socio-economic characteristics. With the help of statistical analysis, similarities and differences in their average tax morale are deduced, and a comparison is carried out between the different objects of the study.

The dissertation ends with a conclusion, which summarizes the main findings and inferences from the previous four chapters and brings out the author's list of scientific contributions. At the end of the dissertation, the list of publications is presented and acknowledgments to all parties involved in the process.

Description of the dissertation

Chapter I The Shadow Economy in Scientific Literature

In Chapter I of the dissertation, the concept of the shadow economy, the evaluation methods, the importance of the topic of economic development are introduced, and key studies involving Bulgaria are indicated. Chapter I fulfils the first goal of the dissertation: to review and critically analyse the scientific achievements and existing problems in the research of the shadow economy.

1.1 The Concept of the Shadow Economy

The first section of the dissertation examines the beginning of the research on the shadow economy and presents the variety of the used terminology. The review indicates the development of the studies on the shadow economy and their evolution.

The initial interest in the study of the shadow economy began in the United States and is sparkled as a consequence of the peak of shadow activities after World War II. The first studies in the field are by Boeke, Lewis, Kaldor and Kagan in the 1950s. The performed review of the scientific literature demonstrates the lack of a universal concept and definition, which can successfully envelope this area of economic science. According to Shneider and Enste, defining the shadow economy precisely is "quite difficult, even impossible, since the shadow economy is constantly evolving according to the principle of flowing water: it adapts to changes in taxes, to sanctions from tax authorities and from general moral views, etc." (Schneider & Enste, 2002b, p. 79)[1]. As a consequence of this problem, a number of methodological issues arise: there is a lack of consensus on the accepted scientific apparatus and definitions of the shadow economy, which makes building on previous research difficult.

The section presents different definitions of the shadow sector and the different points of view from which it is distinguished. Friedrich Schneider introduced and affirmed the concept of "shadow economy" in his works. According to him, the shadow economy includes goods, services and labour that are not illegal, but their production and sale are "concealed" from the state authorities primarily to avoid taxes, social security contributions or to meet obligations to certain requirements and administrative procedures. In this dissertation, the concept of "shadow economy" should be accepted precisely with this definition. The Eurobarometer Survey, which data is used in the quantitative research of the dissertation, the concept of "undeclared work" is

[1] The set of literary sources is contained in the full text of the dissertation.

used. Its definition essentially coincides with the one presented above: paid activities that are lawful but have not been declared to the public authorities. In the dissertation, to comply with the language used by current Bulgarian scientific research, the concepts of "shadow economy", check this and "grey sector" are used, all of which should be considered as synonyms within the text.

1.2 Estimating the Size of the Shadow Economy

The difficulties associated with studying the shadow economy also include the estimation methods. Their development expresses the changing needs of information regarding the actual state of economic processes of executive authorities, statistical institutes, non-governmental organizations, academia, economic analysts, and etc. Estimates of the size of the informal sector are of great importance both to economic analysis and to the formulation of policies, aimed to increase the welfare of a country.

The main classification of estimation methods is in three groups: macroeconomic, microeconomic, etc. An important feature is that the different theoretical justification of the methods and the specifics of the source data used from each of them lead to a different numerical value of the share of the shadow sector.

1.2.1 Methods with macroeconomic models

The subsection presents the methods with macroeconomic models: monetary method, discrepancy analysis, sensitivity analysis, MIMIC (Multiple Causes Multiple Indicators) and physical input method. Their basic theoretical principles and their development are deduced. The strengths and weaknesses of each of the methods are indicated.

1.2.2 Methods with Microeconomic Models

The subsection defines the methods with microeconomic models: analysis of the discrepancy with microeconomic data, tax audit, and survey studies. Along with the description of the methods, examples of their use, as well as the advantages and disadvantages of their application are presented.

1.2.3 Other Methods

The Delphi method, and observation and participation are basic methods that do not fall within the classifications mentioned in the preceding subsections. A definition of the two methods is given, as well as the main accompanying difficulties and their applicability in modern conditions.

1.3 Reasons for the Existence and Relative Size of the Shadow economy

The subsection presents the different views on the existence of the shadow sector and its relative size in the context of the economy, as well as the reason why some economic agents participate in it and others do not. The theory of modernization, neoliberalism, political economy, institutionalism and neoclassicism provide an explanation for the existence of the shadow economy but fail to fully indicate the reasons why some economic actors participate in it and others do not. Therefore, the review continues with the presentation of key studies and arguments that determine the participation in the shadow economy.

In the scientific literature, two main parts of research concerning participation in the informal sector can be distinguished. The first determines the size of the grey sector with the tax burden, and the second focuses on the imposition of regulations and their fairness. The role of institutional asymmetry between formal and informal institutions in the formation of the shadow economy is highlighted. Institutional asymmetry is caused by poor management of public resources, inefficient state administration, lack of transparency, and reduced tax morale. Participation in the informal sector is also an indicator of the existing inequalities and structural problems of the economy.

In the scientific literature, the motivation of economic entities to participate in the grey sector is also explained by the approaches of the rational and social economic actor. According to the first theory, participation in the informal sector occurs when the benefits for economic agents outweigh the costs. The theory of the social economic actor puts forward tax morale as a fundamental factor for motivation: participation in the informal sector is caused by the normalization of grey activities and institutional asymmetry.

Indisputable factors forming the modern characteristics are also the phase of the business cycle, peculiarities in legislation, corruption, the degree of economic development, migration from low-developed to highly developed regions, etc.

1.4 Relationship between the Shadow economy and Economic Development

The section presents studies proving the relationship between the shadow economy and the economic development, examined through various indicators. This particular relationship determines the shadow economy as a socially significant phenomenon. The shadow economy can have both adverse and beneficial effects in different economic and social conditions.

Most scientific studies note the inverse relationship between the size of the informal sector and various indicators related to economic growth and welfare. The negative relationship between the share of the shadow economy and GDP per capita is indicated, including through the main macroeconomic factors of production. The presence of a grey sector creates prerequisites for the distortion of equality between economic operators and reduces the efficiency and competitiveness of the market economy. In addition, the grey sector promotes social exclusion and poverty and puts obstacles to the implementation of green policies and sustainability. The harmful impact spreads on the availability and quality of public resources, the labour market, labour productivity, attracting foreign direct investment, and the quality of statistical data. The shadow sector's effect on the quality of public education is of great importance, as education contributes to the creation of certain values related to conscientious citizenship: this effect is called the "effect of tax morale".

Despite the many negative effects of the presence of a grey sector, positive ones also do exist, as noted in scientific literature. In countries with high levels of corruption, the grey sector is a buffer for resolving many economic problems. In some developing countries the shadow economy can be a haven for entrepreneurship and can foster it, allowing for the circumvention of bureaucracy. The shadow sector can also appear as a generator of innovations, a test environment for start-ups, as well as a short-term environment for the development of small enterprises.

1.5 Review and Analysis of Studies on the Shadow Economy with the Participation of Bulgaria

In this subsection, an overview and analysis of the key studies on the grey economy with the participation of our country are made. In Bulgaria, research on the grey economy began to attract scientific interest more actively after 1989, in view of the need for a more serious market accountability and clearly targeted market reform. The main examined studies give an assessment of the share of the grey sector in Bulgaria, derive its characteristics and investigate the reasons for them.

The shadow economy stands out as a socially significant problem even within the framework of the centrally planned economy. Later, after the beginning of the transition to a market economy, a variety of studies using numerous estimation methods calculated the shares of the shadow sector in the country. The research of both Bulgarian and international scientists confirms that the share of the shadow economy in our country is significant and is above the EU average.

The research of the Center for the Study of Democracy and the Association of Industrial Capital in Bulgaria (BICA) is crucial. The organizations have noted the steady and continuous decline in the share of the shadow sector in recent years. According to BICA estimates, in 2022 the grey sector is about 21% of GDP, while according to other authors it varies between 20-25% of GDP.

According to Bulgarian economic research, construction and trade (wholesale and retail) are the sectors that are most affected by the grey economy. The specific displays are diverse: envelope wages, employing of creative accounting techniques, as well as using "hidden clauses" in labour contracts. The main drivers of the grey sector are corruption, inefficient judicial system, high taxes, the normalization of shadow activities, the low efficiency of institutions, and the labour market regulations. The identified problems for our country regarding the shadow sector are related to unfair competition, lower labour productivity, prerequisites for creating a monopoly, issues with attracting highly qualified personnel, etc.

The literature review outlines the significance of the phenomenon of "shadow economy" in the Bulgarian economic reality. Understanding the processes, together with the practical application of research results, would be of great help when tackling the shadow economy.

Chapter II Comparative Analysis of Key Manifestations of the Shadow Economy in Bulgaria

In this chapter, the data used in the dissertation work are presented and the countries that are part of the comparative analysis with Bulgaria are shown. The methodology used in deriving and comparing the key manifestations of the shadow sector is indicated. With the help of the presented data, the key manifestations and characteristics of the grey economy in Bulgaria and in the selected countries have been deduced. At the end of the chapter, a summary is made, in which significant similarities and differences between Bulgaria and other countries are established.

2.1 Data

The main data used is presented: it is from the Eurobarometer 92.1 survey (Module 4. Undeclared Work in the European Union), held in September 2019. The survey covers 27,565 people aged 15-98 from all EU member states. The raw data available on the GESIS Institute's website was used to conduct the study. It is processed with the following software: Microsoft Excel 2016, EViews 12, PSPP, etc.

2.2 Selection of Countries for the Study

The central topic of the dissertation is the grey economy of Bulgaria in comparative terms. The section presents the methodology with which the countries for the comparison were selected. After its implementation, the final selection consists of Greece, Romania, Slovakia, Croatia and the Czech Republic. In addition, samples for the EU (without Bulgaria) and the Eurozone are included as reference averages for comparison. Eight samples were drawn for each of the countries indicated.

2.3 Comparative Analysis of the Shadow Economy in Bulgaria

In this section, key characteristics and manifestations of the shadow economy are presented, using data from the Eurobarometer survey. All of them are examined separately in the individual objects of the study and are compared with Bulgaria.

Three sets of questions are presented, which cover different aspects of the shadow sector. The first set highlights the actual displays of the shadow economy, as well as the potential opportunities for conducting shadow activity. The second set draws attention to the subjective sense and spread of the shadow economy as viewed by the respondents. The last set points at the sectors and activities where the shadow sector is most prominent, as well as

the reasons why respondents participate in it, the analysis is conducted both from the demand and the supply side.

With the aim of elaborating the analysis in subsections 2.3.1 and 2.3.2 additional estimations have been computed. First the descriptive statistics and the histograms are being examined and then statistical tests are being applied. The second part of the analysis consists of several stages. Firstly, variance analysis (ANOVA) and Fisher's paired F-tests, targeting to check the variance equality within each pair in different groups. After obtaining the results, Student's T-test is applied to check the equality of the average values between different pairs in a category. Student's T-tests are computed taking into consideration the results obtained from Fisher's F-tests and ANOVA. This way the results from Student's tests enable the detection of statistically significant differences between the average values Furthermore, these results are indicative of similarities between the different countries regarding the chosen socio-demographic characteristics of the shadow economy.

2.3.1 Actual and Potential Manifestations of the Shadow Economy

The actual and potential manifestations of the shadow economy are expressed through the purchase of goods, the actual receipt of an envelope salary and the potential willingness to do so, as well as the execution of paid undeclared activities.

The results of Student's tests regarding the purchase of goods and/or services from the shadow sector confirm that there are statistically significant differences between almost all pairs of countries: the purchase of goods and services is equally common in Bulgaria, the Czech Republic and Croatia, more common in Greece and less common in the EU, the Eurozone, Slovakia and Romania.

The results in terms of receiving an envelope salary distinguish two regions: South-Eastern Europe (where receiving a salary in an envelope is more common) and the EU, the Eurozone, Czechia and Slovakia as a separate region, where this practice is less prevalent.

Regarding the execution of undeclared activities, certain statistically significant differences are visible. According to this indicator, Bulgaria is similar to the Czech Republic and different from all other countries. This result shows that in our country the share of respondents carrying out undeclared activities is the highest compared to the other entities.

The last part of the analysis concerns the willingness to receive a salary in an envelope and upon initial review of the data, countries can be divided into three main groups: weakly inclined (EU, Eurozone, Greece), moderately inclined (Bulgaria, Romania, Slovakia) and strongly inclined (Croatia and the Czech Republic).

2.3.2 A Sense of the Shadow Economy

To assess the perception, two questions from the survey were examined, regarding the acquaintance with persons performing paid undeclared activities and the perceived share of those employed in the shadow sector.

The perception of the shadow economy is different in each of the countries studied. On average, Bulgarian respondents know more people who work "in the shadows" compared to those from the EU, the Eurozone and Greece, and less than Romanian and Slovak respondents. The results regarding the perceived share of the population involved in shadow practices show that it is the highest in Greece, followed by Bulgaria and Romania.

The sense of the shadow economy in our country is relatively greater than in the EU and the Eurozone. The importance of the study of this indicator is determined by its role as an indirect measure of the size and spread of the shadow economy, as well as an indicator of social tolerance to such practices.

2.4 Sector distribution and typical activities. Reasons for participating in the grey sector.

In the penultimate section of Chapter II, the characteristics of the shadow economy are examined from the supply side and from the demand side, thus aiming for a clearer and better-structured economic analysis based on the fundamental postulates of supply and demand.

2.4.1 Supply-side Characteristics

The subsection indicates the sectors and activities most affected by the shadow economy, as well as the reasons for carrying out undeclared activities.

Most Affected Sectors

In Bulgaria, the sectors most affected by the shadow economy are construction, retail sales and repairs, agriculture, personal services, and others. These economic sectors are leading in almost all the other selected countries. The data for the rest of the countries points to sectors such as hospitality, transport and others: this reflects different economic and social characteristics for each of them.

Most common activities

In Bulgaria and in most of the other countries, the respondents indicated in first place the repair and renovation activities. The following activities are among the most common

shadow practices inside the borders of our country and the other selected countries: the sale of other goods and services (EU, Eurozone, Greece, Croatia, Czech Republic), the sale of food (Romania, Slovakia), gardening (Romania, Czech Republic), as well as cleaning and ironing (EU, Eurozone, Greece, Croatia, Czech Republic). In contrast to Bulgaria, other activities are also present in the other samples, such as waiter services (EU, Eurozone, Croatia, Slovakia, Czech Republic), babysitting (Greece, Slovakia, Romania), passenger transport (Romania, Croatia, Slovakia), assistance to a dependent or elderly person (Slovakia, Czech Republic), house moving (Romania, Slovakia, Czech Republic), administrative and IT services (Croatia), professional services (Slovakia and Czech Republic), and tutoring (Slovakia).

Reasons for Participation

The motivation for participating in the informal sector can be viewed as a diagnosis of the problems in the economy and a reflection of social reality.

The motives for carrying out undeclared activities are common to all the countries under consideration: the normalization of grey activities, the rational motives arising from economic issues and the dissatisfaction with the government. The differences between Bulgaria, on the one hand, and the EU and the Eurozone, on the other hand, are clear. Unlike our country, the EU and the Eurozone's respondents express that considerations related to the impossibility of finding a formal job and dissatisfaction with the work of state administration bodies are very minor.

2.4.2 Demand-side Characteristics

Most Frequently Purchased Goods and Services

The most frequently purchased goods and services indicated by the respondents correspond to the most affected sectors of the economy (on the supply side) referred to in Section 2.4.1 of this Chapter. Among the most common goods and services are minor repairs and renovations at home, the purchase of food, beauty treatments, repairs of equipment, and health services.

There is a strong resemblance between Bulgaria and the other objects of the study in terms of the most frequently purchased products from the shadow economy. The main differences are in the shares and the ranking of the specific elements. An interesting circumstance is that health services are missing as a highly demanded informal activity in of the EU, the Eurozone, Croatia, Romania, Slovakia and the Czech Republic.

Reasons to Purchase Goods and Services

In all the studied countries, the number one given reason is the lower price, which corresponds to the rationale expressed in subsection 2.4.1 that participation in the shadow economy benefits both sides (from the supply side) and with rational incentives for optimization of the costs inherent to economic entities. Among the other main reasons are the speed of service in the informal market, higher quality (Bulgaria, Croatia, Slovakia, and the Czech Republic) and favours between friends, relatives, and colleagues.

There is also a certain difference: the motive for helping someone in need is the leading one in all countries except Bulgaria. In Bulgaria, the leading reasons are more pragmatic and oriented towards increasing the utility of the given person rather than helping those in need or as a favour between acquaintances. In our country, buying from the shadow sector is rather a conscious act: among the leading reasons: the reason is missing that the respondent realized later that the good he is buying is part of the undeclared economy, unlike in the EU, the Eurozone, and Romania.

2.5 Conclusions

The results of the analysis outline some similarities and many differences between Bulgaria and the other objects of the study according to the characteristics under consideration. In Bulgaria, the shares of respondents who chose the answers "I don't know" or "Refusal" are significantly higher in relation to questions QD6, QD10, QD13 and QD16 compared to the other countries. However, the presence of incomplete answers or refusal to answer is not uncommon in surveys and is in fact one of its weaknesses, and the size of the shares is not significant and does not justify the impossibility of drawing basic conclusions. The available data allow the formulation of several conclusions, which are the starting points for the continuation of the study.

On one hand, the respondents' answers reflect a low level of participation in the shadow economy, as well as a low willingness to accept enveloped salaries in general. These results are not surprising because the usual behaviour of economic operators, which is also encouraged by the state, is exactly that – "in the light." According to most of the indicators reflecting actual participation in the shadow economy and the potentials for such, the results for Bulgaria on average show a greater propensity for this type of behaviour compared to the EU and the Eurozone.

A further conclusion is that most of the objects of the study resemble Bulgaria in terms of the most affected sectors of shadow activities on both the demand and supply sides. In

Bulgaria, as well as in Romania and Slovakia, the construction sector is the leader. Most of the affected sectors are common to all countries, as well as to the EU and the Eurozone, which shows that the shadow economy has similar manifestations in Europe. The same applies to the most common activities on both the demand and supply sides. This suggests that a relative equilibrium has been achieved in the informal sector between supply and demand, and perhaps it is complementary to the formal economy in the context of the selected countries.

The Bulgarian respondents seem to be far more pragmatic and rational compared to the others. The leading motives for purchasing goods and services "in the shadows" according to the Bulgarian sample are related to achieving a lower price, better quality, faster service, and easier access to the certain goods. In other countries, the leading motives, according to the respondents, are social assistance, and also the fact that they have not realized that the good is part of the shadow sector at the time of purchase on the demand side. On the supply side, the reasons are similar and express the cultural specificities, and perhaps the degree of well-being achieved by each of the parties. This circumstance suggests that participation in the informal sector also has its economic motives and probably one possible measure to combat the spread of activities "in the shadows" is by increasing welfare.

Table 2.1 Summary of the similarities and differences with Bulgaria in terms of actual and potential manifestations, as well as the sense of a shadow economy

Characteristic	Similarities	Differences
Purchase of goods/services from the shadow sector	Czech Republic, Croatia	In Greece, the purchase of goods/services from the shadow sector is more common than in Bulgaria. Less common compared to Bulgaria is the purchase of goods from the shadow sector in the Eurozone, the EU, Romania and Slovakia.
Receiving an envelope wage	Greece, Romania, Croatia	Less common in the EU, Eurozone, Slovakia and the Czech Republic than in Bulgaria.
Carrying out paid undeclared activities	Czech Republic	Less common in the EU, Eurozone, Greece, Romania, Croatia and Slovakia compared to Bulgaria.
Willingness to receive an envelope wage	EU, Romania, Slovakia	Respondents in Croatia and the Czech Republic are more willing to receive an envelope wage than in Bulgaria. In the Eurozone and in Greece, the willingness to receive such a payment is lower than in Bulgaria.
Acquaintance with persons working in the shadow sector	Croatia, Czech Republic	More widespread in Greece than in Bulgaria. Less common in Slovakia, the EU, the Eurozone and Romania compared to Bulgaria.
Perceived share of shadow labour force	-	The average perceived share in Greece is higher than in Bulgaria. In Romania, Croatia, the EU, the Eurozone, Slovakia and the Czech Republic, the perceived shares are lower than in Bulgaria.

Source: Author's Calculations

There is also a correlation between the issues related to the perception of the shadow economy (QD1 and QD25). Table 2.12 summarizes the similarities and differences between Bulgaria, the EU, the Eurozone, and the selected countries in terms of the actual and potential manifestations of the shadow economy, as well as the perception of it. In our country, the respondents report knowing relatively more people working “in the shadows” compared to the EU, the Eurozone, Romania, Slovakia, and the Czech Republic. Only Greece surpasses Bulgaria in terms of the perceived share of the shadow labour force. These results lead to the conclusion that Bulgarian respondents are relatively well aware of the state of the shadow economy in the country and their recorded responses in these two questions (QD1, QD25) are in line with their responses about the actual manifestation of the shadow economy and the potentials for this (QD6, QD10, QD16 – Bulgaria is at the forefront in terms of shares, as the data illustrate that the respondents participate more massively in the grey sector than in other countries).

Chapter III Tax Behaviour and Tax Morale

Chapter III extends the topic of tax morale presented in Chapter I. The chapter also emphasizes the importance of tax morale in shaping the characteristics of the shadow economy and through it, economic development. A composite indicator of tax morale is compiled, and a comparative analysis conducted according to the groups of respondents, distinguished by the values of the tax morale indicator (minimum, low, high, maximum). Statistically significant differences were found in the average value of tax morale between the compared countries. Regression models are constructed in order to verify the presence of a statistically significant relationship between tax morale and tax behaviour.

The Concept of Tax Morale

The section presents the concept of tax morale and analyses principal studies related to its relationship to the grey sector and its characteristics. The shadow economy is invariably linked to tax behaviour, as the actual actions form its characteristics, size, manifestations, and influence social development. The study of the tax behaviour, along with the related factors, allows for the analysis and evaluation of various aspects of the shadow economy. Numerous variables do form tax behaviour both independently and jointly; however, the role of tax morale stands out.

A possibility to define tax behaviour as a term includes considering the attitudes of economic agents: their ethical understandings of the tax system and the functioning of the state, which prompts them to comply with the imposed regulations. The concept can also be viewed as a motivational mechanism based on moral considerations, complementing the rational way of thinking. Based on the assumption that economic agents are consistent in their actions and choices: that is, that their actual behaviour follows what is stated, then we can assume that tax morale guides tax behaviour.

The scientific literature indicates the existence of a positive and statistically significant correlation between tax morale and tax compliance regarding inheritance taxes. The inverse relationship between tax morale and tax avoidance is also proven. In addition, tax morale is a main feature of the policy recommendations to tackle the shadow sector based on the social actor approach presented in Chapter I. Higher tax morale is associated with lower envelope wages, lower levels of tax evasion, and lower shadow employment: all examples of the shadow economy’s manifestations.

Tax Morale Indicator

This subsection describes the construction of a tax morale indicator, which strives to quantify respondents' attitudes towards tax compliance: an objective set for the PhD thesis.

The Tax morale Indicator was compiled using respondents' responses to the five questions in the "Legitimacy" category (QD5.1-5). Each of the questions describes an undeclared activity. Respondents have to rate each one of them using a 10-point Likert scale. The indicator of tax morale is computed as the unweighted average of the rating obtained from each respondent. Thus, the tax morale indicator represents the declared tax morale. The resulting value for the indicator is a continuous variable with values ranging from 1 to 10, with 1 indicating high tax morale (or intolerance to each of the described situations), and 10 indicating low tax morale.

3.2.1 Details about the Objects of Study

The subsection analyses the results of the descriptive statistics of each of the eight country samples. They results show that the average value of the indicator of tax morale in our country is close to the average value for Croatia and Slovakia and is higher than the average value in the EU, the Eurozone, and Greece. The analysis further proceeds by employing statistical tests (ANOVA, Fisher and Student tests). Additionally, using the observations so far and the findings in literature, two hypotheses are constructed.

Hypothesis No. 1: There are statistically significant differences in tax morale between the EU, the Eurozone, Bulgaria, Greece, Croatia, the Czech Republic, Romania and Slovakia.

Hypothesis No. 2: Tax morale in the EU and the Eurozone is higher than in Bulgaria, as well as that in the other countries in the survey.

Regarding Hypothesis No. 1: the results of statistical tests indicate the presence of statistically significant differences among almost all pairs. The average tax morale in our country is statistically different from the average for all chosen entities. Respondents in our country have higher tax morale than those in Romania, the Czech Republic and Slovakia. Hypothesis No. 2 is not confirmed, as the highest tax morale turns out to be in Greece.

3.2.2 Comparative Analysis of the Tax Morale Indicator: Conclusions

Different features are observed from the descriptive statistics by category. Respondents with high tax morale are the majority in all samples. Among these respondents the shares of

women and of people who don't have acquaintances working in the shadow economy prevail and the average age is higher.

In the sub-samples with low tax morale, there are no pronounced disproportions, but the average age is slightly lower than that in the general sample and a higher percentage of respondents face when paying their bills. Chapter III lays the foundations for Chapter IV, in which socio-demographic characteristics are examined in greater detail and statistical tests are applied to check for statistically significant differences.

3.3 Research Hypotheses and Methodology

This section describes the methodology used in the following parts of the chapter and formulates two hypotheses to be tested. They are the following:

Hypothesis 1: Tax morale has a statistically significant impact on the degree of complying tax obligations.

Hypothesis 2: There are other socio-demographic and socio-psychological factors, besides tax morale, that influence tax behaviour.

Regression analysis is used to test the given hypotheses. The selected dependent variables are composed of the responses to four questions of the survey, concerning the tax behaviour of the respondents: purchase of goods from the informal sector (QD6), receipt of envelope wages (QD10), willingness to receive undeclared income (QD13), and execution of undeclared paid activities (QD16).

The methodology includes constructing and computing regression models at three levels: one-factor, four-factor, and multinomial. This is necessary for examining the existence of a relationship between the indicator of tax morale and the variables associated with tax behaviour. After constructing the one-factor model, it is possible to expand the initial models by including new independent variables. The main objective is to check whether there are significant changes in the values associated with the independent variables. The indicator of tax morale takes part in each of the models: in this way we examine the extent to predict tax behaviour by using tax morale and other factors. The first hypothesis is tested with the models from all levels, while for the second research hypothesis, the models of the second and third levels are considered.

The entire methodology for constructing ordinal regression models of the probit type follows the principles presented in Greene (2017). The dependent variable is denoted by y

and its values, depending on the answer chosen, can be $y = \{1,2,3\}$. The independent variables are denoted by $x_1, x_2, x_3, .., x_n$. The regression coefficients are denoted by $.\beta_1, \beta_2, \beta_3, \dots, \beta_n$

The probabilistic model assumes that there is a latent variable y^* that is linearly related to the independent variables as follows:

$$y^* = \beta_1 x_1 + \beta_2 x_2, .., \beta_n x_n + \epsilon = \mathrm{x}'\boldsymbol{\beta} + \epsilon$$

Where x' denotes the vector-row of independent variables, $\boldsymbol{\beta}$ is the vector-column of regression coefficients, and ϵ is the stochastic error term. As assumed, the error terms of y^* are normally distributed.

The relationship between y^* and the values of the dependent variable can be illustrated in the following way:

- When the dependent variable takes only two values:

$$y = 1 \; if \; y^* \leq \tau_1$$
$$y = 2 \; if \; \tau_1 < y^*$$

- When the dependent variable takes three values:

$$y = 1 \; if \; y^* \leq \tau_1$$
$$y = 2 \; if \; \tau_1 < y^* \leq \tau_2$$
$$y = 3 \; if \; \tau_2 < y^*$$

As τ_1 and τ_2 and are threshold parameters that are evaluated. The probabilities of selection are respectively represented as follows:

- With two possible choices:

$$P(y = 1|x) = \Phi(\tau_1 - x'\boldsymbol{\beta})$$
$$P(y = 2|x) = 1 \; - \; \Phi(\tau_1 - x'\boldsymbol{\beta})$$

- With three possible choices:

$$P(y = 1|\boldsymbol{x}) = \Phi(\tau_1 - \boldsymbol{x}'\boldsymbol{\beta})$$
$$P(y = 2|x) = \Phi(\tau_2 - x'\boldsymbol{\beta}) \; - \; \Phi(\tau_1 - x'\boldsymbol{\beta})$$
$$P(y = 3|x) = 1 \; - \; \Phi(\tau_2 - x'\boldsymbol{\beta})$$

as Φ is the cumulative distribution function of the standard normal distribution. The vector of independent variables x consists of a set of independent variables for constructing the models, as described in sections 3.4-6.

3.4 First-Level Models

First-level models are one-factor. The dependent variables are compiled on the basis of the data obtained from the survey of the four questions, and the entire procedure for compiling the variables and selecting questions is described in subsection 3.3 of this chapter. The main purpose of these models is to check for the existence of a statistically significant relationship between tax morale and tax behavior and to isolate its effect. The results of all studied one-factor regression models are presented in Table 3.6.

Table 3.6: One-factor regression models

Model - Level 1	Dependent variable			
	Buying from the Shadow Economy	Receiving an Envelope Wage	Willingness to an Envelope Wage	Carrying out Paid Undeclared Activities
Tax morale Indicator	-0.097***	-0.127***	-0.170***	-0.149***
(Standard error)	*(0.005)*	*(0.010)*	*(0.007)*	*(0.007)*
Pseudo R^2	0.019	0.044	0.049	0.060
Prediction Evaluation	0.8591	0.964	0.836	0.964
Schwartz Criterion	0.799	0.295	1.035	0.290
Akaike Information Criterion	0.798	0.294	1.033	0.290
Number of Observations	25944	11530	10655	26278
Method: Maximum likelihood, ordered probit (Newton-Rapson/Marquardt algorithm)				

Note: ***- p-value<1%, **- p-value<5%, *- p-value<10%

(standard errors are indicated in parentheses)

Source: Author Calculations

3.5 Second Level Models

When constructing the models of the second level four-factor regression models have been created, in which additional independent variables are included. These variables are a part of the so called “economic determinants”: tax rate, expected sanction, and detection risk. They are relevant to the main economic motivators of tax behaviour and their inclusion is further solidified by previous economic studies indicating that they have an impact on tax behaviour.

Table 3.7 Four-Factor Second-Level Regression Models

Model - Level 2	Dependent variable			
	Buying from the Shadow Economy	Receiving an Envelope Wage	Willingness to Receive an Envelope Wage	Carrying out paid undeclared activities
Tax morale Indicator	-0.091***	-0.115***	-0.158***	-0.146***

	(0.005)	*(0.011)*	*(0.008)*	*(0.007)*
Tax rate	0.004** *(0.002)*	-0.002 *(0.004)*	-0.006** *(0.003)*	-0.004 *(0.003)*
Expected sanction	0.034* *(0.020)*	0.093** *(0.045)*	0.147*** *(0.030)*	0.046 *(0.031)*
Detection risk	-0.183*** *(0.013)*	-0.057* *(0.030)*	-0.125*** *(0.020)*	-0.185*** *(0.021)*
Pseudo R^2	0.028	0.039	0.051	0.069
Prediction Evaluation	0.851	0.964	0.835	0.964
Schwartz criterion	0.820	0.304	1.039	0.293
Akaike Information Criterion	0.818	0.301	1.034	0.291
Number of observations	21863	9895	9230	22075
Method: Maximum likelihood, ordered probit (Newton-Rapson/Marquardt algorithm)				

Note: ***- p-value<1%, **- p-value<5%, *- p-value<10%

(standard odds errors are indicated in parentheses)

Source: Author Calculations

3.6 Third-level models

Multivariate models (level three) include the variables listed so far, and additional ones are included. The additional variables are connected to with economic determinants (difficulties in paying bills), certain socio-demographic determinants (size of the organization-employer, the dummy variable for unemployment), and the so-called "socio-psychological" determinants (trust in the social security authorities and in the labour inspectorate, as well as perception of the size of the shadow economy). All these factors partially make up the palette illustrating tax behaviour.

The multivariate models have additional model specifications which are present with two of the dependent variables (purchase of goods or services from the informal sector and performance of undeclared paid activities). The additional models include both employed and unemployed, while the other include only employed respondents. The results are presented in Table 3.8.

Table 3.8 Multivariate Level Three Regression Model

Model - Level 3	Dependent variable					
	Buying from the Shadow Economy		Receiving an Envelope Wage	Willingness to Receive an Envelope Wage	Carrying out paid undeclared activities	
	(1)	***(2)***			***(1)***	***(2)***
Tax morale Indicator	-0.085*** *(0.009)*	-0.085*** *(0.006)*	-0.114*** *(0.013)*	-0.157*** *(0.009)*	-0.135*** *(0.013)*	-0.141*** *(0.008)*
Tax rate	0.004 *(0.003)*	0.006*** *(0.002)*	-0.003 *(0.005)*	-0.003 *(0.003)*	-0.008* *(0.005)*	-0.002 *(0.003)*

Expected sanction	0.075** *(0.032)*	0.051** *(0.022)*	0.051 *(0.054)*	0.153*** *(0.033)*	0.026 *(0.051)*	0.031 *(0.034)*
Detection risk	-0.152*** *(0.022)*	-0.136*** *(0.015)*	-0.031 *(0.038)*	-0.094*** *(0.023)*	-0.145*** *(0.035)*	-0.169*** *(0.023)*
Trust in the tax and social security authorities	-0.064 *(0.048)*	-0.058* *(0.034)*	-0.136* *(0.085)*	-0.016 *(0.048)*	-0.001 *(0.075)*	-0.046 *(0.052)*
Trust in the Labor Inspectorate	-0.007 *(0.048)*	-0.011 *(0.0334)*	0.009 *(0.086)*	-0.07 *(0.048)*	-0.002 *(0.075)*	0.068 *(0.052)*
Size of the employing organization	-0.033* *(0.009)*	n/a	0.138*** *(0.015)*	0.008 *(0.009)*	0.063*** *(0.015)*	n/a
Perceived size of the shadow economy	-0.131*** *(0.011)*	-0.132*** *(0.007)*	-0.120*** *(0.017)*	-0.082*** *(0.011)*	-0.142*** *(0.016)*	-0.144*** *(0.011)*
Financial difficulties	0.080*** *(0.029)*	0.071*** *(0.019)*	0.149*** *(0.044)*	0.109*** *(0.030)*	0.111*** *(0.044)*	0.165*** *(0.027)*
Unemployment	n/a	-0.001 *(0.052)*	n/a	n/a	n/a	0.405*** *(0.064)*
Pseudo R^2	0.055	0.054	0.114	0.065	0.104	0.121
Prediction Evaluation	0.823	0.842	0.964	0.829	0.961	0.960
Schwartz Criterion	0.893	0.829	0.286	1.050	0.309	0.300
Akaike Information Criterion	0.884	0.824	0.277	1.040	0.300	0.296
Number of observations	7956	17714	7995	7538	8012	17832
Method: Maximum likelihood, ordered probit (Newton-Rapson/Marquardt algorithm)						

Note: ***- p-value<1%, **- p-value<5%, *- p-value<10%

(1) The model includes a variable reporting the number of employees in the employing organization

(2) The model includes a dummy variable for unemployment

(standard errors)

Source: Author Calculations

3.7 Regression Models regarding the Purchase of Goods and Services from the Shadow Economy

All of the models regarding the purchase of goods and services from the shadow economy undoubtedly confirm the inverse relationship between tax behaviour and tax morale with the highest degree of statistical significance of α=1%. This means that individuals with lower tax morale are more likely to buy from the grey sector: a result in line with scientific publications. All three models have high prediction evaluation values (0.82-0.86), indicating the ability of the models to correctly predict over 80% of observations. Some differences occur with the expansion of the model to four-factor and multinomial. In multinomial

models, the statistically significant coefficients are tied to variables associated with tax morale, expected penalty, tax rate, risk of disclosure, perceived size of the shadow economy, financial difficulties, and trust in social security authorities.

3.8 Regression Models Regarding the Receipt of Undeclared Income

The main conclusion following the regression analysis is that all three models clearly confirm the relationship between tax behaviour and tax morale. The prediction evaluation values for all three models are 96.4%, which illustrates the percentage of correct predictions by each of the models. The final multinomial model points that tax behaviour is also influenced by the size of the employing organization, as well as the perception of the size of the shadow economy, and the financial difficulties. The coefficients for both variables have positive signs, which express that the decrease in welfare and the difficulties when paying regular bills lead to less favourable tax behaviour (from the point of view of the state and tax collection).

3.9 Regression Models Regarding the Willingness to Receive Undeclared Income

Similar to the previous regression model presented so far, all regression models regarding the readiness to receive undeclared income undoubtedly confirm the importance of tax morale with a high degree of statistical significance. The models' prediction evaluations for all specifications range from 0.83 to 0.84, indicating that they can accurately predict a significant part of the observations. The impact of financial conditions as well as the perceived size of the shadow economy is also confirmed. The size of the employing organization, however, has no impact.

Interesting differences are observed in the models: in the four-factor model, for example, all variables are statistically significant, with p-values tending to zero and their signs logically justified according to pre-made assumptions (Table 3.14). When the model is expanded to a multinomial one, the variable for the tax rate loses its statistical significance. In the final multinomial model in Table 3.15, the variables associated with financial difficulties and the perceived size of the shadow economy stand out.

3.10 Regression Models Regarding the Performance of Undeclared Activities

In all of the models regarding the performance of undeclared activities, the coefficient in front of the tax morale indicator is statistically significant and has a negative sign. These findings confirm tax morale's importance in predicting tax behaviour. Prediction evaluation of all of the models is 96%, which is indicative of their strong forecasting abilities.

In the second-level model detection risk and tax morale are the only statistically significant variables. Both of them are with negative signs and preserve their statistical significance in the multinomial models. In the first multinomial model, statistically significant coefficients are present in front of variables associated with tax morale, detection risk, perceived size of the shadow economy, financial difficulties, and size of the employing organization. In the second multinomial model, the unemployment dummi also becomes statistically significant, which illustrates its negative impact on tax behaviour. The signs in front of the coefficients are compatible with economic logic and to the previous studies of other authors.

3.11 Conclusions

The present PhD thesis constructs a tax morale indicator, which aims to quantify the declared tax morale of Eurobarometer survey's respondents. Initially, the average value of the tax morale of each of the eight entities under consideration is calculated and two hypotheses are drawn up and accepted: Hypothesis No. 1 and Hypothesis No. 2. First of all, Hypothesis No. 1 confirms the existence of statistically significant differences between the average tax morale indicators in each country. Secondly, Hypothesis No. 2 confirms that the EU and the Eurozone have a higher average tax morale than that Bulgaria. Thus, it is made clear that there are differences in tax morale between Bulgaria and the other seven entities that are determined by various factors. There are unexplored opportunities for increasing tax morale in Bulgaria, so that it reaches and even surpasses the EU average.

Certain similarities and differences among the entities stand out when examining the distribution of tax morale. The findings suggest that respondents with high tax morale are the majority in each of the examined entities. The main findings show that this group of respondents is comprised of higher shares of women and people who do not know anybody working informally. The average age for this group is also higher and the remaining conclusions can be found in Table 3.5. In the sub-samples with low tax morale, there are no

such pronounced disproportions, but the average age is slightly lower than that in the general sample and a higher percentage of respondents have difficulties in paying their bills. Chapter III lays the foundations for Chapter IV, in which socio-demographic characteristics are examined in more detail and statistical tests are applied to check for statistically significant differences.

The final part of Chapter III models and examines the relationship between the declared tax morale to the declared tax behaviour using regression analysis. All models unequivocally confirm the negative statistically significant relationship between tax morale and tax behaviour. In this way all the models created confirm the relationship between the two variables with a high prediction evaluation. This gives us grounds to continue studying tax morale, especially the factors that determine it. Thus, if tax collection can be affected via tax morale, then the size of the shadow economy can be tackled and welfare boosted.

The current methodology manages to capture the influence of tax morale on tax behaviour and to identify additional significant factors. The presented regression models are sequential and consistent, as each next level builds upon the previous one. Moreover, the different level illustrate certain dependencies and give evaluations about their respective predictive abilities.

Tax behaviour is a complex concept that is shaped by a number of visible and invisible factors. As stated by Hypothesis No. 2, tax morale is one of it but it is not the only one. The second hypothesis is confirmed by the regression models. They illustrate that traditional deterrent factors such as the perceived sanctions for undeclared activities and the perceived detection risk have an impact on the behaviour of economic agents in relation to their tax compliance. Moreover, relevant factors related to their financial well-being (tax rate, existence of financial difficulties), as well as unsuspected factors such as the size of the employing organisation and perceived size of the shadow economy also affect tax behaviour. In fact, the perceived size of the shadow economy appears to be significant in all multinomial regression models. Meanwhile the variable for trust in the authorities, in this case in the labor inspectorate and in the social security authorities, is statistically significant as confirmed by the current models in this study.

Chapter IV Differences in Tax morale According to Socio-Demographic Characteristics

The focus of the current chapter is on the tax morale and its characteristics which have been researched after proving its importance for the tax behaviour in Chapter III. In the chapter we are exploring the existence of statistically significant differences in the tax morale of the respondents in each country based on socio-demographic characteristics.

In the introduction of the chapter a definition of tax morale is presented along with its importance in researching the shadow economy. Historically the term tax morale has been introduced by the Cologne School of Tax Psychology in the 1960s. Researchers' interest manifests decades later and papers on the tax morale grow in the 1990s along with studies related to the tax legislations. Some authors replace the term "tax morale" with "taxpayers' ethics" and define it as "the ethical norms of citizens in their role as taxpayers in their relationship with the government." In the previous chapter the tax morale is defined as the set of motivations which reveal the inner attitude of citizens in accordance with following the tax regulations. Therefore, finding the underlying factors is required for a better understanding of the topic.

Section 4.1 describes the methodology for exploring the existence of statistically significant differences between the averages in groups of respondents defined by their socio-demographic characteristics. Section 4.2 examines the research of other authors and bases hypotheses which are examined by applying the methodology and displaying the results. A comparison between the results for Bulgaria and the other countries in the research is included. Section 4.3 summarizes the main conclusions from Section 4.2.

4.1. Checking for Statistically Significant Differences in the Average Values: Methodology

This section consists of the methodology for examining the statistically significant differences in tax morale of different groups of respondents based on chosen socio-demographic and socio-economic characteristics. Firstly, the research is based on the indicator of tax morale constructed in Chapter 3 (Section 3.2). Secondly, the following characteristics have been selected:

- Gender
- Age
- Marital status
- Place of living
- Political view
- Social class
- Relationships with people from the shadow economy

- Political interest
- Life satisfaction
- Difficulties when paying bills
- Children
- Unemployment

The socio-demographic characteristics in the research have been selected in accordance to the existing research in the present. The results are compared with those of other authors.

In some variables answers with labels “Other”, “Refusal” and “I don’t know” have been removed. Additional transformations have been applied, so that some variables are regrouped in two categories (e.g. unemployment, acquaintances with people working in the shadow economy, children). The average values and the variance of the indicator for tax morale have been examined and differences are noted even though they are insufficient to prove the statistical significance. Therefore, the analysis continues in two stages following the methodology described in Chapter II (Section 2.3.2) – analysis of variance (ANOVA), followed by paired Fischer F-tests and Student’s T-tests. This is done for the purpose of checking whether the variances in each set in the given categories are equal. That determines whether the tax morale of respondents changes with respect to socio-demographic characteristics.

4.2 Analysis of the Results of the Variances tests and Differences in Average Values

In this section the results of the statistical tests are analysed in detail. For each of the chosen characteristics a literature review is done and based on that a hypothesis is formed which is then tested. The main conclusions are presented in Section 4.3.

4.3. Conclusions

Tax morale is a complex phenomenon which is a function of many variables. In the process of studying it, interesting similarities and differences arise between Bulgaria and the other countries. Even though all the entities in the research are part of the European Union the process of European integration still continues and is not fully completed. Therefore, there are differences based on the culture, lifestyle, socio-economic growth, and others. This is visible in the tax morale which reflects the relationship citizens have with their country, as well as their perceptions of right and wrong. Table 4 presents the group of respondents with the highest average tax morale based on the examined socio-demographic characteristics.

Interestingly, based on several criteria our country is similar to the other examined. Based on the differences in tax morale according to gender, Bulgarian women have higher tax morale than men. Similar observation can be done for the European Union, the

Eurozone, and Greece. When comparing the tax morale in different age groups our country's results are closest to Czechia and Greece.

In Bulgaria the different marital status is not associated with differences in the average tax morale, as it is for Greece, Romania, Slovakia and Czechia. The place of living makes distinguished groups with different average tax morale. Citizens of cities have the highest tax morale, as compared to small towns and villages: only Czechia and Croatia don't share this similarity with the other countries. Political views and political interests reflect differently on all researched entities. In Bulgaria political views do form groups with different tax morale as is in Greece, Czechia and Croatia while people with moderate political interest have the highest tax morale.

Groups with different average tax morale are characterised by the sense of shadow economy in respondents, whether they know people working "in the shadows", and the perceived share of the shadow labour force. Life satisfaction plays a role: the closest country to Bulgaria based on the results is Slovakia. The different social classes in Bulgaria are not associated with statistically different average tax morale as is in Greece and Czechia. On the other hand, financial struggles are associated with lower tax morale and the results in Bulgaria are entirely equivalent to those in the Eurozone, Slovakia and Czechia. People with children have a lower tax morale in Bulgaria as those in the European Union, Greece and Czechia. Unemployed citizens have a lower tax morale in Bulgaria as well as in the European Union, the Eurozone, Slovakia and Czechia.

The criteria for which all researched entities demonstrate similarities in their differences in tax morale are whether they know people from the shadow economy and life satisfaction. Based on the first variable results are indistinguishable for all countries – citizens who know tax evaders have lower tax morale. The situation is similar with life satisfaction, but for each country a different category has the highest tax morale. Even though there is a difference in the values of the indicator of tax morale between citizens with high and low life satisfaction as the former are more ethical when it comes to taxes.

The differences in tax morale based on a place of living, country of residence, age, etc. and the variety of results illustrate the complexity of the term tax morale. Additionally, they show why different sets of variables, unique for each country, are needed in order to forecast tax morale. Each country has different social, economic, and cultural characteristics which explain the differences in each category. This heterogeneity shows that even the integrated European Union consists of separate parts having their own way

of life, culture, economic, and social processes. In order for policies to be more effective, they must consider regional differences as otherwise they may lead to negative results.

Table 4 A Summary of the Results of the Conducted Student's T-test: Respondents with the Lowest Tax Morale

	Bulgaria	**EU**	**Eurozone**	**Greece**	**Romania**	**Croatia**	**Slovakia**	**Czechia**
Genger	men	men	men	men	-	-	men	-
Age	25-64	15-24	15-24	15-64	-	15-24	15-24	15-54
Marital Status	-	single	single	-	-	single	single, married, divorced	-
Children	yes	yes	-	yes	-	-	no	yes
Place of Residence	village	village, town	village, town	village	village	village, city	city	-
Political Views	-	right	right	-	right	-	left	-
Political Interest	strong, weak, none	weak	weak, none	respondents with a strong political interest have higher tax morale than those without any	weak	-	moderate, weak	-
Acquaintances working in the Shadow Economy	yes	yes	yes	yes	yes	yes	yes	yes
Perceived Share of the Shadow Labour Force	>30%	>30%	>30%	>30%	-	-	11-20%	>21%
Life Satisfaction	fairly satisfied, not very satisfied	not at all satisfied	not very satisfied, not at all satisfied	very satisfied, fairly satisfied	not at all satisfied	-	fairly satisfied, not very satisfied	not very satisfied
Social Class	-	high class	high class	-	lower middle class	lower middle class, middle class	labour class	-
Difficulties when Paying Bills	often, sometimes	often	often, sometimes	-	often	often, sometimes	often, sometimes	often, sometimes
Unemployment	unemployed	unemployed	unemployed	-	-	-	unemployed	unemployed

Source: Author's Calculations

The differences in tax morale between the countries are a result of a variety of complex factors. Geographical location, historical development and economic differences are examples of such factors, but researchers should not neglect the lifestyle and culture as well. Being part of the same region and union, the similarities between Bulgaria, the European Union, the Eurozone, Croatia, Greece, Czechia and Slovakia are quite a lot. Exploring tax morale in depth is key for the purpose of economic development. As stated in the previous chapter of the dissertation, tax morale is related to the tax behaviour of economic agents, and this determines its relationship with the size of the shadow economy. That is the reason why the term tax morale, its correct understanding and forecasting is of utmost importance for correctly formulating effective economic and social policies that aim to improve the welfare of a town, a region or a country.

Conclusion and scientific contributions

The research presented in this dissertation explores and compares the characteristics of the shadow economy in Bulgaria with those in the European Union, the Eurozone, Greece, Romania, Slovakia, Croatia and Czechia. The work presents key characteristics of the shadow economy in our country and makes a comparison between them and the other seven entities. The relation between tax behaviour and tax morale has been proven and the underlying factors have been researched. The similarities between Bulgaria and the other countries have been concluded. The research thesis has been proven as each chapter explores each of its aspects.

In Chapter I, a literature review on the global research on the shadow economy has been done. The term shadow economy has been defined and the historical development of the given terminology has been presented along with the methods for classifying the size of the grey economy. Significant works have been considered, including those related to Bulgaria. The relationship between shadow economy and welfare has been explored along with the factors defining tax morale. The main conclusion from Chapter I is that exploring the undeclared activities is indeed challenging, as most obstacles stem from the phenomenon itself. Firstly, universal terminology allowing easy systematization of works is non-existent. Secondly, classifying the size of the shadow economy is a complex task. Not reporting business activities is at the very core of the shadow sector. This leads to significant difficulties in obtaining appropriate data to measure the shadow sector and define its characteristics. Additionally, the developed estimation methods all have plenty of weaknesses and drawbacks and are not able to give precise estimates.

The literature review explores the main research topics that could be dug further into, as to enlarge the currently available scientific literature. Some of these topics are present in the current dissertation: finding the up-to-date characteristics of the shadow economy and comparing them with other countries, exploring the relationship between tax behaviour and tax morale, and researching the differences in tax morale between separate socio-demographic groups.

Chapter II compares the characteristics of the shadow economy in Bulgaria with those in the other seven entities using the survey data from Eurobarometer. In Bulgaria the percentage of respondents that stated they would accept envelope wages or make purchases from the shadow sector is much higher than the European Union, the Eurozone,

Croatia, and Czechia. Across all the researched entities, our country has the highest percentage of respondents that have admitted to receiving undeclared income from an employer or performing paid undeclared work. In addition, the sense of the shadow economy, as quantified by Eurobarometer, is second highest after Greece. Moreover, the differences between Bulgaria and the other countries is statistically significant as well. These findings confirm that a significant portion of the Bulgarian economy is in "the shadows" and that phenomenon is more widespread as compared to the European Union and the Eurozone.

The analysis in Chapter 2 states that most of the affected sectors are common between the researched entities which reveals that the shadow economy in the European Union manifests in similar sectors. Construction, caregiving and home maintenance services are the most affected sectors when it comes to undeclared work in all countries. In Bulgaria, Romania and Slovakia, the most affected sector, according to the respondents, is construction. The most common services and stocks in the shadow economy correspond to the following sectors: housekeeping, cleaning and ironing, food, offering other goods or services, and buying food, home maintenance services, and beauty services.

When examining the motivation for buying from the shadow economy, pragmatism is the main driving force of Bulgarians as compared to the other respondents. The main motives of Bulgarians are characterised with rationalism: lower price, better quality, faster service, and availability. The main motives for the other entities are related to social services or the lack of understanding that the service is part of the shadow economy: all motives not observed among the main ones in Bulgaria. On the supply side the similarities between Bulgaria and the other countries are large: the main motives are the mutual gain for both sides as well as the fact that undeclared work is typical in particular sectors. An interesting separation is examined between the European Union and the Eurozone, on one hand, and Bulgaria and the other chosen entities, on the other hand: in the former group lacks main motives such as a lack of sources of income and impossibility of finding work in the official economy. This suggests higher welfare and a lack of structural problems in the labour market. Disapproval in the government also causes differences as it is a main motive in Bulgaria, Greece, Romania, Croatia and Czechia, and not a main one in the European Union, the Eurozone, and Slovakia.

The results state that taking part in the shadow economy has economic as well as social dimensions. Part of the economic reasoning stems from perceived deficits in the official

economy and social reasoning - related to the lower effectiveness and the lack of perceived fairness of the government. The characteristics of the shadow economy in Bulgaria and the other European countries are caused by a variety of factors and there are more similarities than differences. Possible universal measures for fighting the shadow economy are increasing welfare, solving issues related to structural unemployment, encouraging entrepreneurships, simplifying the administrative procedures, and increasing the transparency and effectiveness of institutions.

Chapter III applies a method for examining the declared tax morale of the participants in the Eurobarometer survey by creating a composite indicator of tax morale. The analysis of the distribution of respondents based on the values of the indicator of tax morale determines that in the chosen geographic regions the citizens with high declared tax morale certainly prevail. Two hypotheses (Hypothesis No. 1 and Hypothesis No. 2) have been constructed and later confirmed after performing statistical tests. Hypothesis No. 1 confirms the existence of statistically significant differences in the average values of the indicator for each country. On the other hand, Hypothesis No. 2 confirms that the European Union and the Eurozone have a higher tax morale than our country. Therefore, the average value of the indicator of tax morale for Bulgaria is lower than that of the European Union, the Eurozone, Greece and Croatia.

The comparative analysis of the distribution in Chapter III outlines the main characteristics of the respondents with high and low tax morale in each of the entities: the ones with high tax morale have a higher age than the average and prevail the women and the citizens that do not have acquaintances in the shadow economy. The sample with low tax morale does not reveal such disproportions: the most common feature is a lower-than-average age of the respondents compared to the rest of the sample and the higher percentage of citizens experiencing difficulties in paying their bills.

The analysis in Chapter III also confirms the existence of a statistically significant relationship between tax behaviour and tax morale. This defines the importance of tax morale as a factor in forecasting both the behaviour increasing the shadow economy, and its size. The used regression models undoubtedly confirm the significance of the indicator of tax morale as well as the inverse relationship between tax morale and tax behaviour. Additionally, the constructed models show that the traditional deterring factors such as the perceived size of sanctions for undeclared work and the perceived risk of being caught do influence the behaviour of economic agents in complying their tax duties. Of importance are also factors related with wealth (tax rate, existence of financial

difficulties), size of the employing organisation, and the perceived size of the grey economy. In this way an objective basis is given and the significant factors for planning and executing policies aimed at increasing tax morale in the citizens and reducing the spread of the shadow economy are determined.

Chapter IV analyses the differences in the average tax moral according to twelve different criteria. The chosen criteria make up categories of respondents that are determined by main socio-demographic characteristics which were examined at the distribution analysis in Chapter III. Statistically significant differences in the average tax moral among different entities have been obtained using the different categories of socio-demographic groups. Their precise manifestation depends on the entity considered.

The primary similarity between Bulgaria and all other entities is in terms of acquaintance with people working "in the shadows" and life satisfaction. These two variables make up groups with statistically different average tax morale. Bulgaria, Greece, the Czech Republic and Croatia are similar in other ways, too: – in these countries, political beliefs do not distinguish between groups with different average tax morale. In Bulgaria, Greece, and the Czech Republic the average tax morale is homogeneous between the different social classes in society. In Bulgaria, Greece, Romania and the Czech Republic, marital status also does not play a role in the average value of tax morale.

In Bulgaria women, people without children, adults over 65 years of age, residents of large cities, people with a moderate interest in politics, unaware participants from the informal sector, a lower perceived share of the informal sector, the unemployed, and those without difficulties in paying bills are with higher average tax moral. These results show that higher tax morale is associated with certain economic, social, and geographical characteristics. The manifestation is different from country to country from the selected, and there are more similarities with Bulgaria than differences. This, on the one hand, is indicative of the progress of European integration in our country, but also of the presence of national particularities. The resulting differences reveal the complexity of the concept of tax ethics and the significant factors that shape it in each of the objects of study. The results of the survey allow for further forecasting of tax morale in each of the selected countries and the formulation of policies aimed at the more vulnerable groups, to increase their declared tax morale, which would also contribute to limiting of the informal sector.

The research thesis in the dissertation is **confirmed in its main components.** *The first part of the research hypothesis is confirmed*: the shadow economy in Bulgaria is

relatively larger than that in the European Union because of various factors. First of all, there are the larger shares of respondents who have declared actual participation in the informal sector (those who have performed paid undeclared activities, received envelope wages, purchased goods informally). Furthermore, the share of respondents who are potentially willing to participate is also greater than in most of the other entities (expressed by the willingness to receive envelope wages). Second of all, the sense of the shadow economy in Bulgaria, as expressed by the perceive share of the shadow labour force and the acquaintance with people working "in the shadows", is greater than in the EU.

The second part of the research hypothesis has also been confirmed: the existence of similarities between the structural characteristics of the shadow economy in Bulgaria and in the EU, the Eurozone, and other Member States has been pointed out and proven. Similarities have been demonstrated in various key areas: the most affected economic sectors, inherent activities, and motivators on the supply and demand sides. The conducted analysis in Chapters II and IV demonstrates that the countries most similar to Bulgaria in all of these respects are Greece, Croatia, and the Czech Republic.

The third part of the research thesis is also confirmed: regression models prove the importance of tax morale in predicting tax behaviour, along with other significant factors such as unemployment, the perceived share of employees in the shadow economy and financial difficulties. The influence of the tax morale indicator on tax behaviour is illustrated by all levels of the models and indicates a potential for the implementation of a policy to combat the shadow economy.

The last part of the research thesis has been confirmed, as statistical tests demonstrate that tax morale is not heterogeneous with respect to different social groups at community and national level. The results show various similarities between Bulgaria and other countries in terms of the most vulnerable groups. It is indicated that the groups in Bulgaria that are the most prone to participating in the shadow economy are men, people with children, those experiencing financial difficulties, residents of small settlements, people of active working age, as well as those who perceive the share of shadow labour force as larger. A large part of these characteristics is common to all of the countries under consideration, as usually with lower tax morale and, accordingly, more prone to tax evasion are usually men, the unemployed, people with children, people experiencing financial difficulties and residents of smaller towns and villages.

With all of the presented findings, the research thesis in the dissertation is confirmed and the existence of structural and qualitative similarities between the shadow economy in Bulgaria and the shadow economy in the EU, Eurozone, Greece, Romania, Slovakia, Croatia and the Czech Republic has been proven. The importance of tax morale in forecasting tax behaviour has been proven and the most vulnerable groups at both community and national level have been identified.

The confirmation of the research thesis demonstrates the possibility of formulating common European guidelines and policies to combat and limit the shadow sector based on similarities obtained between the countries. A realistic option to achieve this is by introducing measures at two levels: national and pan-European. The resulting similarities allow the adoption and implementation of proven successful measures to combat the shadow sector from different countries. Moreover, they also provide the basis for formulating new policies.

Author's Reference of General Scientific Contributions

The contributions of this dissertation could be summarized in several dimensions.

First of all, *an important contribution is derivation of current characteristics of the shadow economy in Bulgaria, as well as in the European Union, the Eurozone, and also in countries close to Bulgaria such as Greece, Romania, Slovakia, Croatia and the Czech Republic*. The derived characteristics are both from the demand side (most frequently purchased services, motivation of buyers) and from the supply side (most affected sectors, most performed undeclared activities, motivation of participants). They allow a better analysis of the actual manifestation of the shadow sector and the formulation of effective policies to combat it.

Building on the results presented above*, a comparative analysis was carried out, which took into account the similarities and differences between the selected entities*. The main similarities are concerned with the participation in the shadow sector due to economic incentives. These incentives include rational motives such as achieving a lower price, mutual benefit for the participants, faster or more easily accessible service. Additionally there are similarities with respect to the sectors that are most affected by the shadow economy: construction, caretaking, housekeeping. These findings suggest that the closer cooperation between national revenue authorities and other public administration bodies in the selected countries, as well as the formation of pan-European policies and programs will be beneficial for limiting and preventing the spread of the shadow economy.

A key contribution of this dissertation to economic thought is the examination and confirmation of a statistically significant relationship between the declared tax morale and the declared tax behaviour through the regression models. All of them, undoubtedly, with a high degree of statistical significance and with a prediction evaluation, confirm the role of tax morale in forecasting tax behaviour. This result gives grounds for a more detailed consideration of tax morale as a factor for the collection of taxes due, outside and regardless of the factors that are traditionally considered as motivating the behavior of the rational economic agent.

Proceeding from the importance of tax morale, this dissertation also *contributes to scientific knowledge by outlining current similarities and differences in tax morale based on socio-demographic characteristics of the population*. The main differences are expressed in the resulting homogeneity and heterogeneity between the average tax morale by various other socio-demographic characteristics. the average values of the tax morale of different groups of the population in Bulgaria and other EU countries. The main similarities are that the perception of the shadow economy, as well as financial well-being, are important factors that distinguish groups with statistically different tax morale. Happiness, political interest, age and gender are also important factors in tax morale in most of the countries, including Bulgaria. This, in turn, can serve as a basis for the formation and implementation of targeted policies and programs to reduce the size of the shadow economy.

Publications and participation in the conference

Book chapter

Petranov, St., Georgieva, L. and R. Ivcheva. (2022) The institutional conditions for euro area membership and why the path is more important than its goal. Collective monograph "Challenges to the Bulgarian Economy on the Way to Eurozone Membership". University Publishing House "St. Kliment Ohridski".

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Georgieva, L. (2021) Shadow Economy and Total Factor Productivity: Is There a Relationship?, Proceedings of the 12th International Conference of Doctoral Students and Young Researchers No. 9, editor/s: Prof . Alina Badulescu, Publisher:Oradea University Press, 2021, pages:96-100, ISBN:978-606-10-2171-0ISSN 2344 – 6617.

Presentation of parts of the dissertation at scientific forums

5th Interdisciplinary PhD Forum (with international participation), Training Center of the Bulgarian Academy of Sciences, 16 – 19 April 2024, Kyustendil, Bulgaria – *participation with a poster on the topic "Characteristics of the Shadow Economy in Bulgaria, Greece, and Romania"*

Sustainability, Social Economy, and Digital Transformation 2023 2023 Conference of the Faculty of Economics and Business Administration at Sofia University "St. Kliment Ohridski", December 13-15, 2023 – *participation with a presentation on the topic "Characteristics of the Shadow Economy in Bulgaria (compared to the EU)"*

First Conference of the Council for Economic Analyses (26-27.06.2023, Sofia, Bulgaria) – *participation with a poster on the topic "Assessing Tax Moral and Tax Behavior"*

4th Interdisciplinary PhD Forum (with international participation), Training Center of the Bulgarian Academy of Sciences, 16 – 19 May 2023, Sandanski, Bulgaria – participation with a report on *"Shadow Economy in Bulgaria and the EU and the Eurozone: Assessing Socio-Demographic Characteristics"*

International Scientific Conference 2022: Economic Development and Policies: Realities and Prospects "Challenges and Risks in the Context of Overlapping Crises" of the Institute for Economic Research at the Bulgarian Academy of Sciences, Sofia, 21-22.11.2022 – *participation with a report on "Testing the homogeneity of tax morale in Bulgaria through survey data"*

Seminar of the Department of Economics on "The Shadow Economy and Economic Development", 13.04.2022 – *participation with a presentation on the topic "Relationship between the Shadow Economy and Total Factor Productivity", online.*

Crises, Resilience and Transformation 2022 Conference of the Faculty of Economics and Business Administration at Sofia University "St. Kliment Ohridski" – *participation with a report on "Testing Homogeneity of Tax Morale in Bulgaria Using Survey Data" (November 25-26, 2022, Sofia, Bulgaria).*

Jubilee conference dedicated to the 30th anniversary of the restoration of the Faculty of Economics of Sofia University "St. Kliment Ohridski", 24-24.11.2020, PhD Panel – *participation with a presentation on "A Review of the State of the Shadow Economy in Bulgaria"*

Acknowledgments

I would like to express my gratitude with regards to my work in the PhD program "Economics and Economic Policies" in the Faculty of Economics and Business Administration of the Sofia University "Saint Kliment Ohridski." Starting my PhD was a natural choice for me based on my interest in economics and my will for self-improvement.

In that line of thought, I would like to express my gratitude to my PhD supervisor, Prof. Dr. Stefan Petranov, for the thoughtful advice during our work together. He helped me upgrade my knowledge and explore new points of view while conducting my scientific research.

I would like to thank my reviewers for providing insightful recommendations and ideas for improving my work. In this process the whole department of Economics has helped me by supporting my work and encouraging its improvement. I am thankful to the department for all of the additional professional opportunities, as well, all of which have helped me improve myself as a professional.

I would like to acknowledge the rest of the teaching and administrative staff at the Faculty of Economics and Business Administration as well as that of the entire Sofia University that have helped me in one or another way in my academic career: usually by expressing interest in my work or by hearing encouraging words from them.

I would like to thank the teams behind the projects Transform4Europe, ScholarNet and National Scientific Fund. The participation in all of these projects provided me with an opportunity to discover new horizons and establish contact with interesting scientists from all over the world.

I would like to especially thank my family that believes in me unreservedly from the beginning of my academic career both in education and science. Their support has been crucial to me in many moments along this path. I would like to thank them for their understanding, patience, thoughtfulness, and love.

Many thanks to my relatives, friends, colleagues, like-minded people, and really everybody that has been supportive of my PhD journey. I deeply hope that the result will not be only a personal achievement and a source of pride, but also a contribution to the social development of our motherland.