June 2024

ISSN-L 3008-4504

European Journal of Public Administration Research

EJPAR

ALEXANDRU IOAN CUZA UNIVERSITY of IAŞI

EUROPEAN JOURNAL
OF
PUBLIC ADMINISTRATION RESEARCH

June 2024

The **European Journal of Public Administration Research** (EJPAR) is the result of the project Jean Monnet Chair. EU Public Administration Integration and Resilience Studies - EU-PAIR, project no. ERASMUS-JMO-2021-HAI-TCH-RSCH-101047526, decision no. 1190440/17.02.2022, supported by the Erasmus+ Programme of the European Union, at Alexandru Ioan Cuza University of Iași, Faculty of Economics and Business Administration.

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Jean Monnet Chair. EU Public Administration Integration and Resilience Studies
EU-PAIR
Project no. ERASMUS-JMO-2021-HAI-TCH-RSCH-101047526

"This project is funded by the European Union. Views and opinions expressed are however those of the authors only and do not necessarily reflect those of European Union or or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor the granting authority can be held responsible for them."

ISSN 3008-4504; ISSN–L 3008-4504

DOI: 10.47743/ejpar.2024-3-3

DEVELOPMENT OF PUBLIC ADMINISTRATION THROUGH ARTIFICIAL INTELLIGENCE

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Abstract
Both the specialized literature in the field of public administration and the official sources of information regarding artificial intelligence have shown that there is a desire to renew the administrative system, to the same extent that there is also a trend towards digitization. In the last decade, numerous directions of action oriented towards the implementation of artificial intelligence ecosystems have been outlined, and a relevant number of states around the world are undertaking measures with a unitary goal, especially in the European Union space. The purpose of this article is to establish the potential for the development of public administration through artificial intelligence, to establish the limits of action of modern ecosystems and the impact it has on servants of the state, on the one hand, and on the other hand, on citizens. The methodology used to create this article is based on the study of specialized literature, official websites that provide information about artificial intelligence, and the methods used are documentation and critical analysis. The importance of this study emerges from the increasing use of technologies based on artificial intelligence and its use in daily activities.
Keywords: *artificial intelligence, public administration, development, public institutions*
JEL Classification: H83, J18

1. INTRODUCTION

In the 21st century, the desire for efficient development of all activities that are carried out by human resources has taken on a different dimension, and there is the possibility of putting them into practice much more easily compared to the years before the current democratic system. Whether in the public or the private sector, information systems, development plans and strategies, objectives that are at the root of other objectives, professionalism, quality and efficiency are the main attributes pursued. As far as public administration is concerned, there is a trend towards quality rather than quantity, with an emphasis on professionalism, interest and commitment.

Public administration is an area of activity that aims to satisfy the public interest, guided by principles such as legality, timeliness, subsidiarity and transparency. Most of the people who provide services in this area are called civil servants, who have a special status compared to employees with individual employment contracts. This field of activity is undergoing a process of development due to its involvement in the lives of ordinary people, but also due to external factors which are forcing this environment towards digitisation and therefore innovation.

Development means striking a balance between all the components that intersect the area of action, e.g. economic elements, human resources, social aspects, the environment, public services and, of course, making them more efficient or increasing their quality in a concomitant upward trend.

After countless studies, research and hard work, people have created more and more powerful software programs, until they ended up bringing the concept of artificial intelligence into the public domain via the internet. This concept has created a lot of controversy and is considered by critics to be harmful, with potentially harmful effects on civilisation and everyday life. In 1956, artificial intelligence was founded as an academic discipline and went on to be analysed, improved and used by an increasing number of people, and it was also used in an early form during the Second World War. It is generally accepted that this program has surpassed man in a great many respects, and if it has not yet surpassed him in some, it is certainly competing for a higher place.

Artificial intelligence is currently being used for several things that have an impact on the population, either directly or indirectly. Some of them are autonomous vehicles, public transport, intelligence of objects (vacuum cleaners, refrigerators), smart architecture, innovative agriculture (irrigation, animal feeding), robots used in factories, optimisation of products and sales channels, drones, medicine, administration and public services.

The possibility of storing and processing enormous amounts of data, the use of new algorithms to prevent negative events and the fact that artificial intelligence is expected to be used in all areas of activity, makes it possible to launch the idea that public administration should be left under the umbrella of computer programs and the tasks of civil servants should be handed over to a system that is objective and impartial.

The methodology of the work consisted in studying the literature together with websites providing information on artificial intelligence, looking for links between what artificial intelligence can offer and what public administration can receive in its structure. The methods used include the quantitative method and critical analysis. The quantitative method aims to analyse statistics on the development of artificial intelligence and the administrative field, while the critical analysis method aims to objectively assess the current situation in relation to the potential for development.

The paper is structured in several parts, the first one referring to the literature, and the second part presenting the reality in Romania and its potential for development through artificial intelligence. The third part exemplifies, with the help of critical analysis and personal vision, how to simplify administrative procedures, but also how to make many of them more efficient. The fourth part presents the position of some EU Member States in relation to artificial intelligence. The last part presents the conclusions drawn from the authors analysis.

2. LITERATURE REVIEW

The literature provides an overview of public administration, defined as follows: "*Public administration, in its formal-organic meaning, evokes the* following *public authorities: the President of Romania, the Government, the ministries and other bodies directly subordinated to the Government, central bodies, autonomous specialized central bodies, institutions subordinated to the ministries, the Prefect, specialized local bodies subordinated to the ministries and headed by the Prefect, autonomous local bodies - County Council, City Council and Mayor - and other institutions subordinated to them. In a material, functional sense, public administration evokes legal acts and material operations through which the law is executed, either by organising or, as the case may be, directly providing public services*" (Berchi, 2000, p. 17).

For an efficient society, long-term strategies are the key to success, but these strategies must be based on public policies. Gabriela Pohoață (2017, p. 9) believes that public policies are a relevant part of modern democracies, because they guide officials and at the same time give citizens the possibility to exercise control over officials.

Only a coherent framework created between administrative and political decision can form the premises for achieving the objectives of public administration, which implies creating a system of interconnection between all activities and a hierarchy of tasks (Bedrule-Grigoruță, 2008, p. 31).

For the civil servant, the study of IT has become part of the work of the public administration training, and the National Institute of Administration (NIA) organises training programmes in accordance with European standards (Bercu, 2009, p. 153).

It is well known that in the public administration there are tasks or duties to be performed which are repetitive in nature, subsequently leading to burnout and inefficiency. Systems such as computational intelligence or artificial intelligence can solve this problem. Computational intelligence usually refers to the ability of a computer to learn a particular task from experimental data or observations.

Computational intelligence research and application has grown and will continue to grow considerably as the needs for adaptability, evolution, and self-configuration continually increase to cope with unknown or incomplete operating

conditions, environments, and the evolving needs of users and beneficiaries (Piuri, 2008, pp. 356-357).

Artificial intelligence is defined as the potential of a machine or robot to replicate human functions, including creativity, reasoning and learning. Artificial intelligence can enable technical systems to perceive and understand their role and place in their environment. Artificial intelligence ecosystems take in information, process it and provide solutions based on the effects that will follow, but also on the context (European Parliament, 2020).

Artificial intelligence is also identified with the ability of a computer to perform various tasks that would naturally be performed by human beings. Over the last decade, various sceptical views have emerged about the potential of artificial intelligence, but the ability to reason, generalise or learn from experience have proven otherwise. In a narrow sense, artificial intelligence can be found in applications such as medical diagnosis, computer search engines and voice or handwriting recognition (Copeland, 2023).

Artificial intelligence is "*one of the strategic technologies of the 21st century, both globally and in Europe*", helping to position the EU on the innovation, productivity and welfare ladder. Industry and manufacturing have the potential to be reshaped by robotics and artificial intelligence, and this is part of the long-term strategies of European companies (European Parliament, 2019).

In 2018, the European Commission committed to coming up with a proposal for a European approach to artificial intelligence by developing draft guidelines on artificial intelligence, working with a group of experts in this field.

Through the funding of the Administrative Capacity Operational Programme 2014 - 2020, the Romanian experts concluded that: "*The Recovery and Resilience Programme can be used to modernise the public sector both by supporting procurement with artificial intelligence-based systems and by funding digital skills development initiatives within the public sector. Strong focus on digitisation of government public sector, on skills development in the public sector, on supporting the procurement of needed artificial intelligence systems*".

In terms of data processing, NASA uses artificial intelligence because it would be impossible for a human to find links or relationships between available information. In this endeavour, the Earth Science Data Systems (ESDS) programme acknowledges the responsible use of artificial intelligence. Likewise, recognizing the potential for development through artificial intelligence is an important step toward improving operations and significantly advancing the capabilities of existing data systems (https://ai.jpl.nasa.gov). U.S. authorities believe that artificial intelligence is at the heart of the global technology revolution, and the evolution of AI-based technology has both opportunities and challenges. On the other hand, there is intense work to advance scientific and technological capabilities and promote democracy and human rights. Protecting national and economic security is one of the stated goals of government in the

United States, while promoting national values is another (US Department of State, Artificial Intelligence, https://www.state.gov).

Artificial intelligence (AI) is a revolutionary technology with the potential to boost economic growth and create productivity gains. It also has the potential to profoundly restructure labour markets and working conditions. From a government perspective, policies should focus on maximising the potential for economic and entrepreneurial activities. Policies should focus on the potential to improve work, increase productivity and stimulate growth (Hartl et al., 2021).

After reviewing the literature, as well as the websites of European institutions referring to artificial intelligence, we have accumulated a fair amount of information that will be used throughout the paper to identify development opportunities. The field of artificial intelligence is a relatively new one compared to public administration, and scriptural documents are not as readily available as those on the administrative environment.

3. THE POTENTIAL OF PUBLIC ADMINISTRATION DEVELOPMENT THROUGH ARTIFICIAL INTELLIGENCE

The areas and structures in which artificial intelligence has the capacity to engage are multiple, diverse and evolving. For example, according to the European Parliament's website, the most visible areas where AI is at work are: 'Online shopping and advertising, internet search, personal digital assistants, machine translation, smart housing, smart cities and infrastructure, automotive, cyber security, countering disinformation, healthcare, transport, manufacturing, food and agriculture, government and public services' (European Parliament, 2021).

The field of administration and public services is the most relevant for this study, of course, making connections with the other fields mentioned above. The countries of the European Union are undergoing an extensive process of digitisation, a process which involves the artificial intelligence component during the implementation of specific systems. Public administration needs autonomous systems to handle most of the activities involving repetition, but not only. The European Commission has earmarked €2.5 billion to fund artificial intelligence.

3.1. CITIZEN - ARTIFICIAL INTELLIGENCE INTERACTION

Starting from the relationship with the citizen, at the local level, artificial intelligence can solve problems. The solutions to these problems aim to reduce bureaucracy, eliminate lengthy and time-consuming procedures and shorten the waiting time to resolve requests for public services. Actions such as collecting taxes, issuing certificates, receiving applications and processing them can be classified as tasks for artificial intelligence. The vision for a digital world is based on the idea that all interaction with the civil servant should be reduced exclusively to the supervision of the work of the AI by the person who is supposed to perform

those tasks. Thus, at an early stage, the civil servant will correct any errors, and then reorientate himself professionally to other tasks within the institution. It is not recommended that the future of public administration should move towards the total elimination of human resources from the system; there needs to be a clear demarcation and stable connection between the human factor and artificial intelligence, using this autonomous ecosystem to make the civil servants work easier and not overload the system. It is essential to mention that with this big step for society, there must be zero tolerance for those who are working in the field but do not have quality training or are not open to the new.

Similarly, internally, there must be a link between all departments for a higher degree of resolution of requests. In some public institutions in Romania, there are systems in place for civil servants to communicate and exchange information. Artificial intelligence can process and store a large volume of data and so it is on a higher level than ordinary programmes which have limitations in terms of overload.

Another area where artificial intelligence could be used is in communication between different state institutions, which is currently partly achieved through Virtual Private Networks (VPNs). This is made possible by civil servants providing information requested by another institution. By introducing autonomous ecosystems, information can be stored in a common space and accessed by interested parties. For agreements, artificial intelligence will identify all the stakeholders involved, analyse and verify the information, and after completing certain well-defined steps, electronically sign the administrative acts. For example, if a citizen wants to register a car, he or she will have to provide proof of registration in the records of the tax authority of the local public authority within whose jurisdiction the owner has his or her domicile, seat or residence. This proof will be accessible by artificial intelligence, making the work of the town hall easier, saving material resources, time and, overall, breaking down many bureaucratic barriers. The same applies to proof of payment of the registration fee, which can be recorded in a database and checked when the application is submitted. Once the autonomous ecosystems reach the public administrative environment, administrative procedures can be handled entirely online, with artificial intelligence taking care of checking all legal aspects and, of course, correctness.

Adding details to the above example, it will be possible to apply for the registration of a vehicle in an organised setting, where there will be a mechanism for producing registration plates at the time of validation of the application, after the identity card has been inserted. The amount can be taken directly from the associated bank account and the rest of the information can be extracted from the common database of institutions. This will be feasible if all the authorities involved will operate according to the regulations.

Another example of the use of artificial intelligence in the administrative field could be the change in the procedure for obtaining an identity card or biometric passport. Interaction with a single robot can solve this. If the identity card needs to be changed, after inserting it into a special machine, the artificial intelligence ecosystem checks the data, finds the address where the citizen resides (if necessary, the owner can express his or her wish to take the person in question in advance, online of course), takes a photo and can issue the identity card. Cases can be varied, but depending on their complexity, the robot could read documents and analyse them.

The above examples can be modified and adapted to create a framework in which the human factor, in this case the civil servant, can carry out part of the job. The measure is not intended to create a 100% digital and autonomous system as this would lose the essence of public administration and the study of this field.

At the central level, functions such as councillor can easily be replaced by artificial intelligence, which collects information from the public and makes proposals and initiatives. One example is the honorary advisor to the Romanian Prime Minister, Robot Ion, a 100% Romanian creation. He has the task of quickly receiving the opinions, views and wishes of Romanians, and hopes that in the future he will have more and more prerogatives. Artificial intelligence can also be used to assess the consequences of administrative acts. It also can anticipate effects and to outline guidelines for solving problems.

One of the most rewarding functions that artificial intelligence can perform is to draw up documents and take over the most static work of civil servants.

3.2. ETHICS AND SECURITY OF ARTIFICIAL INTELLIGENCE IN RELATION TO PUBLIC ADMINISTRATION

Starting with the implementation of artificial intelligence in all activities carried out by humans, but especially in the public domain, it is necessary to draw guidelines towards the ethics of using artificial intelligence, but also the security of this environment. As has been exposed throughout the paper, the artificial intelligence ecosystem stores a large amount of data, especially personal data, and this requires the establishment of clear rules and procedures.

For the European Union, artificial intelligence has been a hotly debated topic in recent years, and the first ideas on systems ethics were addressed in "*Artificial Intelligence in Europe*", specifying that: " *[...] the EU must ensure that artificial intelligence is developed and applied within an appropriate framework that promotes innovation and respects the fundamental values and rights of the Union, as well as ethical principles such as accountability and transparency*" (European Commission, 2018).

Artificial intelligence security succeeds in establishing clear responsibilities that are closely related to cyber security, the ability to develop preventive measures and the protection of citizens' data.

Another approach to artificial intelligence security is contained in the "*EU Artificial Intelligence White Paper*" (European Commission, 2020), a document that outlines two principles on ensuring good functionality and regulating data protection measures: Directive (EU) 2016/680; Regulation (EU) 201/1725; European Data Strategy.

4. SIMPLIFYING AND DE-BUREAUCRATISING PUBLIC ADMINISTRATION PROCEDURES WITH THE HELP OF ARTIFICIAL INTELLIGENC

The term bureaucracy is defined in the Explanatory Dictionary of the Romanian Language (DEX) in two distinct meanings. The notion is described as "E*xcessive power of the administration*" on the one hand, the other meaning being "*Routine, formal wor*k" (DEX online, https://dexonline.ro).

Over time, Romanian society has developed the idea that bureaucracy takes over most of the administrative procedures, concluding that, in our country, they are tedious, and, consequently, end up being abandoned in most cases. According to The Global Business Complexity Index (TMF Group, 2022) which analysed 77 countries around the world, Romania ranks 33rd in 2022 in terms of the complexity of administrative formalities. Compared to other European countries, there is no considerable discrepancy between them and Romania. For example, Poland ranks 10th, Germany 20th, Hungary 38th and Bulgaria 50th.

The adaptation and use of artificial intelligence in everyday life requires public administration to move towards another way of making the system more efficient.

4.1. MAKING IT MORE EFFICIENT TO OBTAIN PLANNING PERMISSION FOR A DWELLING

The building permit is an administrative act issued by the local authorities in the area where the building is to be constructed. It gives the holder the right to build, strengthen or alter a building. It must be obtained, for example, for the construction of a house, an outbuilding, a swimming pool, a garage, a fence, a greenhouse, a warehouse, etc. This list is not exhaustive. In 2022, 50 520 building permits were issued for residential, non-residential and administrative buildings in both urban and rural areas (according to Romanian National Institute of Statistics).

The steps to obtain a building certificate for a dwelling are:

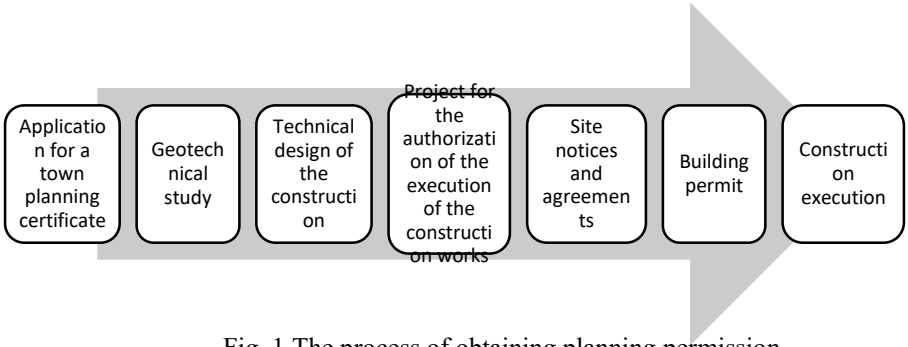

Fig. 1 The process of obtaining planning permission
Source: Authors processing using information from Law 50/1991, accessed 26.03.2023

Analysing the process of obtaining a building permit for a dwelling, the difficulty of completing the formalities, but also the waiting time for its issuance, stands out. These inconveniences are compounded by the cumbersome process of obtaining the necessary approvals from the various institutions or network operators. In practice, building permits are issued within 30 days of the date of application.

The first stage of the authorisation procedure can be improved in terms of where and how the application is submitted. Through artificial intelligence and digitisation, every citizen will be able to have a place online where they can store documents. These documents can be accessed by the artificial intelligence ecosystem at the appropriate time. For example, to obtain a town planning certificate, an application is required, which can be filled in online. The next document is the property deed, which can be scanned in advance and placed in the designated place. Then comes the payment of the fee, which can be automatically withdrawn from the bank account of the beneficiary of the public services. The topographical and cadastral plans endorsed by the Land Registry Office will be entered into a system from which artificial intelligence will be able to process them and extract data at the appropriate scale and for the right land. Therefore, the first step will be possible only online by filling in the application on the City Hall website.

The second stage involves a technical and practical part that cannot be left exclusively to artificial intelligence but must also be carried out with the contribution of qualified personnel. In this case, the geotechnical survey could be carried out with intelligent equipment to facilitate the extraction of information, but also to make it more efficient and shorten the time.

The third stage involves drawing up the technical design of the construction. The owner chooses how the construction will look, but the technical data will also be described. This stage can easily be placed in the hands of artificial intelligence by the beneficiary entering some data and obtaining models of the house with all

the technical data. Standards will be able to be in line with those of a legislative nature, updates in the system can be made at any time and errors are non-existent.

The fourth stage involves selecting parts of the technical project. This process is no doubt apt to be left to artificial intelligence.

The fifth stage involves applying for and receiving site permits and agreements from various public institutions or network operators (water, gas, sewerage). They are mentioned in the town planning certificate and are compulsory to obtain planning permission. This stage is transferable to the artificial intelligence ecosystem. As soon as the necessary documents can be accessed by artificial intelligence, the transition will be made towards obtaining their opinions and agreements without human involvement. This will be achieved by entering technical data, the location of the dwelling and other mandatory elements into a system and validating them instantly by linking them to the databases of the institutions involved and to the legislation in force. This process will help to streamline the processing of applications, reduce waiting times and, at the same time, increase the satisfaction and confidence of the beneficiaries of public services in the public administration.

The sixth stage approach is a formal one, where all the data has been successfully entered and the application will turn into the actual building permit after the analysis of the artificial intelligence ecosystem.

The last stage includes the construction, which will take place much faster than it is currently done, thanks to artificial intelligence and digitisation.

The process of obtaining planning permission after implementing artificial intelligence:

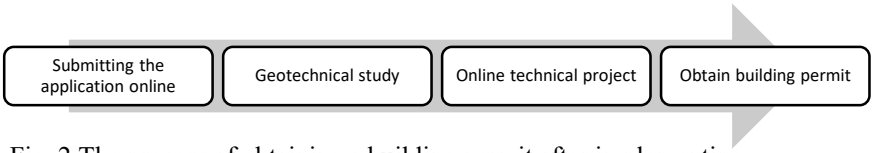

Fig. 2 The process of obtaining a building permit after implementing artificial intelligence
Source: authors processing

4.2. STREAMLINING ENVIRONMENTAL PERMITTING

The environmental opinion is the administrative act issued by the competent authority for environmental protection, which confirms the integration of environmental protection aspects into the plan or programme subject to adoption, as provided for in Article 2 of GEO 195/2005 on Environmental Protection approved with amendments by Law 265/2006 with subsequent amendments and additions.

A short series of steps had to be taken to obtain an opinion, but these could be improved and made more efficient. Typically, the steps involved in obtaining an environmental permit are as follows:

Fig. 3 The process of obtaining an environmental permit

Source: author's processing

In terms of streamlining the environmental permitting process, artificial intelligence will be able to shorten the waiting time and eliminate any human error. For example, it will be possible to obtain this permit after entering technical data into a system that will be linked to the legislative environment, i.e. to standards imposed at national or EU level. Artificial intelligence will be able to analyse the situation and, without a doubt, anticipate the effects of implementing a given project or plan.

The artificial intelligence ecosystem will be able to validate the environmental permit directly from the system. This will help those who want to implement projects in a shorter time.

The draft plan submission stage can be streamlined by using artificial intelligence alongside the traditional way of obtaining a plan. Following implementation, the stages will be summarised as follows:

Fig. 4 The process of obtaining an environmental permit following the implementation of artificial intelligence
Source: author's processing

5. THE APPROACH OF SOME EU MEMBER STATES TO THE USE OF ARTIFICIAL INTELLIGENCE IN PUBLIC ADMINISTRATION

With the use of artificial intelligence in various fields, certain rules and regulations must be respected. As regards its use in public administration, some EU Member States have taken steps in this direction. For example, the Czech Republic accepts the mandatory availability of data used by public administration for the use of artificial intelligence.

Another country with significant implications in this area is Malta, which has launched six pilot projects using artificial intelligence, needed for traffic management, education, customer service, health, tourism and utilities. These programmes will run for three years (Malta AI, https://malta.ai).

The German federal government is making it easier to access data in the public domain and has already set up several portals such as www.mCLOUD.de or www.MDM-portal.de with the aim of increasing the efficiency and quality of

public sector services (Artificial Intelligence made in Germany, (https://www.ki-strategie-deutschland.de).

Authorities in Spain believe that data analysis through machine learning by artificial intelligence is the key to success in public administration management. The public sector is rated as the largest producer of personal data.

Creating a secure and stable data climate and an artificial intelligence friendly public sector dynamics is Lithuania's action plan.

In the Netherlands, the government is organising meetings with professionals from various fields working on improving artificial intelligence, with the aim of using it in the public sector (European Commission, Country Report-Netherlands, 2019).

6. CONCLUSIONS

After studying the literature, websites with information on artificial intelligence and public administration, and from personal interaction with public institutions, we can admit that the public-administrative field in Romania urgently needs an alignment with contemporary standards. Equally, the recurring activities and duties of civil servants and employees in public institutions can easily be left under the umbrella of artificial intelligence.

The efficiency of public administration with the help of artificial intelligence should be part of a well-developed national strategy with clear objectives and results that can be achieved in a gradual and reliable way. All measures to be taken in this area should be implemented in stages so as not to create a gap between traditional procedures and those governed by artificial intelligence. Another edge of the administrative cube is the mentality of citizens when they agree to use the streamlined means of public administration. This goes hand in hand with the duty of qualified people in public institutions to create education and training campaigns for the beneficiaries of public services.

We believe artificial intelligence has a lot of pluses and comes with as many or even more advantages than the implementation of the internet in public institutions. However, it is necessary to draw a line between the use of artificial intelligence in all public administration activities and human resources. The human factor gives vitality to public administration and only through it can transform itself and move towards sustainable development. Part of the essence of public administration is the civil servant-citizen interaction, which should be maintained. Effective administration and attracting people to it is achieved through the connections that arise between people, and this is very important in a world that tends towards individualism.

Equally, the future is a digital one, and all spheres of action of artificial intelligence, as well as its limits, will be properly regulated. At European Union level, guidelines have already been drawn up on how artificial intelligence will be used and how information will be protected.

In our view, everything from obtaining documents and opinions to dealing with simple requests with a high degree of repetitiveness can involve 100% artificial intelligence. The human resource that is qualified and trained for this field must deal with complementary activities that involve attention, but also the identification of legislative problems or atypical situations.

In conclusion, public administration can adapt to current and future times by combining artificial intelligence with autonomy and at the same time considering the practical elements of human resources.

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DOI: 10.47743/ejpar.2024-3-6

EXPLORING THE LANDSCAPE: A LITERATURE REVIEW OF AI'S IMPACT ON HUMAN RESOURCE MANAGEMENT

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Abstract
This article explores literature and finds the transformative impact of artificial intelligence (AI) on human resource management (HRM), highlighting its applications and benefits across various HR functions. AI enhances recruitment, training, performance management, and compensation by automating routine tasks and providing advanced analytics. This allows HR professionals to focus on strategic decision-making and personalized employee engagement. Despite challenges such as data privacy concerns and algorithmic bias, AI improves efficiency, accuracy, and employee satisfaction. The article emphasizes the need for balancing technological advancements with ethical considerations to ensure AI complements rather than replaces human skills.
Keywords: *human resource management, artificial intelligence, AI-Driven HR functions.*
JEL Classification: M10

1. INTRODUCTION

The integration of artificial intelligence (AI) into human resource management (HRM) represents one of the most significant transformations in the field of workforce management in recent years. AI technologies are increasingly being employed to enhance various HRM functions, from recruitment and employee onboarding to performance evaluation and talent management. By automating routine tasks and providing advanced analytics, AI enables HR professionals to focus on strategic decision-making and personalized employee engagement. However, the adoption of AI in HRM is not without its challenges.

Concerns about data privacy, algorithmic bias, and the potential depersonalization of HR functions have sparked important ethical debates. Despite these challenges, the potential benefits of AI such as improved efficiency, reduced human error, and more informed decision-making make it an essential tool for modern HR departments.

As organizations continue to explore the possibilities of AI, understanding its impact on HRM is important for navigating the evolving landscape of work and ensuring that technology serves to enhance, rather than hinder, the human aspects of resource management.

The advent of artificial intelligence (AI) is profoundly altering the landscape of work, with significant implications for both job roles and the management of human resources. On one hand, AI has the potential to automate routine and repetitive tasks, leading to increased efficiency and reduced operational costs. This automation, however, raises concerns about job displacement, particularly in roles that involve repetitive tasks such as data entry, basic decision-making, and administrative support. As AI systems become more sophisticated, they are not only taking over manual processes but also starting to perform complex tasks such as data analysis, recruitment screening, and even performance appraisals, traditionally managed by HR professionals. The impact on jobs is twofold. While AI can eliminate certain positions, it also creates new opportunities in the technology sector and in roles that require advanced digital skills. Jobs in AI development, data science, and AI ethics are growing, necessitating a shift in workforce skill sets. This shift presents a challenge for HR management: how to effectively reskill or upskill employees to ensure they remain relevant in an AI-driven workplace. HR managers are increasingly tasked with overseeing this transition, ensuring that AI is leveraged to complement human skills rather than replace them entirely.

For HR management itself, AI offers powerful tools that can transform traditional HR functions. AI-driven analytics enable HR professionals to make more informed decisions, improve talent acquisition processes, and personalize employee development programs. However, the integration of AI also necessitates a reevaluation of the ethical dimensions of HRM, including issues of transparency, bias in AI algorithms, and the potential for dehumanization in decision-making processes. Balancing the benefits of AI with these ethical considerations is now a key responsibility of HR leaders as they navigate the complexities of AI's impact on the workforce.

This article examines the impact of AI on HRM functions.

2. WHAT IS ARTIFICIAL INTELLIGENCE (AI)

The scientific concept of artificial intelligence (AI) began with a research program at Dartmouth College in 1956. While speculation about AI existed before this, Dartmouth marked the beginning of systematic research. Over the decades, AI evolved from that initial research into various applications, including checkers and chess programs from the 1960s and decision trees in digital systems. Since the 1980s, expert systems, which integrate specialized knowledge to aid decision-making, have emerged. Although AI has fascinated

the public with its experiments and demonstrations, its practical impact on the economy and society was relatively limited until recently (Sheikh et al., 2023).
In the book Mission AI: Research for Policy, authors Sheikh, H., Prins, C., and Schrijvers, E. (2023) define artificial intelligence as follows: "Systems that display intelligent behaviour by analysing their environment and taking actions—with some degree of autonomy—to achieve specific goals" (Sheikh et al., 2023).

Artificial Intelligence (AI) refers to the simulation of human intelligence by a system or machine. The objective of AI is to create machines capable of thinking like humans and imitating human behaviors such as perception, reasoning, learning, planning, and predicting. Intelligence is a key trait that sets humans apart from animals. As industrial revolutions unfold, an ever-growing range of machines increasingly replaces human labor across various fields, signaling a significant transformation (Xu et al., 2021). Definition of artificial intelligence, it is important to highlight the role of generative AI, which refers to advanced AI systems capable of creating new content, such as text, images, and audio, by learning from existing data. Generative AI represents a significant advancement in the field, offering novel applications and transforming various domains through its ability to produce innovative and contextually relevant outputs.

Some of the most significant AI platforms globally include OpenAI with GPT-4 and DALL-E 2 for text and image generation, Google DeepMind's AlphaFold for protein structure prediction and Bard for conversational AI, Microsoft Azure AI for diverse AI services, IBM Watson for data analysis and decision support, Amazon Web Services (AWS) AI with tools like SageMaker and Polly, Baidu's Ernie for NLP, Hugging Face for open-source NLP models, and NVIDIA AI for deep learning and content generation.

3. IMPACT OF AI ON HUMAN RESOURCE MANAGEMENT

Artificial intelligence is revolutionizing human resource departments by automating recruitment processes, enhancing performance evaluation, and personalizing employee development, leading to increased efficiency and data-driven decision-making.

AI, particularly Machine Learning (ML), has enabled HRM to automate basic yet essential areas of recruitment that were previously handled manually. The most common methods of e-recruitment include social media sourcing, employer websites, job boards, online interviews, and AI-powered software. AI recruitment solutions are increasingly popular, with many companies adopting these technologies to streamline their hiring processes.

AI-powered tools used in human resource management include:

Applicant Tracking Systems (ATS): Streamline the entire hiring process by automating the tracking of applications from submission to hiring (McCann, 2024).

Candidate Relationship Management (CRM) Systems: Enhance engagement with potential candidates, managing interactions and improving the candidate experience **(**Khawla, 2024)

CV Screeners: Automatically screen resumes for relevant keywords and qualifications, reducing the time required for initial candidate evaluation (YU, 2023).

AI-Powered Interviewing: Utilize machine learning to analyze can candidates' responses, facial expressions, and other non-verbal cues during video interviews (Martinsson, 2023).

3.1. IMPACT OF AI ON RECRUITING PROCESS

AI-powered recruitment processes can significantly reduce the time and effort required for screening and shortlisting candidates, improving the quality of hires and minimizing human bias (Abuladze and Hasimi, 2023).

Köchling et al. (2023) examines use of AI in different stages of the recruitment process affects candidates' emotions and perceptions, particularly their sense of opportunity to showcase their skills and feelings of emotional discomfort, referred to as "emotional creepiness." It finds that AI involvement in later stages, such as telephone and video interviews, tends to reduce candidates' perceived opportunity to perform and increase feelings of creepiness. These emotional responses negatively impact the overall attractiveness of the organization. The findings suggest that while AI can improve efficiency, its implementation in the recruitment process should be carefully managed to maintain a positive candidate experience (Köchling et al. 2023).

Hunkenschroer and Luetge explores the ethical implications of using artificial intelligence (AI) in recruitment and selection processes. It systematically reviews existing literature to map out ethical opportunities, risks, and ambiguities associated with AI in hiring. The review identifies that while AI can improve efficiency, reduce human bias, and provide timely feedback to candidates, it also introduces ethical challenges such as algorithmic bias, privacy loss, lack of transparency, and accountability issues. The paper calls for a balanced approach to integrating AI in recruitment, emphasizing mitigate potential risks (Hunkenschroer and Luetge, 2022).

3.2. IMPACT OF AI ON TRAINING AND DEVELOPMENT

Seo et al., (2021) in his study about impact of AI and online learning, finds out that AI significantly enhances personalized learning by tailoring content to individual learning patterns and knowledge levels, improving the relevance and efficiency of the training experience. It automates routine tasks for instructors, such as grading and responding to repetitive queries, freeing up their time for more meaningful interactions with students, thereby enhancing the overall quality of training.

Furthermore, AI improves the quantity and quality of learner-instructor communication, offering just-in-time support and strengthening connections in online learning environments. However, balancing AI integration is important to avoid invasiveness and ensure students retain a sense of agency (Seo et al., 2021).

Artificial Intelligence (AI) has recently addressed these challenges by providing AI-driven coaching systems. Two major AI types now assist learners in practicing real-world skills: expert systems and deep learning "flight simulators." Expert systems offer calibrated coaching through adaptive assessments and personalized push notifications, while deep learning simulators provide a safe environment to practice and receive feedback on complex skills. Despite fears of AI replacing human coaches, AI serves to augment the training process. AI cannot replicate the socio-emotional support and contextual understanding provided by human coaches. Instead, it enhances the relationship by offering data-driven insights and support between sessions, allowing coaches to deliver more personalized and effective guidance.

Han, (2024) considers that AI can enhance employee training by tailoring content to their specific needs and interests. By analyzing extensive data, including learning history, preferences, and job performance, AI can create customized training programs. This personalized approach increases employee motivation and learning effectiveness, helping them better align with organizational requirements (Han, 2024).

3.3. IMPACT OF AI ON PERFORMANCE MANAGEMENT

Gaol, (2021) considers that artificial intelligence (AI) significantly enhances performance management by enabling predictive analytics, which allows organizations to forecast future performance trends and make data-driven decisions. This capability supports more accurate and timely interventions to improve employee performance. Additionally, AI systems help reduce human biases in performance evaluations by providing consistent and objective assessments, thereby improving the fairness and transparency of the appraisal process and fostering a more equitable work environment. I also enable real-time performance tracking and feedback, allowing employees to receive immediate insights into their work. This continuous feedback loop facilitates incremental improvements, leading to enhanced overall performance and development. Moreover, the integration of AI in performance management supports better decision-making by analyzing large volumes of data to identify performance patterns and insights that might not be apparent through manual analysis. This empowers managers to make more informed and strategic decisions.

Furthermore, the use of the POAC (Planning, Organizing, Actuating, and Controlling) method to integrate AI into performance management systems can improve the competencies of human resources. This systematic approach

helps in planning, organizing, and evaluating AI-driven performance management practices, ultimately enhancing human resource development in a rapidly evolving technological landscape (Gaol, 2021)

The introduction of Artificial Intelligence (AI) into performance management marks a substantial shift from traditional, ratings-based methods to a more dynamic, developmental, and data-driven approach. AI's integration into performance appraisals and talent management is not just a minor improvement but a complete redefinition of the entire framework, revolutionizing the way organizations perceive, assess, and develop their workforce (Nyathani, 2023).

3.4. IMPACT OF AI ON COMPENSATION AND BENEFITS SYSTEM

Malik et al., (2022) explores how AI and algorithms are transforming compensation strategies by enabling more accurate forecasting and data-driven insights. AI for predictive analytics help in compensation, which helps HR professionals make more strategic decisions regarding pay and rewards (Malik et al., 2022).

Artificial Intelligence (AI) is revolutionizing compensation and benefits by optimizing payroll processes and personalizing employee benefits. AI enhances data analysis, streamlines processes, and provides personalized recommendations, improving decision-making and employee satisfaction. Automated benefit administration increases enrollment efficiency and compliance, while AI in payroll processing enhances accuracy and real-time error detection. Additionally, AI improves salary forecasting, compensation benchmarking, and performance-based incentives, leading to cost savings and competitive compensation strategies. Ensuring compliance and security in AI-powered systems is very important, requiring robust measures and continuous training (Viladrich, 2024).

CONCLUSION

The article highlights the transformative impact of artificial intelligence (AI) on multiple aspects of human resource management (HRM). By integrating AI into HRM, organizations can significantly enhance the efficiency and effectiveness of their workforce management

The integration of Artificial Intelligence (AI) into Human Resource Management (HRM) signifies a transformative shift in managing workforce dynamics. AI enhances efficiency in recruitment, training, performance management, and compensation, enabling HR professionals to focus on strategic decision-making. Despite challenges such as data privacy concerns and potential biases, the benefits of AI, including improved accuracy, personalized employee engagement, and data-driven insights, are compelling.

AI optimizes compensation strategies through predictive analytics, personalized training, and automated processes, thereby improving employee

satisfaction and operational efficiency. Additionally, AI's role in automating routine tasks and providing advanced analytics ensures that HR functions are performed more accurately and efficiently.

Future empirical studies are needed and should examine the optimal balance between AI automation and human involvement in HR processes, identifying which HR functions benefit most from AI and which require a human touch for effective management.

Research should focus on the best practices for safeguarding employee data in AI-driven HR systems, developing guidelines for data privacy, security measures, and compliance with legal standards. Studies should explore how AI changes the skill requirements for HR professionals and employees, identifying the new skills needed to work alongside AI technologies and strategies for upskilling the workforce.

By addressing these areas, future research can provide valuable insights into maximizing the benefits of AI in HRM while addressing its challenges and ensuring ethical and effective implementation.

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DOI: 10.47743/ejpar.2024-3-2

THE IMPACT OF BANKING SECTOR DEVELOPMENT ON ECONOMIC GROWTH: THE CASE OF EU COUNTRIES

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Abstract
Using a multiple linear regression model, this paper examines the role of banking sector development on economic growth in the European Union member countries. The analysis covers a period of 21 years (2000-2020) and is based on data obtained, mainly, from the World Bank's World Development Indicators database. Our empirical results would indicate a strong and statistically significant link between the development of the banking sector and economic growth, both at the level of the EU countries and at the level of the other two groups of countries (euro area countries and non-euro EU countries). However, we obtain some different results in the case of EU countries, which are not members of the euro area. In general, our findings are in line with economic theory, but also with the results of empirical studies relevant to our topic.
Keywords: *banking sector, credit, economic growth, EU countries.*
JEL Classification: G21, O40, C33.

1. INTRODUCTION

The banking sector is the main pillar of the financial system, providing most of the liquidity in the market and supporting economic activity by financing economic agents in the process of financial expansion. Through its functions, it ensures the speed and consistency of transactions, facilitates the flow of information between different sectors, redistributes resources and creates added value, which is then passed on to gross domestic product. Through its institutions (banks), the banking sector provides various banking products and services through which it facilitates trade, improves living standards and contributes to economic development and growth.

Knowing the role of the banking sector in the economy is part of the national identity and is important from the perspective of establishing the real state of the financial system. The analysis of the functions of the sector determines its efficiency within the society and provides an opportunity to estimate long-term results, highlighting the possibility of comparing the de facto state with the expected one. Thus, through its specific intermediary function, it connects participants in transactions, both nationally and internationally, ensures the necessary resources for the conduct of economic activities, facilitates the exchange of information and maintains market liquidity. At the same time, it is the banking sector, by being able to adapt quickly to unexpected situations under conditions of uncertainty, which can provide confidence to certain activities through lending, leading to asset price re-pricing, which is essential during an economic downturn. By acting in the same way as reallocating resources, it lays the foundations for economic growth.

The main objective of this paper is to empirically investigate the impact of banking sector development in the European Union countries on economic growth. In order to achieve this objective, our study is structured as follows: section 2 provides a review of the literature, focused on examining the link between banking sector development and economic growth; section 3 describes the data, the variables included in the analysis and the research methodology used; section 4 focuses on discussing the empirical results obtained, and the last section formulates some conclusions resulting from the investigation undertaken.

2. LITERATURE REVIEW

The banking sector can be considered as a cornerstone of the financial system, which means that its influence on the economy is colossal. Thus, the development of this sector is closely linked to economic growth, stability and efficiency.

Reviewing the literature, we find a significant number of studies (e.g., Petkovski and Kjosevski, 2014; Ductor and Grechyna, 2015; Ghosh, 2017; Gruptha and Prabhakar, 2018; Škare, Sinković and Porada-Rochoń, 2019; Matei, 2020; Abeka *et al*., 2021; Rinosha and Mustafa, 2021; Iqbal *et al*., 2021; Machado, Saraiva and Vieira, 2021; Silva, Tabak and Laiz, 2021) that estimate the link between banking sector development and economic growth. Petkovski and Kjosevski (2014) focused on the influence of the banking sector on economic growth in 16 transition economy countries in Central and South-Eastern Europe, whose financial systems are relatively new and diverse. The results of the empirical study show that the interest margin and credit to the private sector do not lead to economic growth, while the quasi-money ratio turns out to be directly proportional to the dependent variable, the GDP growth rate. Thus, although banks could take these empirical results into account in their decisions, a drawback would be the small sample of developing countries.

Another research (Ductor and Grechyna, 2015) examines the relationship between financial development and economic growth (as expressed by the real growth rate of per capita gross domestic product), analyzing indicators from 101 developed and developing countries over the period 1970-2010. The results found that financial development is directly influenced by private credit growth relative to real output growth, but if very rapid credit growth occurs, economic growth may be negatively affected. At the same time, the idea of balanced development of both the real and financial sectors is emphasized, as they are reflected in the GDP growth rate. Thus, the study stands out for the large sample of countries used and the important findings, which could serve as additional guidelines in future regulations concerning macroprudential policy, but it is based only on developed and developing countries, undermining the importance of less developed countries in the global economy.

Comparatively, Ghosh (2017) is concerned with economic growth from the perspective of the impact of globalization of the banking sector, following the same line of research as other authors in the field of economics. The paper examines the impact of global systematization on a group of 138 countries over a period of eighteen years (1995-2013), reflected in the increase or decrease in the quantity of goods and services produced in these economies (GDP growth) over the years under consideration. Thus, the research results show that foreign banks are reducing the volume of private lending in the countries where they have their head offices, which emphasizes that they are finding it difficult to extend loans to more potential customers in the financial markets of the host countries due to information bottlenecks. In another perspective, the analysis suggests that further opening up of the banking sector may lead to a slowdown in the pace of economic growth or even stagnate it to some extent. While the findings point to the reality in emerging markets, low-income countries or countries where more than 10% of banks are foreign-owned, they do not capture the effects of banking globalization in developed economies and are limited to low and medium-developed countries. Finally, some monetary and economic policy interventions are needed to limit or even eliminate information barriers between the two countries involved in economic processes.

Another study of interest is the one by Gruptha and Prabhakar (2018), which analyzes the world's most powerful developing economies, the so-called BRICS countries (Brazil, Russia, India, China and South Africa), explaining the practical impact of the development of the financial system in the countries concerned on the growth of the global economy. Thus, the results show that economic growth in one of the five countries does not necessarily lead to economic growth in the others, highlighting the unevenness in the relationship and causality of fluctuations among the largest emerging economies on earth.

Škare, Sinković and Porada-Rochoń (2019) complements the literature with an analysis on the case of Poland (period 1990-2018) following the relationship

between economic and financial growth, taking into account the credit side of the financial sector, as most other studies do not involve this variable. As a result of the research, it has been observed that the share of households over the share of firms in total credit is statistically significant, positively influencing economic growth. At the same time, empirical evidence shows that using the total share of private credit in GDP or the total amount of private credit underestimates the effects of the financial system on economic growth, implying the need to introduce the breakdown of bank credit by section in decision making and future studies.

Similar to the other studies, Matei (2020) investigates the impact of financial development on economic growth. However, the author introduces a novel element by looking at finance as an engine of economic growth due to its implications on investments of an innovative nature. At the same time, the analysis on 11 European countries with emerging economies over the period 1995-2016 results in the identification of the linear relationship between the sample units, according to which financial development has beneficial effects on the economy and implicitly on its growth rate over a short period of time.

Other more recent studies (such as, Abeka *et al*., 2021) measure economic growth expressed by the real growth rate of GDP per capita and analyze its relationship with financial development in sub-Saharan economies. After analyzing the results, it is observed that infrastructure in the nature of telecommunication is an important pawn in alleviating bottlenecks and positively helps economic growth.

In the view of other authors (Iqbal *et al*., 2021), the link between the financial system and national governance with economic growth needs to be approached from a causality perspective, which is why a sample of 115 economies over the period 1996-2018 is used. Thus, the final results lead to a two-branch dispersion across economies, considering that financial development and the shakeup in national governance have stronger influences on economic growth in undeveloped countries compared to developed and developing economies.

Silva, Tabak and Laiz (2021) emphasize the relationship between financing and economic growth by showing the importance of bank ownership, loan origination, bank type and lending method on economic expansion.

Looking in perspective, although the relationship between financial sector development and economic growth is analyzed at a global level by different authors, each of them brings an element of novelty in terms of the variables taken into account, the differentiated approaches and the factors taken into account in the research (e.g. pandemic). In this way, the 'outdated' literature is combined with current literature to provide valuable lessons for financial and banking market players so as to avoid the mistakes of the past and to enable the

economies of the world's countries to evolve harmoniously in order to streamline the financial process.

3. DATA, VARIABLES AND RESEARCH METHODOLOGY

The main objective of the study is to highlight the link between the development of the banking system and economic growth in the EU Member States using a multiple linear regression model. In investigating the link between banking sector development and economic growth, we use econometric analysis and estimate the regression equation using a panel composed of the 27 EU countries, divided according to the single currency adoption criterion. Thus, we have euro-area countries (Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, Spain, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia and Spain) and non-euro area countries (Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Sweden and Denmark). The choice of the time period was conditional on the availability of time series data, so that they were the same for all influencing factors. The variables were selected on the basis of the literature in view of their potential impact on economic growth and were collected from various sources, using the years 2000-2020 as the reference period. As the dependent variable, economic growth measured by the annual growth rate of GDP per capita (GDPgrowth) is used. The independent variables included in the study are domestic credit granted to the private sector by banks (PRVC), gross fixed capital formation (GFC), government consumption (GVE), population growth (PG), openness of the economy (TRD), inflation rate (INF) and unemployment rate (UNEMP) are obtained from The World Bank Data Base (WBD). The independent variable asset rate (BAS) is obtained by hand-writing the data from the GlobalEconomy database, due to insufficient data in the other source and unavailability of the download option.

On the basis of the literature review, we performed the following regression equation:

$$(GDPgrowth)_{it} = \beta_0 + \beta_1 * PRVC_{it} + \beta_2 * GFC_{it} + \beta_3 * GVE_{it} + \beta_4 * PG_{it} +$$

$$\beta_5 * TRD_{it} + \beta_6 * INF_{it} + \beta_7 * UNEMP_{it} + \beta_8 * BAS_{it} + \mu_{it}$$

Where: i = 1, 2, ..., 27; t = 2000, 2001, ..., 2020; $(GDPgrowth)_{it}$ = the economic growth rate in country i and at time t, measured by the growth rate of GDP per capita; μ = the error term of the equation; β_0 = the constant; β_1 , β_2 ,....., β_8 - the coefficients of the independent variables.

Economic growth is a rather complex process that is difficult to define in a clear-cut manner, and studies have not yet reached a generally valid conclusion

for the most appropriate indicator that captures its specificity. Most of the literature considers the GDP growth rate as the dependent variable rather than the actual value of GDP growth (Petkovski and Kjosevski, 2014), as it is assumed that changes in the independent variables have a long-lasting effect on the GDP growth rate. To highlight the influences on growth, we use alternative items from different domains. Thus, from the banking sector and its efficiency we consider private credit and asset ratio, and from the macroeconomic sphere we consider, inflation rate, government consumption, openness of the economy, gross fixed capital formation, unemployment rate and population growth (Table 1).

Table 1. Econometric variables and expected effects

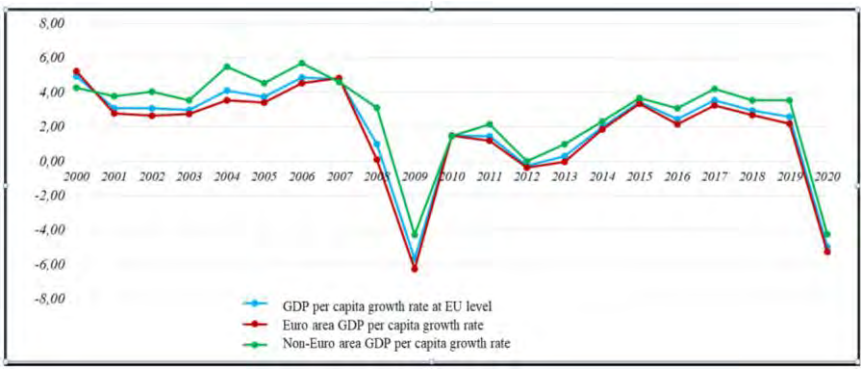
Variable	Symbol	Description	Unit of measurement	The expected effect	Data source
Dependent variable					
Economic growth	GDPgrowth	Annual growth rate of GDP per capita	%		World Bank Data (World Bank Indicators)
Independent variables					
Private credit	PRVC	Domestic credit granted by banks to the private sector	% of GDP	+	World Bank Data (World Bank Indicators)
Banking assets	BAS	Share of banking assets in GDP	%	+/-	the GlobalEconomy.com (Indicators)
Inflation	INF	Inflation, GDP deflator	%	+/-	World Bank Data (World Bank Indicators)
Government consumption	GVE	Government final consumption expenditure	% of GDP	+/-	World Bank Data (World Bank Indicators)
Trade	TRD	Openness of the economy	% of GDP	+	World Bank Data (World Bank Indicators)
Investments	GFC	Gross fixed capital formation	% of GDP	+	World Bank Data (World Bank Indicators)
Unemployment	UNEMP	Unemployment rate (% of total workforce, ILO estimate)	%	-	World Bank Data (World Bank Indicators)
Population growth	PG	Annual population growth	%	+/-	World Bank Data (World Bank Indicators)

Source: authors elaboration based on the specialized literature

Working with panel data, which take into account both country and time period, it is possible that results may be biased due to heterogeneity, which is why both the least squares and generalized method of moments are used, which best highlight the influence and the sense in which the independent variables affect the dependent variable. In fact, the Generalized Method for Moments (GMM) is also the most widely used in econometric studies (Levine, Loayza and Beck, 2000; Kunt and Levine, 2001; Beck and Levine, 2004; Petkovski and Kjosevski, 2014). Both methods yield the same results, which is why we will only put the obtained outputs once.

According to the World Bank (World Bank Data, 2022), the annual growth rate of gross domestic product per capita is calculated at purchaser prices as the sum of gross value added and product taxes less subsidies, but excluding

deductions for depreciation and natural resource depletion. In line with the literature (Petkovski and Kjosevski, 2014; Dobjanschi, 2018), economic growth is a variable that can successfully indicate the degree of development of a country and is directly correlated with the financial system, being influenced by different categories of factors, through which sustainable economic development is ensured in the medium and long term. In perspective, economic growth is an element that very well describes the country profile and the standard of living, identifying through its causes, possible drawbacks that hinder financial stability, such as the inefficiency of the banking sector, of governance or the prevalence of technology use among companies or the population. With the present study, we aim to reveal what effects the explanatory variables have and how they influence the rate of GDP growth, expecting a positive relationship between the development of the financial system and GDP growth. However, some authors (Machado, Saraiva and Vieira, 2021) consider that there is competition between the financial sector and the other part of the economy, which also targets physical capital and skilled labor, which does not always bring positive effects and may deregulate the allocation of resources, as skilled labor migrates to this area, leaving behind the productive sphere. There is also the issue of "bad finance", as it can lead to long-term negative effects on our dependent variable, but at the other end of the spectrum, a bad financial system is seen as reducing saving and investment, leaving room for speculation. However, sustainable economic growth is the result of effective coordination of all the components of the financial system, which help each other to achieve a degree of development conducive to the smooth functioning of economic operations (Figure 1).



Source: Own elaboration based on World Bank Data (2022)

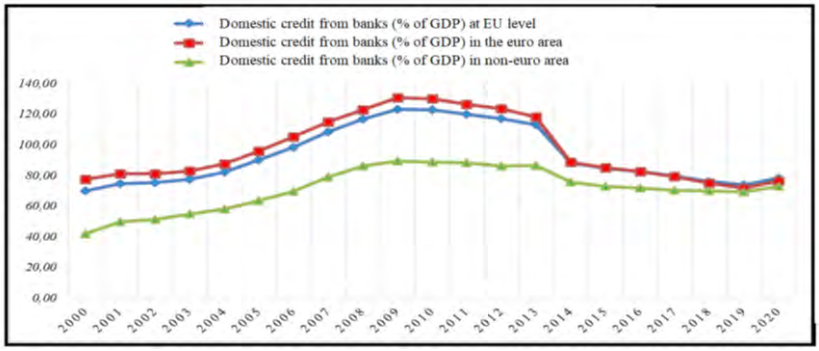
Figure 1. Average GDP per capita growth rates in EU, euro area and non-euro area countries between 2000 and 2020

Analysing the average growth rate of GDP per capita in the countries of the European Union, we find little fluctuation over the period under analysis (2000-

2020), with the exception of the two major crises that have had a significant impact on the financial system and economic growth. As a result of the growing financial imbalances (due to the increase in subprime loan defaults in the USA, the collapse of major banks such as Lehman Brothers and the lack of liquidity), the sharp fall in GDP growth in 2008-2009 was mainly caused by bank failures, which cut off access to finance for many companies, which were to suffer the same fate as credit institutions. As a result, the production of goods and services began to fall, the pressure increased on governments to cut wages, the number of unemployed rose and there was an unprecedented economic shock, which led to a fall in the average per capita GDP growth rate, reaching a negative -5.67% in the European Union in 2009. In terms of the categories of countries analysed, there are no significant differences compared to the EU average, with the lowest values in the same year reaching -6.27% in the euro area and -4.25% in the non-euro area, and the highest values in 2006 at 4.53% in the euro area and 5.70% outside the euro area. The same trend is also observed in 2020 as a result of the pandemic crisis, with a value of around -6%, caused by the bankruptcy of many firms, lockdowns and rising unemployment, with no significant differences between the 3 average growth rates during the pandemic crisis. Compared with the EU average as a whole, the same fluctuation trend is observed for both euro and non-euro countries, with a slight tendency for the average growth rate of non-euro countries to exceed the average growth rate. This comes against the backdrop of the use of the national currency, which is not subject to currency risk, and of the large colonists who prefer emerging economies as they offer cheap labor and low costs.

As for the main independent variable, domestic credit is the most widely used indicator of financial development and the depth of the banking sector (Al-Moulani and Alexiou, 2017) and is considered a proxy variable (Petkovski and Kjosevski, 2014; Ahmed and Bashir, 2016; Abeka *et al.,* 2021), which emphasizes a positive relationship between it and GDP developments. Thus, an increase in the domestic credit variable will lead to an increase in GDP, implying economic growth, while encouraging investment that could lead to higher inflation in the medium to long run. Koivu (2002) contradicts previous results, as he obtains a negative relationship between bank credit to the private sector and economic growth, showing an unsustainable growth in the private sector under different patterns of transition economies. Beck, Degryse and Kneer (2014) associate domestic credit with financial intermediation, emphasizing that sustained growth in domestic credit reduces volatility over long periods of time compared to short periods of time when the effects are weaker, one of the causes being the continuous modernization of financial systems, which directly influences the profitability and stability of the financial system. Guptha and Prabhakar (2018) opine that an increase in domestic credit extended by banks intensifies the volatility of economic growth in the medium term, explaining the

dependent variable with high probability. Silva, Tabak and Laiz (2021) argues that private sector lending can cause high volatility in economic growth in the medium-run, but can be considered a relative source of economic growth in the long-run (Figure 2).



Source: Own elaboration based on World Bank Data (2022)

Figure 2. Evolution of the share of domestic credit in GDP in the EU, euro area and non-euro area countries, 2000-2020

As can now be seen in Figure 2, domestic credit follows the same trend in all three categories of countries, with a larger difference for non-euro area countries. Until 2013, the share of private credit granted by banks in GDP was quite high, above 80% in non-euro countries and above 100% in EU and euro area countries, but from 2014 onwards it declines. The sharp fall in domestic credit just a few years after the financial crisis of 2007-2008 appears to be a delayed effect of the financial crisis, with the tightening of credit conditions and the entry into the EU of weakly developed countries such as Romania (2007) and Bulgaria (2007). At the same time, the measures to limit lending are being taken against the background of the fairly high inflation resulting from the financial crisis, with major differences being observed between the euro area countries, which are close to the EU's total share, compared with the share of countries outside the euro area, due to higher levels of poverty, lower levels of development and underdeveloped capital markets. It can also be argued that the fall in lending is also due to the start of an increasing use of common monetary policies, with developed countries experiencing an increase in GDP, while the population and companies have decided to limit borrowing for precautionary reasons, especially in the face of the problems created by the financial crisis. However, private sector borrowing starts to pick up slightly in 2020 with the onset of the pandemic crisis, with borrowers affected to a lesser extent compared to the 2007-2008 economic shock.

The share of banking assets in GDP is an indicator that measures the efficiency and depth of the banking sector (Al-Moulani and Alexiou, 2017) and

generates positive effects on economic growth. Demirgüç-Kunt and Levine (2001) argue that bank assets are in direct proportion to economic growth, providing a broad dimension on the banking sector. Azman-Saini and Law (2010) and Hismendi *et al.* (2021) emphasize a direct link between GDP growth and commercial bank assets, calculated as the ratio of commercial bank assets to the sum of commercial bank and central bank assets, believing that through the influence on foreign direct investment (if bank assets increase, investment increases), economic growth is achieved. The positive influence of banks' assets on economic growth is also related to their lending capacity, because as borrowing and borrowing requirements increase, so does financial development, which leads to an increase in the goods and services in the economy.

Inflation is one of the indicators specific to monetary policy (Beck, Degryse and Kneer, 2014; Petkovski and Kjosevski, 2014), which can have negative effects on economic growth and positive effects on financial sector volatility. Koivu (2002) emphasizes that an inflationary environment is characterized by uncertainty, which implies that financial intermediation can be unbalanced at any time, as information about investment projects is constantly changing and monetary assets start to be used less and less. Petkovski and Kjosevski (2014), although they identify in their models an inflation with a negative sign that affects GDP, contrary to many results, in the same study they also find a positive effect of it, due to the hyperinflation characteristic of the sample of countries chosen, which are individualized by planned economies The work of Kunt and Levine (2001), Beck and Levine (2004), Ahmed and Bashir (2016) is in agreement with Kareem, Olusegun and Arogundade (2017), who identify an inverse relationship between inflation and economic growth in both the long-run and the short-run. However, Dobjanschi (2018) does not observe an impact on gross domestic product, while Ginevičius *et al.* (2019) find that inflation negatively affects macroeconomic equilibrium through instability. Iqbal *et al*. (2021) find from their research that inflation has a significant and negative influence on economic growth, as an increase in this indicator discourages the financing of moderate and low return projects by investors and minimizes cash flows from firms to financial institutions due to the decrease in real income.

Government consumption is identified with government final public consumption expenditure and is considered by Silva, Tabak and Laiz (2021) as a statistically insignificant additional explanatory variable with a negative impact on economic growth. Economic activity is always also related to the efficiency of government management, which is why Caporale *et al.* (2015) argue that the variable in question is specific to fiscal policy, which limits growth in the medium and long term, especially if it is expansionary. Other authors such as Beck, Degryse and Kneer (2014) and Abeka *et al.* (2021) have observed an inverse relationship between government consumption and economic growth, because the more government spending increases (it does not imply a

counterpart and is not aimed at productive activities), the lower the rate of economic growth will fall, as public goods and services are not remunerated by the population and public revenues are often not sufficient to cover them. At the same time, Beck, Degryse and Kneer (2014) argues that research has found an increase in financial sector volatility as a result of the directly proportional relationship between it and government consumption. Petkovski and Kjosevski (2014) are of the opinion that a higher government burden as measured by government final consumption expenditure denotes a lower development of the financial system, and hence a decrease in economic growth. A significant and negative influence of government spending (considered as a control variable) on economic growth is also identified by other authors, such as Ahmed and Bashir (2016), Guptha and Prabhakar (2018).

The degree of openness of the economy is considered, along with the others mentioned, as another control variable (Petkovski and Kjosevski, 2014), which is calculated as the share of the sum of imports and exports in GDP, according to World Bank Data (2022). While some authors consider the degree of openness of the economy as an additional variable that is not statistically significant for economic growth (Machado, Saraiva and Vieira, 2021), others find a positive relationship between it and economic growth (Levine, Loayza and Beck, 2000; Beck and Levine, 2004; Petkovski and Kjosevski, 2014; Abeka *et al.,* 2021. Rinosha and Mustafa (2021) observe a negative relationship between trade and economic growth in the case of Sri Lanka, as trade is on a downward trend due to significantly higher imports than deficit-generating exports. Beck, Degryse and Kneer (2014) are of the view that openness of the economy is a specific trade policy variable, which means higher internal and external trade leading to GDP maximization. In their turn, Ahmed and Bashir (2016) believe that the openness of the economy variable is not a determinant of economic growth, but Iqbal *et al*. (2021) contradicts this, arguing that trade openness is a crucial factor in the development of the financial system, and hence economic growth.

In turn, gross fixed capital formation is considered as a control variable by some authors (Iqbal *et al.,* 2021), which positively influences economic growth and puts its imprint on the economy by encouraging investment, exchange of technology and skills, maximizing aggregate income output. Thus, it was found that for low-income economies, the indicator is more representative and significantly influences their economy. Pavelescu (2008) identifies 3 types of capital, namely fixed capital, infrastructure and human capital, concluding that economic expansion depends on the distribution of growth by economic activities and it is recommended to acquire fixed assets (buildings), which is why it is necessary to consolidate expenditure to reach the investment stage. Thus, there is an overestimation of investment expansion, which leads to an increase in the share of gross capital formation. The correlation of capital accumulation with government spending is also realized, since part of it, such as

infrastructure (which creates the prerequisites for economic growth by making the investment process more efficient) should not be neglected, fixed capital formation being provided by the private sector. Observations of other studies (Caporale *et al.,* 2015) identify gross fixed capital formation as an investment-specific indicator as the most representative and relevant component leading to economic growth. In a different perspective, Petkovski and Kjosevski (2014) consider gross capital formation as a "former gross domestic investment", formed as the sum of expenditure on additions to fixed assets and net changes in inventories, being a control indicator of investment. In turn, although not emphasizing this variable, Dobjanschi (2018) is of the opinion that gross capital formation is relevant for economic growth by incorporating in its composition the amounts recovered by firms through depreciation. Ginevičius *et al.* (2019) takes capital accumulation as a variable of financial sector development, which through the efficient allocation of resources and increased capital accumulation contributes to the growth of GDP per capita and implicitly causes a positive change in economic growth.

Unemployment rate (% of total labor force) highlights the percentage of the total labor force and is used in econometric studies as having a close relationship with economic growth (Ginting, Hutasoit and Peranginangin, 2021). The authors consider that a higher increase in the labor force that does not contribute to the production of goods and services will lead to a decrease in economic growth or a slowdown in growth as a result of the absorption of fewer people into the labor market. Rumbia *et al.* (2022) reaches results contradictory to previous ones (Mohseni and Jouzaryan, 2016; Ginting, Hutasoit and Peranginangin, 2021), as they find that the unemployment rate has a positive impact on economic growth, which is due to a long-run report of a decline in labor force and a subsequent report of a rise in GDP per capita. Soylu, Çakmak and Okur (2018) argues that the unemployment rate arises as a result of a country's economic structure, in developed countries it is caused by technological progress and in underdeveloped countries as a consequence of capital insufficiency. In line with other recent studies, other authors (Siddikee *et al.,* 2022; Obi and Jones, 2022) argue that long-term sustainable economic growth results in a commensurate decline in unemployment, but requires government intervention through intense economic reforms. However, other studies (Oviedo-Gómez, Viafara and Candelo, 2022) do not find a significant impact of unemployment on economic growth.

Population growth is in turn considered by Sahoo (2014) as a control variable, which has been found to have a positive and statistically significant impact on economic growth in research, an aspect due to labor force creation and demographic changes. The latter provide impetus and create conditions conducive for economic growth by targeting better quality and younger people. Abeka *et al.* (2021) confirms Sahoo's (2014) view and complements it by

bringing Solow's growth model, whereby he argues that output per employee is an indicator that depends on population growth, savings and technological change, and the more labor productivity decreases, the more GDP growth will be felt, but this is as technologies start to replace labor. Headey and Hodge (2009) identify several hypotheses regarding the impact of population on economic growth, concluding that the young population does not have a significant impact on growth, while the adult population has a significant and positive impact on economic growth, with heterogeneity between the two as an adverse effect due to population density. They also identify different partial or total correlations between population and economic growth depending on the different factors taken into account, such as age, education, expenditure and resources (investment).

4. EMPIRICAL RESULTS AND DISCUSSION

Following the research carried out, the application of the GMM econometric model allows us to formulate the main ideas and conclusions regarding our analysis. The summary of the descriptive statistics of the variables are considered as a starting point for formulating the hypotheses (Table 2). The number of observations differs depending on the country's currency, as we have 19 countries that have already adopted the euro (399 observations), while there are 8 countries that are not yet in the euro area (168 observations), this sample also includes Denmark, as it uses the Danish krone as its national currency, although it benefits from the opt-out clause. The growth rate of GDP per capita fluctuates quite widely for the selected sample, ranging from a low of -14.46% (Estonia, 2009) to a high of 23.99% (the case of Ireland, 2015). This result highlights that there are no significant differences between countries using their national currency and those using the euro at first sight.

Comparing the two categories of countries with the EU (Table 2) does not show extraordinarily large differences between them, but it appears that the average economic growth is higher in non-euro countries than in the European Union and euro area countries, even though the latter category includes some of the most developed countries. The higher value of average growth is due to cheaper labor and foreign investment, which is more visible in these countries, precisely because of the attraction of investors through qualified and cheaper staff, especially as employees are paid in national currencies, which have been suffering from a continuous depreciation in recent times (minimum, maximum and median growth are the same as the average). Following the same direction, we observe that euro area countries deviate from the average economic growth by 4.16%, while non-euro countries deviate by only 3.34%. Regarding the Skewness indicators, we find that in the case of economic growth, for all three categories of countries analyzed, Skewness has a negative value, indicating a left asymmetry, while for the other variables, it is positive (except for population

growth in non-euro countries), indicating right asymmetry, which means that overall, the model will be right skewed. In the Kurtosis case, all the values are positive, showing a leptokurtic distribution, the values of the variables are close to their means, being individually homogeneous, also observed for regression coefficients (Table 3).

Table 2. Descriptive statistics of the variables

	GDPgrowth	*PRVC*	*BAS*	*INF*	*GVE*	*TRD*	*GFC*	*UNEMP*	*PG*
				Total EU countries					
Mean	1,998	92,831	91,523	2, 682	10,807	118,863	22,325	8,634	0,227
Median	2,004	85,356	90,600	2,009	19,467	103,241	22,008	7,540	0,239
Max.	23,999	304,951	219,080	43,180	27,935	380,104	53,591	27,470	3,931
Min.	-14,464	7,115	12,390	-9,666	11,882	45,418	10,578	1,810	-3,847
Std. Dev.	3,963	52,450	40,873	3,660	2,906	62,420	4,228	4,360	0,843
Skewness	-0,199	1,074	0,492	5,105	0,310	1,691	1,184	1,456	0,207
Kurtosis	6,531	4,266	2,932	48,138	2,904	6,165	9,355	5,409	5,293
Jarque-Bera	128,372	146,941	23,031	50599,14	9,297	507,120	1086,615	337,630	128,372
Comments	567	567	567	567	567	567	567	567	567
				Euro area countries					
Mean	1,724	101,981	95,965	2,168	19,532	126,334	22,072	8,839	0,376
Median	1,738	95,0085	98,190	1,878	19,232	112,926	21,706	7,760	0,355
Max.	29,999	304,951	206,10	20,061	26,243	380,104	53,591	27,470	3,931
Min.	-14,464	13,165	17,170	-09,666	11,882	45,419	10,578	1,810	-2,258
Std. Dev.	4,169	50,537	36,979	2,457	2,619	70,678	4,452	4,548	0,867
Skewness	-0,032	1,179	0,170	1,402	0,159	1,378	1,297	1,467	0,318
Kurtosis	6,926	4,866	2,967	14,063	3,184	4,647	10,209	5,441	4,475
Jarque-Bera	256,322	256,322	1,945	2165,23	2,245	171,46	975,964	242,163	42,909
Comments	399	399	399	399	399	399	399	399	399
				Non-euro countries					
Mean	2,648	71,100	80,975	3,905	20,460	101,120	22,926	8,147	-0,127
Median	3,134	52,545	65,530	2,621	19,848	91,999	22,410	7,135	-0,067
Max.	11,144	223,834	219,080	43,180	27,935	168,340	37,287	19,920	1,347
Min.	-7,701	7,115	12,390	-1,425	14,016	48,521	16,602	2,010	-3,848
Std. Dev.	3,348	50,613	47,373	5,374	3,415	29,159	3,583	3,849	0,663
Skewness	-0,657	1,323	1,150	4,607	0,236	0,726	0,939	1,266	-1,274
Kurtosis	3,916	3,916	3,473	29,357	2,147	2,670	4,313	4,223	8,549
Jarque-Bera	17,962	53,502	38,640	5457,05	6,663	15,540	36,780	55,378	260,977
Comments	168	168	168	168	168	168	168	168	168

Source: Own calculations based on World Bank (2022) and the Global Economy (2022)

According to Table 3, there are significant differences between countries using the euro as their national currency and those outside the euro area, out of the 8 variables chosen, 7 are significant for the EU, 6 are statistically significant for the former and only 4 for the latter. Thus, according to the results, government consumption, population growth and asset utilization rate have a significant and negative impact on economic growth, while the openness of the economy and inflation (significant only for the EU) also have significant implications on the dependent variable, but this time positive. However, things are different in non-euro countries, where only government consumption and

domestic credit have significant positive effects, while population growth and the asset ratio have negative and significant negative impacts on growth.

Table 3. Estimating the regression equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dependent variable: GDPgrowth				
		Total EU countries		
C	3,709881	2,012602	1,273734	0,2033
PRVC	-0,014154	0,005518	-2,564859	0,0106**
BAS	-0,014671	0,005193	-2,825004	0,0049*
INF	0,083077	0,035096	2,367100	0,0183**
GVE	-0,241511	0,098961	-2,440474	0,0150**
TRD	0,025775	0,009023	2,856466	0,0045*
GFC	0,139552	0,038549	3,6200133	0,0003*
UNEMP	-0,043342	0,041097	-1,054623	0,2921
PG	-1,320474	0,239458	-5,514426	0,0000*
		Euro area countries		
C	6,458347	3,533748	1,827620	0,0685
PRVC	-0,017083	0,006500	-3,851669	0,0090*
BAS	-0,016410	0,005883	-2,789236	0,0056*
INF	0,179466	0,065944	2,721482	0,0068*
GVE	-0,324134	0,122958	-2,636147	0,0088*
TRD	0,027992	0,010500	1,548336	0,0080*
GFC	0,076786	0,049592	-2,628013	0,1224
UNEMP	-0,028801	0,055659	-0,517458	0,6052
PG	-1,202136	0,312108	-2, 628013	0,0001*
		Non-euro countries		
C	0,613615	5,955858	0,103027	0,9181
PRVC	0,098334	0,029614	3,320560	0,0012*
BAS	-0,153260	0,031910	-4,802889	0,0000*
INF	0,053697	0,034575	1,553069	0,1228
GVE	0,094582	0,175939	0,537582	0,5918
TRD	0,000412	0,021188	0,019455	0,9845
GFC	0,230469	0,063936	3,604698	0,0004*
UNEMP	-0,025913	0,057882	-0,447698	0,6551
PG	-1,526896	0,349857	-4,364213	0,0000*

Note: *;** - Variables are significant at 1% and 5% significance level.

Source: based on World Bank Data (2022) and the GlobalEconomy.com (2022)

Domestic credit appears contradictory in the three categories, because although it is significant, in the euro area and the EU as a whole it has a negative impact on economic growth, as in all EU countries, while in the 8 countries that have not yet abandoned the national currency (including Denmark) it has the expected positive effect, results in line with Ahmed and Bashir (2016) and Abeka *et al.* (2021). The fact that credit institutions extend a large amount of credit to the private sector in euro area countries may create dependence and discourage firms' financial stability in the long run, leading to high volatility and a decrease in productivity, the inverse relationship obtained is in agreement with Petkovski and Kjosevski (2014), Ahmed and Bashir (2016) and Guptha and Prabhakar (2018). The positive influences of domestic credit on non-euro area countries may be due to a lower degree of development of this category, with more intensive financing needed to modernize firms' transaction systems and

make new investments in physical assets or securities, together with a greater willingness to save on the part of the population. With these two results, we find the influence of domestic credit on economic growth up to a certain threshold, manifesting the inverted U-curve (Bui, 2020), which means that the main independent variable has reached the maximum threshold where economic growth is in the same direction for non-euro countries, while in the EU and euro area countries, growth is negative due to excess credit, which can trigger an increase in domestic demand as the current account deficit widens (Lazea, 2017).

Bank asset ratio is a specific indicator of banking depth (Al-Moulani and Alexiou, 2017), which provides a consistent picture of the bank-based financial sector. Although previous studies have shown a positive relationship between economic growth and banking sector development through this indicator (Demirgüç-Kunt and Levine, 2001; Azman-Saini and Law, 2010; Hismendi *et al.,* 2021), our results show the opposite, in the sense of exerting a very tight influence on economic growth, but negatively on all EU countries, regardless of their category. This phenomenon can be explained by bank restructurings and their orientation towards the capital market, purchases of fixed assets such as medium and long-term securities, which involve lower risks. At the same time, following the crisis of 2007-2008 and probably the current pandemic crisis, the banking sector will take precautionary measures so as to apply an adapted policy that will encourage more lending to the real sector rather than holding securities and reserves, as people and companies need liquidity.

Regarding government consumption, our results on the euro area and the European Union are in agreement with Beck, Degryse and Kneer (2014), Petkovski and Kjosevski (2014), Caporale *et al.* (2015), Ahmed and Bashir (2016), Guptha and Prabhakar (2018), Silva, Tabak and Laiz (2021), Abeka *et al.* (2021), while the direct relationship between government consumption and economic growth with respect to non-euro countries is sobering. However, we believe that this is due to inflation and destabilization of the financial system, which does not provide sufficient resources, requiring government intervention in the economy to support it, as was the case with the pandemic and the health crisis. Even so, being in the stage of largely bank-based economies, non-euro countries can be encouraged to consume through government spending, thus stimulating economic activity by encouraging a shift towards lending rather than investment.

According to other studies (Levine, Loayza and Beck, 2000; Beck and Levine, 2004; Petkovski and Kjosevski, 2014; Abeka *et al.,* 2021; Iqbal *et al.,* 2021), the degree of openness of the economy has a significant and positive impact on the European Union as a whole and on the countries that use the euro, which is also normal, as transactions can easily be conducted in the same currency and within the same union. In the case of non-euro countries, the

variable does not exert significant influences, approving the opinion of Machado, Saraiva and Vieira (2021), this being due to the instability and increased sensitivity to shocks, as countries are highly dependent on the exchange rate, which often leads, through currency depreciation, to a deficit in the external balance of payments.

As for gross fixed capital formation, although the variable has a positive impact on the economic growth rate, in euro area countries it is not significant, while in the EU and non-euro area countries it is significant, in line with the results obtained by Pavelescu (2008), Petkovski and Kjosevski (2014), Caporale *et al.* (2015), Dobjanschi (2018), Ginevičius *et al.* (2019) and Iqbal *et al*. (2021). On the case of the Union as a whole, this variable appears significantly positive, implying that there is a desire for high financial development through investment in the securities sector and as much involvement of banks in these transactions as possible. Fixed capital is indispensable for enterprises, which for the euro area countries is more stable and more important, with high development exerting its influence, especially through the capital market, compared to smaller countries with lower development and income, which depend on the banking sector to continue operating.

In turn, inflation and unemployment are two control variables that go hand in hand, in an inverse relationship, because in order to limit the effects of one, the other must be neglected, which will change in the opposite direction of restrictive policies. In our case, inflation is statistically significant in the case of the European Union and euro area countries, compared to non-euro area countries, where it does not show significant influences. Although high unemployment acts to lower economic growth, it is not statistically significant, in agreement with Oviedo-Gómez, Viafara and Candelo (2022). The unemployment rate can be explained by the increasing development of technology and the decline in employment in the wake of the crises, which is why it is no longer a relevant variable for the economy, and even less so for the banking sector, which has moved a large part of its activities online. As for inflation, it directly and positively explains economic growth in the EU and euro area countries, showing a positive insignificant positive influence on those outside the euro area. Our results are in line with Petkovski and Kjosevski (2014) and identifying in the paper by Stoica, Roman and Rusu (2020) that inflation is beneficial to the early stage of entrepreneurial activity and gross fixed capital formation, we find that by increasing the explanatory variable, exports are encouraged as the national currency depreciates and the exporter (borrower) is advantaged. Thus, investment is given an impetus to produce more goods and service, which leads to economic growth and even to the development of the banking system through the collection and payment transactions carried out by banks for their customers.

Population growth in both categories of states and in the EU total appears in inverse proportion to economic growth and is statistically significant, in agreement with Sahoo (2014) and *Abeka et al*. (2021). Although normally expected to be positively correlated, GDP falls when population increases, as in recent years there has been a growing phenomenon of people migrating to other economies, to which they contribute by doing skilled work, many studying in the country and then preferring to leave for a better paid job. Stoica, Roman and Rusu (2020) identify a positive relationship between population growth and entrepreneurship, which can be considered as a determinant of economic growth through investment.

At the end of the empirical study, we can observe a greater influence of the development of the financial-banking system on economic growth in the euro area countries compared to those outside the euro area, in terms of the degree of national development, greater openness to technology and innovation, risk-taking and avoidance of depreciation of the common currency, which identifies problems in terms of the standard of living in countries that have retained central bank independence. The banking sector can easily lay the foundations for sustainable economic growth through the multiple roles it plays in an economy, such as easily facilitating maturity transformation (short-term finance can become long-term credit), providing day-to-day banking services, credit instruments and financing trade or large infrastructure projects, taking and managing risks, helping companies to hedge interest rate risk, helping local and state budgets and balancing the demand and supply of funds. The explanatory variables chosen refer directly or indirectly to one of these roles, proving that irrespective of a country's level of development or the currency used, banks will support the economy and be the mainstays of investment, business development and the improvement of living conditions for the population.

5. CONCLUSIONS

Using a multiple linear regression model, our study aimed to examine the link between banking system development and economic growth in the EU Member States.

Our empirical results show that there are no significant differences between the development of the banking sector in the European Union and euro area countries compared to those outside the euro area. Through the main independent variable, i.e. the share of domestic credit granted by banks to the private sector, which is considered as the most widely used indicator of the financial development and depth of the banking sector, we find a close and direct link between banking sector development and economic growth.

Although not directly measuring banking performance and efficiency, the other explanatory variables chosen in the econometric model (bank asset ratio, government consumption, gross fixed capital formation, population growth)

have been found to be significant for economic growth, as they are related to the banking sector. The only variable that does not have a significant impact on the GDP growth rate in the EU countries is the unemployment rate, which has been on an upward trend in recent times due to the restructuring of the workforce as a result of digitalization, bankruptcies or the closure of firms in the wake of the pandemic crisis.

The banking sector can easily lay the foundations for sustainable economic growth through the multiple roles it plays in an economy, such as easily facilitating maturity transformation (short-term finance can become long-term credit), providing day-to-day banking services, credit instruments and financing trade or large infrastructure projects, taking and managing risks by helping companies to hedge interest rate risk, helping local and state budgets and balancing the demand and supply of funds. The explanatory variables chosen refer directly or indirectly to one of these roles, proving that irrespective of a country's level of development or the currency used, banks will support the economy and be the mainstays of investment, business development and the improvement of living conditions for the population.

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DOI: 10.47743/ejpar.2024-3-4

DEVELOPMENT OF YOUTH EMPLOYABILITY ISSUES BY VOLUNTEERISM APPROACHES

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Abstract
There is a global warning signal regarding youth employability, with an estimate of a quarter of world youth population – i.e. 290 million youth aged 15 – 25 years old included in the NEETs ("not in education, employed or in training") category. Last data provided by EUROSTAT in 2022 shows that Romania have almost 20% of its 15 – 29 years old youth as NEETs (19.8%). This percent is almost double compared to EU average of 11.7%. Therefore, a lot of effort was invested into funding special programs and projects aiming at increasing qualification, professional skills and education levels in youth. Between 2007 – 2015 more than 62% of the budget allocation targeting youth in general and NEETs youth in particular (Priority Axe 2 – Improve the Situation of Youth from NEETs Category), as part of the financial exercise for Romania, came from the Social European Fund, and the impact of this investment has not been assessed, yet (QURES, 2016, pp. 39).
Volunteerism, though, as a means of gaining necessary skills and competences needed to find a job on the labour market, is often disregarded, although there are studies and initiatives that show there is a correlation between volunteerism, competences and increased employability chances, thus, underlining the economic capital volunteerism brings.
The current article proposes to analyse the importance of volunteerism in increasing employability chances in youth in general, NEETs youth in particular, through comparative data showcase and examples from various countries, coming from practice and literature review, including Romania's efforts in this regard.
Keywords: *volunteerism, employability, competences, youth, NEETs.*
JEL Classification: F66, J24, J69, M54

1. INTRODUCTION

Globally, there is a warning signal regarding the issue of youth employability. Estimates indicate that a quarter of planet's youth (approximately 290 million youth aged 15 to 24 years old) are included in the NEETs ("not in education, employed or in a form of training") category (The Economist apud International Association for Volunteer Effort, 2013). This category is defined as being formed of youth who either do not take part in any form of education, are unemployed or not included in any form of training (International Association for Volunteer Effort - IAVE, 2013). Eurostat data from 2022 show that the percentage of NEETs youth 15 to 29 years age in Romania was 19.8% almost double the European Union average of 11.7%. In addition, the occupation rate among young people 15 – 24 years old was 18.7% in 2023, according to the National Institute of Statistics, while Eurostat data from 2014 show the same indicator was 22.3%, which means that over a decade time, the occupation rate among this youth age category in Romania decreased by 3.7%. Overall, the World Bank indicates that almost half of the world's young population either was left outside the formal economy or was contributing less productively than it could (IAVE, 2013).

The above - mentioned data are some of the reasons European Union (EU) funding targeted and will continue to target in the next EU financial exercise the youth employability issue, and not only. The previous EU funding programs, along with other type of government funding, focused on NEETs problem, surpassed 3.5 billion EURO, since Romania entered EU (QURES, 2016, pp.39). The impact of the last EU financial exercise (2014 – 2020) has not been assessed, yet. However, hundreds of projects offering free professional training and qualification have been implemented. In addition, project beneficiaries received subsidies and some of them learned about business plans and set up their own business. Currently, despite all these investments meant to increase youth employability, we still have a high percentage of NEETs youth and labour crisis, and employers looking for employees with certain skills and competences.

Most of the efforts and funding focused only on investment in qualification, training and education. For a segment of the inactive population, volunteerism, as a form of gaining competences and skills, eventually securing and increasing chances for a first or new job, has been oversighted.

On the other hand, at the EU level, Romania is one of the countries with the lowest percentages of people involved in volunteer activities. The European Commission's Eurobarometer from November 2010 showed that the EU average of volunteerism was 30%, 13 EU member states being situated above the average. Romania is below the average, with only 20%, which places our country among EU member states with a low level of involvement in volunteer activities (European Commission Eurobarometer, 2010). The Eurobarometer 75.2 „Volunteerism and intergenerational solidarity" (European Commission,

2011) reveals that only 14% of the Romanians were involved as volunteers, with a 6% decrease compared to the previous year. The most recent data issued by the National Institute of Statistics in Romania reveals that approximately 4% of the Romanians got involved in formal or informal volunteer activities (National Institute of Statistics in Romania, pp. 46).

The current research targeted the following objectives:

1. Explore the correlation between volunteerism and employability;
2. Identify employability practices enhanced through volunteerism and their applicability in the Romanian context.

2. METHODOLOGY

The methodology used was literature review analysis on the subject of volunteerism, employability and the correlation between the two, focused also on NEETs youth. In addition, we wanted to identify the examples of good volunteerism practices from EU countries and not only, in increasing employability among youth and NEETs youth, especially, and what are the prospects of applying or adapting some of these practices within the Romanian context of volunteerism. To do that, we analysed the information showcased in comparative examples from various countries, presented in two articles and three publications (handbook and guides). This information was correlated with statistical information provided in European Union barometers and Romanian Government's reports and strategies.

3. DISCUSSIONS AND RESULTS

3.1. What is the link between volunteerism and employability?

To analyse the correlation between volunteerism and employability, we started from the conceptual approach.

Within the context of this article and out of the numerous definitions that the scientific literature offers to volunteerism, the most appropriate definition is the one offered by the International Labour Organization. ILO defines volunteerism as "unpaid non-compulsory work; that is, time individuals give without pay to activities performed either through an organization or directly for others outside their own household or related family members" (Haddock and Devereux, pp.31).

On the other hand, employability is defined as "the ability to gain initial employment; hence the interest in ensuring that 'key competencies', careers advice and an understanding about the world of work are embedded in the education system"(Wikipedia, Berntson Eric, 2008).

Volunteerism is a source of all kinds of capital, from the human, social, physical, to the economic capital (Bates and Davis, 2004). The economic capital of volunteerism can be looked at from the host organization – volunteer paradigm perspective. For the host organizations which involve volunteers in

their activities and which look at the volunteers as a strategic human resource, volunteers' hours of work can be converted into monetary contribution to the organization's budget. If volunteering is measured and monitored appropriately this can be easily done using the Volunteerism Economic Return instrument (VOLUM Federation, Comparative Study, 2016).

From the volunteer's perspective, the economic value of volunteerism translates into competences and skills gained through volunteerism activities which increase volunteer's employability chances. Therefore, we can say that volunteerism and employability are linked through the competencies gained, due to volunteer work. However, to be more intentional in this approach, we also need to consider the kind of motivations underlying the volunteer behaviour. Clary and his collaborators identified six motivational factors, brought together into a Volunteer Functions Inventory Scale, using the functional approach. These are, as follows: (1) motivation factors based on the protection of ego, (2) motivation factors based on values, (3) motivation factors related to career development, (4) social motivation factors, (5) motivation factors based on understanding (gaining competences, knowledge and skills), and (6) motivation factors which enhance personal development and increase self – esteem (Clary et all, 1998). Therefore, Clary and his collaborators identified specific sets of motivational factors which determine people to volunteer, in order to gain competences, knowledge and skills that enable them to find a job (if unemployed), to find a first job (if they are recent graduates of the education system or to change their job, for career development purposes.

We can deduct that the correlation between volunteerism and employability is strengthened through the competences and skills volunteerism is developing. To look at the nature of this correlation, we have done a literature review search and we, then, applied it to the actual Romanian context.

3.2 How strong is the volunteerism – employability link?

To answer this question, we have reviewed two studies made in Great Britain, one in 2000 and a second one in 2013, which aimed to intentionally analyse and research on the same question. The studies seemed interesting, because they are made in Great Britain, a country with a high percentage of the population being involved in volunteer activities. Data provided on UN Volunteers Knowledge Portal on Volunteerism for United Kingdom of Great Britain and Northern Ireland, state that in 2017 - 2018 alone, 64% of the people in England took part in a volunteering activity at least once.

The first study was published in November 2013 by a group of researchers led by Paine A., who wanted to answer the question of employability – volunteerism correlation, around a time when levels of unemployment in the UK was high and, as such the level of interest in volunteerism as a vector for employment was increasing (Paine et al., 2013). They used a longitudinal

perspective, multivariate techniques, focusing on data from British Household Panel Survey (BHPS), 1996 – 2008, which included also questions related to volunteerism and employment. While the authors of this study do not deny the results of previous studies which could identify a connection between volunteerism and employability, in the sense that volunteerism, through the motivational functional approach, can enhance competencies development and new skills gain or skills improvement, through their longitudinal analysis they conclude that the frequency of volunteerism has an influence on the volunteerism – employability correlation. If volunteerism is done monthly, chances to find a job increase. If the frequency is more or less than monthly, it reduces the chances for employability or even, as they say, have a "reverse effect" (Paine et al., 2013, pp. 19). Furthermore, as they conclude, "Overall, volunteering (as measured in the BHPS) does not appear to have as strong or as positive an effect on employability outcomes – on moves into employment, on retention and progression – as suggested in both policy rhetoric and in some previous research" (Paine et al., 2013, pp.19).

Previous research coordinated in 2000 by Andy Hirst, to explore the link between volunteerism and employability, focused on the nature of this link, the operating mechanisms and the circumstances in which unemployed volunteers increase their chances to find a job, compared to the unemployed who do not volunteer (Hirst, 2000). Their analysis concluded that volunteering activity had a more positive impact on unemployed people's chances of finding a job, with more than 50% of the unemployed getting a job, following volunteer initiatives. Another finding was that the nature of volunteering (number of volunteer hours, whether or not they received training during the time they volunteered, variety of volunteer activities, etc.) makes a difference and that more benefits relate to the ones who had previous jobs and are in search for a new one, compared to people who are new – entry into employment (Hirst, 2000).

In December 2012, the International Association for Volunteer Effort (IAVE), organized a Dialogue on Youth, Volunteering and Employment, as part of the 22nd biennial World Volunteer Conference, held in London, with the participation of corporations, youth, NGOs and policy analysts. Part of this London Dialogue included also the results of a survey made of 200 leading UK businesses, on the value of volunteering. Here are some of the employers' perspective on the added – value of volunteering:

- 73% of the employers would recruit candidates with experience gained through volunteerism, meaning that they recognise volunteerism as work experience;
- 80% of the employers declared is good to have volunteerism activities mentioned in a CV, as they appreciate reading about that in a CV;
- 70% said volunteerism is a premise for a bigger salary and promotion opportunities;

- 84% agreed there are chances youth can find a job through volunteerism (IAVE, 2013).

While studies made by Hirst and Paine (along with previous studies they cited in their research articles) do not identify a clear, definitive link between volunteerism and employability, employers' opinions seem to be quite encouraging in this respect, for Great Britain's context.

3.3. Good practices in increasing employability through volunteerism Projects

In countries where volunteerism is highly developed (UK, Norway, Netherlands), volunteerism is recognized as a contributor to increased chances for employability. To do that, volunteer management must intentionally aim at developing skills and competences, which will be useful in the future career and even in getting a job. It is also essential in volunteer recruitment and retention processes, if properly made, focused, and a genuinely structured work experience. This counterbalances with the motivation for volunteerism.

In a comparative study made by VOLUM Federation, regarding the good practices examples present at the European level in recognizing and certifying competencies gained through volunteerism, results are diverse and non-consistent. In Croatia, volunteerism and gained competencies have "generated a certain degree of competition on the labour market and increased employability, in general" (VOLUM Federation, Comparative Study, 2016), while in France, categories most interested in the issuing of a volunteer passport, are young people in search for a first job, with inclusion problems or in school abandonment situation, along with employed and retired persons.

Netherlands is presenting the "validation of prior learning" – VPL model, which validates gained competencies, while Scotland is intentional in using volunteerism to increase employability. The model's name is „Vskills for Employability", and the targeted group are the unemployed. "In Scotland, volunteerism is not separated from employability and people look at volunteerism as an instrument to increase individual skills for employability, to prepare for employment and a means of connection to job opportunities offered at the local/ regional or national level." (VOLUM Federation, Comparative Study, 2016, pp. 9) However, data lead to the conclusion that volunteerism is not a solution for every unemployed and does not guarantee you finding a job.

Slovakia, for example, has concluded, after implementing a project and approach like Scotland, that volunteerism is mainly important as work experience for the NGO sector.

3.4 The NGO Experience in Romania

A step forward in recognizing the economic and social value of volunteerism was made along with the approval of the new Law of Volunteerism

- no. 78/ 2014, lastly up-dated in April 2024. The added - value of the legislative improvements consists in recognizing volunteerism and competencies gained through volunteerism through the national certificates for volunteerism offered and clear stipulations regarding the contract – based relationship between the volunteer and hosting organization. These include formal documents like volunteer job description (the equivalent of job description for and employee) and the security and protection form for the volunteer (Law of Volunteerism no. 78/ 2014, updated April 2024).

Despite it, up to now the economic value of volunteerism is entirely oversighted, while the social value of volunteerism is, more or less formally recognized in the community.

The lack of accurate information and awareness on the importance of volunteerism is one of the causes for inconsistent, less rigorous management of volunteers (sometimes even the lack of it), in public and private institutions. NGOs continue to be, in this case also, the structures that involve volunteers on a larger scale. Even in their case, as it is specified in one of the position documents of VOLUM Federation, there are „barriers that limit the potential of volunteerism" which are related to the lack of a long – term vision, that will encompass "support mechanisms for volunteers and for organizers of volunteer activities, such as: access to appropriate funding means, capacity building for NGOs running volunteerism programs; coherent public policies which reduce barriers in organizing and carrying on volunteer activities, data gathering and analysis systems regarding the impact and economic and social value of volunteerism, as well as systems to measure and recognize competencies gained through volunteerism" (VOLUM Federation position document, pp.9).

The General Secretariat of the Romanian Government has published, in 2019, under the program "The Promoters of Volunteerism in Romania", a guide entitled "Guide regarding the Optimization of the Partnership between Public Administration Authorities and the Associative Environment, in Support of Volunteerism". This is sending a strong sign that volunteerism began to be regarded as generator and enhancer of employability in Romania, through more consolidated partnerships among local public authorities and the associative environment in Romania. In addition, The National Strategy for Youth 2024 – 2027 (Annex) mentions that the focus must be on "increasing the extent to which youth participate in community and social activities" and on "reducing labour poverty and occupational exclusion" (pp.4 – 5), which, again, shows a potential correlation between volunteerism and employability. NEETs youth are part of the analysis and action plan included in this strategy, along with volunteerism, each of the two components are being addressed through specific general objectives. To increase youth participation through volunteerism, the strategy includes information and awareness campaigns, partnerships al local/ regional/ territorial level in support of volunteerism, increasing the number of

volunteerism networks (Romanian Government, 2023). Although the strategic document does not correlate employability with volunteerism directly, it can constitute a starting point in this respect, through the manner in which funding and projects will be designed and implemented.

4. CONCLUSIONS AND RECOMMENDATIONS

Related to the first objective of the research, the analysis of the literature review points out to the conclusion that the link between volunteerism and employability is contradictory and somehow weak. The three studies made in Great Britain by IAVE, Paine and Hirst, based on an analysis of previous research made, lead to this conclusion. The perspectives about the concepts and definitions of the NGO's roles for employability represents a basis for future researchers. Our paper makes the connection between the articles involved in some analysis regarding the skills of NEETs. However, there are some aspects in need of further investigation.

For the second objective of the research, we identified there are several practices and projects implemented, some even covering a large period, like Vskills employability in Scotland, from which Romania can learn as a country. The current legislation for volunteerism in Romania, improved through the addition of provisions regarding the recognition of volunteerism as work experience and the added - value in the selection process, is an excellent starting point. The Law of Volunteerism is also offering specific information regarding means of monitoring volunteer contribution and the volunteer management process overall.

However, despite the efforts made by the NGO sector to bring up to light these provisions and point out practical ways to apply it, the low level of volunteerism in Romania is an indication that a first more intentional step would be to increase awareness on the legislative provisions among volunteers, NGOs, local authorities, universities and employers, and other stakeholders of volunteerism. This could be mainly beneficial, within the current EU financial exercise (2023 – 2027), and the allocation of funds focusing on youth employability, especially NEETs youth employability. Volunteerism could play also an important role, alongside professional training courses, subsidies and entrepreneurship, in increasing employability, through its economic value, but also through the other kinds of capital it carries.

The conclusions of our research are:

1. An important preparatory step in increasing youth, especially NEETs youth employability, would be a nation – wide awareness and information campaign on up – to – date Volunteerism Law and its provisions;
2. A second step would be an intentional approach to youth employability, which involves all volunteerism stakeholders, namely youth looking for a job, potential employers, universities, NGOs involving volunteers, state institutions,

by developing joint projects which link volunteerism to employability and have the power to attract de funds made available by European Union and other financers, during the current financial exercise (2023 – 2027);

3. More volunteer management trainings, especially for smaller NGOs and state institutions, that will familiarize them with the management instruments provided in the Romanian Law of Volunteerism;

4. Establish a unitary methodology and instruments to measure the economic value of volunteerism in Romania and its contribution to the Romanian GDP;

5. Improve the certification and formal recognition system of volunteerism;

6. Identify a coordination body that would manage all these processes, and other Governmental strategies that have included volunteerism on their agenda. This coordinating body should also coordinate and monitor the use of all funding available through different channels, so that in the end the objectives are being met.

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DOI: 10.47743/ejpar.2024-3-1

ANALYSIS OF FACTORS AFFECTING THE PERFORMANCE OF BANKING SYSTEMS IN POST-COMMUNIST EU STATES

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Abstract.
This study investigates the impact of specific banking factors and macroeconomic factors on banking performance indicators (ROA and ROE) in post-communist EU member states for the period 2000 – 2020. To determine the significant impact, an econometric panel data regression model was used. The study's results indicate that specific banking factors (Bank Size and Overhead Cost) have a negative impact on profitability indicators ROA and ROE, while other specific banking factors (Net Interest Margin and Non-Interest Banking Income) have a positive impact on the dependent variables. There is a positive impact of macroeconomic indicators on profitability indicators ROA and ROE, except for inflation, which has a negative impact on both ROA and ROE.

Keywords: *banking performance; OLS; specific banking factors; macroeconomic factors.*
JEL Classification: G21

1. INTRODUCTION

A significant number of studies have focused on the factors influencing the performance of the banking system or the determinants of banking profitability. These studies specify the return on assets (ROA) and return on equity (ROE) as key indicators of banking performance. For example, in 2018, Mirie Mwangi conducted a case study analyzing the influence of bank size (Size) on the dependent variables ROA and ROE. Using an econometric model, Mirie Mwangi demonstrated that the Size variable has a positive influence on the profitability indicators ROA and ROE, describing the banking performance in Kenya.

In 2014, Imad Z. Ramadan, Qais A. Kilani, and Thair A. Kaddumi demonstrated that management cost has a negative impact on the ROA indicator, while it has no significant effect on ROE. They found that inflation and GDP

have an insignificantly positive impact on the return on assets and the ROE indicator.

The net interest margin (NIM) is positively related to profitability; as the income from interest earned on loans increases, so does the profit. Demirguc-Kunt and Huizinga (1999) showed that differences in interest margins and bank profitability reflect a variety of determining factors: bank characteristics, macroeconomic conditions, explicit and implicit bank taxation, deposit insurance regulation, overall financial structure, and legal and institutional indicators.

Many studies on the growth of non-interest income (NII) have measured the effect of this type of income on banking performance. Williams and Prather (2010) stated that non-interest bank income (NII) increases bank risk, but some types of non-interest income (NII) reduce risk when considering bank specialization and size effects. While Sanya and Wolfe (2011) tested the effect of non-interest income sources on performance and insolvency risk, they concluded that net and non-interest income sources reduce a bank's insolvency risk.

Kumar et al. (2016) reported that the diversification of non-interest income (NII) sources can positively impact overall profitability and risk-adjusted performance, along with improving banking system stability. Minh and Canh (2020) argued that declared non-interest income has a positive impact on the performance (ROA, ROE) of Vietnamese commercial banks. A brief review of the literature can be found in Table 1.

Table 1. Taxonomy of Bank Profitability in Research Studies

Author and Year	**Subject**	**Variables**	**Results Obtained**
Mirie Mwangi, 2018	The effect of size on the financial performance of commercial banks in Kenya.	Dependent variables: ROA and ROE. Independent variables: Size Bank.	The study showed that the Size variable has a positive effect on banking performance in Kenya.
Imad Z. Ramadan, Qais A. Kilani, Thair A. Kaddumi, 2011	Determinants of bank profitability: Evidence from Jordan.	Dependent variables: ROA, ROE Bank-specific variables: In (Overhead cost), Capital adequacy, Asset composition, Credit risk, Size Industry-specific variables: Market concentration, Banking sector size. Macroeconomic variables: Inflation, GDP	Management cost has a negative impact on ROA profitability in models 1 and 2, while it has no statistically significant effect on ROE in any of the models. Inflation and GDP showed an insignificant positive impact on asset profitability and the ROE indicator.

Zouari-Ghorbel (2014)	Macroeconomic and bank-specific determinants of household non-performing loans in Tunisia: Dynamic panel data.	"Return on equity, solvency ratio, non-performing loans, GDP, inflation, interest rates, and inefficiency size."	The results indicate the extent to which household non-performing loans in the Tunisian banking system can be explained not only by macroeconomic variables (GDP, inflation, interest rates) but also by poor management quality.
Chowdhury and Rasid (2017)	eterminants of Islamic bank performance in GCC countries: Dynamic GMM approach.	"Return on assets, credit risk: the ratio of loan loss provisions to total loans, equity to total assets, operational efficiency, liquidity management, bank size, annual GDP growth rate, inflation rate, money supply as a percentage of GDP, stock market capitalization as a percentage of GDP."	The empirical findings show that specific factors of Islamic banks, such as equity financing and bank size, are statistically positive and significant for the profitability of Islamic banks. The operational efficiency ratio is significantly negative and statistically significant for asset profitability.
Marijana et al. (2012)	Determinants of Macedonian banking sector profitability in a changing environment.	"Return on assets, bank size, solvency risk, liquidity risk, credit risk, fee income, operating expense management, concentration, EBRD index, and economic growth."	According to the obtained results, among the internal factors of bank profitability, the most important is operating expense management. Additionally, profitability is influenced by solvency risk and liquidity risk. Regarding external variables, economic growth, reform, and banking system concentration show a significant effect on the profitability of banks in the Republic of Macedonia.
Yahya, Akhtar, &Tabash(2017)	The impact of macroeconomic and bank-specific factors on the profitability of Islamic banks: Empirical evidence.	"Return on assets, return on equity, bank size, liquidity, asset management, deposits, operational efficiency, financial risk, GDP, inflation rate, and political factors."	The study results indicate that operational efficiency and financial risk have negative and significant relationships with ROA and ROE. Moreover, the study reveals that asset size (LogA), asset management, liquidity, and deposits have a significant and positive impact on bank profitability.

Source: Own Processing

2. METHODOLOGY

2.1 Description of Variables

For the collection of analysis indicators of the banking system in European Union states with former communist regimes (Bulgaria, Croatia, Czech Republic, Romania, Hungary, Estonia, Latvia, Lithuania, Slovakia, Poland, Slovenia) during the period 2000 – 2020, data was sourced from the official website www.theglobaleconomy.com. By utilizing the dataset related to profitability indicators (ROA and ROE) and influence indicators (GDP, Inflation, Size Bank, Overhead_Cost, NIM, and NII), it was possible to implement statistical tests using Eviews software, where the following information is represented (Table 2).

Table 2: Description of Variables

	Symbol	Characteristics
Dependent Variables		
Profitability Indicators	ROA	Economic profitability (Net Profit/Total Assets)
	ROE	Financial profitability (Net Profit/Equity)
Independent Variables		
Bank-specific factors (internal)	Size	Total assets
	NIM	Net interest margin
	Overhead_Cost	Management cost
	NII	Non-interest income
Macroeconomic factors	GDP	GDP (%)
	Inflation	Inflation (%)

Source: Own Processing

To determine the correlation between the independent variables and the dependent variables, it is necessary to perform an individual graphical analysis of the dependent indicators for each country for the period 2000 – 2020.

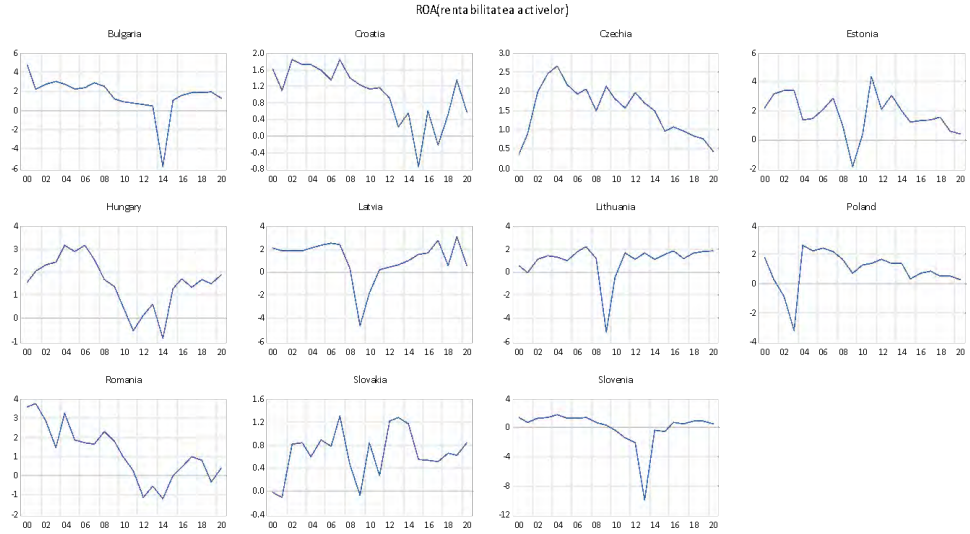

Figure 1: Evolution of the dependent variable ROA of the banking system in EU countries with former communist regimes, for the period 2000-2020
Source: Own Processing in Eviews

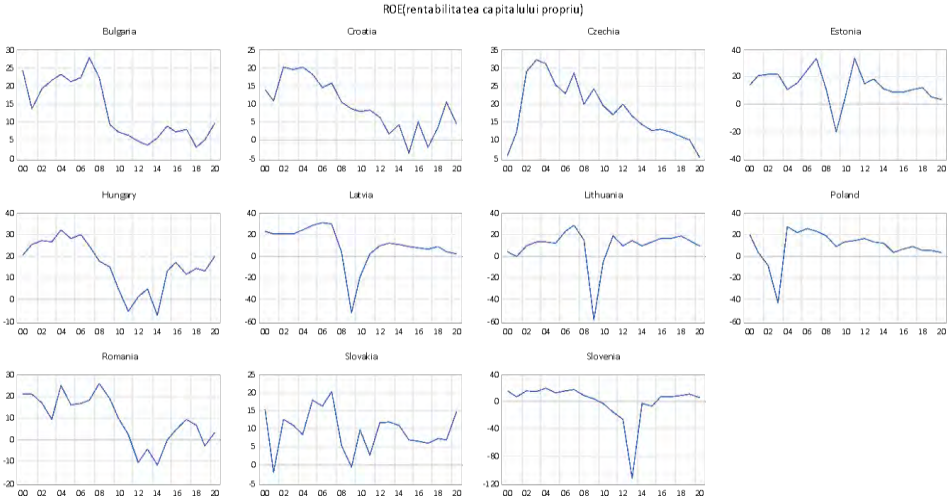

Figure 2: Evolution of the dependent variable ROE of the banking system in EU countries with former communist regimes, for the period 2000-2020
Source: Own Processing in Eviews

From the figures above (Figure 1 and Figure 2), we can observe that the evolution of the dependent indicators ROA and ROE varies according to the country analyzed and the period considered. For example, ROA achieved the highest value of 4.79% in the year 2000 in Bulgaria, and the lowest value of -9.98% in Slovenia in 2013. Regarding the dependent indicator ROE, it reached the highest value of 33.64% in Estonia in 2007, while the lowest value was -112.19% in Slovenia in 2013.

2.2 Model

Panel regression signifies a combination of cross-sectional data series and time series, allowing the simultaneous use of a set of independent indicators, in our case (Size Bank, Overhead_Cost, Inflation, GDP, NIM, and NII), to make the most accurate predictions on the dependent indicators (ROA and ROE). By employing panel regression, we can present a broader and more complex resolution of the relationship between variables. The most complex method of regression estimation is the use of a common regression, which involves forming a single equation for all the data collectively, individually reflecting the dependents ROA and ROE.

The general equation for panel data regression is:

$$Yit = \beta0 + \beta1X1it + \beta2X2it + \beta3X3it + \beta4X4it + \beta5X5it + \beta5X6it + \varepsilon it \quad (1)$$

Where:

Yit – represents economic profitability (ROA) and financial profitability (ROE) for the banking system i in period t;
εit – represents the error term;
β0 – is the constant term;
β1, ..., β6 – are the slope parameters;
X1it – represents total assets (Size Bank) of the banking system i in period t;
X2it – represents non-interest income (NII) of the banking system i in period t;
X3it – represents management cost (Overhead_Cost) of the banking system i in period t;
X4it – represents inflation (Inflation) in country i in period t;
X5it – represents annual GDP growth (GDP) in country i in period t;
X6it – represents net interest margin (NIM) of the banking system i in period t;
i – represents the analyzed countries (Bulgaria, Czech Republic, Croatia, Romania, Estonia, Lithuania, Latvia, Hungary, Slovakia, Poland, and Slovenia);
t – represents the analyzed period (2000 – 2020).

The empirical model realized (to verify the impact of influence indicators on the profitability of the banking system of post-communist EU

states) considers both time series elements, using the "t" index, and cross-sectional elements, captured using the "i" index.
The tested model is as follows:

$$ROA_{it} = \beta_0 + \beta_1 Size_{it} + \beta_2 NII_{it} + \beta_3 Overhead\_Cost_{it} + \beta_4 INF_{it} + \beta_5 GDP_{it} + \beta_6 NIM_{it} + \varepsilon_{it}; \quad (2)$$

$$ROE_{it} = \beta_0 + \beta_1 Size_{it} + \beta_2 NII_{it} + \beta_3 Overhead\_Cost_{it} + \beta_4 INF_{it} + \beta_5 GDP_{it} + \beta_6 NIM_{it} + \varepsilon_{it}; \quad (3)$$

To determine the econometric model that describes the relationship between the dependent indicators (ROA and ROE) and the influence indicators (Size Bank, NII, NIM, Overhead_Cost, Inflation, and GDP) and to estimate the parameters of the panel data regression model, we used the least squares method. After obtaining the synthesis presented in the tables below, analyzing the results, and interpreting the resulting parameters, we can formulate conclusions regarding the probability of the model.

Table 3: Results of the panel data regression model, dependent variable ROA

Dependent Variable: ROA Method: Panel Least Squares Sample: 2000 - 2020 Total panel (balanced) observations: 231				
Variable	***Cofficient***	***Std. Error***	***t-Statistic***	***Prob.***
GDP	0.133494	0.22330	5.978181	0.0000
INFLATION	-0.024961	0.021581	1.156616	0.2487
SIZE_BANK	-0.006283	0.005799	-1.083326	0.2798
OVERHEAD_COSTS	-0.173231	0.090932	-1.905054	0.0581
NIM	0.419596	0.109446	3.833824	0.0002
NII	0.012807	0.010638	1.203806	0.2299
C	-0.400440	0.731878	-0.547141	0.5848
R-squared	0.332085	Mean dependent var		1.128745
Adjusted R-squared	0.314194	S.D. dependent var		1.501454
S.E. of regression	1.243405	Akaike info criterion		3.303419
Sum squared resid	346.3165	Schawarz criterion		3.407734
Log likelihood	-374.5448	Hannan-Quinn criter		3.345493
Prob(F-statistic)	0.000000	Durbin-Waston-stat		1.283464

Source: Processed in Eviews

Table 4: Results of the Panel Data Regression Model, Dependent Variable ROE

Dependent Variable: ROE Method: Panel Least Squares Sample: 2000 - 2020 Total panel (balanced) observations: 231				
Variable	***Cofficient***	***Std. Error***	***t-Statistic***	***Prob.***
GDP	10581890	0.222965	7.094808	0.0000
INFLATION	-0.148941	0.0215483	0.691196	0.4902
SIZE_BANK	-0.033849	0.057905	-0.584565	0.5594
OVERHEAD_COSTS	-1.091670	0.907950	-1.202346	0.2305
NIM	2.646501	1.092806	2.421747	0.0162
NII	0.027381	0.106224	0.257763	0.7968
C	0.539057	7.307727	0.073765	0.9413
R-squared	0.298903	Mean dependent var		10.73797
Adjusted R-squared	0.280123	S.D. dependent var		14.63278
S.E. of regression	12.41527	Akaike info criterion		7.905565
Sum squared resid	34527.10	Schawarz criterion		8.009881
Log likelihood	-906.0928	Hannan-Quinn criter		7.947639
Prob(F-statistic)	0.000000	Durbin-Waston-stat		1.192514

Source: Processed in Eviews

The estimation results from the two tables (Table 3 and Table 4) suggest that the independent variable Size Bank (the size of the banking system) has a negative impact on both the dependent variable ROA and the dependent variable ROE. This negative impact implies that the banking system does not have sufficient capacity to take advantage of a greater diversification of products and loans and to cope with inefficiencies. Larger banks may have a higher concentration of loans and deposits, which can make them more vulnerable to sectoral or regional risks. Alternatively, larger banks may become too rigid and inefficient as their internal processes become more complex and harder to manage. Often, larger banks are considered too big to fail, which can make them overly bold and lead to higher risk-taking.

The variable "management cost" (OVERHEAD_COSTS) refers to the expenses a bank incurs to manage its operations and achieve its business objectives. These expenses include employee salaries, marketing costs, development costs for IT systems, audit costs, and other administrative expenses. The independent variable Overhead Cost (management cost) also has a significant negative impact on profitability indicators, which means that the banking system is unable to manage costs effectively, leading to decreased profitability. Management cost negatively affects banking performance when these expenses are too high relative to the bank's income. For example, if a bank spends much more on operating expenses than it can afford, this can lead to decreased profits. Furthermore, management cost can negatively impact the

bank's efficiency and flexibility. A bank with high administrative costs may be less able to respond to market changes or adjust strategies quickly according to economic developments.

For the independent variable GDP, we observe a positive impact on profitability indicators ROA and ROE, indicating that economic growth increases the profitability of the banking system in post-communist EU states. Several explanations for this include:

1. Increase in consumption: GDP growth can lead to an increase in incomes and, consequently, an increase in consumption. This can result in higher demand for loans and other banking products, thereby increasing bank revenues.
2. Increase in loan demand: GDP growth can lead to increased consumer and business confidence in the economy. This can drive higher demand for loans, generating additional revenue for banks.
3. Increase in economic activity: GDP growth can indicate an overall increase in economic activity, positively impacting bank revenues. More companies may expand their businesses, start new projects, or make new investments, generating more revenue for banks through loans.
4. Increase in interest rates: In a growing economy, interest rates may rise, which can increase bank revenues from interest and other fees.

The influence indicator Inflation has a negative impact on both the dependent variable ROA and the dependent variable ROE. Inflation refers to the general increase in prices of goods and services in the economy. When inflation is high, the costs of goods and services rise, and the value of money diminishes. This can negatively impact banking profitability for several reasons:

1. Decrease in real interest rate: Inflation can lead to a decrease in the real interest rate, meaning that in a high inflation environment, the interest paid on loans may not cover banking costs or generate sufficient profit.
2. Decrease in loan value: In a high inflation environment, money is less valuable than in a low inflation environment; this can lead to a decrease in the value of loans granted by banks, reducing their revenues and profitability.
3. Increase in operating costs: During inflation, bank operating costs, such as salaries, rents, and utility costs, can rise significantly; these additional costs can affect bank profitability.
4. Decrease in loan demand: In a high inflation environment, consumers may be less willing to take out loans as they would be more costly; this can lead to a decrease in loan demand, affecting bank revenues.

The influence indicator NII (non-interest income) has a positive impact on the dependent indicators ROA and ROE, meaning that if NII has a positive trend on the profitability of the banking system, we can say that the banking system relies equally on non-interest income to maintain profit margins. Non-interest

income can contribute to the diversification of bank revenues. Possible explanations include: a) Non-interest income does not depend on the level of lending and does not involve the credit risk associated with bank loans. This can reduce risk for the bank and contribute to increased profitability. b) Many non-interest banking services are automated, which can reduce costs and increase the bank's operational efficiency.

The final influence indicator NIM (net interest margin) also has a positive impact on the dependent variables, suggesting that a positive net interest margin indicates that the profitability of the analyzed banking system operates profitably. A high net interest margin can lead to additional revenues, increased profitability and stock value, increased customer confidence, and, consequently, an improvement in banking profitability. The net interest margin is the difference between the interest a bank charges on loans and the interest paid on deposits attracted from clients or other banks. This can have a positive impact on banking profitability for several reasons:

1. Increase in stock value: A high net interest margin can indicate that the bank is well-managed and can generate sustainable profits. This can lead to an increase in the bank's stock value, benefiting investors.
2. Additional revenues: A high net interest margin can indicate that the bank can collect a larger amount of money from interest than the interest paid for attracting funds - thus, it can generate additional revenues for the bank, improving its profitability.
3. Increase in customer confidence: A high net interest margin can indicate that the bank offers loans with competitive interest rates and can attract new clients; this can lead to increased customer confidence in the bank and increased volume of deposits and loans, enhancing bank revenues and profitability.
4. Increase in profitability: A high net interest margin can lead to increased profitability, as interest income can cover the bank's operating costs, such as personnel expenses, administrative costs, and technology costs.

To estimate the evolution of the dependent indicator, we use one of the most important parameters that indicate whether the regression model is correct: the R-squared parameter (R^2). R-squared is the magnitude of influence or the ability of predictor variables to simultaneously describe the response variable. If the value is greater than 0.5, then the predictor variable's ability is strong in explaining the response variable. Conversely, if the value is less than 0.5, then the predictor variable's ability is not strong in explaining the response variable.

In our panel data regression model, the R-squared value is 0.332085 for the dependent ROA and 0.298903 for the dependent ROE, indicating that the predictor variables are not strong in explaining the analyzed dependent variables ROA and ROE. The low R^2 values are due to fluctuations in the indicators that differ from state to state; for some states, we obtained an R^2 above 0.5, while

in other states, it was below 0.5, showing that in some states, the predictor variables' ability is strong in explaining the dependent variable, but in others, it shows the opposite, explaining the obtained results in the above tables.

In our analyzed model, in both cases, Adjusted R-squared presents values lower than 0.5, thus confirming the independent variables' inability to explain the dependent variables ROA and ROE. This result is due to the differences in influence belonging to each state.

The nullity of the prob (F-statistic) test or proximity to zero value in the econometric model represents the validity of the estimated model; in our case, the prob (F-statistic) is null, resulting in the model's validity. As for the Durbin-Watson statistic, we can state that the value indicating the model's viability should be below 2. In this situation, the Durbin-Watson statistic values in both cases are below 2.

We will represent the regression models for the profitability indicators ROA and ROE in formula. In both cases, the model's calculation formula will be represented by the influence indicators (Size Bank, Overhead_Cost, GDP, Inflation, NIM, and NII).

The obtained regression models are formulated as follows:

ROA = -0,400440 – 0.006283*Size Bank + 0.419596*NIM – 0.173231*Overhead_Cost + 0.133494*GDP - 0.024961*Inflation + 0.012807*NII + εit;

ROE = 0.539057 – 0.033849*Size Bank + 2.646501*NIM – 1.091670*Overhead_Cost + 1.581890*GDP - 0.148941*Inflation + 0.027381*NII + εit;

Based on the formulated models, we can state that a 1% decrease in the size of the banking system will lead to a 0.6% decrease in return on assets (ROA) and a 3.4% decrease in return on equity (ROE); a 1% increase in the net interest margin (NIM) will result in a 42% increase in ROA and a 265% increase in ROE; a 1% decrease in management costs will lead to a 17% decrease in ROA and a 109% decrease in ROE; a 1% increase in GDP will result in a 13% increase in ROA and a 158% increase in ROE. According to the above formula, a 1% increase in inflation will lead to a 2% decrease in ROA and a 15% decrease in ROE; a 1% increase in non-interest income will result in a 1% increase in ROA and a 2% increase in ROE.

CONCLUSIONS

The case study conducted investigates the impact of independent variables (Size, NIM, NII, Overhead Cost, GDP, and Inflation) on the dependent variables ROA and ROE, which describe the profitability of the banking systems in former communist states of the European Union for the period 2000 – 2020. Independent banking characteristics are considered determinants of banking

profitability. To determine the significant impact, the panel data regression econometric model was used.

The results of the study suggest that specific banking factors (Size Bank and Overhead Cost) have a negative impact on the profitability indicators ROA and ROE, while specific banking factors (NIM and NII) have a positive impact on the dependent variables. There is a positive impact of macroeconomic indicators on the profitability indicators ROA and ROE; only Inflation has a negative impact on both ROA and ROE.

Following the analysis, we can accurately confirm that the indicator with the greatest influence on the profitability indicators ROA and ROE, which measure the performance of the banking systems in post-communist EU states, is the specific banking indicator net interest margin (NIM). The independent variable (NIM), according to the panel data regression model, obtained a value of 0.419596 on the dependent variable ROA and a value of 2.646501 on the dependent variable ROE.

In our opinion, for future research, this study can be extended to cover longer development periods. Balanced panel data can be used to incorporate newly established banks, and other econometric techniques can be applied to verify the relationship between the analyzed indicators. In a broader context, the econometric model can influence the development and expansion decisions of the banking systems in former communist states of the European Union.

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DOI: 10.47743/ejpar.2024-3-5

STABILITY OF THE BANKING SECTOR AND MACROECONOMIC PERFORMANCE IN THE COUNTRIES OF THE EUROPEAN UNION

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Abstract
The paper aims to discuss the current challenges of the banking sector in terms of risks in bank lending and to highlight the importance of effective risk management. The analysis spans a 21-year period (2000-2020) and focuses on three groups of countries, namely all European Union (EU) countries, euro area countries and non-euro area countries. Using a multiple linear regression model and the Generalized Method of Moments (GMM) we empirically investigate the impact of macroeconomic factors on the stability of the banking sector, as measured by the non-performing loan (NPL) ratio. Our contribution consists in empirically analyzing the impact of macroeconomic factors on credit risk as measured by the NPL ratio and identifying its key determinants, while also assessing the stability of the banking sector.
Keywords: *banking sector, non-performing loans, macroeconomic factors, EU countries.*
JEL Classification: G21, C33, O52.

1. INTRODUCTION

The banking sector is a significant component of the financial system and plays a fundamental role in the evolution and development of an economy, being a basic pillar in its financial intermediation and financing activity. Any operation carried out in this sector also involves risk, which may be greater or lesser, depending on the scale and scope of the activity. The concept of risk has become an increasingly common and ubiquitous phenomenon in the work of any entity as digitalization and innovation processes have intensified. Years ago, some risks that are of particular importance today were not discussed and included in

banks' reports, such as climate risks or cyber risks, but were mainly focused on credit risk, interest rate risk, liquidity risk, and traditional risks.

The research topic of our paper is important because the possibility of the manifestation of risks has gradually become a threat to banks, on the one hand, but also to borrowers. At the same time, the knowledge of the effects that may occur because of bank mismanagement, as well as the measures to be adopted in order to prevent or recover from such events, is also a topic of interest. In this way, it is essential that the risks involved in the activities carried out by banks are discovered and that there is involvement in the process of managing them, tailored to their specific features. There is a diversity of risk quantification methods, and they are not universal in nature, which requires extra care in finding the right one.

The main objective of our study is to empirically investigate the impact of macroeconomic factors on the stability of the banking sector, as measured by the non-performing loan ratio. In addition, we aim to identify which of the analyzed macroeconomic variables would have a significant impact on banking stability. The analysis covers the period 2000-2020 and focuses on three groups of countries, i.e. all European Union (EU) countries, euro area countries and non-euro area countries.

Our research is structured as follows: section 2 reviews the literature, focusing on the determinants of non-performing loans; section 3 presents the data, describes the variables and the research methodology; section 4 presents and discusses the results of the empirical estimations and section 5 contains some concluding remarks.

2. LITERATURE REVIEW

In the literature, the determinants of credit risk are grouped into two categories, namely: macroeconomic factors (Manz, 2019; Umar and Sun, 2018; Fakhrunnas *et al*., 2022; Lemma-Lalisho, 2022) and bank-specific factors (Khan, Siddique and Sarwar, 2020; Manz, 2019; Umar and Sun, 2018; Lemma-Lalisho, 2022).

Analyzing risks in bank lending is a subject of great interest, and there are countless studies conducted by various renowned authors to identify the problems underlying the increase in credit risk, influencing the bank's functioning, profitability, and the increase in the number of non-performing loans. Through the studies, the authors develop models that can be applied to make this phenomenon as insignificant as possible. In the context of the recent international financial crisis, the pandemic crisis of 2020-2022 and other borderline situations, it has been shown how important it is to have effective bank management in a banking system, whether in a developed or developing country.

Thus, over time, studies have mainly focused on analyzing the relationship between the non-performing loan rate, on the one hand, and the action of bank-specific and/or economic factors, on the other. Moreover, it is worth noting that some studies on bank credit risk have focused on a single country or only those in developed economies, which does not reflect the same representativeness as when analyzing a considerable number of countries or countries that fall between two extreme categories. For example, in their paper Ahmad and Ariff (2008) chose to study the link between non-performing loans and bank-specific factors, i.e. management efficiency, loan loss provisions, loan-to-deposit ratio, funding costs, liquidity, regulatory capital. The authors drew a parallel between banking systems in developing and developed economies. The authors emphasized that credit risk is a greater threat in developing economies than in developed economies and that the number of factors influencing the occurrence of credit risk is more prominent compared to banking systems in developed countries. If we have previously presented the link between non-performing loans and bank-specific factors, Roman and Bilan (2015) analyze the effects of macroeconomic factors on the rate of non-performing loans, with the selection of European Union countries in the period 2000-2013. It is highlighted that the growth of GDP, unemployment rate and domestic credit are factors that have a large influence on the evolution of non-performing loans.

Another study (Kjosevski and Petkovski, 2017) focuses on the relationships between macroeconomic and bank-specific determinants of non-performing loans and their influence on macroeconomic performance in the Baltic States for a group of 27 banks over the period 2005-2014. The two authors examined the feedback between the rate of non-performing loans and their macroeconomic determinants. The results suggested that the real economy reacted to doubtful loans and that there are strong feedback effects between macroeconomic conditions such as domestic credit to the private sector, GDP growth, unemployment rate, inflation and non-performing loans.

Alihodžić and Ekşşï (2018) conducted an analysis at the level of Western Balkan countries and credit policy in Turkey to identify the factors influencing the credit growth rate. While in previous works the dependent variable is the non-performing loan growth rate, in this paper it is the credit growth rate, and return on equity, deposit growth rate, real GDP growth rate and non-performing loan rate were considered as independent variables. It was found that there is an inverse relationship between the credit growth rate and the non-performing loan rate for the countries considered. At the same time, there is a positive relationship between the growth rate of loans and the growth rate of deposits because lending is based on deposits attracted.

Golitsis, Fassas and Lyutakova (2019) were concerned with the Bulgarian banking system from 2001-2015 and analyzed a set of determinants of credit risk. Of the 91 determinants tested, credit risk is influenced by macroeconomic

factors such as interest rates, unemployment, construction index, wages. At the same time, leverage, foreign currency borrowing, credit growth, banks' return on assets, capital adequacy and profitability also have a significant impact on credit risk indicators. The final findings show that both bank-specific and institutional factors have a remarkable influence on credit risk in the Bulgarian banking system.

Kukk and Levenko (2019) add a novel element and analyze the relationship between credit quality and indicators of macroeconomic imbalance. They sample three groups of countries, namely Western European countries, Central and Eastern European countries and Southern European countries. Macroeconomic risks can be assessed using macroeconomic imbalance indicators, which are defined as "deviations of an indicator from its long-term trend or cyclical components". The results of the study show that an increase in the deviation of GDP is accompanied by an increase in non-performing loans in all three groups of countries, while the volume of non-performing loans responds to the unemployment rate in the countries of Central and Eastern Europe and Southern Europe.

In a more recent study, Staehr and Uusküla (2020) conduct research to see to what extent different macroeconomic and macro-financial factors have an influence on the share of non-performing loans in total loans and one contribution would be that they evaluate different models to be able to forecast problem loans even a few years in advance. The analysis was carried out for all EU countries, divided into two groups, Western Europe and Central and Eastern Europe, over a 20-year period, and showed that many of these factors are indeed key indicators for the countries analyzed. Thus, GDP growth, low inflation and lower public debt are prerequisites for a non-problematic rate of non-performing loans. Another shortcoming of the study is that the estimates were made at the level of groups of countries in the European Union and thus the results can be considered as averages for the countries concerned and there is a risk that they do not apply to each country individually.

In a study of 40 banks in Indonesia, authors Havidz and Obeng-Amponsah (2020) use three different approaches to investigate the determinants of credit risk. The results showed that bank-specific factors influence credit risk more than macroeconomic variables, which would imply that banks are more resilient to macroeconomic changes than bank-specific factors, but even in these situations, rigorous management is still maintained in controlling credit risk.

The paper by Khairi, Bahri and Artha (2021) proposes to analyze the effects of macroeconomic shocks on the default rates of three types of bank loans on the case of the United States. Most of the studies find a relationship between macroeconomic conditions and credit vulnerability, thus the importance of high volume of non-performing loans on economic stagnation and financial fragility is observed.

Gjini (2018) analyzes the financial system in Albania, where a key component is the banking system, having a particular importance on the country's financial and economic equilibrium. At the end of 2016, banking sector assets amounted to 95.8% of GDP, demonstrating that the banking system is closely correlated with the state's business cycle and sensitive to economic changes. From his perspective, the factors that determine credit risk are grouped into four categories: macroeconomic factors, creditor-related factors, solvency-related factors, and factors related to the structure of assets and liabilities of the banking system. From the analysis it is concluded that there are close relationships between the economic indicators and the NPL ratio in Albania. Thus, there is an inverse relationship between GDP and the level of non-performing loans, so that an increase in GDP leads to a considerable decrease in doubtful loans. In relation to the other variables, non-performing loans are negatively related to interest rate and inflation rate and positively related to unemployment rate.

The issue of credit risk, materialized by the rate of non-performing loans, is widely studied by numerous authors, who try to illustrate as truthfully as possible the effects, relationships, impact of macroeconomic determinants and/or bank-specific factors. Each individual author brings an element of novelty, either in terms of the variables used, the sample used, or the methods used to test hypotheses. Research is carried out to find out what is at the root of the materialization of certain phenomena and to learn how to avoid or at least minimize the effects as far as possible. At the same time, they also have several shortcomings and need to be supplemented, because a study cannot cover absolutely all the defining elements, developments, effects and implications. It is important for the banks to be aware of the risks, the determining factors and to adopt the most effective measures for economic and financial harmonization.

3. DATA, VARIABLES AND RESEARCH METHODOLOGY

The main objective of our study is to empirically investigate the impact of macroeconomic factors on the stability of the banking sector, as measured by the non-performing loan ratio. The analysis focuses on three groups of countries, i.e. all European Union (EU) countries, euro area countries and non-euro area countries. At the same time, we seek to identify the extent to which these determinants influence the dependent variable (the NPL ratio) and the underlying causes of their onset. In carrying out this study on the identification of the factors influencing the materialization of credit risk, we make use of a balanced panel of the 27 countries of the European Union. The advantages of using panel data are that it provides a more consistent volume of information, a high degree of efficiency and can reveal effects that cannot be detected by other analyses. As regards data collection, data were selected according to macroeconomic variables with a potential impact on the evolution of the share of

non-performing loans, while also materializing credit risk, considering data availability. The period has been set taking data availability into account, so that for each of the variables data are available for the same time interval, and the analysis is carried out at an annual frequency over the period 2000-2020, totaling 21 years. It should be noted that this period also includes two crises (the financial crisis and the Covid-19 pandemic crisis) that have marked the economic evolution of each country, which is why we expect this impact to be visible in the econometric analysis. The research has been carried out using data that come from the sets of international financial institutions such as the World Bank (World Development Indicators) and the European Commission (Eurostat Database). In conducting the research, we use independent variables such as economic growth measured by GDP per capita growth (GDP per capita growth), inflation rate (infl), unemployment rate (unemp), domestic credit granted by banks to the private sector (DCPSB), budget deficit (gds), public debt (debt), exchange rate (exch) and a dependent variable being credit risk measured by the non-performing loans (NPL) rate. The model used in the analysis consists of a multiple linear regression model and its general equation is represented below:

$$NPLi, t = \beta0+\beta1(GDPgrowth)i, t+\beta2(INFL)i, t+\beta3(UNEMP)i, t+\beta4(DEBT)i, t+ \beta5(GDS)i, t+ \beta6(EXCH)i, t+ \beta7(DCPSB)i, t+ \varepsilon i, t$$

Where, i = country, i = 1,2,.....,27; t = year, t = 2000,2001,.....,2020; β0 = constant (the free term of the equation); NPL = is the dependent variable; β1,..... βk - coefficients of the independent variables; (GDPgrowth), (INFL), (UNEMP), (DEBT), (EXCH), (DCPSB) = are the independent variables included in the econometric analysis; ε = the error term of the equation.

A main objective of the empirical analysis is to highlight the influences that different macroeconomic factors have on credit risk and in what direction they affect. The variables that will help us during this paper belong to several conceptual areas, thus we have determinants from the banking sector (domestic credit granted to the private sector by banks, non-performing loans rate), from the macroeconomic level (inflation rate, unemployment rate, exchange rate, GDP per capita growth rate) and from the public finance (public debt, budget deficit). A brief description of the variables included in the study is presented in Table 1.

The *rate of non-performing loans* (npl) is a key indicator of the credit risk propagating on loans granted by banks to individuals and legal entities. Doubtful loans occur because of the manifestation of some factors on the borrowers and thus their financial capacity diminishes, and they remain in arrears, in this situation they either inform the bank about the difficulties and thus ways are found to resolve them, or they choose not to communicate, and legal procedures are applied, finally the loan becomes problematic. In line with other studies

dealing with the link between the non-performing loan rate and macroeconomic determinants, we observe that the latter influence the evolution of our dependent variable, highlighting that credit risk is an increasingly present one (Klein, 2013; Castro, 2013; Staehr and Uusküla, 2020; Foglia, 2022).

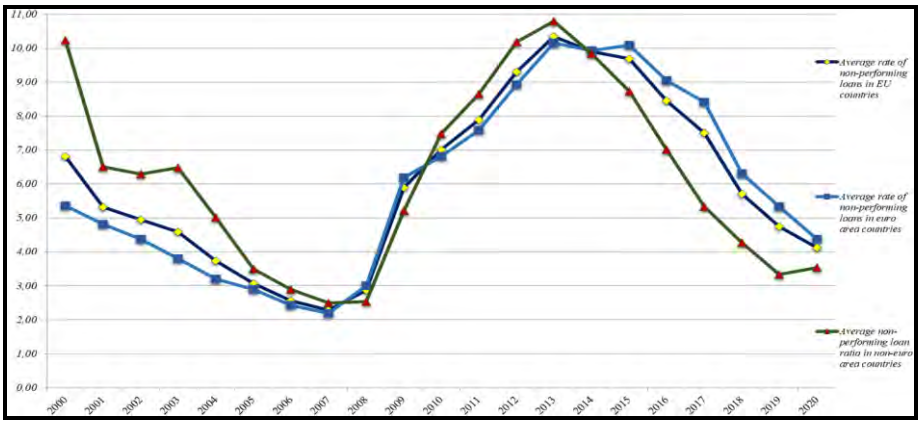
Table 1. Description of selected variables and expected impact

Variable	Symbol	Unit of measurement	Description of variables	Expected effect	Data source
Dependent variable					
Non-performing loans rate	npl	%	The ratio of non-performing loans to total bank loans		World Bank Data (World Bank Indicators)
Independent variables					
Economic growth	gdp growth	%	GDP per capita growth	-	World Bank Data (World Bank Indicators)
Inflation	infl	%	Inflation, GDP deflator	+/-	World Bank Data (World Bank Indicators)
Unemployment	unemp	%	Unemployment rate as percentage of total workforce	+	World Bank Data (World Bank Indicators)
Domestic credit	dcpsb	%GDP	Domestic credit to the private sector	+/-	World Bank Data (World Bank Indicators)
Budget deficit	gds	%GDP	Government deficit/surplus, debt and related data	-	European Commission (Eurostat)
Public debt	debt	%GDP	General government gross debt	+	European Commission (Eurostat)
Exchange rates	exch	Index, 2010=100	Real exchange rate (consumer price index - 27 trading partners)	+/-	European Commission (Eurostat)

Source: processed by the authors

If we analyze the dynamics of the non-performing loans rate at the European Union, euro area and non-euro area level over the years 2000-2020 (Figure 1), we observe that the evolutions follow approximately the same trend and there are small fluctuations that differentiate them. So, there are clear minima and maxima. There was a decline in the volume of lending from 2008 onwards, caused by the global financial and economic crisis, also known as the Great Recession. Since 2008 these effects have been noticeable and peaked in 2013, followed by declines which may be due to the effectiveness of the recovery measures adopted. The effects of the crisis are diverse and have had a significant impact, for example the unemployment rate has risen due to the bankruptcy of many businesses and thus incomes have fallen, reducing the ability of debtors to pay. In 2013, it was 10.34% in the European Union, 10.16% in the euro area and 10.79% in the non-euro area, while in 2008 it started from 2.87%, 3.00% and 2.54%. At the same time, the average for the countries that have not adopted the euro started from the lowest value of the three in 2008 but became the highest compared to the other two values in 2013, which shows a higher impact in this category, demonstrating a weaker management of this global event.

From the perspective of Foglia (2022), the relationship between *economic growth* (gdp growth) and the rate of non-performing loans is expected to be negative because under conditions of increasing GDP there is also an increase in the income of firms and the population, which would lead to honoring payment obligations, thus a decrease in doubtful loans. A negative relationship is also expected in other studies, such as Roman and Bilan (2015) where a decrease in the value of GDP is marked by an amplification of problem loans. In line with the expected results are also the studies by authors (Nkusu, 2011; Havidz and Obeng-Amponsah, 2020; Jabbouri and Naili, 2019).



Source: own calculations and processing based on World Bank Database (2022)

Figure 1. The dynamics of the non-performing loan ratio in the EU, euro area and non-euro area, 2000-2020

In many analyses, the impact of the *inflation rate* (infl) is viewed in two ways: negative and positive. From the perspective of Havidz *et al*. (2020) the positive link is observed when a high value of it materializes in a decrease in the real value of borrowers' income and thus repayment deficiencies occur and non-performing loans increase. On the other hand, the negative relationship arises when inflation would reduce the real value of the credit contracted and in this way its repayment becomes easier and thus a decrease in the rate and implicitly an improvement in the loan portfolio. In line with this view is the study by Nkusu (2011) who in addition to what is already mentioned, he states that inflation can also affect a borrower's debt service when interest rates on loans are variable and thus there is the possibility of a change in the borrower's debt burden, because of the fact that, lenders fold rates in such a way that they preserve their real yields or to transfer the effects of decisions taken to combat inflation. Along the same lines are the studies belonging to the authors (Roman and Bilan, 2015; Kjosevski and Petkovski, 2017; Bayar, 2019).

If we relate to the *unemployment rate* (unemp), we expect the relationship to be positive as borrowers are left without sources of income and thus will default, so this will increase the rate of non-performing loans, which is also emphasized by Bayar (2019). Nkusu (2011) in his study mentions that unemployment is positively correlated with the volume of bad loans, similarly (Ghosh, 2015; Golitsis, Fassas and Lyutakova, 2019; Kjosevski and Petkovski, 2017). According to Foglia's (2022) hypothesis, unemployment also has a positive relationship with our dependent variable, as an increase in the unemployment rate leads to a decrease in household purchasing power and hence to defaulting on payments to the bank.

Regarding the *domestic credit* (dcpsb), it expresses the degree of financial intermediation and if the value of this determinant is high then the probability of the volume of non-performing loans is also higher, hence we have a positive relationship between these two variables Roman and Bilan (2015). On the other hand, in Kuzucu and Kuzucu (2019) authors' paper they mention that this relationship in relation to the ratio of non-performing loans can be both positive and negative depending on the context. Thus, among customers, if the size of credit within a country were to increase then the leverage ratio would also be higher at the household level. This deteriorates debt servicing, because if a household takes out more than one loan, conditions permitting, in unforeseen circumstances at least one of the loans would be problematic and lead to an increase in the latter. But a negative link, from the banks' perspective, would be if they lower their lending standards, leading to an increase in non-performing loans.

In the literature, *exchange rate* (exch) relationships are ambiguous. Thus, there can be positive or negative effects depending on the context. In this way, an appreciation of the exchange rate disadvantages export-oriented firms as higher costs arise and the ability to repay debts decreases, while a negative relationship arises when, in the context of a foreign currency loan and an appreciation of the currency, the borrower's financial situation improves. In another idea, this variable has a negative relationship with, the exchange rate, thus a decrease in the exchange rate will lead to an increase in the bank's credit risk (Havidz and Obeng-Amponsah, 2020).

At the *public finance* area level, we used public debt (debt) and budget deficit (gds) as independent variables. Regarding *public debt*, in the study by Fallanca, Forgione and Otranto (2020) states that the return of public debt to a lower level than before would put pressure on the bank to finance in international markets and at the same time credit institutions are forced to reduce lending. From Foglia's (2022) perspective, public debt would have a positive impact on the non-performing loan ratio, arguing that an important role is played by crises, because at such times liquidity is low and banks are forced to restrict lending and refinance loans. So, if public debt were to increase, this would be

reflected in the quality of the assets that banks hold. If there is a positive relationship between government debt and the non-performing loan ratio, we find in the literature that there is a negative relationship between the *budget deficit* and the non-performing loan ratio.

The budget deficit (gds) is included for analysis in the study by Kukk and Levenko (2019), they expect a negative relationship between the non-performing loan (NPL) ratio and the budget deficit, as they argue that to cover this deficit the government borrows from financial markets and thus the private sector benefits from unfavorable lending conditions. As a result, the budget deficit falls but the non-performing loan ratio rises.

4. EMPIRICAL RESULTS AND DISCUSSION

Concerning the computational method, by analyzing the literature related to the topic of analysis, we noticed that authors often use the least squares method (LS) and the generalized method of moments (GMM) with fixed effects. In carrying out the empirical study I applied both methods and the results are similar, therefore and due to their high utilization, I chose to use the latter. In the analysis we decided to divide the 27 countries of the European Union according to the euro adoption criterion, thus we have euro area countries and non-euro area countries. We have chosen this criterion because credit risk can have distinct influences on the two categories and the non-performing loan ratio can differ. The euro area countries, being more homogeneous in some respects, such as national currency, degree of development of the country and monetary policy applied, may be statistically significantly affected by only some of the variables used, while in non-euro area countries the determinants that have a key impact may be more important. Explicitly these developments will be presented and described during the descriptive statistics representation and the estimation of equations at the EU, euro area and non-euro area levels.

The descriptive statistics of the variables used in the empirical analysis of the EU, euro area and non-euro area countries are highlighted in Table 2.

Based on the data, it can be observed that euro area countries have a lower non-performing loan ratio than non-euro area countries. We also observe that the public debt in the euro area is higher than outside the euro area, which can be justified by the extremely high debts of some countries, which in these circumstances do not significantly affect their continuity, while in non-euro area countries public debt is low. About public finance variables, the average government budget balance over 21 years for euro area countries is -2.64%, while for non-euro area countries it is -2.20%, which is relatively close. The degree of financial intermediation, illustrated by domestic bank loans to the private sector, reached an average of 101.98% of GDP at the euro area level.

Going further, we observe that the EU countries deviate from the average NPL ratio by 6.96%, while the non-euro area countries deviate by 5.58% and the

euro area countries by only 7.48%. Table 2 also reflects information regarding the skewness and skewness indicators, thus in the case of the dependent variable, Skewness presents positive values, at the level of the three groups of countries, which indicates a right skewness, while in the case of the other variables we also find negative values, but the majority are positive, indicating that the model has a right skewness distribution. The positive values of the Kurtosis indicator for all variables and in all country, groups suggest a leptokurtic distribution, the values of the 8 variables are close to their means, thus they are individually homogeneous.

Table 2. Descriptive statistics of the variables

	NPL	GDP growth	Unemp	Infl	Debt	Gds	Depsb	Exch
Total EU countries								
Mean	6,0365	1,9976	8,6473	2,6827	58,4764	-2,5139	92,8312	97,9762
Median	3,6864	2,0035	7,5400	2,0095	52,4000	-2,3000	85,3563	99,7574
Max.	47,478	23,9990	27,4700	43,1807	206,3000	6,9000	304,9514	115,2981
Min.	0,0820	-14,4643	1,8100	-9,6661	3,7000	-32,1000	7,1154	60,1648
Std. Dev.	6,9697	3,9633	4,3718	3,6602	34,8289	3,5978	52,4492	6,6965
Skewness	2,7053	-0,1995	1,4452	5,1055	1,0444	-1,4055	1,0743	-2,1289
Kurtosis	12,4536	6,5311	5,3518	48,1386	4,4873	11,0688	4,2661	9,8407
Jarque-Berra	2803,049	298,3487	328,0499	50599,14	155,3457	1724,834	146,9411	1533,869
Obs.	567	567	567	567	567	567	567	567
Euro area countries								
Mean	5,9653	1,7236	8,8393	2,1678	64,7651	-2,6423	101,9812	99,0702
Median	3,3638	1,7375	7,7600	1,8779	61,2000	-2,4000	95,0085	100,1464
Max.	47,7478	23,9990	27,4700	20,0614	206,3000	6,9000	304,9514	112,9346
Min.	0,1000	-14,4643	1,8100	-9,6661	3,7000	-32,1000	13,1648	60,1648
Std. Dev.	7,4831	4,1688	4,5477	2,4569	38,2506	3,8100	50,5369	5,9394
Skewness	2,8969	-0,0321	1,4668	1,4017	0,7302	-1,6340	1,1793	-2,9750
Kurtosis	12,8701	6,9260	5,5512	14,0625	3,6375	11,8432	4,8663	16,9631
Jarque-Berra	2177,180	256,3221	242,1635	2165,229	42,2157	1477,708	150,4064	3829,973
Obs.	399	399	399	399	399	399	399	399
Countries outside the euro area								
Mean	6,2056	2,6484	8,1911	3,9054	43,5407	-2,2089	71,1000	95,3779
Median	4,3146	3,1340	7,1350	2,6211	40,3500	-2,1500	52,5453	97,3154
Max.	29,3000	11,1442	19,9200	43,1807	87,3000	5,0000	223,8336	115,2981
Min.	0,0820	-7,7007	2,0100	-1,4253	12,3000	-9,3000	7,1154	70,1279
Std. Dev.	5,5804	3,3484	3,8974	5,3742	17,4781	3,0236	50,6125	7,6329
Skewness	1,2973	-0,6570	1,2366	4,6074	0,5280	-0,0578	1,3226	-1,1016
Kurtosis	4,2995	3,9160	4,0646	29,3565	2,8004	2,7047	3,8033	4,4963
Jarque-Berra	58,9451	17,9619	50,7560	5457,058	8,0870	0,7039	53,5020	49,6575
Obs.	168	168	168	168	168	168	168	168

Source: own calculations in Eviews 12 based on World Bank Database and Eurostat (2022)

The empirical results can be followed in Table 3.

The application of the GMM model helps us to observe the implications that the independent variables have on the dependent one and the degree of representativeness. Thus, in the case of the inflation rate, we find that at the level of non-euro area and EU countries the links are negative and representative with

a probability of 99% for non-euro countries and 95% for EU countries for the variable non-performing loan rate. For euro area countries there is a positive but unrepresentative relationship. The effects of inflation are therefore both positive and negative, results which are in line with several studies by authors who have analyzed macroeconomic determinants.

Table 3. Empirical results

	NPL	GDP growth	Unemp	Infl	Debt	Gds	Dcpsb	Exch
Total EU countries								
Mean	6,0365	1,9976	8,6473	2,6827	58,4764	-2,5139	92,8312	97,9762
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Max.	47,7478	23,9990	27,4700	20,0614	206,3000	6,9000	304,9514	112,9346
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Std. Dev.	7,4831	4,1688	4,5477	2,4569	38,2506	3,8100	50,5369	5,9394
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Kurtosis	4,2995	3,9160	4,0646	29,3565	2,8004	2,7047	3,8033	4,4963
Jarque-Berra	58,9451	17,9619	50,7560	5457,058	8,0870	0,7039	53,5020	49,6575
Obs.	168	168	168	168	168	168	168	168

Note: * $p < 0.01$, ** $p < 0.05$, *** $p < 0.10$.

Source: own calculations in Eviews 12 based on World Bank Database and Eurostat (2022)

A negative relationship between inflation and the rate of non-performing loans could be explained by the fact that, the increase in this independent variable leads to a decrease in the real value of the loan taken out and thus benefits borrowers because they can easily repay the loan (Roman and Bilan, 2015; Gjini and Koprencka, 2018; Bayar, 2019). On the other hand, a positive relationship is observed when an increase in the inflation rate spills over to the fall in real income (if not indexed to the inflation rate) and thus the ability of borrowers to service their debt worsens, leading to an increase in non-performing loans. In the literature, the positive relationship of inflation with the volume of problem loans is also analyzed in terms of interest rates. Thus, an important aspect is the type of interest rate practiced by banks when granting

loans (fixed or variable interest rate), because under conditions of rising inflation rate, amid monetary policy to combat it, banks will set higher interest rates and the rate of non-performing loans is higher for variable interest rates than for fixed ones (Jabbouri and Naili, 2019). In this way, an increase in the interest rate, spurred by an increase in inflation, affects the ability of borrowers to meet their payment obligations and this will be observed in a higher volume of non-performing loans. Along the same line, of the positive relationship between these two variables, are the opinions of authors (Kjosevski and Petkovski, 2017; Staehr and Uusküla, 2018; Kukk and Levenko, 2019). In some studies, inflation is a macroeconomic determinant that does not significantly influence the evolution of the bank's credit risk, because its effects affect the real value of the loan, but at the same time also the real income of borrowers, so it would not be a benefit, but the result would be insignificant (Havidz and Obeng-Amponsah, 2020). In our study, we find a positive and insignificant relationship at the level of euro area countries, which shows that inflation is not necessarily a threat, because they in terms of currency, monetary regulations, price stability are more homogeneous than non-euro countries, where every change in the economy generates effects. Although there are more countries in the euro area than in the non-euro area, we note that the result for the EU is negative and representative (with 95% probability), which means that the inflation rate in the 8 countries that have not abandoned the national currency is quite strongly influenced. In line with these results, we can also add that inflation in the euro area has fluctuated within the targets set by the European Central Bank, while in the non-euro area countries inflation has not respected the ranges of the countries' National Banks, with the effects being felt on credit and affecting representativeness at EU level.

In terms of economic growth, the results are heterogeneous, with a negative correlation for non-euro countries and all EU countries and a positive correlation for euro area countries. A change in GDP leads to changes in the NPL ratio for non-euro countries (99% probability) and does not lead to changes for euro countries and the EU (this variable is unrepresentative for these two categories). The negative links between this independent and dependent variable are consistent with numerous empirical studies (Roman and Bilan, 2015; Kjosevski and Petkovski, 2017; Gjini and Koprencka, 2018; Staehr and Uusküla, 2018; Kukk and Levenko, 2019). A negative relationship between GDP and NPL ratio is normal because an increase in GDP means better macroeconomic development, accompanied by a high financial capacity of borrowers and thus borrowers will service their debt, leading to a decrease in NPLs, as banks are no longer exposed to credit risk to a significant extent. For the other two categories, the euro area countries and the EU, these links are not statistically representative, meaning that a change in GDP does not lead to a change in the NPL ratio. These effects are likely to occur if there are drastic negative changes

in GDP, which is unlikely because there are highly developed countries in the euro area with good financial capacity.

The unemployment rate also has a key influence on the evolution of non-performing loans. The empirical results are as expected, thus there are positive and statistically significant relationships with the NPL ratio across the three country groups. An increase in the unemployment rate implies an increase in problem loans, because borrowers, due to unforeseen events that occur in an economy, lose their jobs and hence the income on which they depend so heavily to live, pay their debts and, if they remain, to invest. In line with these results are also the analyses by other authors (Roman and Bilan, 2015; Kjosevski and Petkovski, 2017; Staehr and Uusküla, 2018; Bayar, 2019; Jabbouri and Naili, 2019). In firms, an increase in the unemployment rate manifests itself in a decrease in output due to a decreased demand for goods because of a lack of income of the population. In this case, the profit of the firm decreases significantly and in turn it will have problems in meeting its payment obligation (Kjosevski and Petkovski, 2017).

From the empirical analysis, domestic credit is positively related to the dependent variable, while for non-euro countries the relationship is positive but insignificant. The positive relationships may point to a tendency of excessive lending practiced by banks, which often represents easier access to loans for most individuals, manifested in lower lending standards and lower collateral requirements. At the same time, these lending booms may set the stage for future crises (Foglia, 2022). Banks' openness to lending also implies that they assume the risks involved in these activities. The positive relationship and the statistically unrepresentative nature of this variable for non-euro countries can be explained by the unstable economic environment, where economic shocks can have much more severe effects, as individuals may take out loans, the number of which is increasing, but in the case of unexpected conditions, they may become non-performing. The empirical results are consistent with those of some studies (Roman and Bilan, 2015; Kjosevski and Petkovski, 2017). Therefore, as the volume of domestic loans increases, the risk that some of them will become non-performing also increases, as many of them may be committed to unsuccessful investments or taken out by individuals whose income has declined so that they are unable to meet repayment conditions due to unexpectedly manifested phenomena.

According to the results, government debt is statistically significant in all three groups of countries, but it is positively related only for euro area countries and the EU, while for non-euro area countries the relationship is negative. Public debt is the money owed by the government to other countries, other creditors, businesses or individuals. Positive relationships are to be expected because when a country has high public debt this is observed in the income of the population, mainly on wages as a component of public spending, in this way debtors will

find it more difficult to repay the loans taken out because they have lower incomes, leading to a higher volume of doubtful ones. Public debt increases greatly in times of crisis to recover the economy through various reforms and to support the population by providing subsidies and salaries necessary for subsistence, while at the same time economic activity stagnates as a result of instability. So, to repay public debt, governments will increase their own revenues by raising taxes and cut spending by eliminating subsidies. These measures will have a negative impact on wages which will reduce the repayment capacity of borrowers, leading to an increase in non-performing loans (Jabbouri and Naili, 2019). The negative relationship between these two variables can be reflected when a reduction in public debt would encourage consumption reflected by borrowing and thus increasing the demand for borrowing, the credit risk that these operations are accompanied by is multiplied, leading to a higher probability that some of those loans taken out will become non-performing in the event of an increase in public debt or unexpected crises (Foglia, 2022).

The budget deficit, in our case, is positively related to the non-performing loan (NPL) ratio in the EU, euro area and non-euro area countries. These relationships can be explained through fiscal consolidation measures, initiated with the aim of lower budget deficits or higher budget surpluses, which lead to a deterioration in the quality of the bank loan portfolio. Like what we mentioned above on public debt, the government, to reduce these imbalances, resorts to either decreasing public spending (such as social spending, civil servants' salaries) or increasing revenues by increasing the amount of already existing taxes or introducing new ones. These measures are expected to affect the ability of borrowers to repay the contracted credit and the related interest, which contributes to the increase in non-performing bank loans (Roman and Bilan, 2015). In the analysis by Beck, Jakubik and Piloiu (2015) at the level of Western European countries, the budget deficit exerts a negative influence, among Central and Eastern European countries, but statistically insignificant. In the case of Southern European countries, the independent variable would have an impact on the non-performing loans rate.

The exchange rate shows positive but unrepresentative relationships across EU, euro area and non-euro area countries. At least for countries that have not adopted the euro, it would have been expected to be influenced by this variable, as banks lend in one economy and in different currencies, which implies the exchange rate. However, these results can be explained by the fact that overall banks grant more loans in national currency and fewer in other currencies. In line with studies by Fallanca, Forgione and Otranto (2020) and Beck, Jakubik and Piloiu (2015), the exchange rate variable was not statistically representative.

Therefore, the overall results of the empirical study demonstrate that the dynamics of the determinants of the macroeconomic environment can influence the evolution of non-performing loans. Thus, an increase in the unemployment

rate, domestic credit, public debt and the budget deficit led to an increase in these problem loans in EU and euro area countries, while a decrease in the inflation rate is reflected in a higher volume of doubtful loans in EU countries, which are also statistically representative variables. At the level of non-euro area countries, there are negative and representative links between the inflation rate, GDP growth and public debt with respect to the dependent variable, while an increase in the unemployment rate will also lead to more bad loans.

5. CONCLUSIONS

The issue of the stability of the banking sector has been increasingly researched and analyzed in recent years, particularly in the context of the recent international financial crisis, the pandemic crisis, but also in the context of the ongoing digitalization process. This phenomenon is of interest both to banking companies, supervisory authorities and, more specifically, to the authors, whose studies include useful findings that can make a significant contribution as a starting point or benchmark for measures to be adopted. At the level of some of the studies, the authors invite us to reflect and urge us to continue the research they have begun, because no analysis can be complete, there is always a "loophole" left, which must be exploited by us, the readers. In the same vein, change has become a feature of this century and from day to day there are elements of novelty, which is why everything is unpredictable, as is the materialization of risks. In view of the economic imbalances they can cause, banking risks are of particular importance, being at the heart of the concerns of banking institutions, but also in the operations they carry out through their main functions, which are to collect resources and make investments.

Our study aimed to empirically examine the impact of macroeconomic factors on the stability of the banking sector, as measured by the non-performing loan ratio. The analysis of the non-performing loan ratio in the EU, euro area and non-euro area countries shows that the variations followed the same trend, with peaks in 2000 and 2013 in non-euro area countries, followed by subsequent decreases, below the average of the other groups of countries, which can be explained by the effectiveness of the measures adopted to reduce these values. In terms of economic growth, for non-euro area countries the relationship is negative and statistically significant, which shows that an increase in GDP will lead to a decrease in the non-performing loans rate, which is natural, as this is reflected in a better financial capacity of borrowers. For the other groups of countries this variable is not significant, which can be explained by the degree of development of the euro area countries. Inflation rates show inverse and significant relationships for countries outside the euro area and the EU, while within the euro area inflation shows a positive and insignificant relationship. As for the exchange rate, it is insignificant in all three groups of countries, but we would have expected it to be statistically significant in non-euro countries, as

without the single currency they would have been more exposed to exchange rate risk, but this can be explained by more lending in domestic than in foreign currency.

The unemployment rate is another important macroeconomic determinant, where representativeness and relationships are unanimous, positive and significant relationships exist across all country categories. They share the same idea that high unemployment influences the development of non-performing loans, manifesting credit risk.

Another key independent variable with a significant impact is domestic credit, which according to the analysis is statistically significant for EU and euro area countries and the positive relationship is present for all countries. The non-performing loan ratio could increase due to credit booms that may be the precursors of future Foglia crises (2022).

Overall, the results of the econometric research are in line with those of other authors studied along the way, thus demonstrating that macroeconomic determinants can influence the evolution of the non-performing loans rate. The importance of this empirical analysis derives from uncovering and gaining insight into the influential factors, as well as revealing the underlying causes behind their manifestation. Structuring the 27 countries of the European Union has helped us to observe the differences between the groups of countries selected in the analysis, so that while in the case of the euro area countries all the relationships are positive in relation to the NPL ratio, there are also inverse relationships in the other two categories.

The limitations of the study would be summarized by the selection of a single variable specific to the banking sector, namely domestic credit, which is not enough, and some information could be distorted, so if there were more determinants related to it, the degree of veracity would be more significant. At the same time, the study could be extended beyond the borders of the European Union for a more in-depth analysis of this everyday phenomenon, encountered in every operation carried out by banking companies. In this way, it would also be possible to observe the impact of the risks associated with bank lending in other macroeconomic environments and the ways of managing them, as well as the degree of efficiency.

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