

ИНСТИТУТ ЗА ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ НА БЪЛГАРСКАТА АКАДЕМИЯ НА НАУКИТЕ  
**ИКОНОМИЧЕСКИ  
ИЗСЛЕДВАНИЯ**  
*ECONOMIC STUDIES*

---

---

Volume 32, Issue 3, 2023

**CONTENTS**

<i>Victor Yotzov</i> – The Euro and Bulgaria – Fears and Hopes	3
<i>Stoyan Tanchev, Naftaly Mose</i> – Fiscal Policy and Economic Growth: Evidence from European Union Countries	19
<i>Ignat Ignatov</i> – Convergence Determinants and Club Formation in the EU over 1999-2021	37
<i>Stefan Petranov, Milena Angelova, Lillyana Georgieva, Radostina Ivcheva, Nino Avreyski</i> – Is Tax Morale Homogeneous in Bulgaria?	64
<i>Vasyl Demianyshyn, Bohdana Shuliuk</i> – Formation and Use of the System of Financial Incentives for the Development of Partnership between the State and Business	88
<i>Petar Peshev</i> – Estimation of the Value, Distribution and Concentration of Wealth in Bulgaria, 1995-2020	104
<i>Maria Blikhar, Valerii Syrovatskyi, Ulyana Bek, Maria Vinichuk, Lesia Kucher, Maryana Kashchuk</i> – Shadow Economy vs Economic Security: Trends, Challenges, Prospects	130
<i>Reni Pantcheva</i> – Circular Use of Materials: Drivers of the Circularity Rate in the European Union	148
<i>Muazza Muazza, Akhmad Habibi, Amirul Mukminin</i> – The Socially Responsible Human Resources Management and Its Impacts on the Organizational Legitimacy: The Case of Indonesian Employees	162
<i>Saransh Royal, Namarta Kaushik, Ramesh Chander, Nirmala Chaudhary</i> – A Nexus between Sustainability, Openness, Development, and Urbanization: Panel Data Evidence from QUAD Nations	178
Summaries	197

*Publication of this issue 3/2023 of Economic Studies journal is supported by the Bulgarian National Science Fund at Ministry of Education and Science.*

ECONOMIC RESEARCH INSTITUTE AT BULGARIAN ACADEMY OF SCIENCES

**ECONOMIC STUDIES**

Volume 32(3), 2023

To be cited as *Economic Studies (Ikonomicheski Izsledvania)*, 32(3), 2023.

**Editorial Board**

Prof. MITKO DIMITROV (Chief Editor)  
Prof. ATANAS DAMIANOV  
Prof. DANIELA BOBEVA  
Prof. GEORGE SHOPOV  
Prof. HRISTINA NIKOLOVA  
Prof. ISKRA BALKANSKA  
Prof. NENO PAVLOV  
Prof. PLAMEN TCHIPEV  
Prof. STOYAN TOTEV  
Prof. TATYANA HOUBENOVA  
Assoc. Prof. DIMITAR ZLATINOV  
Assoc. Prof. VICTOR YOTZOV  
Assoc. Prof. VLADIMIR ZHECHEV

**International Advisory Board**

Prof. ANDRASH INOTAI (Hungary)  
Prof. BRUNO DALLAGO (Italy)  
Prof. DIMITAR DIMITROV  
Prof. EVGENI STANIMIROV  
Prof. GABOR HUNIA (Austria)  
Prof. GEORGE PETRAKOS (Greece)  
Prof. GHEORGHE ZAMAN (Romania)  
Prof. IGOR BRITCHENKO (Ukraine, Poland)  
Prof. IRENA ZAREVA  
Prof. MARIYANA BOZHINOVA  
Prof. RUSLAN GRINBERG (Russia)  
Prof. SAUL ESTRIN (UK)  
Prof. TAKI FITI (Macedonia)

DIANA DIMITROVA – journal secretary

Text editor: Ilko Valkov

---

Address: Economic Research Institute at Bulgarian Academy of Sciences, 3 “Aksakov” str., Sofia 1000, BG  
Chief Editor / Journal Secretary: (+359-2) 8104019, e-mail: econ.studies@iki.bas.bg

---

**ISSN 0205-3292**

© Economic Research Institute at the Bulgarian Academy of Sciences, 2023

## THE EURO AND BULGARIA – FEARS AND HOPES<sup>2</sup>

*The political passions of the last three years have prevented the general public from appreciating the long-awaited event – the accession to ERM II, which is undoubtedly an important achievement and the last step towards full membership of the Eurozone. In a broader sense, the monetary union can be considered as a preparatory stage for the transition of the European Union to the next form – Political Union. In practice, however, this does not happen, and the eurozone expansion process is currently slowing down. The main goal of the proposed article is to dispel some of the fears that have been instilled in recent months, related to the upcoming accession of Bulgaria to the Eurozone. The main theoretical concepts regarding the benefits and disadvantages of joining a monetary union are examined. The initial prerequisites, the structure and functioning of the modern monetary regime, as well as some of the peculiarities in the development of the Bulgarian economy, are analysed.*

*Keywords: Euro; Optimum Currency Areas; Integration*

*JEL: E58; F36*

### 1. Brief Description of Monetary Union

In its essence, the theory of optimum currency areas (OCA) is a set of indicators whose values for a given group of economies influence the assessment of whether the existence of a common currency for these economies is justified. The OCA can also be defined as the optimal geographical area for one currency, or several currencies whose exchange rates are fixed. The currency or currencies within a currency area have the same fluctuation in exchange rates relative to currencies outside the particular area. The borders of the OCA are determined by the sovereign states that have chosen to participate in it.

Traditionally, each country maintains its own national currency. However, according to (Mundell, 1961)<sup>3</sup> this is not the most efficient method for achieving high results. According

---

<sup>1</sup> Victor Yotzov, Prof. (Assoc.) Dr., University of National and World Economy and Economic Research Institute at Bulgarian Academy of Sciences, e-mail: vyotzov@unwe.bg, v.yotzov@iki.bas.bg.

<sup>2</sup> This paper should be cited as: Yotzov, V. (2023). *The Euro and Bulgaria – Fears and Hopes*. – *Economic Studies (Ikonomicheski Izsledvania)*, 32(3), pp. 3-18.

<sup>3</sup> Although it's common to regard Mundell as the father of the OCA, (Friedman, 1953) noted much earlier that "A group of politically independent nations all of which firmly adhered to, say, the gold standard would thereby in effect submit themselves to a central monetary authority, albeit an impersonal one. If, in addition, they firmly adhered to the free movement of goods, people and capital without restrictions, and economic conditions rendered such movement easy, they would, in effect, be an economic unit for which a single currency would be appropriate."

to this theory, countries with strong economic ties have the opportunity to integrate a common currency mechanism. In this way, the possibility of a higher convergence of the capital markets, which significantly facilitates trade, increases. Achieving a common currency for a certain group of countries comes at the cost of losing: income from seigniorage, the possibility of monetary and fiscal policy interventions to stabilise the economy, as well as a certain degree of sovereignty (depending on the cultural heritage and traditions of a certain people). In a nutshell, *an area needs a separate currency if the economic costs of adjustment through changes in wage and price levels, or through factor mobility (labour and capital), would be higher than those of altering the exchange rate.* The case for separate currency areas clearly holds only if the impact of a shock varies between areas: i.e., is asymmetric. If the impact were to be the same on all, the exchange-rate changes needed for adjustment would be the same for all, in which case separate currencies would serve no purpose. The OCA theory indeed implies that any two countries generally experiencing symmetric shocks, and trading significant proportions of their GDP bilaterally, should fix their exchange rates.

Mundell outlines the criteria necessary for a region to meet the requirements for an OCA and subsequently profit from the benefits of a common currency:

- **Mobility of production factors** – OCA should be characterised by high internal and low external mobility of production factors. This largely limits the risks of external shocks entering the economic space;
- **Price and wage flexibility** – if nominal prices and wages in the countries of the area are flexible with each other, interventions in the presence of negative externalities are less likely to be associated with high levels of unemployment and inflation over a long period of time;
- **Mobility of the labour force** within OCA – includes free movement of labour and elimination of cultural restrictions that “stop” this movement – language barriers, differences in the functioning of institutions and others. If there is an asymmetry in the economy and a sharp decrease in employment, in the presence of its own currency, unemployment is corrected by reducing relative wage levels. Labour mobility offers an alternative option where the labour force for vacant jobs is contracted through emigration.

After Mundell, (McKinnon, 1963), (McKinnon, 1969) and (Kenen, 1969) further developed his theory by proposing new criteria for defining an OCA by bringing in some additional factors:

- **Fiscal integration** – according to Kenen, fiscal integration at the regional or local level can help to overcome asymmetric shocks. In practice, the theory looks like this: if there is an asymmetric shock in one country of the OCA, it receives a transfer to compensate for it from the rest of the zone, as payments to the general budget are reduced, which does not affect the funds received under the planned programs;
- **A high degree of openness of the economy** – countries that carry out intensive trade with each other form an OCA. The relative price between domestic and foreign goods should be identical or similar. The more open the economy, the less the importance of the exchange rate for competitiveness;

- *Similarities in inflation rates* – when inflation rates between different countries are similar, this ensures stability. It also reduces the need for nominal adjustments in exchange rates;
- *Integration of financial policies* – countries that demonstrate high degrees of integration in terms of financial trade achieve, in the long run, a wealth effect due to capital flows;
- *Political integration* – the leading criterion in choosing to integrate a single currency. Political integration includes the observance of joint commitments and cooperation on the integration of common economic and financial issues. The criterion of solidarity also derives from political integration. It is based on the belief that if the common monetary policy goes against any of the member countries of the currency area, then the other countries should be willing to “pay this price” in the name of the common interest.

These authors, in practice, identified the characteristics that potential members of the single currency area should (ideally) possess before abandoning nationally tailored monetary policies and exchange rate adjustments and exposing the gains resulting from the use of a single currency among economies. Other authors further developed the theory, and thus the literature was enriched with more features related to the identification of candidates for participation in a single currency area, while at the same time proposing more detailed estimates of the benefits and costs of the common currency. However, it is generally believed that the original three collaborators laid the foundation for substantially all subsequent work in this field.

## **2. Pros and Cons of OCA**

### *2.1. General rules*

The unification of countries under the idea of a common currency area aims to transform external shocks for the group into internal ones, thus reducing their uncertainty and facilitating its management. Other advantages of the area are the reduction of transaction costs, the elimination of currency risk and the increase of competition at more easily comparable prices. A major drawback of the theory of an OCA is the presence of multiple criteria, some of which even report contradictory results. The lack of structured information makes quantitative and qualitative assessment difficult when analysing the degree of integration of a specific country. These undoubtedly are the main pros and cons, but a proper study would require a deeper analysis.

Monetary union theorists have long initiated a debate about the benefits and costs of adopting a single currency. This debate, which continues to this day, has important implications for the motivation to form a single currency area among a group of partner countries. Some of the properties of OCA still need to be better formulated and analysed in more detail, and in general, a unifying framework is lacking. Different boundaries of a currency area can be drawn by invoking different properties – something known in theory as an “indeterminate problem” because the properties of an OCA can point in different directions. For example, a country may be quite open to mutual trade with a group of partner countries, leading to a preference for a fixed exchange rate regime or even monetary integration with major trading

partners. However, this country may exhibit low mobility of factors of production and labour with respect to these trading partners, suggesting that instead a flexible exchange rate may be more desirable to deal with shocks originating from countries outside this country group. The problem can be further complicated in cases (which are often observed) when the free movement of labour is deliberately restricted. In theory, it does not matter what grounds are used to impose these restrictions.

There may be a “*mismatch problem*”. For example, small economies, which are more open, should preferably adopt a fixed exchange rate or even monetarily integrate with their major partners. However, these small economies tend to be less differentiated in production than larger ones. In this case, they would be better candidates for a flexible exchange rate, according to the principle of diversification in production. The problem, thus is how to rank the different criteria of OCA. Price and wage flexibility and the mobility of factors of production (including labour) have a particularly vital role in the debate. The integration of financial markets is also considered very feasible. However, until the mid-1980s, for several European countries, full capital mobility and convertibility were the exception rather than the rule. Inflation differentials were still relatively small but not insignificant at the time of the oil shocks. Economic openness and the diversification of production and consumption tend to show their effects through product and labour markets. It turns out that the political will for integration is understood as a crucial prerequisite for the initiation of integration in most of the other areas.

Prioritising the criteria (especially in cases where they contradict each other) is also essential. It is clear that price and wage flexibility are leading because they allow a quick response to possible shocks. Openness and similarity in shocks are also important. But if the members of a currency area are financially integrated, a high similarity of shocks among them is no longer a strict necessary condition. This has relevant implications for the debate over the size of such a currency area. The mobility of the factors of production is highly desirable, but it entails some costs and cannot effectively deal with some shocks in the short run. On the other hand, short-term capital movements can contribute to easing the adjustment process and the flexibility of fiscal policy should be increased to undertake expenditure absorption policies if necessary.

## 2.2. *More on advantages*

An obvious advantage of the euro is the elimination of exchange rate risks. In the floating exchange rate system, continuous changes in exchange relations hamper trade, creating difficulties for exporters and importers. Constant fluctuations in exchange relations between two or more currencies increase uncertainty and risk for firms engaged in foreign exchange and discourage the transfer of goods and services across national borders. From this point of view, the adoption of a common currency creates enormous advantages such as deeper economic integration; increased specialisation and an increase in trade volume.

An important benefit of the common currency is the reduced possibility for national governments to use discretionary monetary policy to achieve short-term goals, especially when they are politically motivated. With a single currency, the government would have

limited opportunities to use inflation as a method of financing the budget deficit. And last but not least, the common currency makes countries observe economic discipline and meet their convergence criteria. To reap the benefits of specialisation and cooperation through a single and wider market, national governments will have to abandon unwise monetary and fiscal policies and restructure public spending by eliminating chronic budget deficits.

### 2.3. *More on disadvantages*

There is no doubt that the introduction of the euro has had a strong positive impact on the volume of trade flows and increased efficiency as a consequence of the division of labour. But this is not a panacea. Like other modern currencies, the euro is fiat money and is based on trust, which is fragile, especially when dispersed between different countries with varying degrees of economic development.

Another serious disadvantage of the common currency is that it (to some extent) limits the freedom of citizens in terms of their choice of what currency to keep their assets. When a common currency becomes legal tender in different countries, every citizen in those countries is forced to accept and use that currency. In practice, the existing national monopolies represented by the national central banks have been replaced by a centralised, stronger and supranational monopoly. In the absence of competition between national currencies, the existence of a single currency provided by a monopoly may lead to any specific adverse effects of any monopoly. The losses arising from the supranational monopoly can (in principle) be overcome only by imposing specific standards on the best currencies existing before the creation of the monetary union. In the case of Europe, this means that the standards of the Bundesbank will become valid for everyone else. The problem is that the standards of the Bundesbank are consistent with the economic characteristics of Germany and not of the euro area as a whole.

Another drawback can be outlined – the huge centralisation and the inevitable bureaucracy in decision-making. In turn, the concentration of power increases the likelihood of making mistakes that will be transferred to the entire monetary union, not just to a country taken individually. Obviously, with the introduction of a single currency, national governments cannot exert direct pressure on their own national central banks to monetise their budget deficits, but the advantage of a common monetary policy could be destroyed by the concentration of powers in the hands of a small group of technocrats.

## 3. **On the Criticisms of the European Monetary Union**

In the context of the debt crisis in the Eurozone some ten years ago, the question of whether and to what extent the common currency is to blame seems quite logical. The answer that one of the most respected economists gives (Stiglitz, 2016) is quite categorical – he pushes his thesis that the creation of the euro was (in his words) a “*fatal mistake*”. Stiglitz insists that the debt crisis was linked to the decision made back in 1992 to adopt a common currency without providing the institutions through which it would work. In this regard, he mentions that “*Good currency agreements do not guarantee prosperity, but flawed currency*

*agreements can lead to recessions and depressions”* (Ibid., p. 16). His arguments are that, in general, the monetary union is built on a flawed neoliberal strategy postulating the efficiency of financial markets, which ultimately led to a debt crisis and an entire lost decade for Europe. The main problem of the euro is recalled – the monetary union is asymmetric, and the centralised monetary policy comes into insurmountable contradiction with the implemented national policies regarding fiscal affairs, incomes, employment, etc. In short, with the introduction of a common currency, economic integration far outstripped political integration – something that (according to Stiglitz) is not only wrong, but also extremely dangerous, as it leads to an increase in financial instability, hinders real convergence, leads to economic inequality (both between individual countries and within each one) and ultimately has a negative impact on the development of the democratic process. *“As we have noted, one of the reasons for the failure of the Eurozone is that economic integration has overtaken political integration. The hope was that politics would catch up with economics. But as division and lack of democracy grow, the likelihood of this happening decreases”* (Ibid, p. 61).

That the Eurozone is not an optimum currency area (according to Mundell, McKinnon, and Kenan’s criteria) has been known for a long time. The question is whether this can be compensated by the imposition of some restrictions, as envisaged by the Stability and Growth Pact in an earlier period, or the Euro-Plus Pact in a later one. It turns out that the restrictions themselves are not convincingly formulated and, what is even worse, they are very often not respected even by the countries that most insisted on their imposition – France and Germany. In such conditions, it is very easy to conclude that the common currency is not fully fulfilling its purpose and is indeed directly related to the debt crisis. It sounds implausible that the euro is the root cause of the crisis, but it seems entirely plausible that the common European currency is a serious obstacle to overcoming, or at least mitigating, the consequences of the debt crisis.

Stiglitz’s criticism of the premature introduction of the euro is not new. He has been one of the main critics since the birth of the idea of a common currency, his arguments being based on the failure to fulfil the criteria for an OCA (mobility of production factors; similar business cycles; symmetry of shocks; significant fiscal transfers; homogeneity of collective preferences, etc.). However, this *“scientific principle”* seems rather strange and even excessive. Theoretical approaches in the field of economics have never had the power of categorically established regularities. Certainly, not all criteria are met, and this is hardly possible. It is worth noting that even the creator of the theory of OCA, Robert Mundell was an active supporter of the idea of a common currency, despite the obvious discrepancy with some of the criteria. In fact, the big question here is whether the process of European integration should be based on the neoliberal approach (i.e., be the result of ongoing market processes) or decisively break with it and transfer the sovereignty of monetary policy to a new central institution. It is strange that Stiglitz, who is usually at the forefront of the fight against neoliberalism, in this case, defends it.

Another important point is that Stiglitz’s approach is not always balanced. For example, when he examines the problems in the countries on the periphery of the Eurozone, which he calls *“victims”* (especially in the case of Greece), the author is highly critical of the actions taken by the so-called Troika (IMF, ECB and EC, which he calls the *“culprits”*), but does not analyse the policies of these countries, and in particular in the pre-crisis period, which were



decisive for the subsequent problems. According to the author, the victims were powerless to prevent the massive inflows of capital that degenerated into current account deficits and/or rapid price increases of both real and financial assets. At first glance, this argument sounds convincing, but it conceals the guilt of the so-called *victims* who had opportunities to react, but because of opportunistic interests intertwined with political bargaining, they chose not to take any action until it was too late. A comparison of the economic policy implemented immediately before the global financial crisis in countries such as Greece, Spain, Portugal, and Italy will find many similarities that are easily associated with the problems that followed. The question of how much the global crisis is to blame for the debt crisis in Europe and how much it is caused by the common currency is not well understood. In other words, would there have been a debt crisis if there had not been a global financial crisis that started in the US but whose effects quickly spread around the world and especially in Europe?

Proponents of the euro note that from its inception, it has been both an ***economic project***, aiming at prosperity based on the results of economic integration, as well as a ***political project***, aimed at bringing different countries closer together and ensuring a peaceful existence through the irreversible interlinking of economies. In today's troubled times, the importance of political integration is hard to overstate. Of course, fulfilling both goals at the same time would be wonderful, but that is not happening. The fear is that the euro is failing on both fronts, threatening not only economic prosperity but potentially peace in Europe. *"The euro has failed to achieve either of its two principal goals – prosperity and political integration – and these goals are now further away than they were before the creation of the Eurozone. Instead of peace and harmony, European countries now view each other with mutual distrust and anger. Old stereotypes are being revived – Northern Europe sees the South as lazy and unreliable, memories of Germany's behaviour during the world wars are stirred up."* (Ibid., p. 37). This quote is indicative of the importance of the European project of which the common currency is only a part.

The euro is sometimes compared to a *"bad marriage"* – i.e. attraction is not enough to build a strong relationship. To recall an old saying, *"True love is not when two people look into each other's eyes, but when they look in the same direction."* The case of the Eurozone is far more complicated because it concerns 20 distinctly different countries that (perhaps?) should not have come together at all and are definitely looking in different directions. If the bad marriage analogy is to be continued, the problems call for a marriage counsellor, and his first question would be: *"Should this marriage be saved?"*. Translated into financial language, the question would be: *"The costs associated with ending the monetary union (economic and political) will be huge, but won't the costs of its maintenance be even higher?"* The question is quite logical and simple, but it can hardly be answered unambiguously. At this stage, there is no proven methodology for valuing all the benefits and costs of participating in a monetary union, and it is unlikely to appear in the foreseeable future. ***Invoking only general theoretical principles (such as the criteria for an OCA) cannot help, insofar as the political effects (e.g., keeping the peace in Europe) have practically such high cost, that it makes no sense to use any quantitative evaluation models of benefits and costs.***

Despite the criticisms of the common currency (justified or not), the majority of European economists share the understanding that it is viable, but its substantiation requires decisive

reforms both in the implemented policies and in the institutions. These reforms (a part of which are already underway) can be summarised as follows:

- Creation of a banking union;
- Unification (consolidation) of debt and issuance of common European bonds;
- Reform of the common stability framework by:
  - Reform of the Maastricht criteria;
  - A new growth pact supported by a solidarity stabilisation fund;
  - Acceptance of progressive automatic stabilisers;
  - Strengthening the flexibility of monetary policy;
  - Introduction of additional regulations to limit volatility;
  - Active countercyclical fiscal policy and a sharp increase in fiscal transfers.
- Implementation of a true (real) convergence policy:
  - Discourage trade surpluses (a revival of the Keynesian idea of “taxation of surpluses”);
  - Expansionary income and fiscal policies in countries with surpluses;
  - Implementation of industrial and infrastructure policies.
- Policies promoting full employment and growth by changing the mandate of the ECB;
- Commitment to shared prosperity and fighting inequality.

These reforms are indeed needed and most of them have been in the works for a long time. At the same time, however, it must be recognised that procrastination, indecision and (sometimes) unprincipled decision-making present the euro area with additional difficulties. For example, one of the essential missing elements of the euro area was a well-functioning banking union, which exacerbates the contradictions between the need to ensure stability for the banking system in the area as a whole and the economic interests of the individual countries. The vicious circle was not broken until the end of 2014, when the banking union officially started. However, it is still incomplete and will remain so until the creation of the common guarantee fund.

With regard to the proposal for debt consolidation and issuance (by the ECB?) of common European bonds, it is worth mentioning that this idea has also been discussed for a long time. It has its supporters (especially among indebted countries), but the decisive opposition from Germany, supported by the Netherlands, Austria and Finland makes the idea unfeasible at this stage. It is interesting to note that Bulgaria is also one of the countries that opposed common European bonds. More importantly, however, it should be recalled that the European Stability Mechanism (which generated debt of around 700 billion euros) and the Juncker Plan (debt of about 300 billion euros) practically had the characteristics of common European debt. Moreover, the ECB has been (until very recently) exercising a massive policy

of buying government (and not only government) bonds for years, which has led to a sharp increase in reserve money and, accordingly, the ECB's balance sheet, which already exceeds that of the US Federal Reserve. A separate question is how the swollen balance will shrink to more normal sizes.

So far, there is no reasonable answer to the above problem, but what is surprising is what critics of the euro actually expect from the ECB. It is vaguely mentioned that the bank's mandate should be changed, i.e. not only to pursue price stability, but to set employment and growth as ultimate goals – something reminiscent of the discretionary nature of the Federal Reserve's policy. I am convinced that the majority of European monetary policy economists have serious reservations about extending the ECB's mandate. The experience gained in recent decades (especially in the face of inflation targeting) unequivocally shows the effectiveness of a single and clearly formulated mandate. The problems in the euro area are not due to any restriction of the ECB's policy (in fact, the ECB's policy even before the crisis was rather expansionary), but to the premature accession to the monetary union of some countries in Europe's periphery, which happened despite the obvious and gross violation of the Maastricht criteria.

It is also regrettable to note that the ECB's policy really benefits countries with high trade surpluses (mainly Germany), which in turn leads to deepening inequality in both the European Union and the euro area. This, however, represents only "one side of the coin". Yes, Germany definitely has its responsibilities to the stability of the euro area and its policies do not always meet the common interest. But it would be unfair not to note that Germany has also made and continues to make compromises. The Germans were and continue to be satisfied with the policy of the Bundesbank and if in the past there was a referendum on the adoption of the euro (as some political parties in Bulgaria wish today), it is not at all certain whether they would have given up the stability provided by the German mark. The truth is that for Germans, the abandonment of the national currency (which Great Britain, Denmark and Sweden refused to make) was a serious compromise. There is no doubt that Germany is at the heart of the European project, and no one should be surprised that the ECB largely continues the policy of the Bundesbank, but already at European level. This may seem unfair, but this is the price of compromise, and this was the promise of German politicians to the German people to be able to implement the single currency project. As a matter of fact, it must be admitted that in recent years these promises have been more and more drastically broken. Whether by effectively allowing local central banks to issue new euros; whether, by tacit consent, the accumulation of unpaid accounts should be borne by the clearing system; whether through the European version of "quantitative easing" – the ECB is increasingly moving away from the notorious conservative policy of the Bundesbank. If this policy continues, it is not difficult to predict that if inflation persists, discontent with the euro and calls to leave the common currency will move from the periphery of the Eurozone to the centre. And the notion of a single European currency without German participation is, to put it mildly, naive.

In theory, radical structural changes should always meet some criterion of optimal choice. In the case of the euro, the idea that monetary union necessarily requires fiscal union is also a form of optimisation of governance policy. This understanding is so deeply embedded in the theory of the OCA that it has long become a cliché for all opponents of the idea of a common

currency. It is even assumed that the fiscal union should precede the monetary union – something that sounds logical but is far from proven. No matter how similar they may seem at first glance, fiscal and monetary synchronisation is a rather complex issue, as the former is, after all, a one-off act and the latter is a lengthy process. That this is so can be seen even from the historical development of the US, where the process of fiscal convergence between different states is still going on, despite the common monetary unit. It is often pointed out that this requires large-scale transfers between different regions (countries), but is this not the idea of the Structural and Cohesion Funds? Their importance is indeed great and needs to be expanded. However, it should be mentioned that there is still much to be desired in this regard. For example, Germany's net financial contribution to total EU funds is less than 1% of GDP and should be much more. However, calls for increased fiscal transfers often face justifiable dissatisfaction with the way they are spent, leading to a serious problem of aggravating moral hazard.

#### **4. On Some of the Widespread Fears about the Euro in Bulgaria**

##### *4.1. Loss of monetary sovereignty*

This issue has been touched upon before, when the advantages and disadvantages of the common currency were discussed. It is strange to put forward this argument in the case of Bulgaria, which gave up an active monetary policy 25 years ago. Of the traditional monetary policy instruments, only minimum reserve requirements are available, and they are usually not often used – only in cases of systemic financial difficulties. In the last 25 years, the BNB has only twice resorted to this instrument, and entirely for external reasons. It is even stranger to believe that the loss of monetary sovereignty is an important problem for Bulgaria, but obviously, it was not important for Germany, France, Italy and all other eurozone members.

##### *4.2. Rising inflation*

Over the past two decades, we have witnessed several enlargements of the monetary union. It is fair to note that according to various studies, as well-described in (Zlatinov, et al., 2022, pp. 142-156), the effect of converting national currencies into euro does have an impact on consumer prices in an upward direction **but is generally weak and one-off**. According to Eurostat estimates, the effect of the introduction of the euro in January 2002 (for the countries that joined the euro in 2001) on the total euro area HICP was between 0.1 and 0.3 percentage points. Price increases are most often triggered by transferring some of the additional costs on consumers; rounding prices; the belief of traders that consumers tend to ignore small price changes as they get used to the new currency. On the other hand, there are factors that can contribute to a decrease in some prices – the presence of high competition in some economic sectors, the measures taken by the state to increase transparency in the process of price adjustment, as well as the reduction of transaction costs and currency risk to the economy. The experience of countries which have already adopted the euro shows that price increases due to currency changes are concentrated in a small number of products, mainly in the services sector, such as catering, accommodation services, hairdressing services,

miscellaneous repairs, dry cleaning services, recreational and sports services, etc. As the share of these products in the consumer basket is relatively low, the effect of their appreciation on HICP inflation is expected to be rather small.

The introduction of the euro is often accompanied by an unjustified increase in household perceptions of inflation, which can lead to the formation of negative attitudes towards the single currency – something that can be observed today in Bulgaria. Moreover, if consumers overestimate current inflation, they may at the same time underestimate changes in real wages and purchasing power, which may lead them to decide to cut spending. In such a situation, the introduction of the euro could contribute to short-term negative effects on the real economy. A recent study suggests (Zlatinov, et al., 2022, p. 141) that the gap between actual and perceived inflation at the launch of the euro is less pronounced in the new Member States, partly due to information campaigns and other consumer protection measures, as well as encouraging firms to set fair pricing.

#### *4.3. Increase in money supply*

This problem is largely related to the previous one, as the volume of the money supply affects the price level. It is pointed out that most countries outside the euro area currently having significantly stricter requirements. For example, in Bulgaria, minimum reserve requirements (MRR) are at 10%; in Poland it is 3.5%, and in Romania – 8%. The argument is that a reduction of the MRR will naturally lead to a multiple increase in the money multiplier, which in turn will stimulate the money supply in the newly joined country. In addition, it is argued that the effect will be most noticeable in Bulgaria, as far as the difference between the current threshold set by the BNB and the established level in the euro area is the largest. This will most likely lead to a permanent outranking of the rate of money supply compared to that of manufactured goods and services and will accumulate significant inflationary potential that can only be released in one way, namely through outpacing price rises. In other words, the main effect of the forthcoming reduction in reserve requirements is that the purchasing power of savings and fixed incomes after several years of stay in the euro area will be limited or that, at a minimum, its growth will slow down.

It is true that the money multiplier will certainly increase, but the effect on the money supply cannot be predicted, since reserve money will also decrease. It is also not known how the general public would react in terms of the size of the desired cash holdings, and the same applies to commercial banks and their excess reserve. Thus, it is not correct to assume that a reduction in MRR itself would lead to higher inflation. The experience of the Baltic countries that entered the euro area with more or less similar economic fundamentals does not show the existence of such inflationary potential.

#### *4.4. Interest rates*

As already hinted, the concerns here are related to a possible shock cut in interest rates, which would prompt households (and the government) to take on more debt. However, analyses show that the Bulgarian banking system is characterised by high levels of liquidity,

significantly exceeding the minimum regulatory requirements. This is due both to the long-established trend of increasing savings and to the consistently conducted countercyclical policy. In view of the rapid transmission of the ECB's monetary policy to interest rates on the interbank money market in Bulgaria, as well as in view of the high liquidity in the banking system, the eventual accession of Bulgaria to the euro area would not have a significant impact on developments in this market. Based on the analysis of the observed trends in deposit and loan rates in the newest euro area member states and in Bulgaria, it can be argued that Bulgaria's possible membership in the euro area would not in itself lead to a significant decrease in these interest rates, which are currently very close to the European ones.

Other possible factors that may affect the dynamics of interest rates are economic growth, the financial stability of the country and prudent fiscal policy. All this, other things equal, would lead to a decrease in the risk premium. The analysis of the dynamics of long-term government bond yields and the change in the credit rating of the newest Member States, compared to Bulgaria, give enough reasons to assume that Bulgaria's future accession to the euro area, even if accompanied by an increase in the country's long-term credit rating, does not necessarily have to be reflected in a decrease in yields on the 10-year bonds.

#### *4.5. Fiscal policy and public debt*

There are also widespread fears that joining the euro area will loosen fiscal discipline and lead to higher budget deficits and the accumulation of public debt. The arguments are primarily related to the expected lower interest rates, which may tempt the government to take on more debt. It is true that similar phenomena were observed in some of the countries, but this can in no case be defined as a regularity. It can only be concluded that the common currency does not serve as a guarantor of good fiscal policy. Nevertheless, the issue is indeed important and deserves more attention (Rangelova, et al., 2021).

As rightly observed in one of the peculiarities of the European monetary union is determined by the preservation of national discretion in the conduct of fiscal policy. While fiscal prudence has historically been highly valued as a cornerstone of financial stability, currently, the imposition of shocks of various natures (the global financial crisis; the COVID-19 pandemic; the war in Ukraine) requires more flexible fiscal frameworks and a departure from fiscal conservatism. In other words, prudent fiscal policy should be aimed not only at supporting economic growth but also at building a sustainable model of economic development.

At the same time, in order not to disrupt the monetary union, various safeguards should be applied, which aim at ensuring sustainable fiscal policies during the economic cycle through the achievement of a medium-term objective. The situation is complicated by the fact that the fiscal target varies from one member state to another and relates to the level of the structural budget balance.<sup>4</sup>

---

<sup>4</sup>As a general rule, the medium-term budgetary objective should not exceed 0.5% of GDP structural deficit, and for Member States with government debt below 60% of GDP and an insignificant risk to the long-term sustainability of public finances, this deficit can amount to -1% of GDP.

From the point of view of fiscal discipline, Bulgaria stands well and there are hardly grounds for serious fears that the adoption of the euro will change the long-term trend of fiscal prudence. Bulgaria clearly maintains the best indicators of budget balance and government debt after Estonia. The average budget deficit for the EU and the euro area for the period 2000-2021 is very close to the Stability and Growth Pact reference value of -3% of GDP. The average value of government debt for the EU and the euro area ranges between 76 and 81% respectively, whereas for Bulgaria, it is below 30% of GDP. Empirical evidence does not give grounds to conclude that joining the euro area leads to an increase in government debt. Such trends can indeed be found, but after the outbreak of the global financial crisis. The data also show that the above conclusion applies to Bulgaria even without being a member state of the euro area, which makes the cyclical impact on the debt behaviour of governments a much more serious factor than the direct effects of entering the single currency area.

When discussing the possible fiscal consequences of adopting the euro, another feature of the Bulgarian tax model should be considered, namely that the focus is on taxing consumption rather than income. The significant predominance of indirect over direct taxation in the country is largely due to proportional taxation (i.e. flat tax), accompanied by low tax rates, which were introduced immediately after the country's accession to the EU in 2007. The hope that this will contribute to higher investment in the economy has proved illusory. As Zlatinov (Zlatinov, et al., 2022, pp. 121-144) notes, the low direct tax rates create strong cyclical dependence of budget revenues on consumption and imports, which are subject to indirect taxes, and limits the government's ability to conduct countercyclical policies. The relatively stable amount of tax revenues, regardless of the cyclical fluctuations in the economy, is an indicator of the depleted capacity of tax policy in the country with marginally low tax rates achieved and the transfer of the entire burden of preserving fiscal sustainability to expenditure policy, which is subject to much more discretionary decisions by the government and, respectively, a source of instability.

On the basis of the above analysis, it can be confidently concluded that the management and state of public finances do not differ significantly from best practices in the field. There are, of course, risks, but they are identified in terms of accelerating inflation and COVID-related fiscal expansion in 2020 and 2021. This will most likely make it difficult to adopt the euro in 2024, but it does not necessarily mean higher deficits and entering a debt spiral.

#### *4.6. Banking sector*

Fueled concerns and instilling fears of adopting the euro extend to the banking sector. In this regard, both Bulgaria's participation in the Banking Union and its membership in the euro area are often the subject of speculation and clearly expressed concerns about the consequences on the Bulgarian banking system, on the one hand, and the country's economy as a whole on the other. Some of them are due to an insufficient understanding of the mechanisms of work of the European Union and the euro area, and another – to hidden domestic political goals and a desire to deliberately “process” public opinion to achieve them.

One of the most commonly used claims is that by joining the euro area, Bulgaria should participate in the capital of the European Stability Mechanism, which implies the allocation

of significant funds, which Bulgaria cannot (because it is poor) or should not (because it is not fair) afford. One can often hear the warning that Bulgaria will be forced to buy bonds of other countries to finance foreign economies that are generally more developed than the Bulgarian ones.

These arguments are untenable. Apart from the lack of solidarity (what if Bulgaria had to be saved?), it should also be borne in mind that the quota of the allocated capital should not be paid at all at once, i.e., within a budget year. As rightly noted in (Zlatinov, Nenova-Amar, & Raleva, 2022, pp. 109-123), the situation with participation in the Single Resolution Mechanism is similar, which has long been claimed to burden Bulgarian banks with unjustified costs. This statement has already found enough rebuttals in the facts. For example, the funds transferred to the Single Resolution Fund over the past two years (less than EUR 200 million) represent only a negligible part of banks' assets and could in no way affect financial stability. And last but not least – two years ago, the BNB adopted a special ordinance that practically transposed the ECB's model for financing supervisory activities – namely, by paying fees by supervised entities, i.e. banks. Although it represents a novelty in the relationship between commercial banks and the central bank, in particular, it implies new costs. The size of the latter, however, is neither expected to jeopardise the stability and normal activities of banks, nor even to have a significant impact on the pricing of services to their customers.

#### *4.7. Competitiveness*

A common accusation is that Bulgaria is economically not ready and should postpone the adoption of the euro.<sup>5</sup> By this is meant that neither markets nor institutions are ready to resist competition. There were such accusations (they continue to this day) even before Bulgaria's accession to the EU. In fact, here we are talking again about the principles of the OCA, which have already been reflected. The question, however, can be reduced to the simpler question of whether the country would be better off if it remained outside the Eurozone. Examples are given of other new member states that have so far refused to join the ERM II, like Poland, Hungary, the Czech Republic, and Romania. The difference, however, between them and Bulgaria is significant. These countries have said that they will join the Eurozone when a higher level of real convergence is reached – something quite logical and justified in terms of OCA theory. From the point of view of this goal (accelerating real convergence), these countries want to use all possible instruments, including monetary policy. Bulgaria, however, has long abandoned these instruments, or in other words, the real convergence in Bulgaria does not depend on the monetary regime. What's the point of staying out of the Eurozone? It turns out that all the negatives of the lack of monetary policy must be borne (and they are not few) without taking advantage of the positives (they are also not few) of joining the common currency. Such a position is clearly not reasonable (Petranov, et al., 2022).

Some additional arguments can be put forward here. It is clear that joining the euro area might put the local economy to a kind of test in terms of competitiveness. The empirical data,

---

<sup>5</sup> Such, for example, is the request of the proposed referendum in Bulgaria, which aims to delay the adoption by 20 years.



however, are clear that Bulgaria's macroeconomic characteristics place it much closer structurally to the countries of Central and Eastern Europe than to the peripheral countries of the southern flank of the monetary union. Thus the model of economic growth, based on a small open and highly integrated economy in the EU, puts a very narrow framework for the possibilities of conducting economic policies. In addition, Bulgaria still has considerable room to catch up with the levels of wages, productivity and price levels to those of the euro area, which means that the rates of productivity increase in the short and probably medium term are unlikely to change compared to those observed in recent years. This can be interpreted as meaning that in the short- and medium-term, Bulgaria is not threatened with a loss of competitiveness even after the adoption of the euro.

## 5. Conclusions

The adoption of the euro has both negative and positive effects. It can definitely be considered proven that a common currency facilitates the specialisation and integration of national markets into a supranational, wider market. It also allows a reduction in transaction costs induced by exchange rate risks, thus increasing the benefits of international trade. To the above must be added the reduced possibilities of national governments to finance deficits by creating (printing) money and monetising existing deficits. The common currency, however, has some shortcomings, such as: the fiduciary nature of this currency; the creation of a supranational monopoly of the European Central Bank; the excessive centralisation of decision-making in the European Union; the suppression of the freedom of choice of European citizens in monetary matters. These shortcomings for some of the countries are sufficient reason for delaying monetary integration, as far as priority is given to real convergence. For other countries, as is the case with Bulgaria, the lack of monetary policy instruments makes such an option unacceptable.

Most recently, the authorities abandoned the officially stated aspiration to join the Eurozone in early 2024. A new target date has not been officially set, but it appears that it will be no earlier than January 2025. Even this date seems too ambitious, given all still high inflation. Political instability also poses threats to the fiscal criterion. The still high distrust in the euro is also a serious problem, overcoming which will require additional efforts.

Regardless of the specific date of joining the euro area, the expected effects are most likely to be the following:

- From the point of view of the real economy, significant changes should not be expected:
  - Growth would not be affected
  - Employment (unemployment) will not be affected either.
  - Inflation may accelerate slightly (due to rounding of prices), but this will have a one-time impact
  - The volume of foreign trade will be affected positively, albeit moderately
- From the perspective of the financial sector, more significant changes can be expected

- Interest rates (especially on loans) will slightly decrease
- Liquidity in the banking system will remain high due to direct access to ECB funding
- The banking system will be safer (supervision by the ECB), but will not be immune from bank failures
- A change in the tax system may be necessary due to increased pressure towards fiscal harmonisation.

## **References**

- Friedman, M. (1953). The case for flexible exchange rates. In: *Essays in Positive Economics*. Chicago: University of Chicago Press, pp. 157-203.
- Kenen, P. B. (1969). The theory of optimum currency areas: an eclectic view. – In: *Monetary Problems of the International Economy*. Chicago: University of Chicago Press, pp. 41-60.
- McKinnon, R. I. (1963). Optimum currency areas. – *American Economic Review*, Vol. 53, pp. 717-725.
- McKinnon, R. I. (1969). Discussion: the currency area problem. – In: *Monetary Problems of the International Economy*. Chicago: University of Chicago Press.
- Mundell, R. A. (1961). A Theory of Optimum Currency Areas. – *The American Economic Review*, 51(4), pp. 657-665.
- Petranov, S., Zlatinov, D., Atanasov, I. (2022). The Shadow Economy in Bulgaria during the Period 2006-2019. – *Economic Studies*, 31(5), pp. 3-18.
- Rangelova, R., Bobeva, D., Zlatinov, D. (2021). *Ikonomicheski rastezh i konvergentsiya v Evropeyskiya sayuz*. Sofiya: Izdatelstvo na BAN „Prof. Marin Drinov“.
- Stiglitz, J. (2016). *Evroto. Kak edna obshta valuta zastrashava badeshteto na Evropa*. Sofiya: Iztok-Zapad.
- Zlatinov, D., Nenova-Amar, M., Raleva, S. (2022). *Predizvikatelstva pred balgarskata ikonomika po patya kam chlenstvo v evrozonata*. Sofiya: Universitetsko izdatelstvo "Sv. Kliment Ohridski".

## FISCAL POLICY AND ECONOMIC GROWTH: EVIDENCE FROM EUROPEAN UNION COUNTRIES<sup>3</sup>

*This article empirically examines the fiscal policy elements affecting economic growth in 27 European countries and Switzerland (Without the United Kingdom). The research objective is to estimate the impact of macroeconomic variables such as tax revenue, government expenditure and public debt on the economic development of 28 European countries. The study employs a panel ordinary least squares (POLS) technique with a fixed effect estimation method. The Hausman test was applied to support the validity of the fixed effect over the random effect estimation model. Annual secondary data for the period 1995-2020 were used, including 728 observations. Based on the results, it may be inferred that the increase in government expenditure and tax revenue leads to an increase in economic growth in 28 EU countries. However, the higher rates of public debt lead to a decrease in economic growth. From the standpoint of fiscal policy, we conclude that Keynesian theory in the 28 EU countries was present. The study has empirically established the importance of fiscal policy tools in European countries. The study calls for the establishment of moderate fiscal policy strategies that would help ensure solvency and stimulate economic growth.*

*Keywords: fiscal policy; budget deficit; economic growth; Keynesian theory*

*JEL: E62; H62; E12; E13*

### 1. Introduction

The fiscal policy shows the actions of the government for the regulation of the economy and the achievement of certain macroeconomic goals and economic prospects (Georgieva, 2021). The objective of fiscal policy tools is the stimulation of economic growth by pursuing a policy guideline that ensures a sense of balance between taxation, spending and borrowing that is consistent with economic growth goals (Blanchard et al., 2010). Employing fiscal policy, the government influences the aggregate demand and supply of goods and services in the economy. Fiscal policy through tax revenues (direct and indirect taxes) and government

---

<sup>1</sup> Stoyan Tanchev, Associate professor PhD, Department of Finance and accounting, Southwest University "Neofit Rilski", Blagoevgrad, Bulgaria, e-mail: [stoyan\\_tanchev@swu.bg](mailto:stoyan_tanchev@swu.bg), <https://orcid.org/0000-0002-4399-8427>.

<sup>2</sup> Naftaly Mose, PhD, Researcher Department of Economics, University of Eldoret, Eldoret, Kenya, e-mail: [ngmoce@uoeld.ac.ke](mailto:ngmoce@uoeld.ac.ke), <https://orcid.org/0000-0003-0467-235X>.

<sup>3</sup> This paper should be cited as: Tanchev, S., Mose, N. (2023). Fiscal Policy and Economic Growth: Evidence from European Union Countries. – *Economic Studies (Ikonomicheski Izsledvania)*, 32(3), pp. 19-36.

expenditures affects short-term and long-term physical capital development and thus resilient growth. According to Blanchard et al. (2010), economic growth, price stability, the balance of payments equilibrium, and exchange rate stability are the most important macroeconomic targets that governments focus on when pursuing a fiscal policy to stimulate growth. Therefore, fiscal policy influences the aggregate demand for goods and services, employment, and inflation. In other words, fiscal policy has an impact on the business cycle and long-term economic growth potential of a country. In addition to tax collection and spending, governments use budget deficits and surpluses to impact the business cycle and long-term growth.

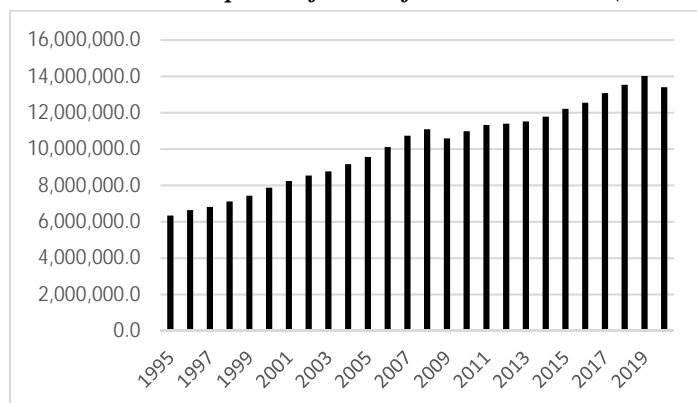
The government can adopt an expansionary or contractionary fiscal policy to influence economic activities. Expansionary fiscal policy has a stimulating effect on the economy, and restrictive fiscal policy has a restrictive effect on the economy. Under the expansionary fiscal policy, the government lowers tax rates and increases government expenditure by increasing the budget deficit. Under the restrictive fiscal policy, the government increases tax rates and lowers government expenditure, and increases the budget surplus. The government pursues expansionary fiscal policies when the economy is in recession. When the economy is at its peak, the government pursues restrictive fiscal policy. When the government deliberately changes the levels of tax rates and government expenditure, this policy is called discretionary fiscal policy, whether restrictive or expansionary fiscal policy. When these changes are made automatically without government intervention, this policy is defined as an automatic stabiliser of fiscal policy.

### *1.1 Fiscal Policy in European Union Countries*

Fiscal policies have a significant effect on an individual country's economic growth, macroeconomic stability and inflation. Key aspects in this respect are the level and composition of government spending, revenue collection, budget deficits and public debt. Fiscal policy is a tool governments employ to influence the business cycle and economic growth. Nominal values of GDP for the period 1995-2020 in the EU show an increase from 6.3 trillion euros in current prices to 13.4 trillion euros or a 111% increase. The highest nominal value of GDP in 2019 was 14.07 trillion euros before the Covid-19 pandemic, an increase of 121%. During the crises (2009 and 2020), the nominal value of the GDP of the EU 28(EU 27 + Switzerland) decreased. In 2009, the nominal value of GDP decreased by 4.5%, and in 2020 the decrease is 4.3% compared to 2019, as shown in Figure 1. Figure 1 shows the trend of GDP growth in the EU.

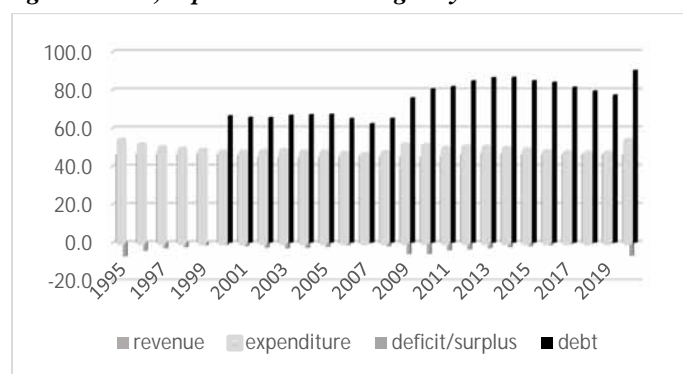
Figure 2 shows the trend of public revenues, government expenditures, budget balance (deficit/surplus), and government debt as a part of the GDP of the countries of EU 28 for the period 1995-2020.

**Figure 1. GDP at market prices of EU 28 from 1995 to 2020 (trillion euros)**



Source: Prepared by the authors (Data: Eurostat, <https://www.mnje.com/index>).

**Figure 2. Budget revenue, expenditure and budgetary balance and debt trend in the EU**



Source: Prepared by the authors (Data: Eurostat, [https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov\\_10a\\_main&lang=en](https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov_10a_main&lang=en)).

As can be seen (see Figure 2) for the period 1995-2020 in the countries of EU 28, government revenues ranged from 44.4% to 46.6% as a share of GDP. The expenditures ranged from 45.6% to 53.1%. The average value of revenues was 45.6% and that of expenditures was 48.4%. This means, although with many limitations, that government periodically rely on budget deficits to stimulate economic growth (Kurantin, 2017). For the period under investigation, the highest deficit expenditures were registered during the crises in 1995, 2009 and 2020, with values of -7.2%, -6.0% and -6.9%. The average deficit was -2.8%. On the one hand, these deficits aim to stimulate economic growth, as observed empirically. Gillogjani et al. (2021) empirically proved for six Central and Eastern European countries(CEE) that the budget deficit stimulates economic growth. Similar findings are confirmed by Nayab (2015), Molocwa et al. (2018), and Zaheer and Jahan (2021) studies. On the other hand, the use of government deficits in the long-run lead to an increase in government debt and lower economic growth. As confirmed by Kurantin's (2017) study, the continued budget deficit

decreases economic growth in Ghana. Empirical literature records the critical role of government expenditure in providing necessary infrastructure and human capital but high tax revenue will lead to a crowding out effect and may lead to loss of political support by the population.

The government debt as a share of GDP in 28 EU countries was the lowest in 2007 at 62.2% and the highest in 2020 at 90.1%. The average debt value was 75.3%. According to László (2022), the government debt in the euro area countries had fallen from 87.7% to 84% by the end of 2019 but still was too high. A study by Misztal (2021) for the EU countries empirically confirmed that high debt reduces economic growth. The same conclusions are confirmed by Mhlaba and Phiri's (2019) study. They empirically investigate the influence of government debt on economic growth in South African countries for the period 2002-2016. Confirmed that the gross public debt may be beneficial towards short-run economic growth, but the long-term effects remain negative. Mariet (2014) published results for the period 2008-2012 in EU countries. She confirmed that a high level of government debt decreases economic activity. Empirical studies in European countries have been contradicting each other.

Like many other advanced countries, European economies have faced a significant accumulation of public debt in the past three decades. The public debt-to-GDP ratio of these nations has increased from an average level of less than 60 per cent of GDP in the early 1990s to more than 90 per cent of GDP in 2015 and worsened by the global financial crisis. It turns out that the governments of the EU 28 countries mainly pursue fiscal deficit policy to overcome the debt effect, which is related to Keynes's theoretical views. The size of the deficit is small when economies are stable and register economic growth. When the economies of the EU 28 countries are in recession, governments significantly increase budget deficits and public debt to stimulate growth. However, deficits created by governments in the period of economic growth harm the long-term development of the economy and contradict Keynes's conclusions. The trends in the figures above reveal a widening gap between expenditure and revenue and increasing debt in the European Union, therefore, a concern that this study is interested in. In addition, at the moment, most empirical studies carried out in European countries on the subject have been inconclusive and mixed. Therefore the study intends to fill this void by investigating the role of fiscal policy tools in explaining economic growth in European countries by applying the *ordinary least squares* (OLS) technique and panel data methodology.

### *1.2 The objectives of the study*

Therefore the paper attempts to:

- To estimate empirically the effect of the tax revenue on economic growth in EU 28 countries.
- To estimate empirically the effect of the government expenditure on economic growth in EU 28 countries.
- To estimate empirically the effect of the public debt on economic growth in EU 28 countries.

## 2. Theoretical Review

Contemporary fiscal policy is based on Keynes's theory. Keynes (1936) proves that changes made by the government in the levels of taxation and government expenditure have a direct impact on aggregate demand and levels of economic activity. According to him, governments can stabilise the economy by deliberately increasing or decreasing tax rates and government expenditures to regulate the business cycle. This means that during a recession, the government must pursue an expansionary fiscal policy and, in times of high inflation, a restrictive fiscal policy. Under the expansionary fiscal policy, the government reduces tax rates and increases government expenditure (increases the budget deficit). Therefore, the government deliberately makes discretionary changes in fiscal policy. Usually, the increase in government expenditure is accompanied by an increase in the budget deficit. There is a subsequent increase in government debt as a result of this action. Restrictive fiscal policy has the opposite effect. If inflation in the economy increases, the government must increase tax rates and reduce government expenditure. This limits the infrastructure investment by the government and slows private productivity. In expansionary policy, the government increases the money available to business agents and households, while in restrictive policy, it reduces the money. In other words, Keynesian theory encourages governments to exploit budget deficits when the business cycle is in recession. When the business cycle is at its peak, governments have to increase the budget surplus.

From a macroeconomic point of view, economic growth can be represented by the equation:

$$Y = C + I + G + NX \quad (1)$$

Where:

Y – national income (GDP);

C – consumption;

I – investment;

G – government expenditure

NX – net export.

Government fiscal policy in Equation 1 can be included through consumption, such as C (Y-T). Thus, government intervention through fiscal policy (Equation 2) directly affects national income (Y).

$$Y = C(Y - T) + I + G + NX \quad (2)$$

Therefore, C (Y-T) shows that consumption costs depend on taxpayers' incomes and the amount of taxes collected. *Ceteris paribus*, a reduction in taxes (T) increases aggregate consumption (C), which leads to an increase in national income (Y) on the one hand. On the other hand, an increase in government expenditure (G) also leads to an increase in national income (Y). These two policies show the expansionary policy of the government. Therefore, the government's expansionary fiscal policy increases national income.

When the government increases the amount of taxes, the disposable income of taxpayers decreases (Equation 2). In other words, an increase in taxes (T) leads to a decrease in national income (Y) due to lower consumption (C). When the government reduces government expenditure (G), the effect on consumption is the same as a tax increase (T). Therefore, a reduction in government expenditure (G) leads to a reduction in national income (Y). These two policies show the government's restrictive fiscal policy. Restrictive fiscal policy hurts national income.

These effects of fiscal policy on the economy show that expansionary fiscal policy increases national income and restrictive fiscal policy lowers it. Expansionary fiscal policy has a stimulating effect on the economy, and restrictive fiscal policy has a restrictive effect on the economy. Under the expansionary fiscal policy, the government lowers tax rates and increases government expenditure by increasing the budget deficit. Under the restrictive fiscal policy, the government increases tax rates and lowers government expenditure, and increases the budget surplus. The government pursues expansionary fiscal policies when the economy is in recession. When the economy is at its peak, the government pursues restrictive fiscal policy. When the government deliberately changes the levels of tax rates and government expenditure, this policy is called discretionary fiscal policy, whether restrictive or expansionary fiscal policy. When these changes are made automatically without government intervention, this policy is defined as an automatic stabiliser of fiscal policy.

The opposite view of Keynesian theory is neoclassical economics. The views of neoclassical economics require governments to pursue a budget-neutral policy. A neutral fiscal policy is associated with tax decreases and government expenditure limitations. A basic rule is that the budget is balanced and does not allow the use of a deficit. According to them, low tax rates and limited government expenditure increase the activity of the private sector, which leads to increased economic growth. According to neoclassical theory, three main factors affect economic growth.

1. Labour supply, which is determined by wages and salaries after taxes are removed;
2. Saving, which is determined by the after-tax rate of return to saving;
3. Business investment is determined by the after-tax rate of return to capital investment.

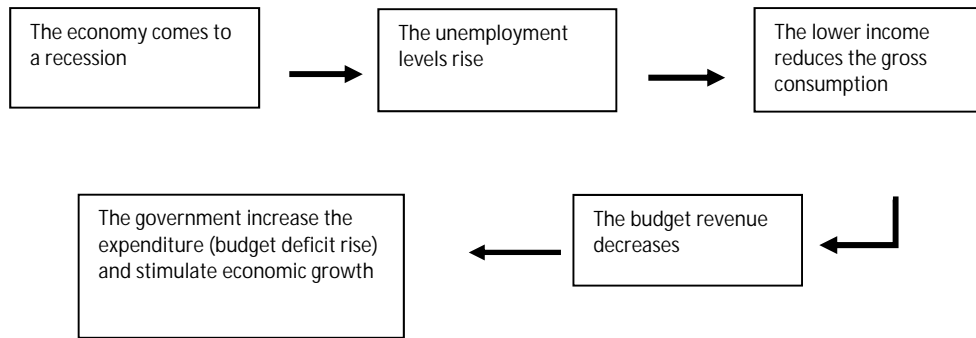
As can be seen, the two theories have opposing views on the use of fiscal policy. Keynesian theory recommends that governments actively use fiscal policy to influence demand to regulate the business cycle and improve long-term growth. The neoclassical theory rejects these arguments. According to them, fiscal policy is not effective in regulating the economy. Therefore, low taxes and a balanced budget have a positive impact on the business cycle and long-term growth (Maravalle, Rawdanowicz, 2020).

However, both theories do not take into account the elasticity of tax revenues. The above specifics of theories for the use of fiscal policy may not apply if the taxes used by the government to collect revenue are elastic. Provided that a tax is elastic when inflation rises, it increases budget revenues and limits consumer demand for goods and services (Maravalle and Rawdanowicz, 2020). For these reasons, governments must use elastic taxes. If taxes are not elastic, governments often implement policies that change tax rates (Baunsgaard & Symansky, 2009). Frequent changes in tax rates lead to political instability in the country.



Figure 3 shows the operation of automatic fiscal stabilisers when the economy falls into recession.

**Figure 3. Automatic fiscal stabilisers**



Source: Baunsgaarda and Symansky (2009).

Automatic fiscal stabilisers (see Figure 3) are a convenient tool for governments to regulate the business cycle and long-term economic growth. As part of fiscal policy, internal and external debt can also stimulate aggregate demand and have a positive effect on growth in the short term, Calderón and Fuentes (2013). According to Elmendorf and Mankiw (1999), the high level of public debt, in the long run, pushes out private investment and worsens economic development. Similar results are confirmed by António et al. (2014). They proved that the increase in government debt leads to lower economic growth. In other words, a low level of government debt has a stimulating effect on the economy, while a high level of debt has a negative effect.

The rational expectation theory places more emphasis on the difference between the long-term and short-run effects of fiscal policy variables. Thus, permanent fiscal expansion can be expected to cause a crowding-out effect by influencing expectations of interest rates and exchange rate persistence (Krugman & Obstfeld, 1997). The crowding-out effect might be additionally magnified if the government's spending appears un-reversible, hence if fiscal policy is not perceived as credible by the private sector. In such cases, fiscal expansion could be perceived as inflationary and thus crowding-out effect through the negative influence of interest rates on investment and growth will be stronger.

The real business cycle hypothesis develops the idea that business cycles can be generated by random fluctuations in productivity. The theory also implies that fiscal policy will converge to a stochastic steady state in which policy varies predictably over the business cycle. Upon entering a boom, expenditure will increase, and tax revenue will fall, but the primary surplus will increase. The overall fiscal stance, as measured by the long-run pattern of debt, is counter-cyclical: public debt decreases in booms and increases in recessions (Battaglini & Coate, 2008). The theory integrates a dynamic political economy model of policy-making of the form used in Battaglini and Coate (2007) with a neoclassical real business cycle framework with serially correlated productivity shocks. The political economy

component of the model assumes that policy choices in each period are made by a legislature. The legislature makes policy decisions by majority rule and legislative policy-making is modelled as non-cooperative bargaining and supports fiscal policies supported by a majority of voters (Battaglini and Coate, 2007). All of the above theories show that through fiscal policy, the government can influence macroeconomic stability by regulating the business cycle and ensuring stable economic growth in the long run. Key aspects in this regard are government revenues and expenditures, the budget deficit, and government debt.

Empirical results of the fiscal policy have been published in different research. According to Gechert (2015), fiscal policy is one of the most important tools of economic management in achieving economic development and eliminating the problems that impede economic stability. He empirically confirms that the distributional and specialised effects of fiscal policy instruments, there are stable effects of the role of government spending and taxes on the overall demand and hence macroeconomic variables.

Ganchev and Todorov (2021) examine three fiscal instruments- direct taxes, indirect taxes and government spending in EU countries with the ARDL method for the period 1999-2020. They proved that fiscal instruments could be used to stabilise Bulgaria's growth in the short run, but they are neutral in the long run. Direct tax revenue, government consumption, and indirect tax revenue are highly effective and can be used as tools for invigorating and stabilising Bulgaria's economic growth in the short run.

Stoilova and Patonov (2020) study the fiscal policy of Bulgaria for the period 1995-2018 with the OLS method. The empirical estimates prove that taxation is a more reliable instrument of fiscal policy than government spending in terms of a small open emerging-market economy. Similar results for the economy of Bulgaria are confirmed by Karagyozeva-Markova et al. (2013). They examine the fiscal policy in Bulgaria for the period Q1 1999-Q3 2011. The results of the linear VAR models indicate that the effectiveness of fiscal policy in stimulating economic activity is generally low, as first-year spending multipliers do not exceed 0.4.

Ugwuanyi and Ugwunta (2017) examined the impact of fiscal policy on economic growth in 18 sub-Saharan African countries using the panel data estimation technique under the fixed effect for the period 1990-2012. The empirical results revealed that the government's productive and unproductive expenditures, distortionary tax and non-distortionary taxes have significant effects on economic growth. The findings also revealed that budget balances of sub-Saharan African countries have a positive but insignificant effect on economic growth.

Gurdal et al. (2021) studied fiscal policy in G7 countries (Canada, France, Germany, Italy, Japan, the UK, and the USA) and used annual data for the 1980 to 2016 period. They confirm the positive effects of the taxation policies pursued by the G7 countries on economic growth. The main finding is that the taxation policies to be implemented based on the economic conjuncture of G7 countries are a powerful financial tool with the potential to serve the economic objectives to be achieved.

Babatunde et al. (2017) investigated the influence of taxation on economic growth from 2004 to 2013 in 16 African states using Panel Data. The results confirm a significant and positive relationship between tax revenues, foreign direct investment and economic growth.

Shahmoradi et al. (2019) empirically examined the impact of tax revenues on economic growth in 169 developed and developing countries for the period 2008-2016 using the panel data technique. The results of the analysis revealed that there is a negative and significant relationship between the ratio of tax revenues and GDP in developed countries. Also, they find that there is no significant relationship between tax revenues and economic growth in developing countries.

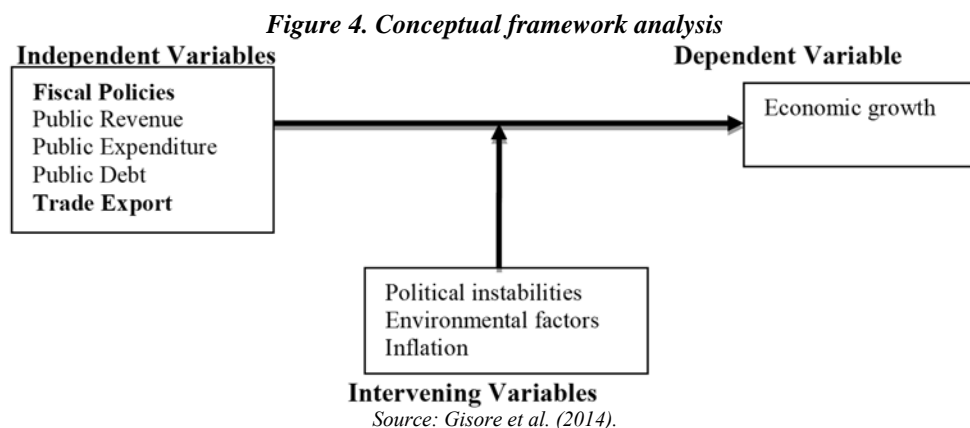
Stoilova and Todorov (2021) empirically estimate the impact of three fiscal instruments (direct tax revenue, indirect tax revenue and government consumption expenditure) on the economic growth of ten new European Union member states from Central and Eastern Europe (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia) for the period 2007-2019. The empirical results indicate that the real output growth rate is negatively affected by direct tax revenue, while economic growth in the euro area, exports and gross capital formation are positively related to economic growth. The results also confirm that government consumption and indirect tax revenue have no significant impact on the growth rate of real output of the ten studied countries from central and Eastern Europe.

Gillogjani et al. (2021) estimate the influence of the fiscal deficit on economic growth in 6 countries of South-Eastern Europe. With the fixed-effects and dynamic linear regression and data for the period 2005-2019, they confirm the fiscal deficit and economic growth for the transition economies of Southeast Europe, supporting the Keynesian theory. The main findings are that public debt, foreign direct investment, exports, and imports have a positive effect on economic growth. They proved that public debt and imports have a positive influence on economic growth, unlike exports and foreign direct investment, which showed an adverse effect on economic growth.

From empirical studies, the majority of studies (Gillogjani et al., 2021; Stoilova & Todorov, 2021) conducted do not examine the effect of tax revenue, expenditure and public debt in 28 EU countries. In addition, some of the studies were cross-country or time series based, which are prone to many econometrics disadvantages like multicollinearity and omitted variable bias. As a result of the above-mentioned factors, the study found it necessary to devolve into the study to fill the existing void.

### *2.1 Conceptual Framework*

The study argues that public debt, public expenditure, tax revenue and other economic growth variables affect economic growth prospects in European Union economies. In between the dependent and explanatory variables are the intervening factors which aren't controlled for in the study. This relationship is conceptualised in Figure 4.



### 3. Materials and Methods

Our research will adopt longitudinal and cross-sectional research designs to determine the role of fiscal policy in explaining the effect and trend of economic prospects of the European Union member states. This was administrated within the period 1995-2020 using secondary data and a panel ordinary least squares (POLS) estimation approach. The panel data approach was preferred as it permits the control for unobserved individual country characteristics and conditions. The study location was the European union member states. The study selected 27 European countries and Switzerland (Without the United Kingdom). The United Kingdom was left out, considering it has different macroeconomic fiscal policies and conditions in comparison to other European countries. This study employed secondary data set of 28 European countries. The data was collected from the World Bank indicators database, Penn World Tables and some World Bank reports. The brief data description is presented in Table 1.

**Table 1. Sources of Data**

Variables	Description	Unit of Measurement	Source
$y_{i,t}$	Economic growth	Real Gross Domestic Product growth	World Bank indicators database
$e_{i,t}$	Government Expenditure	Annual total government expenditure (%GDP)	World Development Indicators
$t_{i,t}$	Tax revenue	Aggregate tax revenue collected (% GDP)	World Development Indicators
$d_{i,t}$	Public Debt	Aggregate internal and external debt (% GDP)	World Development Indicators
$x_{i,t}$	Next export	Export (X) minus imports (M), (X – M % GDP)	Penn World Tables

#### 3.1 Econometric Procedure

Building on Mose (2021), a modified econometric growth function was formulated and presented as follows:

$$\ln Y_{i,t} = \beta \ln X_{i,t-1} + \gamma \ln F_{i,t-1} + \mu_i + v_t + \varepsilon_{i,t} \quad (3)$$

Where:

$\ln Y_{i,t}$  – the dependent variable – economic growth

$\ln X_{i,t-1}$  – set of explanatory variables

$\ln F_{i,t-1}$  – the fiscal policy variables

$\beta$  and  $\gamma$  – are parameters to be estimated

$\mu_i$  – country fixed effects

$\nu_t$  – time fixed effects

$\varepsilon_{i,t}$  – the error term and the subscripts  $i$  and  $t$  represent country and period, respectively.

Modifying the Solow-Swan theoretical works (Solow & Swan, 1956), the panel model to be estimated is presented as:

$$y = f(e, t, d, x),$$

$$\ln y_{i,t} = \beta_0 + \beta_1 e_{i,t} + \beta_2 t_{i,t} + \beta_3 d_{i,t} + \beta_4 x_{i,t} + \varepsilon_{i,t} \quad (4)$$

Where:

$y_{i,t}$  is a measure of economic growth, which is real GDP at time  $t$  in country  $i$ .

$e_{i,t}$  – the total expenditure as a share of GDP

$t_{i,t}$  – the tax revenue as a share of GDP

$d_{i,t}$  – the total public debt as a share of GDP

$x_{i,t}$  – the difference between export and import as a ratio GDP to represent net export

$\varepsilon_{i,t}$  – the error term at time  $t$  in country  $i$ .

### 3.2 Panel data analysis

The panel unit root test was employed to check if the variables are non-stationary and if the series possess unit root to reduce the chances of misleading results. Levin-Lin Chu unit test was employed in this study since it has superior test power for the long-run relationships in panel data than Im-Pesaran and Shin, which begin by specifying a separate ADF regression for each cross-section with individual effects and no time trend.

$$\Delta y_{it} = \alpha_i + \rho_i y_{i,t-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{i,t-j} + \varepsilon_{it} \quad (5)$$

Where:

$i = 1, \dots, N$  and  $t = 1, \dots, T$

The second step is to check if the variables have a long-run relationship; this study will apply the Kao co-integration test. The co-integration procedures proposed by Kao make use of estimated residual from the hypothesised long-run regression of the following form:

$$y_{i,t} = \alpha_i + \delta_i t + \beta_{1i} x_{1i,t} + \beta_{2i} x_{2i,t} + \dots + \beta_{Mi} x_{Mi,t} + e_{i,t} \quad (6)$$

for  $t = 1, \dots, T$ ;  $i = 1, \dots, N$ ;  $m = 1, \dots, M$ ,

Where:

T is the number of observations over time;

N – number of cross-sectional units in the panel;

M – number of regressed variables.

In this set  $\alpha_i$  up, the member-specific intercept or fixed effects parameter varies across individual cross-sectional units. The same is true of the slope coefficients and member-specific time effects  $\delta_i t$ .

The study adopted panel ordinary least squares (POLS) as an estimation technique to analyse the relationship between the study variables. Panel data can be estimated by two methods, fixed or random effect model as selected by Hausman (1978) test. One advantage of the fixed effects model is that it allows the unobserved individual effects to be correlated with the included study variables. Some panel diagnostic estimation analyses were applied in the regression model to qualify the result, such as heteroscedasticity and serial correlation.

## 4. Results and Discussions

### 4.1 Descriptive matrix result

A normality test is employed in most studies to test whether the elements employed in the analysis are normally distributed. The common test for normality is the Jarque-Bera statistics test (Jarque & Bera, 1980). This test utilises the mean-based coefficient of skewness and kurtosis to test the normality of all the study elements. On the one hand, skewness measures the direction and degree of asymmetry. During this study, results indicate normal curves for all the variables, with positive values of skewness indicating a tail to the left. This suggests that the positively skewed variables were high during the start years but are progressively declining over the years. The negatively skewed variables show an increasing trend during the latter years. From the Kurtosis result, all the variables have a kurtosis value of more than three which suggests the variables have Leptokurtic distribution. Extreme negative or positive skewness implies that the European economy may experience high or extreme returns due to changes in the independent variable. Table 1 below shows a summary statistics of target variables.

**Table 1. Descriptive Statistics Results**

Variable	Observations	Mean	Standard Deviation	Skewness	Kurtosis
<i>y</i>	728	379176.7	618232.3	2.549	9.334
<i>t</i>	728	170708.0	289905.7	2.619	9.525
<i>e</i>	728	180578.6	305233.9	2.547	8.933
<i>x</i>	728	138867.9	221312.9	3.471	18.668
<i>d</i>	728	277490.7	533438.2	2.614	9.030

Source: Prepared by the authors (Data: Eurostat)

Notes: *y*- Gross Domestic Product (GDP) (a proxy for economic growth), *t*- tax revenue, *e*- government expenditure, *x*-Total export, and *d*- Public debt.

Bivariate correlation was used to evaluate the degree of relationship between study variables. The absolute value of the coefficient of correlation ranges from 0 to 1. In general, from Table 2 results, most independent variables seem to be positively correlated between themselves. Table 2 shows the correlation results.

**Table 2. Correlation matrix**

<i>y</i>	<i>r</i>	<i>e</i>	<i>d</i>	<i>x</i>	
1.0000	0.9939	0.9915	0.9369	0.7749	<i>y</i>
	1.0000	0.9979	0.9435	0.7697	<i>t</i>
		1.0000	0.9491	0.7526	<i>e</i>
			1.0000	0.7023	<i>d</i>
				1.0000	<i>x</i>

Source: Prepared by the authors.

#### 4.2 Panel econometric results

The Levin-Lin-Chu unit root test was employed to eliminate any possibility of spurious regressions and erroneous results. This involved determining the order of integration of the time series through the unit root test. Accordingly, Levin-Lin-Chu's results are reported in Table 3.

**Table 3. Panel Unit Root Test Results**

Variables	Levin-Lin-Chu at Level		Order	LLC at First difference		Order
	Statistics	Probability		Statistics	Probability	
<i>y</i>	0.159	0.4370	<i>I</i> (0)	-9.345	0.0000	<i>I</i> (1)
<i>t</i>	0.180	0.5718	<i>I</i> (0)	-11.139	0.0000	<i>I</i> (1)
<i>e</i>	6.991	1.0000	<i>I</i> (0)	-6.51645	0.0000	<i>I</i> (1)
<i>x</i>	1.956	0.9748	<i>I</i> (0)	-10.905	0.0000	<i>I</i> (1)
<i>d</i>	6.717	1.0000	<i>I</i> (0)	-2.388	0.0085	<i>I</i> (1)

Source: Prepared by the authors.

The unit root results reveal that all study variables are non-stationary at the level. However, they become stationary after the differencing, implying that the variables are integrated into order one, *I*(1).

The Hausman test results (p-value is  $0.00 < 0.05$ ) suggest a rejection of the alternate hypothesis. Hence the null hypothesis is accepted, and therefore, the panel fixed effect model is chosen. One advantage of the fixed effects model is that it allows the unobserved individual effects to be correlated with the other variables. Table 4 reports the results of the fixed regression analysis.

**Table 4. Fixed Effect Regression Results**

Variables	Coefficient	Standard error	t- Statistics	P-value
<i>t</i>	1.706761***	0.089724	19.02237	0.0000
<i>e</i>	0.140714*	0.085034	1.654797	0.0984
<i>x</i>	0.098932***	0.014211	7.052347	0.0000
<i>d</i>	-0.039464***	0.014211	-2.777029	0.0056
<i>Cons</i>	59621.43***	4304.952	13.84950	0.0000
<b>The goodness of Fit Test</b>	<b>R<sup>2</sup> = 0.958830</b>		<b>Adjusted R<sup>2</sup> = 0.958603</b>	
<b>F-Statics</b>	<b>F=5517.525</b>		<b>P-value(F) = 0.000</b>	
<b>Wooldridge Test</b>	<b>F( 1,27) = 173.064</b>		<b>Prob &gt; F = 0.000</b>	
<b>Modified Wald Test</b>	<b><math>\chi^2</math> (28) = 3.047</b>		<b>Prob&gt; <math>\chi^2</math> = 0.000</b>	
<b>Pesaran CD</b>	<b>(z) = -1.38348</b>		<b>Pr = 0.463</b>	
<b>Hausman Test</b>	<b><math>\chi^2</math> (4) = 28.070</b>		<b>Prob&gt; <math>\chi^2</math> = 0.000</b>	

Source: Prepared by the authors.

The regression result reveals that public tax revenue is positively significant in European Union to economic growth at a five per cent level of significance. This suggests one per cent increase in revenue collection will translate to about a 1.7 per cent increase in economic activities. According to Keynes's theory, the relationship between economic growth and taxes is negative. The taxes decrease the welfare function of the economic agents and thus slow economic growth. Empirically this is confirmed by Khumbuzile and Khobai (2018), Dackehag and Hansson (2012), and Alinaghi and Reed (2021). There are many empirical studies which confirm a positive relationship between economic growth and taxes, such as Mercan et al. (2010), Kalaš et al. (2018), Gaszzazhi, Asllani and Boqoll (2018), and Moyo, Samour and Tursoy (2021). The positive relationship means that the taxes are compatible with economic growth and able to influence growth through funding physical capital and human capital (Stoilova, 2017). This finding supports why Tax receipts as a share of GDP in 27 EU countries during 1995-2020 increased from 24,8% to 26,7%. According to Taqi, M. et al. (2021), the overall tax has a positive relation with economic growth. Therefore, the total taxes in 28 EU countries do not decrease economic growth.

The government expenditure was positively significant in European Union to economic growth at a ten per cent level of significance. This suggests one per cent increase in public spending will translate to about a 0.14 per cent increase in economic activities. This finding supports policy action recommended by Bretton Woods Institutions (Mitchell, 2005). Further, per Keynesian scholars, expenditure can contribute positively to economic expansion through the increased purchasing power of the local population (Romer,1996). As a result, public consumption spending augments the total demand, which stimulates an increased output by betting on expenditure multipliers and funding key infrastructure projects (Gisore et al. 2014).



Public debt was negative with economic growth in European Union member states. According to Babu et al. (2015), extensive use of domestic borrowing can have severe repercussions on the economy. Domestic debt service can consume a significant part of government revenues, especially given that domestic interest rates are higher than foreign ones. From the findings, increased external and internal debt will lead to low economic growth attributed to the crowding out effect and increasing interest rates or debt payment.

Trade export is positively significant in European Union. Export earns the necessary foreign exchange for a country and increases productivity through competition and innovation and thus translating to economic growth (Murphy et al. 1991).

The coefficient of determination (adjusted R2) shows that 95 per cent of the dependent variable is explained within the model. The F-test result indicates that all the independent variables have explanatory power at a 1% level of significance. This indicated that the overall goodness of fit was satisfactory. From the above regression result, cross-sectional dependence/contemporaneous correlation is not a problem. Heteroscedasticity and autocorrelation were detected in the panel regression model. This study used panel robust standard error to correct it.

## **5 Conclusion and Recommendations**

This study explored the indication of how the increase in government expenditure, tax revenue, public debt and net export leads to an increase in economic growth in European countries. The results reveal that there is a positive relationship between government expenditure, tax revenue and economic growth. On the other hand, public debt negatively affects the European Union's economic growth. From the findings, therefore, adjustments at both levels of revenues and changes in the structure of the tax system can influence economic activity. Tax cuts offer the potential to raise economic growth by improving incentives to work, save, and invest. But they also create income effects that reduce the need to engage in productive economic activity, and they may subsidise old capital, which provides windfall gains to asset holders that undermine incentives for new activity. The net effect of the tax cuts on growth is thus theoretically uncertain and depends on both the structure of the tax cut itself and the timing and structure of its financing.

Expenditure growth can facilitate physical and human capital development and, thus, productivity which will translate to growth. The government's action for attaining economic growth ultimately depends on the fiscal space available for it to initiate spending, reorder the existing expenditures, implement tax cuts and increase net exports. The expenditures depend on the access to financing at a reasonable cost since prospective lenders believe that additional spending and borrowing would put much pressure on the economy and result in to delay in recovery as many resources will be taken from the private sector.

The high rate of public deficits has raised concerns about the financial health of many economies. Though governments can be able to run moderate fiscal deficits for extended periods, with domestic and international financial markets and international and bilateral partners convinced of their ability to meet present and future obligations, deficits that grow

too large and linger too long may, however, undermine that confidence. Being cognizant of these risks calls for the establishment of a fiscal policy strategy that would help ensure solvency. It should at least be committed to fiscal correction once the unfavourable conditions improve; structural reforms should be identified and implemented to enhance growth. The deficit should be maintained within manageable limits and avoid the unsustainable budget deficit, which could have undesirable macroeconomic costs and the government's macroeconomic objectives, such as low inflation and high economic growth, might be in jeopardy. For more clear recommendations, there's a necessity for further revenue source data disaggregation into debt and tax revenue for deeper policy prescription.

## References

- Abdon, A., Estrada, G., Lee, M. & Park, D. (2014). Fiscal Policy and Growth in Developing Asia. Asian Development Bank, No. 412, pp. 2-15. <https://www.adb.org/publications/fiscal-policy-and-growth-developing-asia>
- Afonso, A & Alves, J. (2014). The Role of Government Debt in Economic Growth. *ISEG-UTL Economics Department Working Paper*, No. 16/2014/DE/UECE, pp.2-44. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2468805](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2468805)
- Alinaghi, N. & Reed, R. (2021). Taxes and Economic Growth in OECD Countries: A Meta-analysis. – *Public Finance Review*, Vol. 49, 1, pp. 3-40. <https://doi.org/10.1177/1091142120961775>
- Babalola, A. (2015). Fiscal Policy and Economic Development in Nigeria. *Journal of Economics and Sustainable Development*, Vol. 6, No. 7, 150-159. <https://iiste.org/Journals/index.php/JEDS/article/view/21476>
- Babatunde A., Ibukun, O. & Oyeyemi, G. (2017). Taxation revenue and economic growth in Africa.- *Journal of accounting and taxation*, Vol. 9 (2), pp. 11-22. <https://doi.org/10.5897/JAT2016.0236>
- Babu, J., Kiprop, S., Kalio, A. & Mose, N. (2014). External debt and economic growth in East Africa Community. – *African Journal of Business Management*, 8(21), pp. 1011-1018. <https://academicjournals.org/journal/AJBM/article-abstract/489B8C048688>
- Battaglini, M. and S. Coate, (2007), “Inefficiency in Legislative Policy-Making: A Dynamic Analysis,” *American Economic Review*, 97(1), 118-149.
- Battaglini, M. and S. Coate, (2008), “A Dynamic Theory of Public Spending, Taxation and Debt,” *American Economic Review*, 98(1), in press.
- Baunsgaard, T. & Symansky, S. (2009). Automatic Fiscal Stabilizers: How Can They Be Enhanced Without Increasing the Size of Government? *International Monetary Fund*, SPN/09/23, ISBN/ISSN:9781455290567/2072-3202, pp.5-23. <https://www.imf.org/en/Publications/IMF-Staff-Position-Notes/Issues/2016/12/31/Automatic-Fiscal-Stabilizers-23303>
- Bhimjee, D. & Leão, E. (2020). Public debt, GDP and the Sovereign Debt Laffer curve: A country-specific analysis for the Euro Area. – *Journal of International Studies*, 13(3), pp. 280-295. [https://www.jois.eu/?639,en\\_public-debt-gdp-and-the-sovereign-debt-laffer-curve-a-country-specific-analysis-for-the-euro-area](https://www.jois.eu/?639,en_public-debt-gdp-and-the-sovereign-debt-laffer-curve-a-country-specific-analysis-for-the-euro-area) DOI: 10.14254/2071-8330.2020/13-3/18
- Blanchard, O., Dell’Ariccia, D. & Mauro, P. (2010). Rethinking Macroeconomic Policy. *International Monetary Fund*, SPN/10/03, ISBN/ISSN:9781455224982, pp. 3-16. <https://www.imf.org/en/Publications/IMF-Staff-Position-Notes/Issues/2016/12/31/Rethinking-Macroeconomic-Policy-23513>
- Calderón, C. & Fuentes, R. (2013). Government Debt and Economic Growth. *Inter-American Development Bank*, IDB Working Paper Series No. IDB-WP-424, pp. 4-35. <https://publications.iadb.org/en/government-debt-and-economic-growth>
- Dackehag, M. & Hansson, A. (2012). Taxation of Income and Economic Growth: An Empirical Analysis of 25 Rich OECD Countries. *Lund University Libraries, Working Paper 2012:6*, pp. 1-27. [https://swopec.hhs.se/lunewp/abs/lunewp2012\\_006.htm](https://swopec.hhs.se/lunewp/abs/lunewp2012_006.htm)
- Elmendorf, D. & Mankiw G. (1999). Government Debt. *National Bureau of Economic Research (NBER)*, Working Paper 6470, pp. 1-90. <https://www.nber.org/papers/w6470>
- Ganchev G. & Todorov I. (2021). Taxation, government spending and economic growth: The case of Bulgaria. – *Journal of Tax Reform*, Vol.7(3), pp. 255–266. <https://doi.org/10.15826/jtr.2021.7.3.102>

- Gashi, B., Asllani, G. & Boqoll, L. (2018). The Effect of Tax Structure in Economic Growth.- *International Journal of Economics and Business Administration*, Volume VI, Issue 2, pp. 56-67. <https://www.ijeba.com/journal/157>
- Gechert, S. (2015). What fiscal policy is most effective? A meta-regression analysis. *Oxford Economic Papers*, 67(3), pp. 553-580. <https://doi.org/10.1093/oep/gpv027>
- Georgieva, S (2021). Fiscal Multipliers in Bulgaria and Central and Eastern Europe Countries. *Economic studies*, 30(1), 131-167
- Gisore, N., Kiprop, S., Kalio, A., & Babu, J. (2014). Effect of government expenditure on economic growth in East Africa: A disaggregated model.- *European Journal of Business and Social Sciences*, 3(8), pp. 289-304. <file:///C:/Users/User/Downloads/moseP-5.pdf>
- Gllogjani, L. & Balaj, D. (2021). The Assessment of Fiscal Deficit on Economic Growth in Transition Countries of South-Eastern Europe.- *Journal of Liberty and International Affairs*, 7(3), pp. 102-117. <https://doi.org/10.47305/JLIA2137102g>
- Gurdal, T., Aydin, M. & Inal, V. (2021). The relationship between tax revenue, government expenditure, and economic growth in G7 countries: new evidence from time and frequency domain approaches.- *Economic Change and Restructuring*, Vol. 54(2), pp. 305-337. DOI: 10.1007/s10644-020-09280-x
- Hausman, J. A. (1978). Specification Tests in Econometrics. – *Econometrica*, 46(6), pp. 1251-1271. <https://doi.org/10.2307/1913827>
- Jarque, M. and Bera, K. (1980). Efficient tests for normality, homoscedasticity and serial independence of regression residuals.- *Economics Letters*, 6(3), pp. 255-259. [https://doi.org/10.1016/0165-1765\(80\)90024-5](https://doi.org/10.1016/0165-1765(80)90024-5)
- Kalaš, B., Mirović, V. & Milenković, N. (2018). The Relationship Between Taxes and Economic Growth: Evidence from Serbia and Croatia. – *The European Journal of Applied Economics*, Vol. 15 No 2, pp. 17-28. <https://journal.singidunum.ac.rs/paper/the-relationship-between-taxes-and-economic-growth-evidence-from-serbia-and-croatia.html>
- Krugman, P; Obstfeld, M (1997). *International Economics*, 4th ed., Reading, MA: Addison-Wesley, 1997.
- Keynes, J. (1936). *The General Theory of Employment, Interest and Money*. Palgrave Macmillan, ISBN 978-0-230-00476-4
- Khumbuzile, D. & Khobai, H. (2018). The impact of Taxation on Economic Growth in South Africa.- *Munich Personal RePEc Archive, MPRA*, pp. 2-14. <https://mpa.ub.uni-muenchen.de/86219/>
- Kurantın, N. (2017). The Effects of Budget Deficit on Economic Growth and Development: The Experience of Ghana (1994–2014). -*European Scientific Journal*, ESJ, 13(4), pp. 211-224. <https://doi.org/10.19044/esj.2017.v13n4p211>
- László T. (2022). Breakdown of Government Debt into Components in Euro Area Countries. – *Journal of Risk and Financial Management*, 15(2):64, pp. 1-13. <https://doi.org/10.3390/jrfm15020064>
- Levin, A., Lin, C. F. & Chu, J. (2002). Unit Root Tests in Panel Data: Asymptotic and Finite Sample Properties. – *Journal of Econometrics*, Vol. 108(1), pp. 1-24. [https://doi.org/10.1016/S0304-4076\(01\)00098-7](https://doi.org/10.1016/S0304-4076(01)00098-7)
- Maravalle, A. & Rawdanowicz, Ł. (2020). How Effective are Automatic Fiscal Stabilisers in the OECD Countries?.- *Economics Department Working Papers*, No. 1635, OECD, pp. 3-23. <https://doi.org/10.1787/flfb9d6a-en>
- Marieta, M. (2014). Analysis of public debt in the European Union – issues related to its sustainability.- *Journal of International Studies*, Vol. 7, No 2, 2014, pp. 25-32. [https://www.jois.eu/?161,en\\_analysis-of-public-debt-in-the-european-union-issues-related-to-its-sustainability](https://www.jois.eu/?161,en_analysis-of-public-debt-in-the-european-union-issues-related-to-its-sustainability)
- Mercan, M., Göçer, Ğ., Bulut, S. & Dam, M. (2010). The Relationship Between Economic Growth and Tax Revenue: Bounds Testing. 2nd International Symposium on Sustainable Development, June 8-9 2010, Sarajevo, pp. 626-636. <https://omeka.ibu.edu.ba/files/original/57be8c6bd9026bdb575bbe286565eeca.pdf>
- Mhlaba, N. and Phiri, A. (2019). Is public debt harmful towards economic growth? New evidence from South Africa.- *Cogent Economics & Finance*, Vol. 7(1), pp. 1-15. <https://doi.org/10.1080/23322039.2019.1603653>
- Misztal, P. (2021). Public Debt and Economic Growth in the European Union. Empirical Investigation.- *WSEAS Transactions on Business and Economics*, Vol. 18, 199-208. <https://wseas.com/journals/articles.php?id=197>
- Mitchell, D. (2005). *The Impact of Government Spending on Economic Growth*. The Heritage Foundation, Report Budget and Spending. <https://www.heritage.org/budget-and-spending/report/the-impact-government-spending-economic-growth>
- Molocwa, G., Khamfula, Y. & Cheteni, P. (2018). Budget deficits, investment and economic growth: A Panel Co-integration Approach.- *Investment Management and Financial Innovations*, Vol. 15(3), pp. 182-189. [http://dx.doi.org/10.21511/imfi.15\(3\).2018.15](http://dx.doi.org/10.21511/imfi.15(3).2018.15)

- Mose, N. (2021). Determinants of regional economic growth in Kenya.- African Journal of Business Management, Vol. 15(1), pp. 1-12.<https://doi.org/10.5897/AJBM2020.9118>
- Moyo, D., Samour, A. & Tursoy, T. (2021). The Nexus Between Taxation, Government Expenditure and Economic Growth in South Africa. A fresh evidence from combined co-integration test.- Sustainable Economics, Vol. 39(3).<https://doi.org/10.25115/eea.v39i3.3835>
- Murphy, K., Shleifer, A. & Vishny, R. (1991). The Allocation of Talent: Implications for Growth.- Quarterly Journal of Economics, 106(2), pp. 503-530.<https://scholar.harvard.edu/shleifer/publications/allocation-talent-implications-growth>
- Nayab, H. (2015). The Relationship between Budget Deficit and Economic Growth of Pakistan.- Journal of Developing Country Studies, Vol. 5(11), pp. 79-85.  
<https://iiste.org/Journals/index.php/DCS/article/view/23097>
- Romer, P. M. (1990). Endogenous Technological Change. – Journal of Political Economy, Vol. 98(5), pp. S71–S102.  
<http://www.jstor.org/stable/2937632>
- Shahmoradi, M., Molgharni, A. & Moayri, F. (2019). Tax Policy and Economic Growth in the Developing and Developed Nations.- International Journal of Finance and Managerial Accounting, Vol. 4(14), pp. 5-25.  
[https://ijfma.srbiau.ac.ir/article\\_15034.html](https://ijfma.srbiau.ac.ir/article_15034.html)
- Simon, M. (2012). Effectiveness of fiscal policy in economic growth: The case of Zimbabwe.- International journal of economics and research, Vol. 3(6), pp. 93-99.  
[https://www.ijeronline.com/documents/volumes/Vol%203%20Iss%206/ijer%202012%20v3i6%20nd%20\(9\).pdf](https://www.ijeronline.com/documents/volumes/Vol%203%20Iss%206/ijer%202012%20v3i6%20nd%20(9).pdf)
- Stoilova, D & Todorov, I. (2021). Fiscal policy and economic growth: Evidence from Central and Eastern Europe.- Journal of Tax Reform, Vol. 7(2), pp. 146-159.<https://doi.org/10.15826/jtr.2021.7.2.095>
- Stoilova, D. & Patonov, N. (2020). Fiscal policy and growth in a small emerging economy: The case of Bulgaria.- Society and Economy, Vol. 42(4), pp. 386-402.<https://doi.org/10.1556/204.2020.00015>
- Stoilova, D. (2017). Tax structure and economic growth: Evidence from the European Union.- Contaduría y Administración, Vol. 62(3), pp. 1041-1057.  
<http://www.cya.unam.mx/index.php/cya/article/view/1094>
- Solow, R.M. and Swan, T.W. (1956) Economic Growth and Capital Accumulation. Economic Record, 32, 334-361.  
<https://doi.org/10.1111/j.1475-4932.1956.tb00434.x>
- Tam, J. & Heather, K. (2000). Automatic Fiscal Stabilisers: Implications for New Zealand. New Zealand Treasury Working Paper, No. 01/10, pp.3-25.<https://www.econstor.eu/handle/10419/205451>
- Taqi, M., Rizwan, M., Rizwan, W. & Rizwan, M. (2021). Effect of the Tax Rate on Economic Growth: A Panel Analysis.- International Research Journal of Management and Social Sciences, Vol. 2(2), pp. 12-26.<http://www.irjmss.com/index.php/irjmss/article/view/19>
- Ugwuanyi, B. & Ugwunta, D. (2017). Fiscal policy and economic growth: An Examination of selected countries in Sub-Saharan Africa.- International Journal of Academic Research in Accounting, Finance and Management Sciences, Vol. 7(1), pp. 117-130.<http://dx.doi.org/10.6007/IJARAFMS/v7-i1/2587>
- Zaheer, R. & Jahan, S. (2021). Impact of Budget Deficit on Economic Growth and Investment in Pakistan.- Pakistan Social Sciences Review (PSSR), Vol. 5 (1), pp. 23-36.[http://doi.org/10.35484/pssr.2021\(5-1\)03](http://doi.org/10.35484/pssr.2021(5-1)03)

## CONVERGENCE DETERMINANTS AND CLUB FORMATION IN THE EU OVER 1999-2021<sup>2</sup>

*Within the EU, the applied decomposition of the GDP per capita over 1999-2021 reveals that labour productivity is a dominant contributor to economic growth, followed by employment, though the impact of each factor is largely non-uniform among countries. Although the fast-converging economies benefit from productivity gains, the core EA countries have lost some of their long-term growth capacity. Despite the implemented measures, almost all EU countries experience an aggravating age structure. In 2020, digitalization was evidenced to have mitigated the negative effects of COVID-19 on productivity and employment. The estimated panel model accounts for these developments by including other relevant convergence factors such as human capital, regulatory quality and debt. The investments are empirically inferred to be a transmission channel of the positive impact of higher institutional quality and the adverse influence of higher debt stock on economic growth. While in times of high indebtedness, the expenditures on education are found to be crowded out by interests, the low debt is not necessarily associated with greater spending on education. Eventually, these inferences are graphically supported by the three-club formation derived through the K-means clustering algorithm. Although such distribution is generally in line with the neoclassical growth theory, it also reveals disturbing EU heterogeneity due to worsening demographic dynamics, rising indebtedness and insufficient regulatory quality. The derived club formation is not tightly related to EMU membership. Overall, to enhance the speed and quality of the convergence, the EU countries have to strengthen their institutional and fiscal framework.*

*Keywords: convergence; clubs; COVID-19; institutions; debt; clustering*

*JEL: O43; O47; C38*

<sup>1</sup> Dr. Ignat Ignatov, Chief Assistant at Plovdiv university “Paisii Hilendarski”, ORCID ID: 0000-0003-3893-4565, e-mail: i\_ignatov@uni-plovdiv.bg.

<sup>2</sup> Acknowledgements: This research was partially supported by two projects: KP-06 K2-29 “Integrated model for prediction and prevention of negative social and economic effects from future epidemic crises”, funded by the Bulgarian National Science Fund (BNSF) – “Funding of fundamental research projects on public challenges associated with the COVID-19 pandemic –2020”; UIA05-202 “INNOAIR – Innovative demand responsive green public transportation for cleaner air in urban environment”, funded by the European Union initiative – Urban Innovative Actions (UIA).

This paper should be cited as: Ignatov, I. (2023). *Convergence Determinants and Club Formation in the EU over 1999-2021*. – *Economic Studies (Ikonomicheski Izsledvania)*, 32(3), pp. 37-63.

## **1. Introduction**

The economic development of a country in a union cannot be secluded. There exist objective factors that bind its economy to that of others, e.g., supranational legislation, close trade and possibly common currency. It is inevitable for these countries not to exhibit similarities in terms of development. However, the club formation can indicate certain trends affecting groups of EU countries. Therefore, the examination of the union's clustering profile is a means for monitoring its degree of dissimilarity. In fact, the heterogeneity of the block is directly dependent on the evolving characteristics of the EU members.

The main objective of the present study is to examine the EU convergence dynamics as dependent on various factors.

In order to attain this goal, the tasks involve:

- the choice of the factors that propel the economies;
- the exploration of the convergence factors' dynamic nature on a country-specific basis;
- evaluation of the convergence determinants' relative importance and interaction effects;
- derivation of the convergence clubs over the examined period.

The rest of this article is organized as follows. Section 2 looks at the relevant literature on convergence clubs and factors underlying the relative development among countries. Section 3 presents the used methodology and data. Section 4 presents the empirical analysis in three parts. Section 4.1 decomposes the GDP per capita (PPP) into dependency ratio, employment ratio and labour productivity in order to delve into the convergence forces at play over 1999-2021. Section 4.2 introduces additional variables that may help explain the observed patterns. Section 4.3 looks in more detail at the hypothesis of Europe at different speeds. Section 5 concludes by outlining the lessons for policy-making and discusses further directions for research.

## **2. Literature Review**

The neoclassical growth theory (NCGT) implies that the further an economy is from its steady state, the higher the marginal productivity of capital and the growth rate is (Solow, 1956; Swan, 1956). Provided that the empirical specification does not account for differences in steady states, it examines the unconditional convergence. However, in the case of conditional convergence, each particular economy approaches its own unique steady state (Barro, Sala-i-Martin, 1991; Mankiw, Romer, Weil, 1992). Further, the idea of club convergence is based on models that yield multiple equilibria. A group of countries may approach a particular equilibrium if they share the initial location or attribute corresponding to that equilibrium. Nevertheless, Islam (2003) notes the empirical difficulty in distinguishing 'club convergence' from 'conditional convergence'. The idea of convergence club formation can be traced back to Baumol (1986). The clubs reflect different groups of countries experiencing similar growth development within these groups. Therefore, countries being members of different clubs experience dissimilar convergence rates (Baumol, 1986). He

concluded that industrial countries appear to belong to one convergence club, middle-income countries to a separate, only moderately converging club, and that low-income countries actually diverged over time. He went on to note that these groups also exhibited very little convergence with one another. However, De Long (1988) noted that the strong convergence findings, specifically in the top group, were primarily the result of an ex-post selection of wealthy countries rather than an ex-ante selection. Despite the sample being inadvertently biased towards showing convergence, Baumol and Wolff (1988) showed that the initial results and the conclusions of De Long (1988) were still compatible because a smaller group of countries truly started converging as early as 1860 and expanded later, but for the greater group of countries studied by De Long there presumably weren't any indications of convergence.

Ben-David (1994) specifies that convergence clubs tend to be more prevalent at the two ends of the income spectrum. At its upper end there is some convergence resulting from catching up by some of the relatively wealthy countries, but at its lower end the stagnancy leads to convergence among the very poorest countries. By using a dataset of 121 countries over 1950-1980, Durlauf and Johnson (1995) conclude that the cross-country growth process exhibits multiple regimes in which subgroups of countries defined by initial conditions obey separate linear models. They attribute the compatibility of growth rate behaviour with multiple steady-state perspectives to the substantial differences between the aggregate production functions of the economies. While recognizing the innovative technique of Durlauf and Johnson (1995) for consistently uncovering local basins of convergence, Quah (1996a) gives a different empirical method which studies evolving distributions. Particularly, his model assumes that countries endogenously select themselves into groups while specialization in production allows exploiting economies of scale and ideas are an important engine of growth. Using data for 118 countries over 1962-1984, Quah (1996a) predicts a bimodal distribution which implies the formation of two coalitions or convergence clubs. Thus, the middle-income group of economies vanishes and the rich continue to become richer, and the poor, poorer. Therefore, convergence clubs exist at the high and low ends of the income distribution. This worldwide polarization into the rich and the poor is later referred to as evidence for the idea of "twin peaks" (Quah, 1996b). Quah (1996b) envisages this clumping together of country incomes as an argument to distinguish two key aspects of economic growth and convergence. The former pertains to pushing up technology and capacity constraints and the latter is concerned with the relative performance of rich and poor economies.

The concept of club formation is also examined by Fegerberg and Verspagen (1996). Particularly, they analyze the post-war growth of per capita GDP for a sample of 70 regions, covering six of the EU Member States. After 1980 the reversal of the trend they ascribe to regional differences in R&D effort, investment support from the EU, the structure of GDP and differences in unemployment. Recognizing the drawback of the regression analysis embedding the implicit assumption that all regions obey the same simple linear relation between growth and independent variables, they seek for a set of regional groupings characterized by differences in how the variables are taken into account work. Eventually, they find strong evidence for the hypothesis of a "Europe at different speeds using unemployment as a control variable. In an attempt to explain the formation of the poorer convergence clubs, Ben-David (1998) modifies the neoclassical growth model by focusing

on how living standards bordering subsistence in highly poverty-stricken countries can lead to convergence among them.

Later, Alexiadis (2013) argues that due to the existing gaps in technology and innovation, economies (countries or regions) form different clubs. Similar to Baumol (1986), Alexiadis (2013) argues that convergence is only identified within the members of the club but not among the clubs. He further specifies that broad disparities among the different club sets may persist or even increase, so that income distribution becomes polarized. Studying the per capita real income convergence in the EU over 1970-2010, Borsi and Metiu (2015) discern subgroups that converge to different steady-state equilibria. The club formation is mostly of geographical nature – a division along the South-East vs North-West dimension, so the clustering is not necessarily related to EMU membership. They infer that the higher growth of CEE countries over the last 40 years was insufficient to eliminate any cross-country real income per capita differences. In their opinion, the lack of growth-enhancing structural reforms in EU countries poses a threat to the achievement of real convergence in the near future. Using a panel of 194 NUTS-2 regions over 1980-2011, Von Lyncker and Thoennessen (2016) confirm that club convergence holds within the EU, indicating a multi-speed Europe along geographic lines. Specifically, the income growth paths differ substantially among Northern, Central, and Southern Europe. They attribute their findings to plausible different initial conditions or differences in region-specific structural characteristics. Further, they infer that the European regional and structural policy should be aimed at supporting regions in converging within their respective income club for the years to come.

The real convergence is viewed as a phenomenon determined by various factors. Measuring the US transaction sector over 1870-1970, Wallis and North (1986) argue that until economic organizations developed the advantages of ever-greater specialization remained untapped. That is why, in their opinion, economic history is the story of the reduction of transaction costs that permit the realization of gains from greater specialization. Nevertheless, North (1993) admits that economic markets throughout history and in the present world are frequently very imperfect, beset by high transaction costs and defined by institutions that produce incentives to work against economic efficiency. The solution he suggests is the restructuring of an economy into an efficient one that, over time, provides an institutional framework for a wide menu of alternative choices for organizational innovation. This restructuring involves a reexamination of property rights so as to provide the correct incentives and of the mental models of the economic subjects to make the choices aligned with these incentives. This whole process involves not only the creation of formal rules but also an impartial judicial system for enforcing them. This institutional characteristic concerning the degree of protection of property rights exerts a sizable impact on the economic results of any country. Focusing on growth over the period 1974-1989, Knack and Keefer (1995) conclude that institutions protecting property rights are crucial to economic growth and to investment. Moreover, the safeguard of property rights affects not only the magnitude of investment, but also the efficiency with which inputs are allocated.

Employing the worldwide governance indicators and log GDP per capita of 215 countries, Han, Khan and Zhuang (2014) examine whether a higher initial governance score leads to better growth performance over 1998-2011. They conclude that the governance quality does



have a significant impact on growth performance, that is, the countries with initial governance “surplus” grow, on average, up to 2-2.5% faster than their counterparts. Juncker et al. (2015) argue that the process towards more resilient economic structures is essential for any country that is set to take on a sustainable path to greater convergence. In other words, the sound institutional level is a required condition for an irreversible and qualitative advance on the convergence path. Analogously, Masuch, Moshhammer and Pierluigi (2016) emphasize on the essential role of institutional quality, which could have a sizable beneficial effect on the long-term growth of a country. They even come to the inference that the initial government debt, surpassing 60% of GDP, against the backdrop of lower than the EU average institutional quality could weigh on the subsequent growth performance. Conversely, the negative effects of high debt stock might get suppressed by sound institutions. Similarly, Raleva and Marikina (2021) present evidence that the structural characteristics of a country could be favoured by an improvement in institutional quality, though they admit that the enhancement of the institutions’ capacity involves continuous efforts.

Mankiw, Romer and Weil (1992) argue that accounting for human capital is vital for any convergence study. The aim of such a variable is to take into consideration possible investment in skills yielding improvement in the employed labour. Such a positive externality exerts a beneficial impact on the economic development of any economy. Using an updated panel on educational attainment for 146 countries over 1950-2010, Barro and Lee (2013) investigate the relationship between education and income. They confirm that the schooling of workers has a significantly positive effect on the level of income at the country level. Particularly, the estimated rate of return to an additional year of schooling ranges from 5% to 12%.

The EU faced various challenges over the last two decades. The SGP framework could not prevent pro-cyclical fiscal policies before the crisis (Eyraud and Wu, 2015). The consistent deviation from a countercyclical fiscal policy accounted for the observed debt accumulation in some countries (Ignatov, 2020). Subsequently, Nikolova (2020) provides some evidence that the adoption of stricter EU fiscal rules after 2011 exerted a positive impact on the debt sustainability indicators. The pre-crisis capital flow-driven dynamics contributed to imbalances and real economic divergence. Specifically, the aggregate productivity slowdowns were due to the more rapid expansion of employment in construction, which is a structurally low productivity growth sector (Borio, 2014). By constructing Integral Macroeconomic Imbalance Index, Bobeva and Atanasov (2017) infer that the catching-up economies suffered the largest imbalances prior to the crisis as the strong economic growth in some of them was fueled by high credit growth and booming real estate markets. The slowdown of economic growth following the crisis in 2009 helped the majority of the catching-up economies to reduce their imbalances, while several euro area members enlarged their imbalances and affected the entire euro area.

There was no productivity catch-up following the introduction of the euro (Diaz del Hoyo et al., 2017). Franks et al. (2018) confirm that income convergence among EA-12 countries slowed after Maastricht and subsequently came to a halt. The problems of the euro area are of no help to the unity of the block. Overall, the differences in the economic developments within the EU lead Alcidi (2019) to conclude that deeper economic integration does not necessarily deliver income convergence. In her opinion, the free movement of capital, people,

goods and services can result in an uneven distribution of activities and income. Consequently, cohesion policies should create conditions across regions to avoid polarization in production and concentration of income, leading to social divisions and fractures, either along regional or national borders. Analogously, over 2002-2018 Pirimova (2020) studies the structural convergence of exports of six CEE countries to exports of the Euro area as a whole. She infers that the introduction of the euro is neutral or does not have any significant impact on the structural sigma convergence of the studied group of countries to the Euro area.

Using unbalanced panel data over 1960-2014, Coutinho and Turrini (2020) find that for the whole sample of 66 countries, there is evidence of convergence. Specifically, they conclude that this is also the case for the EU and for the euro area, but not for the EA11. In an attempt to explain the lack of convergence of EA in the post-crisis period, they relate deviations of per capita GDP from the predicted convergence paths to variables reflecting the presence of macroeconomic imbalances. For the euro area, the evidence indicates that high public debt and a high weight of non-tradable in output seem important in driving growth below expected paths. Similarly, Ignatov (2021) confirms the negative relation between public debt and economic growth in the EU over 2000-2019. Zlatinov and Atanasov (2021) also identify the government debt as a variable hindering the EU convergence process, which they rather view as not fast enough. Within this process, they notice convergence clubs' formation instead of community convergence. Examining whether economic integration within the EU has caused countries' productive structures to become increasingly similar over the period 1995-2018, Cavallaro and Villani (2021) infer that the EU countries do not converge to a unique path. They attribute the countries' disparities in the long-run productivity levels to differences in their vertical specialization, that is, countries approaching the high-growth paths specialize in knowledge-intensive production, and the foreign value-added content of their exports is lower.

### **3. Methodology and data**

#### *3.1. Methodology*

In order to enhance the understanding of the drivers of real convergence, the GDP per capita,  $Y/TPop$ , could be decomposed as follows:

$$\frac{Y}{TPop} = \frac{L}{TPop} \times \frac{Y}{L} = \frac{WP}{TPop} \times \frac{L}{WP} \times \frac{Y}{L} \quad (1)$$

where:

$Y$  is real GDP in PPP terms;

$TPop$  is total population;

$WP$  is working population (from 15 to 64 years);

$L$  is employment.

This multiplicative decomposition could easily be presented in a growth form. It is useful to further delve into the population of working age as a share of the total population,  $WP/TPop$ , to uncover its underlying components. To that end, the denominator could be expressed as:

$$\frac{WP}{TPop} = \frac{WP}{WP + nonWP} = \frac{WP}{WP \left(1 + \frac{nonWP}{WP}\right)} \quad (2)$$

where the numerator of  $nonWP/WP$  includes the sum between the population aged 0-14 and the population beyond 65+. Thus, the change in this ratio captures the dynamics of the total age dependency ratio, which sheds light on the demographic situation of a country. The importance of this factor is heavily emphasized by Rangelova and Bilyanski (2019) as they argue that the population ageing afflicting the EU countries, though non-uniformly, has negative implications not only for the public finances but also for economic growth through lower labour productivity. Specifically, the worsened age structure increases the burden on the budget through higher spending on pensions and medical care for the elderly, while economic growth would have to be achieved by fewer and older workers. Eventually, the decomposition of the GDP per capita takes the following form:

$$\frac{Y}{TPop} = \frac{1}{1 + \frac{nonWP}{WP}} \times \frac{L}{WP} \times \frac{Y}{L} = DR \times ER \times LP \quad (3)$$

where:

$DR$  is the total age dependency ratio;

$ER$  is the employment ratio;

$LP$  is the labour productivity.

The determinants included in the decomposition capture only part of the factors commanding the convergence process. To account for the impact of other relevant determinants mentioned in the literature, a panel model is estimated that exploits both cross-sectional and time-series variation. The basic specification of the panel model is:

$$ypgrowth_{it} = \beta_1 + \beta_2 \ln DR_{it} + \beta_3 \ln ER_{it} + \beta_4 \ln LP_{it} + \beta_5 EDU_{it} + \beta_6 \ln RQ_{it} + \beta_7 \ln OPEN_{it} \quad (4)$$

where:

$ypgrowth_{it}$  is the economic growth of the PPP GDP per capita growth rate of a country  $i$  in period  $t$ ;

$EDU$  is the share of education outlays within the total government expenditures of a country  $i$  in period  $t$ ;

$RQ$  is the regulatory quality of a country  $i$  in period  $t$ ;

$Open$  is the import penetration ratio of a country  $i$  in period  $t$ .

To support the computation of correct interval estimates or correct values for test statistics in the presence of heteroskedasticity, White's heteroskedasticity-consistent standard errors are employed.

Further, the same variables are able to ascertain the current clubs formed within the EU. To that aim, a partitioning clustering procedure following the methodology proposed by Hartigan and Wong (1979) is applied. The three variables used in the decomposition are transformed into geometrically average annual growth rates. Then all of the data are standardized in advance so as to minimize the risk of outliers skewing the final results. The procedure makes use of a Euclidean distance between the observations.

### 3.2. Data

The data about GDP per capita, PPP (current international \$) are provided by the World bank.

The data about population concepts are extracted from AMECO.

For Croatia, the data for the working population, population aged 0-14 and population aged 65+ are unavailable in 1999 and 2000, so they are interpolated.

Along with the main decomposition variables, the additional variables include:

- Human capital – this variable is concluded to significantly improve the conditional convergence results (Mankiw, Romer and Weil, 1992). Specifically, the models use the share of expenditures on education into the total general government outlays in line with the COFOG classification. The budget share of expenditures on education might well be a plausible proxy variable for the level of human capital. The available time series of this indicator is up to 2020 in Eurostat;
- Regulatory quality – it is one of the Worldwide Governance Indicators (WGI), published annually from 2002 onwards by the World bank<sup>3</sup>. For the methodological construction of the WGI indicators, see Kaufmann, Kraay and Mastruzzi (2011). Specifically, the indicator for Regulatory quality captures the perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development;
- Openness is a structural characteristic inherent to any economy. In fact, the technology spillover is attainable through the foreign trade channel, so open countries experience faster productivity growth (Edwards, 1998). The degree of openness is measured by the import penetration ratio. Specifically, it presents the share of the imports in the absorption of the economy. The data for exports and imports of goods and services are available in Eurostat;
- the debt ratio – the consolidated government debt stock as a share of the GDP. The data for this indicator are available in Eurostat. The variable is converted in real terms and presented as a base index (1999=100).

---

<sup>3</sup> Filling the gap in the series, the 2001 value is the averaged value of 2000 and 2002 values.

The contributions of the variables to the convergence process are captured by a cross-section regression. Its estimation requires that all variables be checked for a unit root. The results of the conducted tests are available in Appendix 1. Except for expenditures on education and degree of openness, the other time series are inferred to be nonstationary at levels, so they are first-differenced within the model. According to the test of Levin, Lin and Chu (2002), the degree of openness exhibits some stationarity at levels which is not supported by the test of Im, Pesaran and Shin (1997). This rather warrants the precaution to treat the variable with a unit root at levels which requires further first-differencing. Following the results of the tests, the budget share *Edu* seems to be stationary at levels. According to Granger (2010), such variables are, in effect, limited processes as they have bounds either below or above (or both). This feature renders the conventional unit root tests potentially unreliable since they tend to over-reject the null hypothesis of a unit root (Cavaliere and Xu, 2014). To avoid this possibility, this variable is envisaged as a pure I(1) process, so it enters the model at first differences.

## 4. Results

### 4.1. Decomposition of GDP per capita (PPP)

The first stylized fact of Kaldor (1957) implies that the GDP per capita grows over time. It is valuable to use the proposed decomposition to scrutinize the convergence dynamic in fig. 1 over 1999-2021. To that end, the real contribution of each factor to economic growth is estimated. Thus, it is possible to reveal the relative role of these three factors. Additionally, a line at a level of 100% is inserted in fig. 1 in order to gauge the overall GDP per capita performance, that is, the line identifies the countries that have succeeded in doubling the value of this indicator. It turns out that only 12 EU countries have doubled the GDP per capita (PPP) over the observed period. In fact, 6 out of these 12 countries are non-EA. It seems that the highly converging countries are not exclusively non-euro area countries.

Over the period, labour productivity has been the main factor to boost the GDP per capita (PPP) in all EU27 countries. Nevertheless, the contributions are far from identical. In Romania, the productivity contributes to economic growth by 203.5 p.p. This is by far the highest observed real contribution in EU27. Astonishingly, all else being equal, Romania could have tripled its GDP per capita over two decades. The next countries with the highest productivity contribution to GDP are the three Baltic countries. Specifically, Lithuania, Estonia and Latvia benefited from productivity gains by 153.2 p.p., 145 p.p. and 139.7 p.p., respectively. In fifth place is Bulgaria by 130.9 p.p. The countries lagging behind the most in productivity's contribution are Greece, Italy, Spain and Germany. They elicit a GDP growth benefit from average productivity amounting to only 44.9 p.p., 52.5 p.p., 64.6 p.p. and 67.3 p.p. It is a distressing fact that part of the EA19 members lose some of their long-term growth capacity.

Another factor to raise the GDP per capita over 1999-2021 is employment. Except for Romania, where employment negatively impacts the GDP per capita growth rate by -13.7 p.p., the rest of the countries benefit from rising employment. The countries with the largest employment contribution to GDP per capita growth are Hungary, Bulgaria and Malta as they

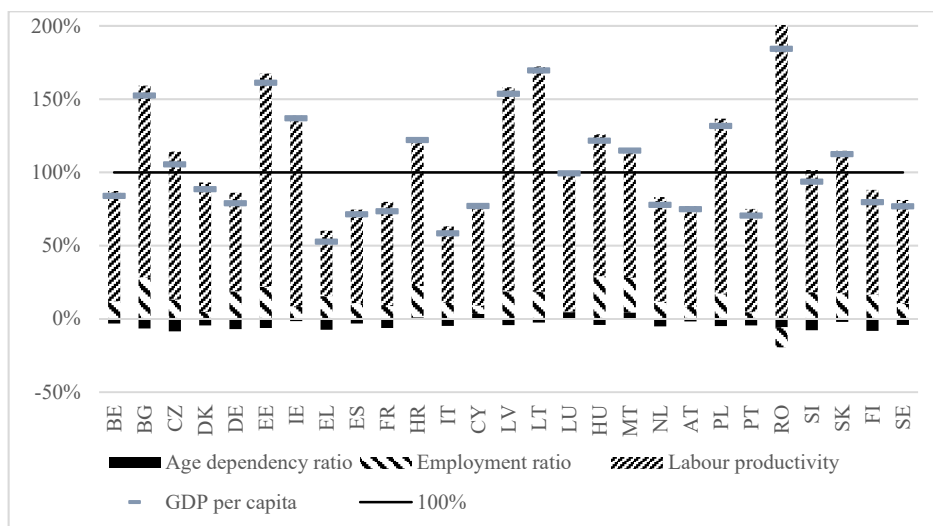
experience a boost by 29.1 p.p., 28.3 p.p. and 23.6 p.p. As a matter of fact, both productivity and employment are key factors to quicken the economic growth of Bulgaria and the three Baltic countries. However, a general feature is discernible. The participation rates of men aged 55-64 have risen substantially since 2000, mainly as an outcome of pension reforms raising the early and statutory retirement ages (European Commission, 2021). Furthermore, the female overall participation rates have steadily risen in recent decades, largely reflecting societal trends. Over the period, the countries eliciting the least benefit from employment are Luxembourg, Portugal and Denmark, as their share of employed in the working population contributed to GDP per capita growth only 0.5 p.p., 4.6 p.p. and 4.7 p.p., respectively.

The total age dependency ratio depicts the demographic conditions of a country. Unfortunately, the population structure undergoes negative changes in most EU countries. This is not the case only in Luxembourg, Cyprus and Malta, where the demographic factor contributes 4,1 p.p., 3,1 p.p. and 2,6 p.p. to the GDP per capita growth. The rest of the countries in the union experience the burden of the ageing population. This trend suppresses the GDP growth the least in Austria and Ireland, where the total age dependency ratio contributed to the GDP growth rate by -1,7 p.p. and -1,8 p.p. The adverse impact of the aggravating demographic conditions is strongest in the Czech Republic, Finland and Slovenia, where the GDP per capita growth was reduced by -8,8 p.p., -8,1 p.p. and -7,8 p.p. Overall, with a median age of 45, Europe will be the “oldest” region in the world by 2030 (European Commission, 2017). In fact, the outlined demographic decline has already induced sizable GDP per capita losses, though unevenly felt. In order to mitigate these adverse developments, the EU governments have to consider the prospect of rising pension age in combination with active ageing and flexible retirement policies.

According to the European Commission (2021), the average annual GDP growth rate is projected to remain fairly stable over 2019-2070, but the sources of GDP growth will change critically. Specifically, over the forecast period, labour will contribute to growth negatively due to two opposing effects. While the assumed increase in employment will impact average potential GDP growth positively, this effect will be more than offset by the decline in the share of the working-age population in the total population. Eventually, the labour productivity growth, driven by TFP growth, is projected to become the sole source of potential output growth in both the EU and the euro area.

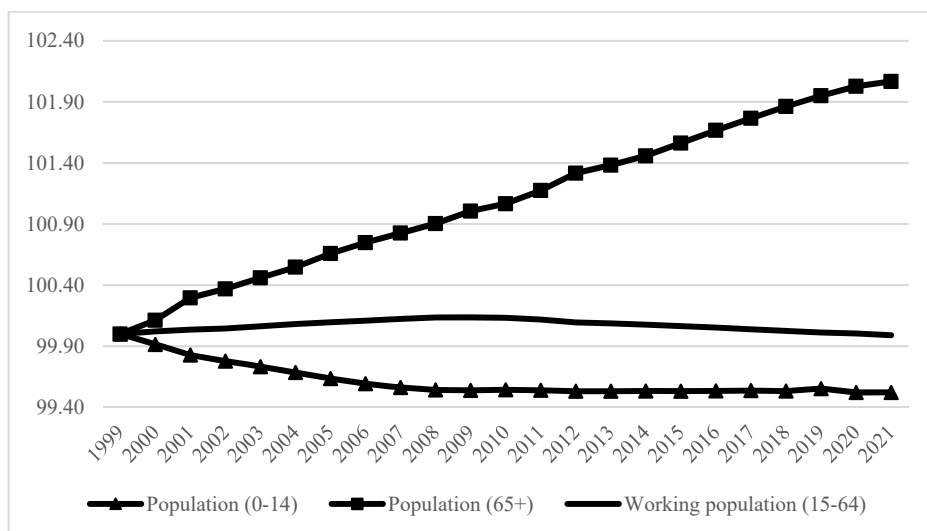
The worsening demographic conditions within the EU27 over 1999-2021 are readily seen in Figure 2, where the population aged 0-14 exhibited a negative growth rate until 2009 and it levelled off onwards. If the governments want to trigger any positive dynamics in this age bracket, they should focus heavily on policies supporting births and younger families. In contrast, the population of the 65+ age bracket has been rising continuously with a constant growth rate. The working population shifts its weakly positive growth rate into negative after 2009, though mildly. It is evident that the working population as a share of the total population falls over the period, which is predominantly due to the continuously positive growth of the population aged 65+. It is important to take notion that the presented data are aggregate so it does not reflect the underlying heterogeneity among the EU countries with respect to the demographic conditions.

**Figure 1. Contributions of the main determinants to GDP per capita (PPP) change over 1999-2021**



Source: World Bank, AMECO.

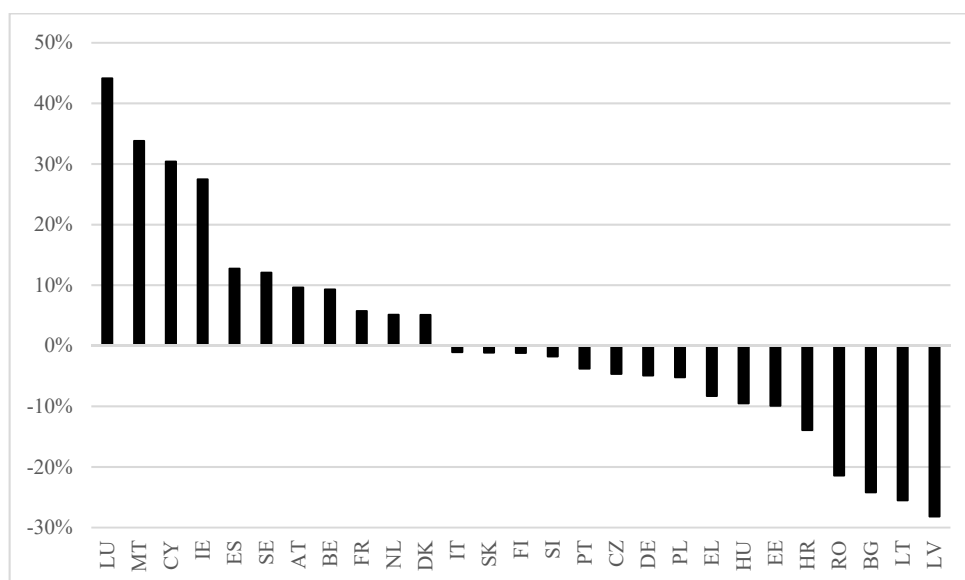
**Figure 2. Logs of the population within the EU aged 0-14, 15-64 and 65+ over 1999-2021 (base index, 1999=100)**



Source: AMECO.

As evident in fig. 3 the working population has risen in 11 EU countries over 1999-2021. The countries that have seen the biggest increase in working population are Luxembourg, Malta, Cyprus and Ireland by 44,1%, 33,8%, 30,4 and 27,5%. The rest of the counties experienced a rise smaller than 13%. In fact, the countries that suffered the greatest drop in the working population are Latvia, Lithuania, Bulgaria and Romania by -28,1%, -25,5%, -24,2% and -21,4%. It seems that the high-convergence performers may face grim prospects for long-term growth since their working population has been shrinking. Noticeably, the four countries both with the highest and lowest growth in the working population differ from the rest of the countries by a magnitude greater than 10 p.p. Such a feature depicts two diverging labour market trends persisting in the EU.

**Figure 3. Growth rate in the working population among the EU countries over 1999-2021**

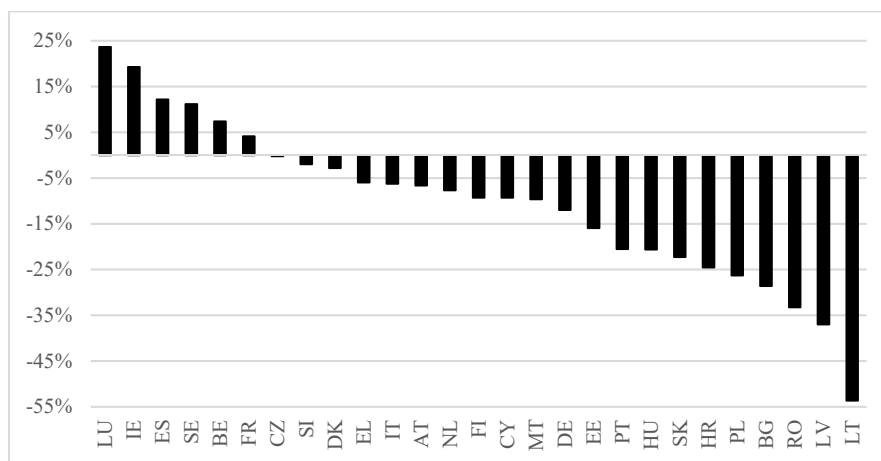


Source: AMECO.

In Figure 4 the adverse dynamics of the population aged 0-14 are observed among most of the EU countries. It is only in 6 countries that the population in this bracket has risen. These EU members are Luxembourg, Ireland, Spain, Sweden, Belgium and France. They have seen a growth in the younger group ranging from 23.6% to 4,1%. The rest of the countries are inflicted by a declining younger population. Analogously, the countries most affected are again Lithuania, Latvia, Romania and Bulgaria, which have experienced a drop in this age group by -53.6%, -37%, -33.2% and -28.6%. As a whole, the pervasive decrease in the young age bracket within the EU countries forebodes imminent deep structural problems.



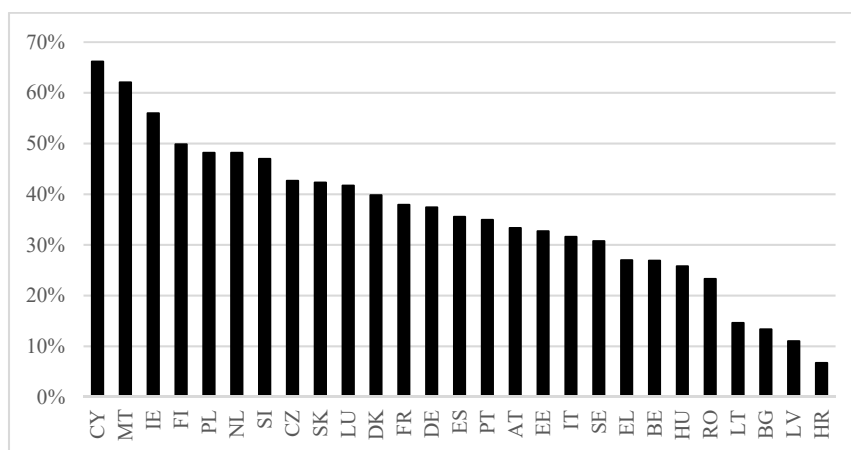
**Figure 4. Growth rate in the population within age bracket 0-14 among the EU countries over 1999-2021**



Source: AMECO.

Figure 5 presents the staggering growth in the population aged 65+ in all EU27 countries. It is highest in Cyprus, Malta, Ireland and Finland, where the population in the age bracket 65+ has risen by 50% or more over 1999-2021. The high-fliers in convergence Lithuania, Bulgaria, Latvia and Croatia are not excluded from this trend, though they exhibit a smaller than 20% rise in the population of this age bracket 65+. The ubiquitous ageing population challenges countries to reform their health, pension and education systems in order to meet up the needs of the changing population structure.

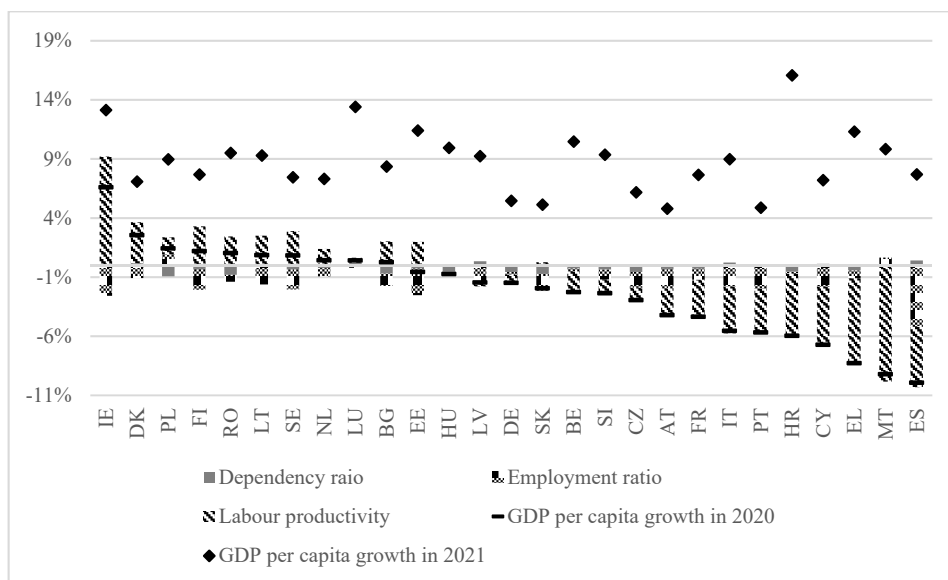
**Figure 5. Growth rate in the population within the age bracket 65+ among the EU countries over 1999-2021**



Source: AMECO.

Against the backdrop of population ageing, all EU countries plunged into the Covid-19 pandemic in March 2020 as depicted in Fig. 6. In view of this development, the policymakers had to strike the right balance between safeguarding lives and preventing the firms from shutting down permanently. The implemented health restrictions limited the spread of the virus but affected mobility and economic activity unfavourably (Maloney and Taskin, 2020). Thus, the economic losses in the short term warranted for a strong policy response. The macroeconomic actions had to be of adequate magnitude so they could be helpful enough to mitigate the economic fallout of the crisis. Indeed, Deb et al. (2020) argue that the negative effect of containment measures on economic activity is more sizable in countries with relatively smaller fiscal packages and smaller policy rate cuts. Specifically, among the EU countries the average GDP per capita growth rate in 2020 was -2.1%, albeit the individual outcome was highly varied, that is, ranging from 6.6% in Ireland to -9.9% in Spain. Productivity and employment were largely burdened by the pandemic. Particularly, the average contribution of employment to the GDP per capita growth in 2020 was -1.2 p.p. The negative contribution of shrinking employment was the most severe in Spain, Ireland and Estonia by -5.2 p.p., -2.6 p.p. and -2.2 p.p. Nevertheless, in Poland and Malta, the employment ratio contributed to GDP per capita positively, that is, by 0.9 p.p. and 0.7 p.p., respectively. Strange as it may seem, not all EU countries suffered a drop in productivity. Astonishingly, the productivity in Ireland contributed to real growth by 9.2 p.p. The explanation stems from both the sizable economic stimulus of the government and the activity of the multinational pharmaceutical and technological companies operating in the country. Besides, there are also 11 EU countries whose productivity propped up GDP per capita growth in 2020, though considerably less. The rest of the EU countries saw a significant fall in the contribution of productivity to growth. The adverse impact of the fallen labour productivity was strongest in Malta, Greece and Croatia, where the growth was suppressed by -9.7 p.p., -7.2 p.p. and -5.3 p.p., respectively. The impact of the dependency ratio on GDP per capita growth for 2020 varied from 0.4 p.p. in Spain to -0.94 p.p. in Poland, depending on how severely Covid-19 afflicted the population. The negative Covid-19 impact on economic growth substantially weakened in 2021 thanks to the elaboration and distribution of a vaccine. In 2021 the GDP per capita of all countries grew by more than 4%. Although recognizing the COVID-19 crisis as a great challenge, Ivanova and Chipeva (2021) also view it as a significant opportunity for economic transformation. That is why they suggest the ecological transition to a circular economy as a way to combat climate change and attain a new type of economic growth and a new quality of life.

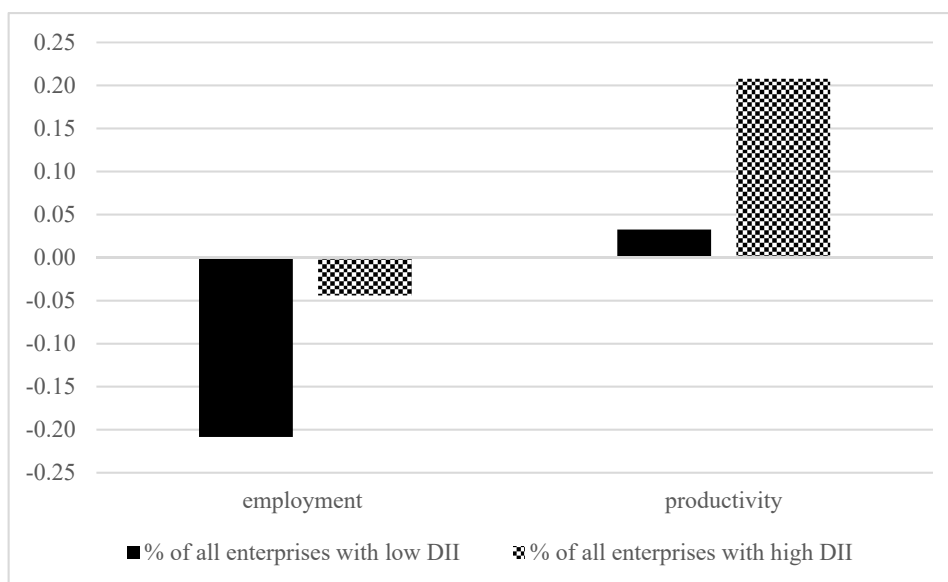
**Figure 6. Impact of Covid-19 restrictions on the determinants of GDP per capita growth in PPP terms over 2020-2021**



Source: World bank, AMECO.

What accounts for the different contributions of employment and productivity to growth in the year of the Covid-19 outbreak is the varied digital intensity index (DII) among EU countries. Specifically, the elaborated index monitors the intensity of ICT (Information and Communication Technologies) usage and e-commerce in enterprises. Figure 7 explores the relation of digital intensity with growth determinants. Evidently, the percentage of enterprises with low DII is associated with a stronger fall in employment and a smaller rise in productivity. Conversely, the economies with firms better equipped with high digital skills suffered less shrinkage in employment and experienced higher labour productivity. This is expected because, following the health restrictions, many firms had to shut down temporarily or rely on their employees from home. So, the operation of firms in the economy didn't stop altogether, but certain production processes couldn't be managed at a distance. For example, certain manufacturing businesses stopped operating, but the ICT and freight-forwarding firms were weakly affected. Noteworthy, the higher DII didn't eliminate the negative Covid-19 impact on employment and productivity completely but provided more favourable initial conditions for the economy to offset the shock to a higher degree. The attainment of greater digitalization makes the economy more competitive and resilient to external shocks.

**Figure 7. Cross-country correlations between the % of all enterprises with low/high digital intensity index (DII) and contributions of employment and productivity to growth in 2020**



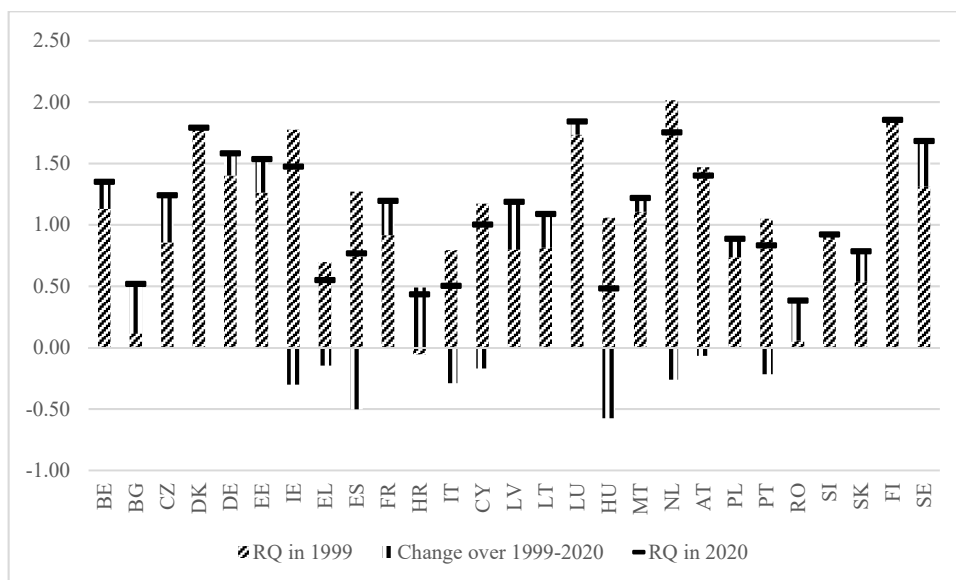
Source: Own estimations, World bank, AMECO, Eurostat.

#### 4.2 Extended view on convergence factors

Membership in the EU involves the commitment of the countries to improve and sustain their institutional framework flexible and resilient. Such a goal does not require a one-off endeavour but a series of efforts over time. Fig. 8 depicts the institutional development of the EU member states over 1999-2020. The heterogeneity of the regulatory quality is prevalent in 1999; that is, it ranges from -0,06 for Croatia to 2,02 for the Netherlands. In fact, the initial variation of the regulatory quality is 0,26. Over the period 1999-2020, only 18 countries improved their institutions. The countries that exhibited the highest institutional enhancement are those that started from a low initial level, such as Croatia and Bulgaria raising their institutional level by 0,49 points and 0,4 points, while the countries that registered the largest institutional regress are Hungary, Spain and Ireland by -0,58 points, -0,5 points and -0,3 points.

Evidently, the EU countries do not evolve institutionally in a uniform way. The reason is that not all countries exert continuous and substantial efforts to strengthen their institutions. This includes either the improvement of the regulatory quality at an insufficiently high rate, such as Bulgaria and Romania or divergence from the previously achieved level, such as in Greece and Cyprus. In contrast to them, other countries such as Denmark and Finland continuously maintain high regulatory quality. The institutional disparities within the EU widen, which feeds into the heterogeneity of the block.

**Figure 8. Initial regulatory quality of EU27 countries and of a fictitious country and its change over 1999-2020**

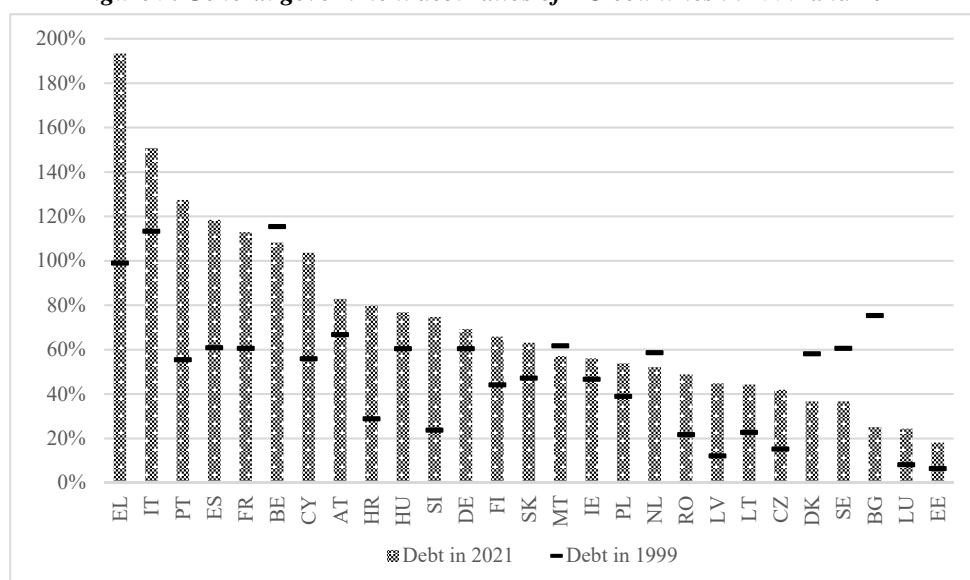


Source: World bank.

Along with the varied institutional quality, the EU countries mostly exhibit increased indebtedness. The debt ratios of EU27 countries in 1999 and 2021 are presented in Figure 9. The initial average debt ratio is 51% and it rises to 73%. At first, 11 EU countries had a debt ratio beyond 60% of GDP, but this number rose to 14 till the end of the period. Notably, half of these 14 countries even have debt exceeding their GDP in 2021. All of them are EA members, such as Greece, Italy and Portugal, servicing debt relative to GDP to the tune of 193%, 151% and 127%, respectively. Therefore, the issue of exorbitant indebtedness is of high relevance for the euro area countries. The EU countries with the lowest debt ratio in 2021 are Estonia, Luxembourg and Bulgaria, where the debt ratio is 18%, 24% and 25%, respectively. In fact, Estonia and Luxembourg have preserved their relative debt positions over time. Although Latvia has positioned itself among the countries with the lowest debt in 1999, subsequently, it raised its debt ratio by 33 p.p. Bulgaria exhibited a staggering drop in its debt ratio from 75% to only 25%, ranking the country among the EU members with lowest debt in 2021. Other countries that reduced their indebtedness, though far less, are Sweden and Denmark. They cut their debt ratio by 24 p.p. and 21 p.p. Generally, the relatively low compliance with the nominal convergence criterium for debt ratio shadows the growth prospects of the indebted countries as the interest rate on the debt becomes a significant determinant of the budget balance. This concern is even more relevant at present because the need of more debt to fight the pandemic that is still ongoing periodically has not come to an end. Such a possibility is recognized by Deb et al. (2021), who argue that emergency lifelines should not be withdrawn prematurely as they have been vital to support the economy during

the COVID-19 crisis. Specifically, these measures are elaborated in a way that permits work from home, social distancing and periods of temporary unemployment.

**Figure 9. General government debt ratios of EU countries in 1999 and 2021**



Source: Eurostat.

Evidently, the individual convergence experience of the EU countries is largely varied. Thus, it seems that the participation either in EA or non-EA doesn't reconcile with only two-speed Europe. Rather, there exists another cluster distribution that adequately captures the current heterogeneity of the EU members. Such inference is reinforced when taking into account other determinants of the catching-up process whose impact is initially not straightforward to measure. The joint examination of more convergence factors could be accomplished econometrically through a panel regression for EU27. The novelty in this analysis is the applied decomposition of the initial GDP level in the growth regression into dependency ratio, employment ratio and labour productivity.

The linear-log model and its modifications are presented in Table 1.

In the basic specification in column 1 of table 1, apart from the dependency ratio, all other convergence determinants have coefficients that are statistically significant at 1% level and with expected signs. All else being equal, a 1% higher initial employment ratio leads to lower economic growth by 0,0032 p.p. Furthermore, a 1% higher initial labour productivity ratio leads to lower economic growth by 0,0062 p.p. In effect, the dynamics of the population structure fail to be any significant determinant in the model. In general, the aforementioned findings are in line with the hypothesis of conditional convergence, which is predominantly induced by the employment ratio and labour productivity.

**Table 1. Growth regression for EU27 over 1999-2020**

	(1)	(2)	(3)	(4)	(5)
	Basic specification	Augmented with debt	Test for debt-inv hypothesis	Test for debt-edu hypothesis	Test for RQ-inv hypothesis
Dependent variable – long-run economic growth for the period 2001-2020					
Estimator	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS
constant	0,02***	0,03***	0,03***	0,03***	0,03***
$\Delta\text{Log}(\text{dr}(-1))$	-0,25	-0,41	-0,29	-0,44	-0,36
$\Delta\text{Log}(\text{er}(-1))$	-0,32***	-0,58***	-0,60***	-0,59***	-0,61***
$\Delta\text{Log}(\text{lp}(-1))$	-0,62***	-0,67***	-0,70***	-0,70***	-0,68***
$\Delta\text{Log}(\text{edu})$	0,05**	0,02	0,02	0,02	0,02
$\Delta(\text{RQ})$	0,06***	0,05***	0,05***	0,05***	0,03**
$\Delta(\text{Log}(\text{Open}))$	0,36***	0,27***	0,27***	0,27***	0,27***
$\Delta(\text{Log}(\text{Debt}))$		-0,12***	-0,12***	-0,13***	-0,13***
DumDebtInv			-0,01***		
DumDebtEdu				-0,01***	
DumRqInv					0,01**
R-squared	0,5	0,58	0,59	0,59	0,59
Prob(F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000
DW	2.05	2.14	2,14	2,13	2,15

The levels of significance at 1%, 5% and 10% are denoted respectively as \*\*\*, \*\* and \*.

Source: Own estimations.

The government is responsible to secure an adequate level of education for all of its citizens. These actions maintain and even increase the human capital of the country, which is a vital convergence determinant in the long run. Specifically, provided that all else being equal, higher public expenditures on education by 1 p.p. trigger a higher GDP growth by 0,0005 p.p.

The Worldwide Governance Indicator of Regulatory quality is a measure of the institutional level. Overcoming the crises over time is perceptibly eased, provided that the institutional structure of any country is robust. Then the actions of the government are likely to be perceived as credible. Other things remaining the same, a higher regulatory quality by one unit induces higher economic growth by 0,0006 p.p.

Participation in a union such as the EU provides various trade benefits boosting the economic development of the members. All else equal, a rise in the openness of the economy by 1 p.p. brings forth higher GDP growth by 0,0036 p.p. Nevertheless, the higher openness could also trigger larger spillover effects in times of crisis.

Excessive debt accumulation has been a critical issue to address for many EU countries over 1999-2021. It is reasonable to explore whether the higher debt ratio might turn out to be an impediment to higher growth and convergence, respectively. To account for such a possibility, the basic specification is augmented with a new debt variable in column 2 of table 1. The impact of the public debt ratio on economic growth is negative and statistically significant at 1% level. It is certainly a distressing fact that further debt accumulation weighs on growth, so it is important to reveal the mechanism of that impact. A reasonable conjecture could be through the investment channel. In order to explore this possibility, a dummy

variable is inserted into column 3 of table 1. This dummy variable denoted as *DumDebtInv* is defined the following way:

$$D = \begin{cases} 1 & \text{if } \text{debt ratio}_i > \text{average debt ratio}_{EU} \text{ and} \\ & \text{investment ratio}_i < \text{average investment ratio}_{EU} \\ 0 & \text{if one or both of the conditions do not hold} \end{cases}$$

The specific hypothesis under examination is whether the highly indebted countries observe diminishing gross capital formation. The coefficient of the dummy variable is negative and significant at 1 % level. This result might stem from various reasons. First, a crowding-out effect on private investments arises due to higher interest rates. Second, fears about government solvency overwhelm firms limiting any profitable private investment prospects. Thirdly, the public sector diverts budget funds in order to service its debt, so it fails to fulfil its investment targets. Eventually, the investments within the economy plummet. In fact, there are also two subtle explanations for the damaging effects of debt. For instance, it is highly likely that the marginal productivity of newly undertaken public investments drops as the debt keeps accruing. Besides, the regular usage of debt to alleviate social problems eventually suppresses any incentives of the government for structural reforms, so the institutional level stalls. The last explanation relates the debt problems with the development of a country's institutions. Thus, the debt problems could explain why some EU members fail to keep pace in real convergence or fall into an income convergence trap.

The specific argument that focuses on the government redirecting funds to free space in the budget for growing interests pertains not only to the accumulation of physical capital but also to human capital stock. It is worrying if this redistribution is performed on the cost of essential expenditures, such as educational outlays, because they closely correspond to the long-term capacity of the economy. To explore this proposition, a dummy variable is plugged into column 4 of table 1:

$$D = \begin{cases} 1 & \text{if } \text{debt ratio}_i > \text{average debt ratio}_{EU} \text{ and} \\ & \text{EDU}_i < \text{average education ratio}_{EU} \\ 0 & \text{if one or both of the conditions do not hold} \end{cases}$$

The coefficient of *DumDebtEdu* is negative and statistically significant at 1%. Hence, in countries with higher than average debt ratio, the educational expenditures as a share of the total government outlay tend to be smaller to a certain degree, which in its turn impacts long-term economic growth unfavourably. This is because, due to high debt, human capital formation is, in effect, restrained over time. Strikingly, the conclusion that indebted countries fail to invest more in education is not robust to alternative definitions of the hypothesis. Specifically, the opposite reformulation of the hypothesis stating that countries with less debt invest more in education is not evidenced in the dataset; that is, it is rejected at 5% level of significance. This observation is suggestive that the relatively lower debt ratio does not necessarily correspond to a higher share of expenditures on education within the total budget outlays, but when the debt is higher than average, the expenditures on education are highly likely to be crowded out by the interests.

As discussed above, the higher regulatory quality exerts a positive impact on convergence. The security which the resilient national institutions bestow upon the population is the



mechanism through which economic growth is enhanced. The confidence in the institutions could be discerned through the actions of firms and households. This conjecture could be subjected to further examination. To that end, in column 5 of table 1 the model is modified to include a dummy variable *DumRqInv* focusing on the relation between regulatory quality and investments in the economy:

$$D = \begin{cases} 1 & \text{if regulatory quality}_i \text{ rises and} \\ & \text{investment ratio}_i > \text{average investment ratio}_{EU} \\ 0 & \text{if one or both of the conditions do not hold} \end{cases}$$

The dummy variable has a positive coefficient which is statistically significant at 5% level. Therefore, to accelerate their convergence to EU income levels, the countries should focus on the improvement of their institutions. Thus, growing unsustainably without addressing the institutional framework is costly in the long term.

The invariable high statistical significance of all conditioning variables confirms the multifaceted nature of real convergence. Thus, it is insufficient to rely only on a limited number of variables on the path to sustainably high-income per capita levels.

#### 4.3 Partitioning into clubs

According to the white book for the future of the EU, multi-speed Europe is the third plausible scenario called “Those who want more do more” (European Commission, 2017). Following a debate, the EU countries could become part of one or several “coalitions of the willing” that work together in specific policy areas. This paper argues, however, that the EU countries have already clubbed in terms of convergence. In other words, the joint alignment in the convergent development of individual countries is inevitable in a community based on some level of integration, such as the EU. In particular, the unveiling of the clusters gives a momentous picture of the heterogeneity of the EU. Then, the specific cluster position of a country could serve as a reference point for the government about the challenges ahead.

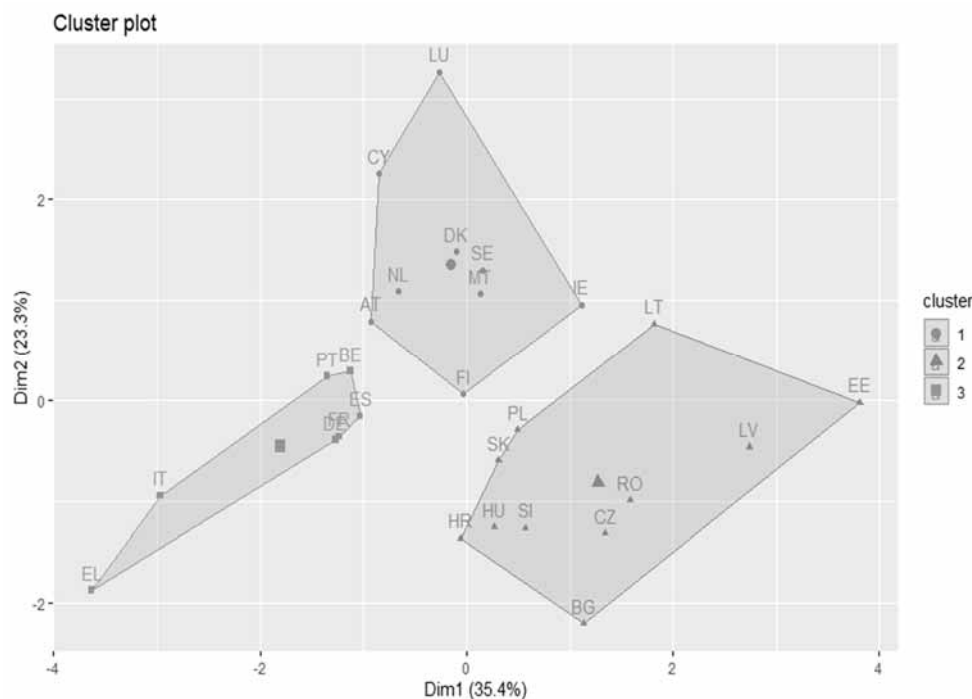
The discussed variables<sup>4</sup> guiding the convergence might help the derivation of the clusters. The elbow plot in appendix 2 indicates that there is a discernable drop in the within-groups sum of squares when moving from one to three clusters. After three clusters, this decrease drops off, suggesting that a three-cluster solution may be a good fit for the data. The derived clusters can be shown in Figure 10.

Although the algorithm makes use of standardized data, it is possible to determine the variable means for each cluster in the original metric, as in Table 2. The clusters are listed in descending order in terms of the labour productivity growth rate. Enriching the focus on the issue of convergence truly introduces subtle aspects of the development of the countries over time.

---

<sup>4</sup> The variable degree of openness is excluded from the calculations as it produces extreme outliers such as Luxembourg and Malta.

**Figure 10. Derived clusters in the EU over 1999-2020**



Source: Own estimations

**Table 2. Centroids of the clusters in original metric (%)**

Cl	Countries	dr	er	lp	rq*	Inv	rdebt	edu
2	BG, CZ, EE, HR, LV, LT, HU, PL, RO, SI, SK	-0.23	0.82	5.64	0.86	24.76	38.13	12.08
1	DK, IE, CY, LU, MT, NL, AT, FI, SE	-0.07	0.42	3.68	1.60	22.48	52.82	12.12
3	BE, DE, EL, ES, FR, IT, PT	-0.24	0.49	2.74	1.09	21.49	97.23	9.96

\* The estimate gives the cluster's score on the aggregate indicator, in units of a standard normal distribution.

Source: Own estimations.

After taking into account the additional variables, all the high-convergence performers share a joint second cluster. This club exhibits a much higher growth rate of labour productivity and employment ratio. Interestingly, this cluster is not comprised only of countries outside the EA. In fact, it also includes the three Baltic countries, Slovenia, Slovakia and Croatia, which are planned to join the euro area on 01.01.2023. Besides, Bulgaria entered the preparatory phase for euro adoption as the Bulgarian lev was included in the European exchange rate mechanism (ERM II) on 10 July 2020. Thus, Bulgaria is set to operate under a regime of stable exchange rates vis-à-vis the euro and is expected to further strengthen its macroeconomic, macroprudential, supervisory and structural policies. With the exclusion of Denmark and Sweden, clusters 1 and 3 include only EA countries. Particularly, the countries in cluster 3 exhibit lower productivity than the rest of the EA members. This observation is

indicative of the existing and widening gap in the core of the euro area, despite the relatively identical growth rate of employment in both clusters. Similar to Borsi and Metiu (2015), the boundaries of the formed clusters are not tightly related to EMU membership, as EA countries are evident in all three clusters.

Although cluster 2 is growing rapidly, it is not devoid of demographic problems similar in magnitude to these of cluster 3. These issues are addressed through measures such as higher retirement age, stimuli for work after retirement etc. Although to a smaller extent, cluster 1 also experiences continuous changes in the population structure. These changes forebode future challenges for the pension and social systems.

What is important here is that the differences between the clusters are also noticeable with respect to the other variables. Conspicuously, the countries that grow the swiftest are not the ones with the most robust regulatory quality. On the contrary, they experience an institutional gap which renders the real convergence for them a moving target. Cluster 3 also exhibits certain deficiencies in institutional quality. Though being challenging to measure, this aspect provides the countries with prospects for sustainable convergence. Cluster 1 commands the highest institutional quality. As already proven, the institutional environment is related to the investment dynamics. Due to higher prospects for convergence in view of the initial low capital stock and presumed commitment to strengthen the institutions, cluster 2 enjoys higher investment. However, any deviation from this commitment is valued very poorly by foreign investors and consequently reflected in the investment dynamics. That is how insufficient institutional quality is directly able to suppress the convergence rate. Analogously, the undeveloped and slowly transforming institutions have certainly contributed to some emigration over the years. The outflow of highly-educated workers negatively affected the overall human capital and employment in these countries. Therefore, the low level of institutions sooner or later turns into a bottleneck for the pursued convergence to higher incomes.

The inference for a negative relationship between debt and investments is fully reflected in the cluster results. The debt stock for cluster 2 is relatively low, so the investment ratio is higher with respect to the other growth clubs. However, the investments as a share of GDP plummet the higher the average debt stock. Thus, the investment ratio is the lowest for cluster 3, which is comprised of the debt-stricken EA countries. Cluster 1 is a borderline case due to its intermediate level of debt. Depending on the assumed fiscal stance over the medium term, the countries in cluster 1 might retain their position or might descend into cluster 3. In line with the debt problems, cluster 3 also has the relatively lowest share of expenditures in total outlays, amounting to 9,96%. In contrast, the lower debt burden of clusters 2 and 3 allows them to invest more in education. As previously discussed, however, the lower debt is not needfully associated with a higher share of expenditures on education. Such is the case for cluster 2. Despite its lowest debt ratio, the included countries are not the ones to invest in education the greatest. Rather, they invest slightly less than the countries in cluster 1, which have relatively higher debt.

Overall, the club of high-fliers in convergence enjoys higher growth rates of productivity and employment but suffers critically from an insufficient level of institutions. These two main contributors to economic growth help the countries in this cluster to overcome organically any debt issues leaving them at a low level of indebtedness and more budget funds to invest

in physical and human capital. The remaining countries are grouped by debt and regulatory quality into two clubs. The former cluster, with resilient institutions and moderate debt, still has enough fiscal space to plan its investments in various forms of capital, so it earns a premium to economic growth by roughly one percentage point. The latter cluster suffers from limited fiscal leeway to invest, so its lower economic growth and relatively lower institutional level deepen the debt issues. Although the unfavourable demographic dynamics affect all clusters, this issue is most relevant for the indebted EA countries.

## **5. Conclusions**

Falling into a certain cluster doesn't mean that the relative position of any EU country is perpetuated over time. Rather, this should be an incentive for the country to improve its real convergence prospects. The implied policy implications are the following:

- From the multiplicative decomposition, it follows that a persistent unfavourable demographic change has burdened the real convergence of the EU countries over 1999-2021. In view of that, the EU governments should focus on policies to stimulate the birth rate and after-retirement employment;
- Digitalization could bring forth immense benefits for the economy. While it could directly raise the aggregate level of productivity, it could lead to the creation of various productions and jobs in the economy. It could also render the economy resilient to various shocks, such as the recent pandemic;
- Sound institutions should be put high on the agenda of each government. Lagging behind institutional convergence puts a cap on the development of any given country. In fact, the nominal convergence of a country solely doesn't ensure higher incomes without previously attained robust regulatory quality;
- Omitting the debt ratio as a long-term determinant of the convergence process is unjustifiable. Specifically, not accounting for this factor could overestimate the convergence forces. The reason is that the adverse impact of excessive debt stock worsens some parameters of the economy that define its long-term potential. These are, in particular, lower gross capital formation and suppressed education expenditures, that is, slower physical and human capital accumulation;
- The explicit club formation is indicative for the policymakers of which clusters of countries can be severely affected or helped by specific policies, such as an increase in the ECB policy rate, increase in the money supply, provision of EU funds for alleviating social disparities etc.

The applied methodology is to broaden the discussion for convergence as an intricate research issue involving many aspects of development. Hopefully, this knowledge will be useful for countries facing slow or stalled convergence for years. The econometric approach could be further extended in future works by using longer time series, including more countries and considering nonlinearities between growth and conditioning variables. The clustering approach could further be refined by applying other measures for the distance

between observations, such as Manhattan, Canberra and asymmetric distance. Other similar methodologies, such as hierarchical clustering, could also be applied.

## References

- Alcidi, C. (2019). Economic Integration and Income Convergence in the EU. – *Intereconomics*, Vol. 54, No. 1, pp. 5-11.
- Alexiadis, St. (2013). *Convergence Clubs and Spatial Externalities. Models and Applications of Regional Convergence in Europe*. Springer-Verlag Berlin Heidelberg.
- Barro, R., Lee, J. W. (2013). A New Data Set of Educational Attainment in the World, 1950-2010. – *Journal of Development Economics*, 104, pp. 184-198.
- Barro, R. J., Sala-i-Martin, X. (1991). Convergence across States and Regions. – *Brookings Papers on Economic Activity*, 22 (1), pp. 107-182.
- Baumol, W. J., Wolff, E. N. (1988). Productivity Growth, Convergence, and Welfare: Reply. – *American Economic Review*, 78, pp. 1155-59.
- Baumol, W. J. (1986). Productivity Growth, Convergence, and Welfare: What the Long-Run Data Show. – *American Economic Review*, 76, pp. 1072-1085.
- Ben-David, D. (1994). *Convergence Clubs and Diverging Economies*. Centre for Economic Policy Research, Working Paper 922.
- Ben-David, D. (1998). Convergence Clubs and Subsistence Economies. – *Journal of Development Economics*, Vol. 55, no. 1, pp. 155-171.
- Bobeva, D. & Atanasov, A. (2017). Macroeconomic Imbalances in Euro- and Non-Euro Area Member States. – *Yearbook of UNWE*, pp. 21-49
- Borio, C. (2014). The Financial Cycle and Macroeconomics: What have we learnt?. – *Journal of Banking & Finance*, Vol. 45, pp 182–198.
- Borsi, M. T., Metiu, N. (2015). The Evolution of Economic Convergence in the European Union. – *Empirical Economics*, 2015(48), pp. 657-681.
- Cavaliere, G., Xu, F. (2014). Testing for Unit Roots in Bounded Time Series. – *Journal of Econometrics*, 178 (2), pp. 259-272.
- Cavallaro, E., Villani, I. (2021). Club Convergence in EU Countries: A Sectoral Perspective. – *Journal of Economic Integration*, 36(1), pp. 125-161.
- Coutinho, L., Turrini, A. (2020). Real Convergence Across the Euro Area. – *Intereconomics*, 55, pp. 301–311.
- De Long, B. J. (1988). Productivity Growth, Convergence, and Welfare: Comment. – *The American Economic Review*, vol. 78, no. 5, pp. 1138-1154.
- Deb, P., Furceri, D., Ostry, J. D. & Tawk, N. (2020). The Economic Effects of COVID-19 Containment Measures. IMF, WP/20/158.
- Deb, P., Furceri, D., Ostry, J. D., Tawk, N. & Yang, N. (2021). The Effects of Fiscal Measures During COVID-19. IMF, WP/21/262.
- Diaz del Hoyo, J.-L., Dorrucchi, E., Heinz, F. F., Muzikarova, S. (2017). Real Convergence in the Euro Area: a Long-term Perspective. *European Central Bank Occasional Paper*, 203.
- Durlauf, S. N., Johnson, P. A. (1995). Multiple Regimes and Cross-Country Growth Behaviour. – *Journal of Applied Econometrics*, 10 (4), pp. 365-384.
- Edwards, S. (1998). Openness, Productivity and Growth: what do we really know?. – *The Economic Journal*, 108(447), pp. 383-398.
- European Commission. (2017). *White Paper on the Future of Europe: Reflections and Scenarios for the EU27 by 2025*.
- European Commission. (2021). *The 2021 Ageing Report: Economic & Budgetary Projections for the EU Member States (2019-2070)*. Institutional Paper 148.
- Eyraud, L., Wu, T. (2015). *Playing by the Rules: Reforming Fiscal Governance in Europe*. – IMF Working Paper, No. 15/67.
- Fegerberg, J., Verspagen, B. (1996). Heading for Divergence? Regional Growth in Europe Reconsidered. – *Journal of Common Market Studies*, 34 (3), pp. 431-448.
- Franks, J., Barkbu, B., Blavy, R., Oman, W., Schoelermann, H. (2018). Economic Convergence in the Euro Area: Coming Together or Drifting Apart?. IMF, WP/18/10.

- Granger, C. W. J. (2010). Some Thoughts on the Development of Cointegration. – *Journal of Econometrics*, 158, pp. 3-6.
- Han, X., Khan, H., Zhuang, J. (2014). Do Governance Indicators Explain Development Performance? A Cross-Country Analysis. *Economics Working Paper Series*, No 417, Asian Development Bank.
- Hartigan, J. A., Wong, M. A. (1979). A k-Means Clustering Algorithm. – *Applied Statistics*, 28, pp. 100-108.
- Ignatov, I. (2020). Inflexibility of the EU Budget Positions in 2000-2018. Conference proceedings, Jubilee International Scientific Conference “Economic and Social [Dis]Integration”, Plovdiv, pp. 635-642.
- Ignatov, I. (2021). Unravelling the EU Debt Knot over 2000-2019: An Injection-Leakage Approach. – *Economic Studies (Ikonomicheski Izsledvania)*, 30(5), pp.49-71.
- Im, K. S., Pesaran, M. H., Shin, Y. (1997). Testing for Unit Roots in Heterogeneous Panels. MS, Department of Applied Economics, University of Cambridge.
- Islam, N. (2003). What have we learnt from the Convergence Debate?. – *Journal of Economic Surveys*, 17 (3), pp. 309-362.
- Ivanova, V., Chipeva, S. (2021). The Impact of Green Technologies on Transition to Circular Economy. – *Management and Business Research Quarterly* 17, pp. 55-71.
- Juncker, J.-C., Tusk, D., Dijsselbloem, J., Draghi, M., Schulz, M. (2015). Completing Europe’s Economic and Monetary Union.
- Kaldor, N. (1957). A Model of Economic Growth. – *The Economic Journal*, 67(268), pp. 591-624.
- Kaufmann, D., Kraay, A., Mastruzzi, M. (2011). The Worldwide Governance Indicators: Methodology and Analytical Issues. – *Hague Journal on the Rule of Law*, 3(2), pp. 220-246.
- Knack, S., Keefer, P. (1995). Institutions and Economic Performance: Cross-Country Tests using Alternative Institutional Measures. – *Economics and Politics*, Vol. 7, N 3, pp. 207-227.
- Levin, A., Lin, C. F., Chu, C. S. (2002). Unit Root Tests in Panel Data: Asymptotic and Finite Sample Properties. – *Journal of Econometrics*, 108, pp. 1-24.
- Maloney, W., Taksin, T. (2020). Determinants of Social Distancing and Economic Activity during COVID-19: A Global View. – *Covid Economics: Vetted and Real-Time Papers*, 2020(13), pp. 157-177.
- Mankiw, N. G., Romer, D., Weil, D. N. (1992). A Contribution to the Empirics of Economic Growth. – *The Quarterly Journal of Economics*, Vol. 107, pp. 407-437.
- Masuch, K., Moshhammer, E., Pierluigi, B. (2016). Institutions, Public Debt and Growth in Europe. *ECB Working Paper Series*, No 1963.
- Nikolova, V. (2020). Debt Sustainability of EU Member States: A Cluster Analysis. – *Economic Archive*, (1), pp. 44-56.
- North, D. (1993). Institutions and Credible Commitment. – *Journal of Institutional and Theoretical Economics*, Vol. 149, pp. 11-23.
- Pirimova, V. (2020). Comparative Analysis of Structural  $\Sigma$ -convergence of Exports. In *Fourth International Scientific Conference on Recent Advances in Information Technology, Tourism, Economics, Management and Agriculture*, Association of Economists and Managers of the Balkans, Belgrade, Serbia, pp. 93-105.
- Quah, D. T. (1996a). Empirics for Economic Growth and Convergence. – *European Economic Review*, Vol. 40, pp. 1353-1375.
- Quah, D. T. (1996b). Twin Peaks: Growth and Convergence in Models of Distribution Dynamics. – *The Economic Journal*, Vol. 106, N 437, pp. 1045-1055.
- Raleva, S., Marikina, M. (2021). Structural Convergence with Eurozone and Institutional Quality in Bulgaria. – In: Bilgin, M. H., Danis, H., Demir, E., Karabulut, G. (eds.). *Eurasian Business and Economics Perspectives*. *Eurasian Studies in Business and Economics*, Vol. 20, Springer, Cham.
- Rangelova, R., Bilyanski, V. (2019). Economic Aspects of Demographic Changes in the European Union and in Bulgaria. – *Economic Studies (Ikonomicheski Izsledvania)*, 28(5), pp. 25-54.
- Solow, R. (1956). A contribution to the Theory of Economic Growth. – *The Quarterly Journal of Economics*, Vol. 70, N 1, pp. 65-94.
- Swan, T. W. (1956). Economic Growth and Capital Accumulation. – *The Economic Record*, 32(2), pp. 334-361.
- Von Lyncker, K., Thoennessen, R. (2017). Regional Club Convergence in the EU: Evidence from a Panel Data Analysis. – *Empirical Economics*, 52(2), pp. 525-553.
- Wallis, J., North, D. (1986). Measuring the Transaction Sector in the American Economy, 1870-1970. – In: Engerman, S., Gallman, R. (eds.). *Long-Term Factors in American Economic Growth*, 95-148, University of Chicago Press: Chicago and London.
- Zlatinov, D., Atanasov, I (2021). Absolute and Conditional Convergence: A Story about Convergence Clubs and Divergence in the EU. – *Economic Studies (Ikonomicheski Izsledvania)*, 30(2), pp. 39-55.

### Appendix 1

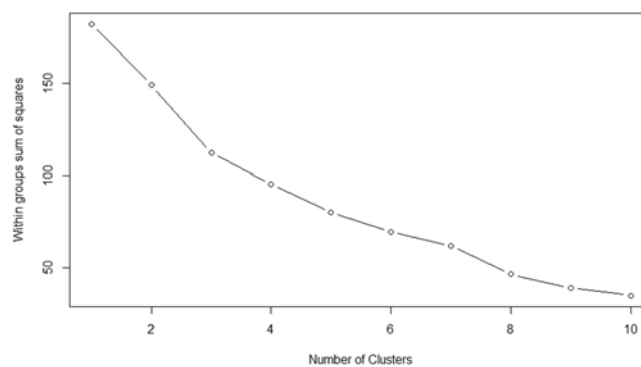
#### Pool unit root test: Summary

Variables	Levin, Lin and Chu test statistic		Im, Pesaran and Shin test statistic	
	At levels	First difference	At levels	First difference
Dr	0.89847	-3.53646***	3.59135	-4.09559***
Er	0.23597	-9.07001***	2.33088	-9.07816
Lp	4.45376	-17.0209***	9.87861	-18.6680***
Edu	-2.41612***	-19.8957***	-2.28030**	-19.7172***
Rq	1.73985	-6.84991***	-0.83472	-13.0094***
Open	-2.28779**	-17.3397***	0.78994	-18.3568***
Debt	-0.02494	-12.5782***	1.78122	-12.2853***

Source: Own estimations.

### Appendix 2

#### Within-groups sums of squares vs the number of clusters extracted



Source: Own estimations.

Stefan Petranov<sup>1</sup>  
Milena Angelova<sup>2</sup>  
Lillyana Georgieva<sup>3</sup>  
Radostina Ivcheva<sup>4</sup>  
Nino Avreyski<sup>5</sup>

## IS TAX MORALE HOMOGENEOUS IN BULGARIA?<sup>6</sup>

*The article argues that tax morale is an essential component of social capital with a significant impact on tax compliance and tax collection. Against this backdrop, the results of the study are based on a questionnaire survey in Bulgaria, conducted among 1280 employed individuals. They work in enterprises that are representative of the country's economy in terms of economic activity, size, and geographical location. We design an index to assess the tax morale of the respondents and use it to address a series of questions. What is the tax morale of the Bulgarian population currently? What factors possibly influence it? Are there any differences between various population groups, based on socio-demographic or socio-economic characteristics? The results show that tax morale in Bulgaria is heterogeneous. Such findings lead to certain conclusions about economic policy reforms. By influencing the tax morale of the population, policymakers can improve tax collection. Our estimations show that a relatively large share of the population in Bulgaria has average or low tax morale. We point out that one of the most effective ways to increase tax revenues is through targeted measures to improve the tax morale of specific groups of people with a high inclination to participate in the shadow economy and evade taxes. Using statistical tests and ordinal regression models, this article provides empirical evidence that the profile of these individuals includes low income, living in regional cities, younger age and poor education.*

*Keywords: tax morale; tax collection; shadow economy; economic policy; ordinal regression model; Bulgaria*

*JEL: H26; H30; K42; O17*

---

<sup>1</sup> Stefan Petranov, PhD, Professor at Sofia University "St. Kliment Ohridski", e-mail: [spetranov@feb.unisofia.bg](mailto:spetranov@feb.unisofia.bg).

<sup>2</sup> Milena Angelova, PhD, Chief assistant in the Institute for Economic Studies, Bulgarian Academy of Sciences, Secretary-General of BICA.

<sup>3</sup> Lillyana Georgieva, PhD Candidate at Sofia University "St. Kliment Ohridski", e-mail: [lillyana.georgieva@abv.bg](mailto:lillyana.georgieva@abv.bg).

<sup>4</sup> Radostina Ivcheva, PhD Candidate at Sofia University "St. Kliment Ohridski", [radi\\_ivcheva@abv.bg](mailto:radi_ivcheva@abv.bg)

<sup>5</sup> Nino Avreyski, Masters Student at Sofia University "St. Kliment Ohridski", [ninoavreyski@gmail.com](mailto:ninoavreyski@gmail.com).

<sup>6</sup> This research article is financed by the "Scientific Research" Fund under project № 80-10-193 / 27.05.2022.

This paper should be cited as: Petranov, S., Angelova, M., Georgieva, L., Ivcheva, R., Avreyski, N. (2023). *Is Tax Morale Homogeneous in Bulgaria?*. – *Economic Studies (Ikonomicheski Izsledvania)*, 32(3), pp. 64-87.



## **Introduction**

Tax collection is fundamental for every country. The development of a civilized society is impossible without a respective mechanism to provide resources for building and maintaining infrastructure, defence, security and law enforcement, education, health care and other public goods, which are provided more efficiently by the state rather than by the free markets.

The funding of these public goods is ensured through the state and local budgets, that in turn are funded through taxes and other revenues. But tax collection is associated with costs and for a number of reasons, taxpayers do not always pay in full what they owe to the public authorities. From this perspective, it is clear that the effective management and provision of public goods requires a deep understanding of the underlying motivations that encourage or discourage taxpayers to fulfil their tax obligations.

What motivates economic agents to pay taxes? Undoubtedly, the mechanism of coercion plays a role in this process. Individuals and firms are obliged to declare their income and pay their due taxes. Otherwise, they would face some sanctions. This very mechanism provides a possible explanation for their motivations. If economic agents do not comply with their tax obligations, they will certainly benefit financially, but at the same time, there might be penalties and costs. The benefit is related to tax rates, and the cost of incurring penalties is related to the likelihood of tax audits and the severity of the penalties. If the expected benefit is lesser than the expected cost, then rational economic agents will be motivated to pay their tax obligations, and vice versa.

This point of view, along with the assumption of the rational economic agent, provides an explanation for the mechanism that motivates the payment of taxes. It is on the basis of the understanding that if the collection of taxes is insufficient, then the sanctioning measures should be strengthened. Following this logic, increasing the number of tax audits and raising penalties will make the expected costs of tax evasion higher and this will increase the motivation to comply with tax obligations. The same effect would be achieved by reducing tax rates, which in turn leads to a reduction in the benefit of tax evasion. The same logic is often applied in practice by the tax administration, and it is formalized in the baseline model of Allingham and Sandmo (1972).

Nevertheless, this viewpoint is not sufficient to fully explain the taxpayers' motivation. In recent years, another possibility has been increasingly discussed in economic literature: a motivational mechanism based on, broadly speaking, moral considerations, as a complementary one to the mechanism generated by the assumptions of rational behaviour. In this regard, the concept of "tax morale" is considered and is regarded as a set of motives influencing the tax behaviour of individuals. These motives, however, are not related to monetary benefits and rational behaviour in the sense presented in the model of Allingham and Sandmo (1972).

There are plenty of examples of such motives. First of all, on a theoretical level, a number of publications show that actual tax collection is higher than that predicted by the Allingham and Sandmo (1972) model (Alm *et al.* 1992). However, it is not only that, but there are also many practical examples. Such is the case with the church tax in Bavaria, collected by the Protestant Church. According to the official tax code, it is mandatory, but there is no penalty

mechanism, and this is well known among taxpayers. Despite of this, 20% of people do pay it (Dwenger *et al.* 2016). Another such example can be observed from the empirically documented differences in the tax behaviour of economic agents with different cultural profiles operating under the same economic conditions (Torgler and Schneider 2007).

Motives for voluntary tax payment, without coercion and fear of sanctions, can be triggered by various factors. Social norms, traditions, cultural environment and education can all play a role in this regard. Such motives can be, for example, an internal conviction that this is the right thing to do, or the understanding that in this way more and better public goods will be obtained, or possibly a positive or negative attitude from people whose opinion the relevant taxpayer values (for more details see Luttmer and Singhal 2014). These very motives shape tax morale, and since it affects tax behaviour and the collection of public funds and hence economic development, tax morale is clearly an important component of social capital.

The indisputable importance of tax morale as an element of social capital highlights the need for it to be studied and evaluated. At the same time, as far as we know, there are no in-depth studies in this area for Bulgaria. What is the tax morale of the Bulgarian population at the present moment? What factors possibly influence it? Are there differences between different population groups? Is it possible to increase tax compliance by improving tax morale? These are the questions on which this article focuses as a scientific objective. Our task is to design a quantitative measure, based on a questionnaire survey, to assess the tax morale of different groups of the population. In order to address the above questions, we raise the general hypothesis that different groups of the population have different levels of tax morale and we test statistically several forms of this hypothesis. The fact that for our analysis we use the results from a questionnaire survey imposes some natural limitations. The survey is conducted among 1280 employed individuals, which leaves out of its scope employers and self-employed. Therefore, technically the obtained results should be pertained to the population of employed individuals. Nevertheless, we believe that the results can be applied with high confidence to the entire population, because employed individuals represent the vast majority of the economically active population.

The text in the remaining parts of the article is organized as follows. In Section 1, we discuss the importance of tax morale as a component of social capital influencing taxpayers' behaviour. In Section 2, we show the data we use and design a quantitative index that we consider as a measure of individuals' tax morale. Section 3 contains three sub-sections. In sub-section 3.1. we examine the homogeneity of tax morale from the judgment point of view for various scenarios involving damage to public funds. In addition, in sub-sections 3.2 and 3.3., we examine the homogeneity of tax morality from the point of view of different groups of the population of employed individuals, distinguished based on socio-demographic and socio-economic characteristics. Section 4 presents the main conclusions of our study.

## **1. Why is Tax Morale Important? A Short Literature Review**

As stated in the Introduction of this article, economic agents make their decisions based on two different motivational mechanisms: whether to pay their taxes due or evade them. State coercion is one of these mechanisms and the other one is that of internal conviction, which

is shaped under the influence of social norms, education, upbringing, and the cultural environment. Both mechanisms are important, as they complement each other, and taxpayer behaviour is ultimately shaped by the overall combined influence of these two mechanisms.

It is very difficult to estimate in a quantitative way the exact impact of each of the mechanisms on tax compliance because they interact with each other, and the respective interaction can change according to the circumstances. But the exact quantification of the size of the influence of one or the other mechanism is not so important. The important thing is to accept that both of them exist, because this understanding provides a more complex and accurate explanation of the taxpayers' behaviour.

If tax morale plays a role in taxpayers' behaviour, then through policies, targeted towards its improvement, an increase in tax compliance can be achieved. This could be done at minimal cost and would be effective not only from a financial perspective, but also with respect to economic development. This is so, as morale values are stable over time and are usually preserved in the long run. In this context, understanding tax morale and recognizing its characteristics can lead to better and more successful tax policy. Such an approach is recommended to tax administrations by international institutions – OECD (2013).

A number of empirical studies show that tax morale has a significant effect on the behaviour of taxpayers. Higher levels of tax morale correlate with lower rates of tax evasion and vice versa. Stark and Kirchler (2017) found such a relationship, for example, in the study of inheritance taxes. Based on an analysis of portfolio investment flows from 138 countries to 21 developed OECD member countries, Kemme *et al.* (2020) find evidence of tax avoidance through cross-border operations for countries that have low tax morale estimates. In a more general context, an inverse relationship between tax morale and tax evasion is confirmed by data for the US and Turkey in the study by Torgler *et al.* (2008), from data for Costa Rica and Switzerland in Torgler (2004), as well as in other studies.

A relationship between tax morale and tax evasion automatically implies the existence of a relationship also between tax morale and various manifestations of the shadow economy, as one of the main reasons for the existence of the shadow economy is precisely the benefit that tax evasion presents. Higher tax morale is associated with less undeclared work, which is one of the main forms of manifestation of the shadow economy (Windebank, Horodnic 2017). Higher tax morale is also associated with lower “envelope wages” (Williams, Horodnic 2017). Against the background of these results, higher tax morale naturally correlates with smaller sizes of the shadow economy in general (Halla 2010). The size of the shadow economy is related to the level of corruption, since money generated by the shadow economy is often the source of funds for corrupt practices.

Tax morale affects individual manifestations of the shadow economy, as well as its size as a whole; therefore, it is of essential importance for Bulgaria. Recent research works show that the size of the shadow economy in the country is relatively large compared to the other countries of the European Union (Petranov *et al.* 2022b, Kelmanson *et al.* 2019). In turn, the large size of the shadow economy has a negative impact on the accumulation of productive

capital and on total factor productivity, which leads to low economic growth<sup>7</sup> and, thus, slows down the economic development of the country.

## **2. Data and Variables**

This article is based on data from a survey prepared and conducted in the first half of 2020.<sup>8</sup> The survey itself is designed on a two-stage nested sampling model. In the first stage, the nests are selected – 600 enterprises throughout Bulgaria, selected in such a way, as to be representative from the point of view of business demographics according to the following three criteria: economic activity, size of the enterprise, and geographical location. In the second stage, between one and five employees are selected from each enterprise, while the specific number of employees to be interviewed depends on the enterprise's size. In 325 micro enterprises (with a staff of up to 9 people), only a single employee from each enterprise has completed the survey. Concerning the 166 small enterprises with a staff between 10 and 49 people, the survey has been completed by three people from each. In 82 medium-sized enterprises with a staff of between 50 and 249 people, four people from each participated. Finally, in 27 large enterprises with a staff greater than 250 people, five people from each were selected as respondents.<sup>9</sup>

After conducting the survey, the total number of respondents is 1283. When the questionnaire is filled out only by a single person, a scheme of alternation is being followed, so that the respondent from each enterprise is firstly a person with a higher or semi-higher education, then a person with a secondary education, and then another one with a lower education. When the survey is completed by three people, two of them have a higher or semi-higher education (at least a bachelor's degree), and the last one has a secondary or lower education. When there are four respondents, two of them have higher or semi-higher education and the other two are with secondary or lower education. In large enterprises, where there are five respondents, their selection was made in such a way that two of them have a higher or semi-higher education, and three have a secondary or lower education. In the selection of respondents, the principle of selecting persons proportionally from a gender point of view has been also implemented, based on the ratio between males and females in the respective enterprise.

The comparison between the sample of respondents and the data on the distribution of the country's population by various indicators from the National Statistical Institute (NSI) shows that in the data we have, the male/female ratio is practically identical to the ratio for the entire Bulgarian population. Regarding the age structure, the relative share of the group 15-24-year-

---

<sup>7</sup> *The inverse relationship between the size of the shadow economy and the macroeconomic production factors is studied in Petranov et al. (2022a).*

<sup>8</sup> *The survey is conducted online by the Bulgarian Industrial Capital Association in partnership with the Confederation of Independent Syndicates in Bulgaria, the Ministry of Labor and Social Policy, and labor market institutions, in execution of project BG05M9OP001-1.051-0001 „Improving the Access to Employment and the Quality of Workplaces by Limiting and Preventing Undeclared Employment “.*

<sup>9</sup> *The selection of enterprises, according to the number of their personnel, corresponds to the classification of micro, small, middle, and large enterprises that is adopted in Bulgaria.*

olds in our sample is smaller than on a national scale, but this is due to the fact that individuals at this age are primarily engaged in pursuing their education, and not so much with labour activity. Therefore, it is natural that the share of this age group in a sample of employed individuals is significantly smaller than the share of the same group in the population as a whole. Regarding education, the share of respondents who have completed higher or semi-higher education is greater than the corresponding share of the country's population with the same level of education, but this does not hinder the representativeness, because the deviations are not large. Greater differences are only noticeable according to the criteria of a place of residence, with about 90% of the individuals in the sample living in cities: a regional centre or the capital, compared to about 41% nationally.

The main object of this study is tax morale. This characteristic of individuals cannot be measured directly, so we use a psychometric approach to obtain an estimate of it. In this case, we assess respondents' tax morale with a set of questions revealing their attitude to certain events that, generally speaking, damage public funds. Respondents are invited to evaluate eight different scenarios using a 10-point Likert scale with numbers from 1 to 10, with a score of 1 indicating "absolutely unacceptable behaviour" and a score of 10 indicating "absolutely acceptable behaviour." The numbers between 1 and 10 enable expressing a more nuanced attitude: the closer the number is to 10 (and, accordingly, further from 1), the more acceptable the described behaviour is.

The scenarios that the respondents evaluate are shown in Table 1. For each of them, the respondents are invited to express their attitude by answering the question: "How acceptable, in your opinion, is the following behaviour?"

**Table 1. Scenarios from the Psychometric Test for the Estimation of Tax Morale**

Scenarios	Description
C1	Someone receives social benefits, without being entitled to such a right.
C2	Someone is using public transport without a ticket.
C3	Someone is hired by a given family for completing a certain house or domestic activity in return of payment (private lessons, household care, cleaning, repair works, etc.), but does not declare this income to the tax authorities.
C4	A firm is hired by a family for certain domestic work (cleaning, gardening, repair works, etc.), but does not declare this revenue to the tax authorities.
C5	A firm is hired by another firm for certain work and does not account for the revenue received.
C6	A firm hires a worker and pays his/hers remuneration "in an envelope" (cash), without including it in its official accounts.
C7	Someone does not pay fully or partially the taxes and social contributions due with respect to his/her income.
C8	Someone sells homemade products (fruits, vegetables, sausages, wine, etc.) and does not declare the income to the tax authorities.

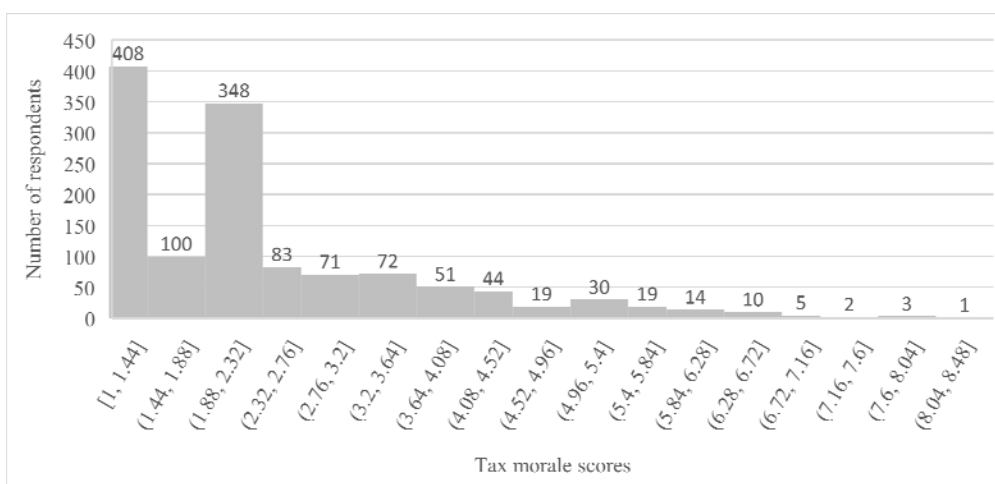
*Source: Survey's Questionnaire.*

There is no internal contradiction in the questions and answers of the respondents. The evaluation of the compatibility, non-contradiction, and internal consistency of the psychometric test questions, based on Cronbach's alpha coefficient, shows a value of 0.81, which is considered reliable in scientific literature. This high value gives us a ground to design a composite indicator (index) for each individual. We obtain each respondent's tax

morale index as an unweighted average of the response scores for each of the eight scenarios. Thus, we obtain scores for the tax morale of each of the respondents, which vary between 1 and 10, with values close to 1 corresponding to high tax morale, and values close to 10 corresponding to low tax morale.

Three of the respondents refused to answer these questions and were removed from the database. Three others gave partial answers – i.e., they rated only some of the cases and did not provide answers for other cases. In order not to lose the information provided by some partial responses, we calculate an estimate of their tax morale by filling in the missing responses with the arithmetic mean of their responses to the other situations to which they expressed an attitude. Thus, in the end, we have the opportunity to work with a sample of 1280 individuals.

**Figure 1. Distribution of the Index of Tax Morale**



Source: Authors' Calculations.

The results regarding respondents' tax morale scores are shown in Figure 1, which depicts the empirical distribution of the tax morale index. A priori, one might expect that this distribution would be illustrated by a monotonically decreasing pattern, but the results show otherwise. One would expect that most scores would cluster near the value one (expressing high tax morale), and then moving toward the value ten, smaller and smaller groups of respondents would be associated with decreasing tax morale. But as seen in the figure, the distribution has a two-peaked (bimodal) shape. It shows that among the respondents, the largest group consists of 408 individuals (31.9%) with a tax morale score between 1 and 1.44. This is the group of people who have high and close to high tax morale, and it forms one of the peaks of the distribution. It is the largest group, but still, its share – only 31.9% is relatively low considering the score for the tax morale.

The other relatively large group of respondents, which forms the second peak of the distribution, consists of 348 individuals (27.2%) that cluster around the mean<sup>10</sup> – they have a tax morale index of 1.88 to 2.32. These are people who are ready to make compromises for some of the scenarios considered, but not big ones and not for all scenarios. But again, keeping in mind that the score is about tax morale, the share of this group is relatively high. A relatively large group (33.1%) are people who have a score above 2.32. This corresponds to tax morale which is lower compared to the average for all respondents. In addition, in this group, there are 69 individuals (5.4%) who have a very low score for tax morale – above 5.0. This means that for them, literally any form of damage to public funds, be it by companies or individuals, is acceptable and they are tolerant to such behaviour.

Tax morale is shaped under the influence of certain factors. Therefore, in addition to obtaining a quantitative assessment of tax morale as a characteristic, it is valid to investigate the possible influence of certain factors on it. The factors whose possible influence on tax morale we examine in this article are gender, age, financial situation, marital status, education, and place of residence.

Other authors have also researched the impact of these and other similar factors on taxpayers' readiness and willingness to pay their taxes. A publication by the Organization for Economic Cooperation and Development (Daude et al. 2012) focusing on developing economies shows that different socio-economic characteristics in these countries influence individuals' tax morale. For example, individuals who identify as religious have higher tax morale. The study also shows that women generally demonstrate higher levels of tax morale. Moreover, age also affects the results, as people's tolerance for tax evasion decreases as they age. Education and employment status also positively influence tax morale. Highly educated individuals show lower tolerance for tax fraud. Such results might be expected because people with higher education have a deeper understanding of fiscal policy instruments and that tax revenues are used to finance public services. The results of the analysis in this publication also show that part-time employees and the self-employed have lower tax morale than full-time employees. According to the authors, the quality of institutions and the transparency of governance also play an important role. Those who perceive democracy as the best system of governance for their country believe that tax evasion is unjustified. Likewise, those individuals who express higher trust in their national government generally exhibit higher tax morale.

For his research, Sipos (2015) put an emphasis on the tax morale of Hungarians and found that men have a relatively high and persistent tax morale because they appear to be willing to undertake a greater tax burden to increase municipal revenues, having in mind that these funds will subsequently be used to finance public services on a local level. At the same time, his analysis shows a moderate relationship between age and respondents' evaluation of tax morale. The results show that the tax morale of older respondents is much higher than that of younger ones, but the author cautions that this does not prove that tolerance for tax evasion necessarily decreases, as age increases.

---

<sup>10</sup> *The mean value of the respondents' tax morale score is 2.32 and the standard deviation is 1.36.*

In turn, Rishava and Zidkova (2021) analyze the influence of selected factors on the tolerance of tax fraud in the Czech Republic, Poland, and Spain. The first factor examined is gender. The results of the analysis show a relationship between gender and tolerance of tax evasion in the Czech Republic and Poland. In both countries, women are less likely than men to justify tax evasion. According to the authors, this is due to psychological factors and women’s lower willingness to take risks, as well as the fact that women are more aware of the benefits of larger public funds, since they benefit from them equally with men, but also in additional circumstances, such as motherhood, for example. In Spain, the test does not show a dependence on this ground. Another factor studied for possible correlation with tax morale is age. Such a relationship has been proven only in the Czech Republic. The reason for the correlation, according to the authors, can be found in the fact that the data they have from the Czech Republic is mostly from pensioners who receive benefits from a social system, so it is natural that they do not justify tax evasion. At the same time, the level of education did not show a relationship with the estimates of tax morale of individuals in any of the countries included in the study. On the other hand, in all three countries, religious people tend to tolerate tax evasion less than non-religious people.

Within the survey at our disposal, data on the distribution of respondents, according to the characteristics of the factors under study, are in the form of categorical variables. The relevant categories are presented in Table 2, and the content of the categories is clear from their names which are shown in the row corresponding to each variable. The number of categories varies between two and six. For example, the variable “Gender” has only two categories (male, female), while the variable “Age” has six categories for six different age groups.

**Table 2. Variables, Analyzed for Their Impact on Tax Morale**

Variable/Categories	Categories					
	male	female				
<i>Gender</i>						
<i>Age</i>	15-24	25-34	35-44	45-54	55-64	Over 65
<i>Financial status</i>	I can’t cover my needs, I’m in debt	It’s hard for me to cover my needs	I can cover my needs, but I don’t save money	I’m fairly well off financially, I can save money	I don’t have any financial difficulties	
<i>Marital status</i>	Not married	Married or living in a concubinage	Divorced	Widowed		
<i>Education status</i>	Low education*	Secondary education	Secondary professional education	University education		
<i>Place of living</i>	Village or small town	District centre	Capital city			

\* Including people with primary or lower education.

Source: Questionnaire

### 3. Methodology, Results and Analysis

This article aims to address the fundamental question in its title – is the tax morale in Bulgaria homogenous or not? To do so, we design our analysis on the data with the respondents’ distribution, which is in accordance with their demographic characteristics from Table 2 and



the answers to the questions displayed in Table 1. In theory, it is possible for the tax morale to be homogenous, meaning that distinctive groups of the population demonstrate no significant differences in their predisposition to paying taxes. Yet, the opposite hypothesis is also feasible, implying that various socio-demographic and socio-economic factors influence tax morale and contribute to the formation of separate groups in society with dissimilar levels of tax morale. If the latter is the case, it would have determining consequences in terms of tax collection efficiency.

### 3.1. Attitude Towards Different Scenarios

In the present section, the analysis intends to determine the degree of homogeneity of tax morale by assessing whether the attitude of the employed population is equally tolerant (or intolerant) to different scenarios of direct harm to public funds. Eight hypothetical scenarios, displayed in Section 2 (Table 1), are used to evaluate the tolerance levels of respondents towards tax-evading behaviours and to assess if acceptance of such actions depends on a particular context, or if the behaviour is regarded as tolerable in any of the mentioned situations.

Each of the eight scenarios is investigated on its own, thus, we could examine and differentiate the attitude of individuals towards each specific case. Table 3 shows the average tax morale scores and their standard deviation of all responses for each separate situation (scenario).

**Table 3. Descriptive Statistics per Response Case**

	C1	C2	C3	C4	C5	C6	C7	C8
Average	1.55	1.76	2.12	1.94	1.82	1.94	1.98	5.46
Std. dev.	1.27	1.47	1.89	1.67	1.58	1.69	1.81	3.92

*Source: Authors' Calculations.*

The derived values exhibit certain differences, but the calculations in such form do not allow for an instant estimation if the differences are statistically significant. Therefore, the methodology proceeds with further testing and subsequent operations in two stages. Initially, the analysis employs ANOVA and F-test to determine the presence of equal (or unequal) sample variances among the responses for each of the eight scenarios. In the second phase, the empirical analysis conducts a two-sample T-test to check for equality of means. The T-tests are performed in correspondence with the acquired results from the F-tests and the indicated equal or not sample variances. Therefore, the T-test enables us to outline statistically significant differences between the means, which would reflect divergent average attitudes of the relevant groups to the different scenarios. This methodology facilitates to assess if the respondents perceive tax evasion as invariable, or their attitude changes upon specific situations.

The T-test results are summarized in Appendix (Table A1).<sup>11</sup> The empirical findings delineate five distinctive sets of scenarios that imply statistically significant differences in attitude. The basis for distinction is that respondents have demonstrated different tolerance levels between the five sets, but the scenarios within each set are regarded by them as equivalent. The reported differences between the means prove that the tax morale is heterogeneous. This means that people's propensity to engage in or tolerate shadow practices is based upon their judgement of a particular situation and not on the universal principle of what could damage public funds.

The first set of scenarios that tested to be statistically different from all others includes only one scenario – the case in which people receive social benefits without having such a right (C1). This situation is perceived with the lowest level of tolerance and, among all scenarios, is considered the most unacceptable. The average attitude of respondents towards the receipt of social benefits without legal eligibility is conceived differently from all other cases. One possible explanation for such an attitude could be linked to the fact that abuse of the Social security fund is a crucial societal issue. Cases of Social security fund abuse are manifestations of the shadow sector of the economy in the country, as there are several common types of practices harming the social system. A major one involves receiving unemployment benefits, while at the same time, the compensated individual performs paid work without a formal contract. Evidently, such economic phenomenon is clearly not tolerated by the respondents who are employed individuals. Another key practice of social fund abuse is through the illegal issuance of a certificate documenting a disability or chronic disease. Since 1990, the number of disabled people in Bulgaria has increased 3 times, and the number of newly registered handicapped persons is double the EU average, being one of the highest in the world (Pashev, 2007). The third main procedure used to obtain support from the Social security fund is by falsely registering as a single parent with minor children, while still living together with a partner. It is also important to note that during the last decades, certain minority groups have been extensively involved in such practices, resulting in the increased dependence on social assistance of these groups (Christidis 2020).

The next set of grey practices with statistically distinctive levels of intolerance among respondents includes two cases – using public transport without a ticket (C2) and business-to-business transactions out of the official accounting. (C5). Engaging in such wrongdoing actions is perceived with a high degree of disapproval, as individuals have reported comparatively higher tax morale in such situations. Some of the main drivers for participation in practices from this set encompass the explicit financial gains and the issues with law enforcement and tax control in such cases. The probable prerequisites for the higher tax morale against these actions are analogous to the ones in the previous set and include the scale of prevalence and the presumed size of the impact on the state budget.

The third set of cases consists of the following scenarios: hiring a company for domestic works without receiving an invoice or proof of payment while the company does not declare

---

<sup>11</sup> Table A1. shows the t-statistic obtained from testing for equality of means from the responses for every pair of scenarios. In cases where the null hypothesis for equality of means is rejected, the level of significance is marked with the symbol (\*). The table contains results only in the cells below the main diagonal because the results are not affected by the order of the tested data.

the income (C4), payment of remuneration “under the table” (C6), and partial or full non-payment of due taxes and social security (C7). In this group, the respondents’ tolerance levels are higher than those of the previous two groups. Yet, the reduced tax morale in the mentioned scenarios could be attributed to the fact that such actions are relatively widespread and numerous Bulgarians have encountered and engaged in one or more of these practices at least once. Contracting a company for domestic work without any financial documentation and receipts often comes with price incentives for the customer, which makes the service more affordable and accessible to a wider range of households. Likewise, the payment of wages unofficially (“under the table”) is regarded as one of the most common and proliferating aspects of the shadow economy in Bulgaria. We assume that as respondents are all employed individuals, they might have had first-hand experience or even received additional undeclared remuneration over their professional careers. A reasonable explanation of the increased tolerance for such practices could be that many individuals have taken part in tax-evading activities of this kind (by their will or forced by the circumstances) without legal consequences and now regard them as somewhat permissible.

The analysis further outlines in a separate group the employment of a natural person to provide a service in domestic conditions for payment, but without declaring the income (C3). Examples of such services are private tutoring, home repairs, cleaning, caregiving, etc., for which the data shows a high degree of tolerance and lower tax morale. It should be noted that hiring an individual for domestic work would have a huge difference in price, compared to hiring a company. The price, therefore, does not reflect payment of VAT, profit for the company and profit tax, which could be equal to at least 34.5% without any additional costs a business would have to account for. Undoubtedly, this contributes to a significant price difference, attracts customers to such practices and leads to a more tolerating attitude. An interesting fact should also be emphasized here – the contrasting attitudes towards companies and individuals engaged in shadow practices. The results prove that people are more willing to tolerate individuals who do not declare their income than legal entities with unregistered profits. Although both acts violate and harm public finances in an identical manner, respondents reveal different attitudes. They perceive it as most unacceptable (high tax morale) if a company does not declare income received from another company (business-to-business transaction) (C5). At the same time, they are more tolerant when a company does not register profits received from individuals (C4), while the scenario with the lowest tax morale tested to be when a natural person does not report income (C3). It is possible to associate the differences in attitude between firms and individuals to the perception of the scale of operations. Respondents perhaps presume firms serve more customers, thus the harm caused to the state finances is greater than the one caused by individuals. Issues with control and sanctioning tax violations, alongside with substantial price differential for the services, further incentivize people to engage in those practices. Once individuals take part in the discussed situations, their tolerance threshold grows respectively.

The last set is represented by only one scenario – selling homegrown grocery products without any fiscal document and without declaring income (C8). The results for this case differ significantly from all other situations, as the highest level of tolerance is reported. The average acceptability rate of (C8) is 2.5 times higher, i.e., the tax morale for not registering income from selling homegrown products is 2.5 times lower than the one demonstrated towards the previous group – (C4), (C7), (C8). We should mention that purchasing fruits and

vegetables from home farms, individuals or acquaintances is a widely accepted practice by consumers in Bulgaria. People's perception is the most fundamental contributing factor to the highest degree of tolerant attitude. The social aspect of this practice is of huge importance and determines the low tax morale. Consumers usually want to encourage and support homegrown products from families, micro-farmers, acquaintances, or roadside traders, because agricultural work is considered as strenuous and risky for the output. Also, consumers often regard homegrown products to be of supposedly higher quality and sometimes at a lower price, due to the shorter supply chain. Another factor for tolerating such practice is the traditions from the past, as, during socialist times, part of the production from the 'cooperative' farms was sold for supplemental income. All these aspects of consumer psychology reflect on the overall low tax morale for purchasing groceries from small private farms without any fiscal document.

### *3.2. Analysis of Tax Morale by Demographic Indicators*

In addition to individuals' subjective judgment about specific situations, tax morale could hypothetically be influenced by demographic characteristics. The current section analyzes the role of demographic and economic factors such as gender, age, education, financial situation, location, and marital status in the formation of tax morale among respondents. Putting these characteristics into models would allow us to depict profiles of individuals with the highest and lowest tax morale.

The methodology of the analysis follows the trajectory of tests used for the eight hypothetical scenarios in Section 3.1. Analogously, the empirical calculations include ANOVA and F-test to check for equality of variances between each pair of categories of the demographic and economic indicators. Then adhering to the results, the analysis continues with a T-test to determine if the subgroups, determined by the relevant categories, have equal or unequal means. The tested subgroups are based on the categorization shown in Table 2. The analysis carried out according to the described procedure shows that 4 out of the 6 tested indicators have an effect on the formation of tax morale.

The test results reveal that two demographic indicators, namely gender and marital status, do not have a statistically significant effect on the tax morale of individuals. The gender variable is divided into two categories of male and female, and as displayed in Appendix Table A2. and Table A8., the analysis determines no statistical difference in tax morale between the two gender groups.<sup>12</sup> In other words, both men and women in Bulgaria have an equal attitude when it comes to tax evasion. This result distinguishes Bulgaria from other countries like Hungary (Sipos, 2015), the Czech Republic and Poland (Rishava, Zidkova, 2021), where tax morale levels change with gender. As already mentioned in Section 2, Sipos (2015) unfolds

---

<sup>12</sup> Table A8 presents averages, as well as other descriptive statistics for the tax morale indices by categories of respondents. Tables A2-A7 in the Appendix show the T-statistic obtained from testing data for each pair of categories of respondents, based on the relevant demographic indicator. In cases where the null hypothesis for equality of means is rejected, the level of significance is marked with the symbol (\*). The tables contain results only in the cells below the main diagonal because the results are not affected by the order of the tested data.

the Hungarian case, in which males have higher tax morale than females. The opposite is evident in the Czech Republic and Poland, as Rishava and Zidkova (2021) empirically illustrate the higher morale inclination of women towards their tax obligations.

According to our research, such a gender difference in tax morale is not observed in Bulgaria. One of the major reasons for this outcome could be linked to the relatively high degree of equality between men and women in the country. The historical and socio-economic development of the state (mainly during socialist times) has added up to women now having equal participation in politics, science, culture, business, and as a result of this to similar tax mentality for both genders.<sup>13</sup>

The other demographic indicator, for which the results found no particular influence over tax morale in Bulgaria, is marital status (see Appendix, Table A3. and Table A4.). In general, civil status is a crucial factor, because it provides access to state financial aid and other public goods. Having family and dependents also implies greater responsibility and greater tax morale. Yet, the present study does not find any statistical evidence to confirm such a hypothetical relationship.

The T-test results indicate no statistical difference of the means of tax morale among the four categories of marital status – single, married, divorced and widowed. Another parallel could be drawn with other countries, as, for example, in Spain and the US, the highest tax morale is observed for single individuals (Alm and Torgler 2004). In those countries, the differences in tax morale are attributed to the separate taxation policy for a civil status of people and to their social circle. Another study demonstrates that in Brazil, individuals in stable unions have lower average tax morale compared to singles, divorced or widowed.<sup>14</sup> We assume the findings for Bulgaria are connected to the similar perceptions of tax obligations of both men and women, discussed previously, as well as to the lack of tax legislation which treats people differently based on their marital status.<sup>15</sup>

The empirical analysis proves that the other four examined demographic indicators – education, age, location and financial status, indeed, influence the tax morale of individuals. Education is a fundamental factor for the formation of tax morale, as our tests show a significant difference between people with university degrees and all others. University graduates have the highest average tax morale, whereas other educational groups with post-secondary diplomas and secondary or lower education do not differ statistically (see Appendix, Table A4. and Table A8.). This gives us ground to conclude that higher education has a significant impact on tax morale in Bulgaria. One explanation for this phenomenon is

---

<sup>13</sup> According to the index of European Institute for Gender Inequality for 2021, Bulgaria has 59.9 points out of 100. In comparison the Czech Republic has 57.7, Poland 56.6 and Hungary 53.4. Regardless of the possible subjectiveness of such indices, they still convey certain information, i.e., we have a reason to believe that in Bulgaria there is higher degree of equality between genders than in the other mentioned countries.

<sup>14</sup> The definition of a stable union in Brazil is linked to the existence of a durable, public and continuous relationship of a couple who live as if they were married, including homosexual relationships. <http://www.vistoparaestrangeiros.com.br/en/visa-stable-union.htm>

<sup>15</sup> The Bulgarian jurisdiction on income tax uses a taxation system with flat income tax rate of 10%, regardless of the income levels or marital status of individuals.

the fact that people with a university education are often better informed about the way state finances function. They are often usually more aware that their contribution to the state budget and the funding of public goods is through taxes. Highly educated people are generally more informed about the legal consequences of tax evasion. Another explanation again relates to the social circle and environment of more educated individuals, as their communities and social groups are often less tolerant to tax-evading practices. Therefore, the internal and external motivations of highly educated people add up to higher tax morale.

Other researchers have produced similar results about the correlation between educational levels and tax morale. In Brazil, data shows that the more educated people are, the higher their tax morale they have (Martinez and Coelho 2019). Knok and Yip (2018) conducted a comparative study in Hong Kong with groups of students, regarding education and tax compliance. They conclude that higher levels of education and understanding of tax legislation have a positive effect on tax morale and compliance.<sup>16</sup>

The next indicator that has a reflection on the tax morale is the location (in terms of place of residence) and the urban-rural typology. A statistically significant difference was identified between the “district centre city” and the other two categories – “capital city” and “village and small town” (see Appendix, Table A5. and Table A8.). The results of the T-test show that the lowest tax morale is in the district centres. Contrary to our expectations, a difference between the capital and villages and small towns was not detected by our calculations. We assume the national tax agency units manage to monitor and control better in the capital and smaller towns than in district centres. Another possible explanation is the sectoral structure of employment, based on location. In the capital, there is a large number of people employed in the state administration, financial services, telecommunications, education and other sectors, in which the share of shadow practices is somewhat minimal or not existing at all. A similar result could be found in a publication by Bejakovic and Bezeredi (2019), who report that individuals in the capital have higher tax morale in Croatia.

The financial status also has a profound effect on the tax morale of respondents. It is an integral part of the socio-economic profile of individuals, which in many cases predetermines the likelihood of participating in the shadow economy. From the five income categories disclosing the financial status of the population, the results delineate three groups with statistically different tax morale levels (see Appendix, Table A6. and Table A8.). Evidently, the individuals with the highest tax morale are those who do not have any financial problems or are fairly well off and have savings. The representatives of these categories are those who disapprove most the shadow practices. One reason is that the sums paid for taxes do not affect their overall financial well-being.

The second income group that statistically differs from the previous one includes the people who can cover their financial needs but cannot save money. Their tax morale is lower than the one exhibited by the first two categories. Representatives of this group may try to achieve greater financial stability by engaging in transactions of the shadow economy.

---

<sup>16</sup> *An interesting finding of the study is that compliance with tax legislation is less dependent on tax education among postgraduates than among undergraduate students. The authors explain this with the presence of general courses on taxation in undergraduate programs.*

The tax morale of individuals who have difficulties meeting their needs, or cannot do so and take loans, is correspondingly the lowest and statistically different from that of the other groups. The hard financial situation of these individuals constitutes their desire to ensure their physical survival, even at the cost of harming public funds. A large number of representatives of this group live near or below the poverty line and it could be expected that they have the highest predisposition to employ in shadow sector operations. Our results about the effect of the financial status on tax morale in Bulgaria correspond to the results of other comparative studies, showing a positive correlation between tax morale and income (Peñas and Peñas 2010).

The last investigated demographic indicator for possible relation with tax morale is age. The respondents are divided into six age categories, starting with individuals at the age of 15 to 24 and each covering 10 years. The analysis proves that people between the age of 25 to 34, and 35 to 44 have the highest tax morale, which distinguishes them from all other groups (see Appendix, Table A7. and Table A8.). At the same time, individuals over the age of 65 show the lowest tax morale, similar to that of persons between the ages of 15 and 24. Representatives of the other two subcategories (45-54 and 55-64) also have lower tax morale than the younger groups of 25-34- and 35-44-years old individuals.

The low tax morale of the employed between the ages of 15 and 24 is no surprise. This is a group of individuals who are relatively uninformed about social funds and are far from their active use (pensions, health care, etc.) As the youngest group, it also has a low degree of membership in the trade union. People from 15 to 24 are considered one of the vulnerable groups for participation in undeclared work and for remuneration received “under the table”.

Nevertheless, the results for the older groups are not expected and distinguish Bulgaria from other countries in a comparative plan. In the Czech Republic, for example, age has a positive effect on tax morale levels (Rishava and Zidkova 2021). The same trend is observed in the United States and Turkey, according to Torgler *et al.* (2008), who prove the existence of a positive correlation between age and tax morale. In general, the age increase is expected to lead to reduced tolerance for tax-evasive practices, as older individuals often receive more tax-financed social benefits. Our results do not confirm the presence of such a relationship in Bulgaria. We interpret them as a sign of accumulated distrust of older cohorts in the efficiency of state institutions in the management of public funds which is a result of the transition period for the Bulgarian economy.

### *3.3. Tax Morale Regression Model*

The last part of this paper presents the empirical findings from a regression analysis, using tax morale as a dependent variable. We consider the regression model an essential element of our methodology, because it allows for a comprehensive multidimensional assessment of the combined impact of the discussed socio-demographic factors on tax morale. The importance of the regression analysis is that it measures the simultaneous influence of all evaluated indicators on the dependent variable. Moreover, the regression model is also used as an additional instrument to cross-check the results of the performed T-tests.

Due to the nature of the available data, we designed an ordered regression model, instead of the standard linear regression. Several characteristics of the dependent variable, which is tax morale, prompted the use of an ordered model. The observations for the dependent variable are derived from discrete responses of the respondents, but more importantly, it is bounded in the interval between 1 and 10, making it unsuitable for analysis as a dependent variable in a linear regression model. Also, the empirical distribution (Section 2, Figure 1) portrays that the answers for some points of the 10-point Likert scale are very few or even zero. Thus, employing the data without any transformations would lead to unreliable results.

In this case, it is more convenient from a technical standpoint to convert the resulting index, which stands for the tax morale of a particular respondent from Section 2, into a categorical variable. Starting from the empirical distribution of Figure 1, and adhering to an approach applied by other researchers<sup>17</sup>, we form a categorical variable in the following way. Respondents who have a tax morale score exactly equal to 1 are assigned to the category of “high tax morale”. The criterion for the first category is undisputable – perfect score for tax morale. People who believe that it is inadmissible to harm public funds in any form are classified as the “high tax morale” group. The second category incorporates scores bigger than 1, but lower than 2.5 and assigns them to the “average tax morale” category. This group of people has a score close to the sample average – a little bit more or a little bit less. Such a score reveals some degree of tolerance for certain practices from the shadow economy. It shows some flexibility, also judgement depending on the situation but not on the general principle of possible damages for the public funds. In their view, some shadow practices might be tolerated on a limited scale.

Respondents with a score equal to or above 2.5 are assigned to the “low tax morale” category. This group includes people who have relatively high average estimates on the 10-point scale. Here we include those with scores which are explicitly in the range of 5 or above, because so high score signalizes that such individuals perceive tax evasion as more permissible than being not permissible. In this group, we also include individuals with a score above 2.5. We assume that such a result is high enough to classify them as being with low tax morale. It is clear that such a categorical division is conditional because, in reality, the boundaries between high, average and low tax morale might be subjective and are not as clear-cut. To fit the ordered logistic regression, the categorical variable is formed to take values of (0), (1) or (2), defining respectively “high”, “average” and “low” tax morale.

The indicators of gender, age, education, marital status, and location are used as independent variables in the regression analysis. They are categorical variables but have been converted to dummy ones and each variable with code 1 from Table 2, Section 2 is left out as a reference category. With  $N$  number of observations for the dependent variable, the ‘ordered’ regression model has the following general equation:

$$y_i^* = \beta x_i + \varepsilon_i, \forall i = 1, \dots, N$$

as  $y_i^*$  is an unobserved latent variable,  $y_i$  is the observed ordinal variable that takes values from 0 to 2, according to the following rule:

---

<sup>17</sup> See for example Torgler et al. (2008) or Kemme et al. (2020).



$$y_i = j \text{ if } l_{j-1} < y_i^* < l_j, j = 0 \div 2$$

In the above equations  $x_i$  is a column vector of the explanatory variables,  $\beta$  is a row vector of regression parameters to be estimated, and  $\varepsilon_i$  is a random error. The parameters  $l_j$  also are to be estimated as  $l_{-1} = -\infty, l_2 = \infty$ .

To fulfil the objectives of the study, we have applied three types of ordinal regression – logit, probit and extreme values, to check for the consistency and robustness of results, regardless of the specification of each applied model. Model calculations were made using the method of maximum likelihood estimation.

The results of the three regression models are presented in Appendix, Table A9. They, to a large extent, confirm the derived relations in Section 3.2 about the impact of demographic and economic variables on tax morale. As the results show, all three model specifications affirm that gender and marital status do not have a statistically significant effect on tax morale. Therefore, it can be concluded that various employed population subgroups, categorized by those two characteristics, do not have statistically different tax morale.

The models further determine the most substitution and statistically significant contributor to tax morale to be financial status and, more precisely, the situations when individuals do not have financial problems or are relatively well off and can increase savings. The negative signs of the coefficients mean that the dependent and independent variables are inversely related, meaning that an increase in the financial status will bring the tax morale score closer to 1 (high tax morale). The identified inverse relationship validates the findings that higher income levels are associated with more intolerant individuals to shadow practices. Justified by the regression models, the results about the correlation between tax morale and financial status correspond to both the conclusions of this paper in Section 3.2 and to existing scientific literature with similar findings for Portugal (Sa *et al.* 2013).

Another demographic characteristic that the model proved to have a significant impact on tax morale is age, and particularly the age group of people in the category between 25 and 34 years. Various reasons fuel the intolerance of individuals in this age group, mainly social factors like different mentally formed among younger people under the influence of EU membership. Economic factors such as income level also contribute, as representatives of the 25-34 age group are seeking jobs in high-paying sectors with many international companies, for example, IT, financial services, telecommunications, etc. The regression model results also confirm the findings of Section 3.2, where we emphasized that younger cohorts have different and specifically higher tax morale than one of older groups.

The extreme values regression model showed statistical significance also for the location variable in the category of regional cities. It is important to note that the regression coefficient for this category is positive. All other things being equal, the positive coefficient means that if an individual belongs to this group, this fact increases the value of the dependent variable, i.e. increases the probability to that he will end up with relatively low tax morale. Such a conclusion is in accordance with the findings in Section 3.2 and points out to regional cities as critical locations for boosting control and educational programs to increase tax morale.

The only demographic characteristic that the regression models do not confirm to have an influence on tax morale is education. In Section 3.2, our results indicate that individuals with

higher education, have, on average higher tax morale, but this was not proved by the regressions. We assume this is partially connected with the large number of categorical variables in the models. From a technical perspective, the influence of education in the model might be accounted for by the other variables (for example, financial status, as university graduates tend to have higher incomes). Another explanation could be found in some methodological shortcomings which come with regression models of this type.

## **5. Conclusion**

In the current paper, we argue that tax morale is an important component of social capital and that its study can yield useful results for both economic policy and research. It is with this understanding that in this article, we present the results of a research project based on a survey conducted in Bulgaria.

Tax morale is not necessarily always and for everyone reflected in relevant tax compliance. Nevertheless, there is convincingly enough documented evidence in the literature that this characteristic, in general, as a tendency, plays an important role in tax collection. Therefore, from the point of view of economic policy, it is important to understand what tax morale is and what factors ultimately shape it. In this way, we can understand whether, by improving tax morale, it is possible to increase tax collection. The results presented in this article give reasons to answer this question positively.

Our analysis shows that tax morale in Bulgaria is heterogeneous from at least two points of view. On the one hand, the public's perception of acceptable and unacceptable in terms of behaviour (from a tax perspective) is quite heterogeneous. The data show that respondents judge differently situations damaging public funds in essentially the same way. People perceive as acceptable or unacceptable equivalent situations whose only differences are their respective participants. In addition, heterogeneity is manifested in terms of tolerance for different practices related to the damage of public funds. According to the perspective of society, the decision of whether a given practice is acceptable or not is based on people's judgment of a particular situation, not on the general notion of whether public interests are violated.

On the other hand, tax morale is also heterogeneous from the point of view of individual groups. According to our analysis, tax morale is influenced by certain socio-demographic and socio-economic factors, with the result that some population groups have, on average, higher tax morale and other population groups have lower tax morale. The results of Section 3.2. and Section 3.3. show that individuals who have a higher level of income, those who are relatively young in age (but over 24), those living in the capital and those with higher education tend to have higher tax morale. At the same time, people with a low level of income, the elderly (65+), the very young (under 24 years old), those living in district centres, and those with low education tend to have low tax morale. We find no difference in tax morale between men and women, nor between groups separated by marital status.

Based on these results, certain conclusions can be drawn. Above all, it is clear that the good knowledge of tax morale and the factors that shape it, expand the opportunities that the

administration has to improve tax collection. Traditional approaches of more checks or tougher punishments for non-conformists are not the only option. The tax administration in Bulgaria also implements other measures related to various information campaigns, but tax morale analyses can provide more tools to increase collection, because the information from them can be used for implementing targeted measures. Well-grounded and implemented targeted measures aimed at certain groups are always more effective from an organizational and financial point of view than large-scale measures aimed at the entire population.

In this sense, in terms of economic policy, our results show two things. First, that by influencing the tax morale of the population, tax collection can be improved. There is an ample scope for this, as our estimates show that a relatively large proportion of the population currently has average or low tax morale. And secondly, that the most effective way to do this would be through targeted measures for improving the tax morale of specific groups of the population: people with low incomes, the youngest, those living in regional centres and the poorly educated. Such measures may include information campaigns, sending letters, educational courses, etc.

Another implication for economic policy is that research such as the one presented here should be done regularly for tax administration purposes. If targeted measures are undertaken to reduce tax evasion and non-payment, they should be based on research results that are up to date, because tax morale and its characteristics, as well as the factors that shape them, can change over time.

From the perspective of theory, our study also has certain results that can be used as a starting point for future research. Of particular interest to sociology would be to investigate why certain groups of the population have higher or lower tax morale than other groups. For example, why do younger cohorts in Bulgaria have higher tax morale than older cohorts? Alternatively, also, why some factors that influence tax morale in other countries do not influence Bulgaria – for example, such is the gender factor. We have suggested possible explanations for these results in the text of the relevant sections, but other explanations are also possible.

Another aspect of our research that has implications for theory is related to the research on tax morale, which would focus on the possible influence of institutional or cultural factors on it, such as, for example, religious affiliation, trust in government or parliament, trust in the judicial system, corruption, etc. Such studies would inevitably rely on econometric models, and they may use the socio-demographic and socio-economic factors analyzed in this article as part of the explanatory variables, insofar as our results show that they have a certain role in the formation of tax morale.

## References

- Allingham, M., Sandmo, A. (1972). Income Tax Evasion: A Theoretical Analysis. – *Journal of Public Economics*, 1 (3-4), pp. 323-338.
- Alm, J., MacClelland, G., Schulze, W. (1992). Why do people pay taxes?. – *Journal of Public Economics*, 48, (1).
- Alm, J., Benno Torgler. (2004). Estimating the Determinants of Tax Morale. – *Proceedings. Annual Conference on Taxation and Minutes of the Annual Meeting of the National Tax Association*, Vol. 97, pp. 269-274.

*Petranov, S., Angelova, M., Georgieva, L., Ivcheva, R., Avreyski, N. (2023). Is Tax Morale Homogeneous in Bulgaria?.*

---

- Bejaković, P., Bezeredi, S. (2019). Determinants of Tax Morale in Croatia: An Ordered Logit Model. *Business Systems Research*, 10(2), pp. 37-48.
- Christidis, Y. (2020). The Roma in Post-Communist Bulgaria: Growing Social Marginalization and State Policies. – *Journal of Asian Social Science Research*, 2(1), pp.1-24
- Daude, C., Gutiérrez, H., Melguizo, Á. (2012). What drives tax morale?. – OECD, Working Paper No. 315.
- Dwenger, N., Kleven, H., Rasul, I., Rinke, J. (2016). Extrinsic and intrinsic motivations for tax compliance: evidence from a field experiment in Germany. – *American Economic Journal, Economic Policy*, Vol. 8, N 3, pp. 203-232.
- Kelmanson, B., Kirabaeva, K., Medina, L., Mircheva, B. & Weiss, J. (2019). Explaining the shadow economy in Europe: size, causes and policy options. – IMF Working Paper No. 19/278.
- Kemme, D., Parikh, B., Steigner, T. (2020). Tax morale and international tax evasion. – *Journal of World Business*, 55, pp. 1-12.
- Kwok, B., Sim, Y., Wing R., Yip, Y. (2018). Is Tax Education Good or Evil for Boosting Tax Compliance? Evidence from Hong Kong. – *Asian Economic Journal* 2018, Vol. 32, N 4, pp. 359-386.
- Luttmer, E., Singhal, M. (2014). Tax Morale. – *Journal of Economic Perspectives*, Vol. 28, 4, pp. 149-168.
- Martinez, A. L., Coelho, M. L. B. (2019). Tax morale and the Brazilian citizen: an empirical study. – *Cad. EBAPE.BR*, v. 17(3).
- OECD. (2013). Tax and development: What drives tax morale? Committee on fiscal affairs. Development assistance committee task force on tax and development, March 2013.
- Pashev, K. (2007) Corruption in the Healthcare Sector in Bulgaria. Center for the Study of Democracy.
- Peñas, I., Peñas, S. (2010). The determinants of tax morale in comparative perspective: Evidence from European countries. – *European Journal of Political Economy*, 26, pp. 441-453.
- Petranov, S., Zlatinov, D., Velushev, M., Georgieva, L., Ivcheva, R. (2022a). Shadow economy and production factors: results from an empirical analysis with a panel data set. – *Economic Studies*, N 2.
- Petranov, S., Zlatinov, D., Atanasov, I. (2022b). The shadow economy in Bulgaria during the period 2006-2019. – *Economic Studies*, N 5.
- Ryšavá, T., Zídková, H. (2021). What are the factors of tax evasion? New findings in the EVS Study. – *Review of Economic Perspectives*, Vol. 21(4), pp. 385-409.
- Sá, C., Martins, A., Gomes, C. (2014). Tax morale, Occupation, and Income Level: An Analysis of Portuguese Taxpayers. *Journal of Economics, Business and Management*, 2(2).
- Sipos, A., (2015). Determining factors of tax-morale with special emphasis on the tax revenues of local self-governments, 4<sup>th</sup> Economics&Finance Conference, London, UK, August 25-28, *Procedia Economics and Finance*, Vol. 30, pp. 758-767.
- Stark, J., Kirchler, E. (2017). Inheritance tax compliance – earmarking with normative value principles. – *International Journal of Sociology and Social Policy*, Vol. 37, 7-8, pp. 758-767.
- Torgler, B., Demir, I., Macintyre, A., Schaffner, M. (2008). Causes and consequences of tax morale: An empirical investigation. – *Economic Analysis and Policy*, v. 38, 2, pp. 313-339.
- Torgler, B., Schneider, F. (2007). What shapes attitudes toward paying taxes? Evidence from multicultural European countries. – *Social Science Quarterly*, v. 88, 2, pp. 443-470.
- Torgler, B. (2004). Cross-culture comparison of tax morale and tax compliance: evidence from Costa Rica and Switzerland. – *International Journal of Comparative Sociology*, v. 45, 1-2, pp. 17-43.
- Halla, M. (2010). Tax Morale and Compliance Behaviour: First Evidence on a Causal Link. – IZA Discussion Paper No. 4918.
- Williams, C., Horodnic, I. (2017). Evaluating the illegal employer practice of under-reporting employees' salaries. – *British Journal of Industrial Relations*, Vol. 55, 1, pp. 83-11.
- Windebank, J., Horodnic, I. (2017). Explaining participation in undeclared work in France: lessons for policy evaluation. – *International Journal of Sociology and Social Policy*, Vol. 37, 3-4, pp. 203-217.

**APPENDIX**

**Table A1. T-test Results: Tax Morale Differences for Different Behavioural Scenarios**

	C1	C2	C3	C4	C5	C6	C7	C8
C1	X							
C2	-3.90***	X						
C3	-9.03***	-5.43***	X					
C4	-6.69***	-2.90***	2.60***	X				
C5	-4.84***	-1.03	4.38***	1.84*	X			
C6	-6.68***	-2.92***	2.54**	-0.04	-1.87*	X		
C7	-7.06***	-3.44***	1.90*	-0.64	-2.42*	-0.59	X	
C8	-33.94***	-31.60***	-27.40***	-29.55***	-30.79***	-29.45***	-28.78***	X

Notes: \*p-value <0.10; \*\* p-value <0.05; \*\*\*p-value<0.01.

Source: Authors' Calculations

**Table A2. T-test Results: Tax Morale Differences by Gender**

	Male	Female
Male	X	
Female	0,26	X

Source: Authors' Calculations.

**Table A3. T-test Results: Tax Morale Differences by Marital Status**

	Not married	Married or living in a concubinage	Divorced	Widowed
Not married	X			
Married or living in a concubinage	0,55	X		
Divorced	-1,42	-1,19	X	
Widows	-0,96	-0,76	-0,22	X

Source: Authors' Calculations.

**Table A4. T-test Results: Tax Morale Differences by Education**

	Low education*	Secondary education	Secondary professional education	University education
Low education	X			
Secondary education	-0,51	X		
Secondary professional education	0,75	0,45	X	
University education	2,36**	3,10***	4,71***	X

Notes: \*p-value <0.10; \*\* p-value <0.05; \*\*\*p-value<0.01.

Source: Author's Calculations

Petranov, S., Angelova, M., Georgieva, L., Ivcheva, R., Avreyski, N. (2023). *Is Tax Morale Homogeneous in Bulgaria?*.

**Table A5. T-test Results: Tax Morale Differences by Place of Leaving**

	Village or small town	Regional city	Capital
Village or small town	X		
Regional city	-1.8414*	X	
Capital	-0.1333	3.2455***	X

Notes: \*p-value <0.10; \*\* p-value <0.05; \*\*\*p-value<0.01.

Source: Authors' Calculations

**Table A6. T-test Results: Tax Morale Differences by Financial Status**

T-test – Financial Status	I can't cover my needs, I'm in debt	It's hard for me to cover my needs	I can cover my needs, but I don't save money	I'm fairly well off financially, I can save money	I don't have any financial problems
I can't cover my needs, I'm in debt	X				
It's hard for me to cover my needs	-2.1488**	X			
I can cover my needs, but I don't save money	-2.6762***	-0.8943	X		
I'm fairly well off financially, I can save money	-4.923***	-5.771***	-5.5823***	X	
I don't have any financial problems	-4.8756***	-4.6662***	-4.3055***	-0.6324	X

Notes: \*p-value <0.10; \*\* p-value <0.05; \*\*\*p-value<0.01.

Source: Authors' Calculations

**Table A7. T-test Results: Tax Morale Differences by Age**

	15-24	25-34	35-44	45-54	55-64	65 and up
15-24	X					
25-34	2,01*	X				
35-44	1,89*	-0,53	X			
45-54	1,04	-2,85***	-3,07***	X		
55-64	1,19	-1,77*	-1,60	0,48	X	
65 and up	-0,75	-3,06***	-3,33***	-1,98**	-2,03**	X

Notes: \*p-value <0.10; \*\* p-value <0.05; \*\*\*p-value<0.01.

Source: Authors' Calculations

**Table A8. Descriptive Statistics of Tax Morale Scores by Categories of Respondents**

Variable	Categories	Average	Standard deviation	Minimum	Maximum	Number of observations
Gender	Male	2,29	1,28	1,00	8,00	638
	Female	2,31	1,41	1,00	8,25	642
Age	15-24	2,81	1,83	1,00	7,00	32
	25-34	2,13	1,25	1,00	8,25	183
	35-44	2,19	1,20	1,00	6,88	480
	45-54	2,46	1,45	1,00	8,00	407
	55-64	2,40	1,51	1,00	7,88	160
	65 and up	3,15	1,36	1,75	6,63	18
Financial status	I don't have any financial problems	1,77	1,24	1,00	8,25	98
	I'm fairly well off financially, I can save money	1,86	1,10	1,00	6,38	189
	I can cover my needs, but I don't save money	2,40	1,37	1,00	8,00	591
	It's hard for me to cover my needs	2,49	1,37	1,00	7,38	343
	I can't cover my needs, I'm in debt	2,91	1,52	1,00	8,00	59
Marital status	Not married	2,25	1,29	1,00	7,00	267
	Married or living in a concubinage	2,30	1,35	1,00	8,25	728
	Divorced	2,42	1,44	1,00	7,25	250
	Widows	2,48	1,60	1,00	6,63	35
Education status	Low education	2,70	1,23	1,00	6,50	25
	Secondary education	2,56	1,75	1,00	8,25	171
	Secondary professional education	2,49	1,35	1,00	7,88	464
	University education	2,11	1,21	1,00	8,00	620
Place of living	Village and small town	2,18	1,35	1,00	8,00	110
	District center	2,45	1,45	1,00	8,25	620
	Capital	2,20	1,24	1,00	8,00	550

Source: Authors' calculations

**Table A9. Probit, Logit and Extreme Values Regression Models Results**

	LOGIT	PROBIT	EXTREME VALUES
25-34	-0.7355**	-0.4271*	-0.5260**
35-44	-0.5945	-0.3351	-0.4087
45-54	-0.2751	-0.1461	-0.1671
55-64	-0.3447	-0.1883	-0.2045
65 and up	0.5596	0.4188	0.3004
Secondary education	-0.5649	-0.3685	-0.1734
Secondary professional education	-0.2406	-0.1584	-0.1237
University education	-0.3447	-0.2385	-0.1135
It's hard for me to cover my needs	-0.0304	-0.0174	-0.0392
I can cover my needs, but I don't save money	-0.0244	-0.0228	0.0270
I'm fairly well off financially, I can save money	-0.7329***	-0.4429***	-0.4611***
I don't have any financial problems	-1.1953***	-0.7189***	-0.7311***
Gender	0.0417	0.0226	-0.0532
District center	0.3122	0.1849	0.3156**
Capital	0.1035	0.0587	0.1599
Married or living in a concubinage	-0.1429	-0.0860	-0.1320
Divorced	-0.0628	-0.0399	-0.0644
Widows	-0.0526	-0.0516	-0.0714

Notes: \*p-value <0.10; \*\* p-value <0.05; \*\*\*p-value<0.01

Source: Authors' Calculations

### **FORMATION AND USE OF THE SYSTEM OF FINANCIAL INCENTIVES FOR THE DEVELOPMENT OF PARTNERSHIP BETWEEN THE STATE AND BUSINESS<sup>3</sup>**

*The article reveals the domestic and foreign practices of using the main types of financial incentives for public-private partnership: direct financial support, subsidies, guarantees and insurance and government benefits. It was found that concessional lending, provided mainly by international development banks, plays an important role in direct financial support. Such support is especially relevant in the initial stages of project implementation due to the lack of skills and financial resources to achieve effective results. Emphasis is placed on the active participation of public authorities in the lending process, which involves the signing of international agreements and the provision of state or local credit guarantees. Given the low level of development of the financial market in Ukraine, the expediency of using interest rate subsidies is justified, which compensates for the difference between market and preferential rates. It is proved that in the process of state incentives in the form of tax benefits, preferential tariffs for private partners, lease or leasing benefits, public authorities must take into account the annual losses of the state budget from the provision of such benefits. In this regard, to minimize the negative consequences, it is necessary to apply financial incentives, taking into account the impact on the budget and financial and economic activities of economic entities, to introduce an effective system of control over their use. Carrying out a comprehensive analysis of the use of financial incentives in domestic and international practice made it possible to identify problems that hindered their successful implementation in Ukraine.*

*Keywords: financial incentives; public-private partnership; soft loans; guarantees and insurance; subsidies; tax benefits*

*JEL: G32; G38; H54*

---

<sup>1</sup> Vasyl Demianyshyn, Professor, West Ukrainian National University, e-mail: v.g.demianyshyn@gmail.com.

<sup>2</sup> Bohdana Shuliuk, Associate Professor, West Ukrainian National University, e-mail: BohdanaShulyuk@i.ua.

<sup>3</sup> This paper should be cited as: Demianyshyn, V., Shuliuk, B. (2023). Formation and Use of the System of Financial Incentives for the Development of Partnership between the State and Business. – Economic Studies (Ikonomicheski Izsledvania), 32(3), pp. 88-103.



## **1. Introduction**

In Ukraine and the world, there is an increasing tendency to intensify relations between the state and private business. The implementation of many socioeconomic tasks in the country is associated with ever-increasing constraints in the financial sphere, as well as the need to improve the quality of social services and infrastructure. In this regard, an integral condition for the effective functioning of the economic system is the constructive interaction of government and business to address common financial, economic and social problems. Therefore, the interaction between the state and the business sector is effective at every stage of state formation, as it allows not only to save budget funds, but also to develop entrepreneurship and social infrastructure and promote cooperation with the state in doing business.

In particular, the first stage (1991-1992) is related to the formation of the institutional environment, that is, the birth of private entrepreneurship and the expansion of cooperation between the state and business in the economic sphere began. The second stage (1993-1999) was characterized by an active transformation of the economy, in which various approaches to the implementation of the state's economic policy were developed. Mutual cooperation between the state and business was mainly focused on the raw material sector of the economy. At the same time, the deterioration of the economic situation in the country led to a decrease in incentives for entrepreneurial activity and business readiness for long-term investment. The main content of the third stage (2000-2008) was to strengthen the role of the state in regulating the socioeconomic processes of the country. Big business has firmly established its position as the main subject of innovation and investment activity and the main partner of the state in joint socially significant and economically strategic projects. The fourth stage (2009-2014) is associated with the global economic crisis, which led to the problems of the extensive development of the domestic economy, which led to the negative dynamics of the main indicators of the socioeconomic development of the state, including the cancellation of many public-private partnership projects. The fifth stage (2015 – present) is the period of the modern development of the financial mechanism of public-private partnership, which is aimed at the development of industry, modernization, and transfer of new, innovative technologies.

Thus, the interest of public authorities in the implementation of partnerships with business entities is due to the need to invest in important socioeconomic projects. Instead, in conditions of economic instability, due to the high level of risky investments, companies are not interested in cooperating with public authorities. In addition, they have problems attracting long-term loans to finance public-private partnership (PPP) projects. In this regard, it is important to take additional measures to encourage business participation in PPP projects. In view of this, it is advisable to consider the peculiarities of the formation of a system of incentives that should ensure the interests of the private partner and not hinder the implementation of public policy priorities in the socioeconomic sphere.

## **2. Literature Review**

Despite significant achievements in the field of public-private partnership, in the economic literature, domestic scientific papers on the need for its financial incentives are presented sporadically. Among the research should be noted the works of O. Stefankiv and V. Danylyshyn, which are devoted to new models of financial incentives for the private sector to cooperate with the state. So, according to scientists, direct state support can be implemented by: providing investment transfers; repayment of interest on loans; reimbursement of expenses (for construction, participation in a tender, major repairs, etc.); lending at the expense of budget funds; provision of tax, customs benefits, tax credit, refusal to collect taxes, etc.; provision of state (local) guarantees for loans of a private partner; provision of state (local) guarantees for compensation of losses due to exchange rate fluctuations. And indirect state support may include: indirect financing through the system of «shadow» tariffs – reimbursement of payment for services provided to consumers from the state budget through the system of state subsidies for communal services; attraction of loans from foreign countries, financial and credit institutions and international organizations; provision of guarantees for indemnification of the private partner due to non-compliance of the demand for products (services) with the planned indicators, changes in prices (tariffs), non-fulfilment of obligations by the state partner, etc.; guaranteeing the minimum amount of demand (state order) for products or compensation for losses from its reduction; risk insurance (Stefankiv, Danylyshyn, 2016). M. Prorochuk proposes measures necessary for the development of the mechanism of interaction between government and business in the field of infrastructure, the main of which are: thorough elaboration of contracts and funding opportunities, improving legal and economic training of executive bodies, promoting their willingness to compromise and find ways to solve the problems (Prorochuk, 2020). G. Komarnytska also investigated directions of activation of public-private partnership in terms of the development of investment and innovation activities. She proved that the public-private partnership would be effective if it is fully supported by various institutions: both directly by state authorities at the national, regional and municipal levels and by other entities specially created for this purpose (Komarnytska, 2019).

The issue of financial stimulation of PPP projects is a direction of research and foreign scientists. Thus, N. Linh, X. Wan, H. Th. Thuy emphasize the need to encourage the participation of banking institutions in the implementation of PPP projects (Linh, Wan, Thuy, 2018). F. Blanc-Brude and R. Strange study the impact of risks on the bank financing of PPP projects, noting that market risk has the greatest impact, while technical risks are diversified through project structuring (Blanc-Brude, Strange, 2007).

Despite some scientific achievements in the field of financing public-private partnership projects, most of the works mostly concern the general principles and provisions of public-private partnership, but there is still no thorough research on the formation and use of financial incentives for public-private partnerships in Ukraine determines the relevance of this study. Therefore, the aim of the article is to reveal the peculiarities of the formation and use of financial incentives for public-private partnership in domestic practice, highlighting the best world achievements in this field in order to implement them in Ukraine.

### 3. Research Methodology

In the course of the research, statistical methods were used – when comparing the domestic and foreign practices of applying financial incentives for the development of partnership between the state and business; analysis and logical generalization – in revealing the problems of using direct financial support, subsidies, guarantees and insurance, public benefits for the development of the public-private partnership. At the same time, a systematic approach is used to obtain results, which is aimed at reconciling the interests and ultimate goals of the partnership participants and ways to achieve them.

### 4. Results

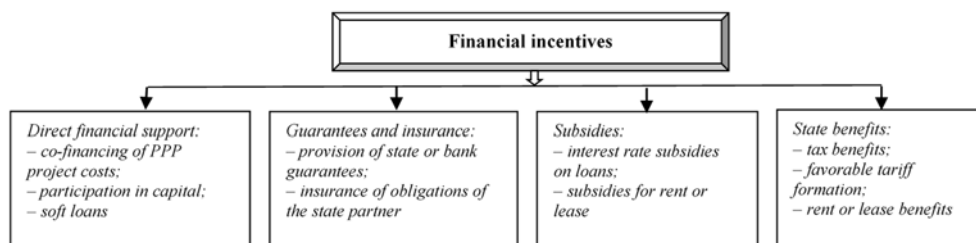
#### 4.1. Types of financial incentives for public-private partnership

In foreign practice, public authorities use various incentives to develop cooperation with business: from investing in a PPP project to providing financial advisory services. Maintaining partnerships with business, the state uses financial incentives in various combinations. It is worth noting that there is no «perfect» set of incentives, as each of them has both positive and negative properties. Attempts to improve one tool by supplementing it with certain types of another worsen rather than improve the situation. This necessitates a study of the practice of financial measures in the process of stimulating public-private partnerships.

Incentives are developed taking into account the peculiarities of national economies and the financial capabilities of the state budget. A. Kireeva, I. Sokolov, T. Tishchenko and E. Khudko believe that «in small countries, the effect of stimulating private business is not always felt, and large countries can assess the effectiveness of measures only at the global level» (Kireeva et al., 2012). At the same time, the stimulus policy is aimed at attracting and retaining business in the field of public-private partnership.

The purpose of PPP financial incentives is to reduce the costs of the private partner in the project and obtain commercial benefits from the partners of the partnership. Given the above, it is advisable to distinguish the following species' financial incentives for PPP development: direct financial support, subsidies, guarantees, insurance and government benefits (Figure 1).

**Figure 1. Types of financial incentives for public-private partnership**



Sources: <https://www.worldbank.org/en/topic/publicprivatepartnerships/publication/the-ppp-reference-guide-version-20>; (Solntsev, 2017).

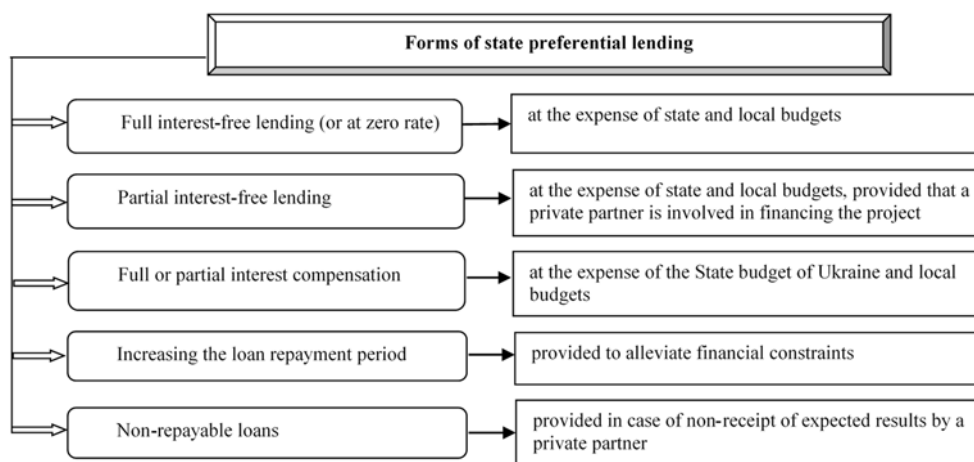
#### *4.2. Direct financial support of public-private partnership projects*

Direct financial support is usually provided to compensate for the capital costs of a private partner. Common types are direct or indirect co-financing of PPP projects, as well as participation in the capital (budget investments in exchange for the right to manage the company), which are carried out mainly from the state budget, as local budgets do not have the financial capacity to implement projects PPP.

In addition, in international practice, there are special funds for the development of partnerships between government and business. In particular, in India – the Financial Infrastructure Development Company of India (IDFC) and the Indian Infrastructure Finance Company (India), in Africa – the South African Project Development Facility, in Canada – the Canadian Public-Private Partnership Fund (PPP Canada Fund), etc. An important place in the European financing of PPP infrastructure projects is occupied by European Union funds – the European Regional Development Fund, the European Social Fund and the Financial Support Fund.

Preferential lending involves providing a loan at a zero rate or reduced interest rate, so the borrower is offered an interest rate below market level; full or partial compensation of interest; increasing the term of loan repayment; granting non-repayable loans (Figure 2).

**Figure 2. Forms of state preferential lending for public-private partnership projects**



*Source: compiled by the authors.*

Public lending can be an additional burden on the state budget, as the risk of default of the borrower is cyclical and unpredictable.

In world practice, preferential lending for PPP projects is provided by international development banks, the purpose of which is not to maximize profits, but to support, for the most part, commercially unattractive areas of activity in developing countries. The need for their participation in the financing of PPP projects is due to the following factors:

- first, the scale of PPP projects, their long-term implementation and high cost, which prevents the participation of national commercial banks, as well as the inability of the latter to provide low-interest rates on loans raised for these projects;
- secondly, the constant lack of budget funds aimed at financing state-targeted programs, restrictions on the domestic capital market, excessive fiscal burden on businesses;
- thirdly, high political risks, a lack of appropriate legal and regulatory framework in the field of public-private partnership, etc.

The active participation of international development banks in creating charitable conditions for the development of public-private partnerships is especially important in the initial stages of project implementation due to the lack of skills and financial resources to achieve effective results. Therefore, development banks can be involved both in the initial stages of PPP (from financing the development of project documentation to non-financial technical assistance to governments to implement the necessary economic reforms to improve the environment of PPP projects) and directly at the project lending stage by providing loan guarantees, investing in the capital of the project company, issuing soft loans.

No financial institution uses such a wide range of instruments as development banks. However, the most common are loans, which are provided mostly on concessional terms. The conditions for the provision of credit resources by development banks depend on the level of socioeconomic development of the country and the type of credit product. The loan term varies from 1 to 38 years, with a minimum grace period of 3 to 15 years. Interest rates are mostly fixed on soft loans and floating on commercial loans (Faure et al., 2015). At the same time, attracting such credit resources requires the active participation of public authorities in these processes, as it is done by signing international agreements and providing state or local credit guarantees.

#### *4.3. Warranty and insurance support for PPP projects*

The most common form of PPP incentive is the provision of state guarantees and liability insurance of the state partner. They are used to implement significant socioeconomic projects, creating favourable conditions for attracting credit resources. This allows to stimulate the attraction of private investment. In contrast to the provision of guarantees to small and medium-sized enterprises, which are mainly carried out with the help of guarantee agencies, guarantees for PPP projects are mostly provided from the state budget.

Guaranteed participation in capital stimulates the investment of high-risk projects, as it provides for the payment of the debt by the state in the event that the private partner is unable to fulfil its obligations. The state guarantee allows the development bank to provide soft loans on the capital market. In addition, state support should promote, not compete with, the Development Bank's cooperation with commercial banks on a subsidiary and segregation-based basis.

In world practice, there are a large number of successful PPP projects with guarantees provided at the national, regional or municipal levels of government, that are implemented within public finances. At the same time, such guarantees are not debt obligations of

countries, but are accounted for separately. They usually have a legal, financial limit (Spain, Poland, France, etc.). The exception is the United States, where government guarantees are the country's debt. This significantly limits the potential for their provision, as a result of which the amount of risks taken by the public sector is reduced.

There are situations when the public partner is forced to fulfil guarantees on PPP projects with erroneously assessed risks, that is, pay funds due to default or to compensate for lost revenue by financing expensive and often economically unjustified PPP projects. In addition, in international practice, there are cases in which guarantees have not been implemented, but to prevent default on guaranteed obligations, the government has provided support to the private partner in other forms (subsidies, soft loans, etc.).

Government credit guarantees should be used in countries where public-business partnerships have not been properly developed. Given that the state provides guarantees on a paid basis, creditors have incentives to finance PPP projects and, at the same time – full or partial responsibility for assessing the creditworthiness of potential borrowers. The state benefits as the need for budget allocations decreases. However, such guarantees may reduce the motivation of borrowers to meet all the terms of loan agreements.

Unlike government guarantees, guarantees issued by development banks have a higher credit rating. The experience of countries with a long history of PPP shows that the implementation of projects using the guarantee mechanism of such international financial institutions allows the completion of the project on time with the initial budget. When issuing guarantees, most banks assume some operational risks, such as low-demand risks and political risks.

Providing guarantees by commercial banks is a rather expensive way to support public-private partnership projects. After all, they apply a rate based on a full risk assessment. Instead, international development banks can provide them on preferential terms, that is, free of charge, at a fixed (one-size-fits-all) or differentiated (by the amount of liabilities and the level of development of the country) rate. It is the first type of rate that supports priority development projects (selected on the basis of scale, type of economic activity and territorial affiliation of the project).

In economically developed countries, the amount of guarantees provided exceeds the cost of their creation and maintenance. In particular, the share of guarantees, that is, payments for guarantees is 2-3% of their total. At the same time, in world practice, it is believed that the optimal level of funding for such guarantees is from 5% to 10%.

According to World Bank statistics, during 2010-2021, there was active participation of international development banks in financing public-private partnership projects. The largest financial support was provided to Latin America and the Caribbean, where 187 PPP projects worth \$ 4,6553.8 million were implemented. The countries of the Middle East and North Africa received the least amount of financial support from development banks, where 58 projects worth \$ 13,606.8 million were implemented (Table 1).

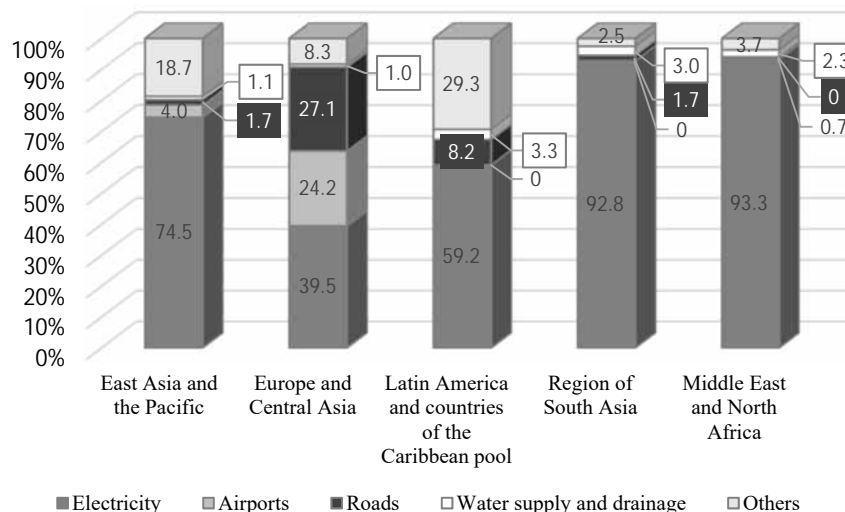
**Table 1. The amount of financial support for public-private partnership projects provided by international development banks to various regions of the world during 2010-2021**

Years	Regions									
	East Asia and the Pacific		Europe and Central Asia		Latin America and countries of the Caribbean pool		Region of South Asia		Middle East and North Africa	
	units	million dollars	units	million dollars	units	million dollars	units	million dollars	units	million dollars
2010	6	1242,0	6	1997,5	22	4106,4	3	203,5	2	409,7
2011	5	1452,3	9	1836,9	21	4795,7	19	1551,3	–	–
2012	10	5260,5	7	6012,0	18	3633,1	13	2457,0	1	223,0
2013	5	994,1	4	581,5	25	4700,3	6	631,3	2	1728,0
2014	5	2740,8	1	4,0	20	3941,1	6	755,3	6	2906,6
2015	4	1828,7	7	2915,3	22	8973,0	8	1514,0	9	2160,0
2016	4	750,0	3	296,5	4	1222,5	3	417,6	4	1255,1
2017	11	5118,4	7	1131,8	11	3077,7	9	3073,4	28	3109,4
2018	13	5593,0	8	2165,6	16	4384,2	6	1107,3	2	364,9
2019	8	2579,8	25	3115,3	19	5187,5	13	1756,2	1	335,0
2020	6	509,8	8	1475,8	7	2040,8	8	2410,9	2	961,0
2021	5	507,9	5	1934,9	2	491,5	4	316,4	1	154,1
<b>Total</b>	<b>82</b>	<b>28577,3</b>	<b>90</b>	<b>23467,1</b>	<b>187</b>	<b>46553,8</b>	<b>98</b>	<b>16194,2</b>	<b>58</b>	<b>13606,8</b>

Source: <https://ppi.worldbank.org/en/visualization#sector=&status=&ppi=&investment=&region=&ida=&income=&ppp=&mdb=&year=&excel=false&map=&header=true>.

Worldwide, financial support for PPP projects by international development banks has been provided in various sectors of the economy. The largest share of the mentioned financial support in the regions of the world is provided in the field of electricity. Thus, during 2010-2021 it ranged from 39.5 to 93.3 percentage points. This is primarily due to energy and environmental issues on a global scale. A significant amount of financial support from energy development banks is provided by the so-called «Greenfield project», which is developed from scratch and involves the design of infrastructure, its construction and commissioning. At the same time, the state provides the investor with guarantees of long-term cash inflows as a result of concluding contracts with the main consumers of electricity. However, in the structure of financial support provided, its share was small in PPP projects in such areas as air and rail transport, heat supply and waste treatment, which were mostly implemented in the form of concessions (Figure 3).

**Figure 3. Structure of financial support of PPP projects by international development banks in various sectors of the economy during 2010-2021**



Source: <https://ppi.worldbank.org/en/visualization#sector=&status=&ppi=&investment=&region=&ida=&income=&ppp=&mdb=&year=&excel=false&map=&header=true>.

In Ukraine, financial support for national and regional PPP projects by international development banks is low. Thus, during 2009-2021, they financially joined the implementation of 13 PPP projects, the largest number of which was observed in the 2019 year: 6 projects worth 680.9 million dollars, and in 2010-2011, 2013-2016 and in 2021 (Figure 4) no support was provided by the mentioned financial institutions. The main reasons for the low level of interest of development banks in financial support of domestic projects are distrust for the state as a subject of the partnership due to economic instability, changing legislation, frequent changes in priorities of various political forces, underdeveloped institutional environment for public-private partnership.

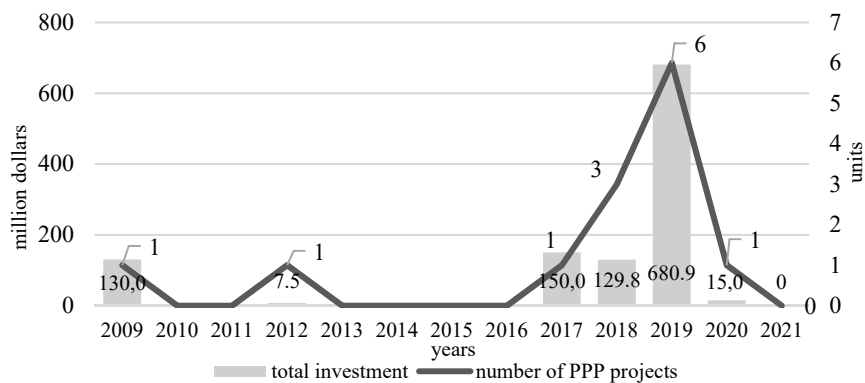
During 2009-2021, financial support for PPP projects in Ukraine was provided by such international financial institutions as the European Bank for Reconstruction and Development, the International Finance Corporation, the Netherlands Development Bank, the Black Sea Bank for Trade and Development, the Nordic Environmental Finance Corporation, the Norwegian Agency for guaranteeing export credits, etc. Mainly, the participation of these institutions was manifested in the form of preferential loans, less often – in the form of guarantees.

In the specified period, development banks provided financial support exclusively to PPP projects that were implemented in the port industry and electric power. The largest amount of such support was received by the project, which is a significant contribution to the development of the renewable energy sector of Ukraine, called «Syvash Wind Power Project», which involved the construction of a wind power plant. The total amount of financing of the project was 428.45 million dollars, including development banks, among



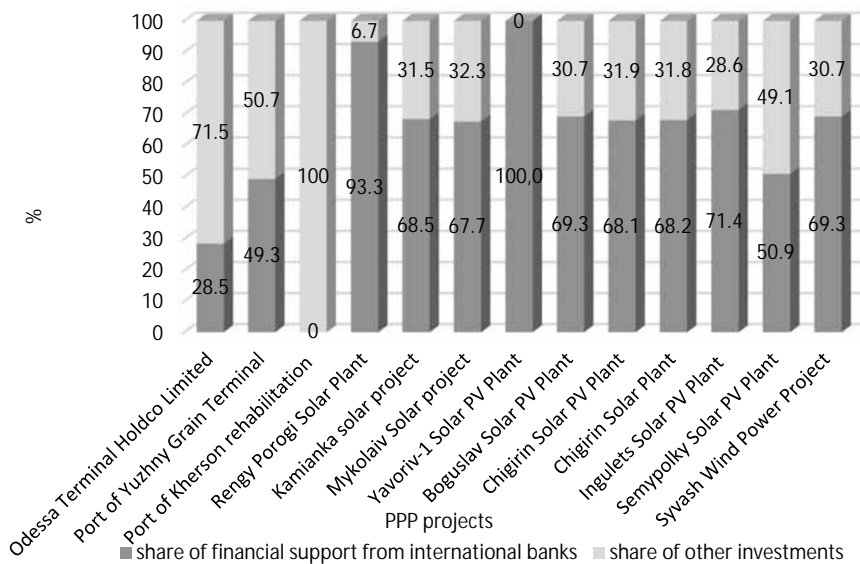
which there were eight participants, provided preferential loans in the amount of 297.0 million dollars, which is 69.3% of the entire cost of the project. In addition, a significant share of such financial support was also observed in other PPP projects. In general, it ranged from 28.5 to 100 percentage points (Figure 5).

**Figure 4. Dynamics of the number and volume of financial support for PPP projects in Ukraine from international development banks for 2009-2021**



Source: <https://ppi.worldbank.org/en/visualization#sector=&status=&ppi=&investment=&region=&ida=&income=&ppp=&mdb=&year=&excel=false&map=&header=true>.

**Figure 5. The share of financial support from international development banks in the total amount of investments in PPP projects in Ukraine for 2009-2021**



Source: <https://ppi.worldbank.org/en/visualization#sector=&status=&ppi=&investment=&region=&ida=&income=&ppp=&mdb=&year=&excel=false&map=&header=true>.

Despite the significant share of financial support from international banks for the development of PPP projects, which is shown in Figure 5, it was provided in certain sectors of the economy (port and electric power), so the number of such projects was insignificant. Therefore, in order to deepen cooperation in other sectors of the economy, in October 2019, the International Financial Corporation, whose activities are focused on supporting the development of partnership relations between the state and business in developing countries, and Ukraine signed a memorandum regarding the identification of priority sectors for financing PPP projects. Highways, airports, railways and health care are chosen as the main ones, where pilot projects are being developed under concession conditions. The goal of implementing the mentioned projects is to increase the volume of investments, increase the general well-being of society and accelerate the growth of the economy of Ukraine.

The continuation of cooperation with international development banks was the signing on June 26, 2020, by the Ministry of Infrastructure of Ukraine, the Administration of Sea Ports of Ukraine and a consortium of companies as part of Risoil S.A. and Georgian Industrial Group of the agreement on public-private partnership for the purpose of development of the Kherson sea trade port according to the concession model. This was of great importance for the Government of Ukraine, because the mentioned project required an urgent investment and professional experience in the port sector of the country. The International Finance Corporation, the European Bank for Reconstruction and Development, and the Global Fund for Infrastructure Financing became the main financial consultants in this area. This made it possible to conduct a tender for the implementation of the mentioned project in Ukraine at the level of world standards for the first time. Also, within the framework of such cooperation, the implementation of the PPP project for the seaport «Olvia» took place.

Thus, financial support in the form of soft loans and guarantee support in the process of public-private partnership projects is an important factor in strengthening the cooperation of business entities with the state. At the same time, it is necessary to create a comprehensive system of project selection, determine the acceptable level of risks and conditions of the guarantee, take into account the latter, as well as monitor the implementation of guarantee obligations.

#### *4.4. Subsidizing in the process of financial stimulation of public-private partnership*

Providing favourable conditions for the participation of banking institutions in lending to PPP projects is important in stimulating partnerships between the state and business. Unfortunately, the interest rate of the National Bank of Ukraine and the risky activities of commercial banks do not allow lending to these projects at an affordable rate. Therefore, it is advisable for public authorities to apply interest rate subsidies, which provide compensation for the difference between market and preferential interest rates.

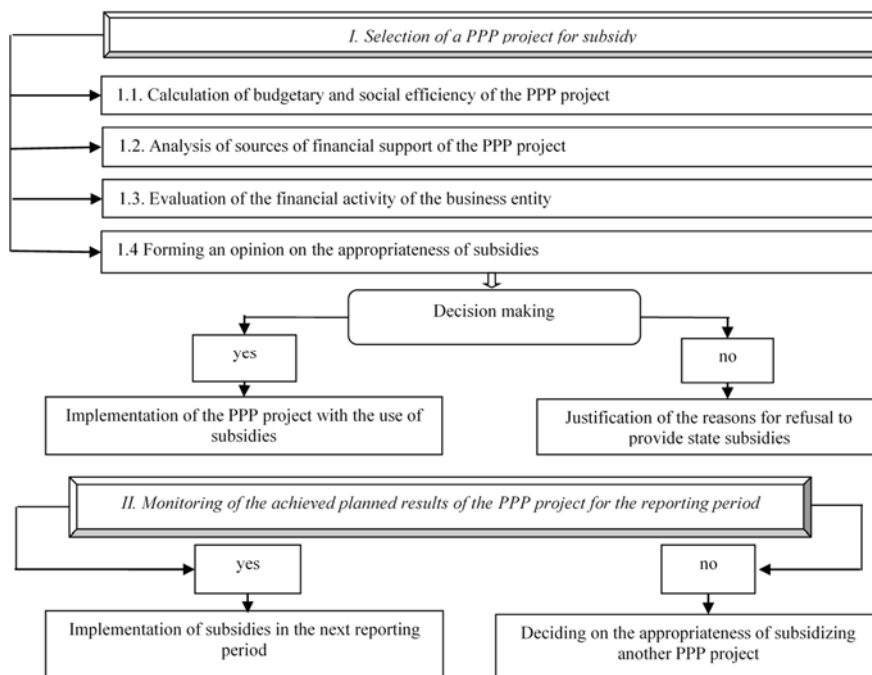
In economically developed countries, the use of this financial instrument is significantly reduced due to the development of financial markets. For example, the Organization for Economic Cooperation and Development, which includes 37 countries, uses interest rate compensation to support 3% of PPP projects (Kryshtal, 2017). However, at the international

level, it is impossible to compare the amount of budget funds allocated by states for these subsidies, as there are different methods of providing and the amount of subsidies.

In Ukraine, the subsidy instrument is a promising stimulus for lending to public-private partnership projects by banks in the long run, due to the low level of development of the domestic financial market. In domestic practice, it is used for investment projects implemented in agriculture, transport, food industry, construction of infrastructure and small and medium-sized businesses. At the same time, as noted by G. Kryshstal, «the scheme of subsidies for loans raised by enterprises for the reconstruction and renovation of production facilities, provides for reimbursement of 3/4 of the amount of interest on the loan for 1 year» (Kryshstal, 2017). However, such a stimulant was not used in the domestic practice of PPP.

Subsidizing payment for rent or leasing in the process of PPP project is legally regulated in the Law of Ukraine «On Concession» from № 155-IX 03.10.2019 (About the Concession: Law of Ukraine, 2019) and the Law of Ukraine «On Lease of State and Municipal Property» from 03.10.2019 № 157- IX (About the Lease of State and communal property: Law of Ukraine, 2019). These legislative acts give the state partner the right to reduce the amount of concession and lease payments. The decision to provide benefits is made by the state partner after calculating the amount of budget losses for the year. These types of benefits must be provided for in the public-private partnership agreement.

**Figure 6. Decision-making mechanism on the feasibility of subsidizing a public-private partnership project**



Source: built by the authors.

Decisions on subsidizing interest rates and rent or lease payments in the process of PPP projects should be made in accordance with the results of an open discussion with all stakeholders and independent entities, including foreign, professionals, members of the public. It is necessary to take into account the annual losses of the state budget from the provision of such benefits. The mechanism for deciding on the appropriateness of subsidizing a public-private partnership project is shown in Figure 6.

#### *4.5. State benefits in the system of financial incentives for public-private partnership*

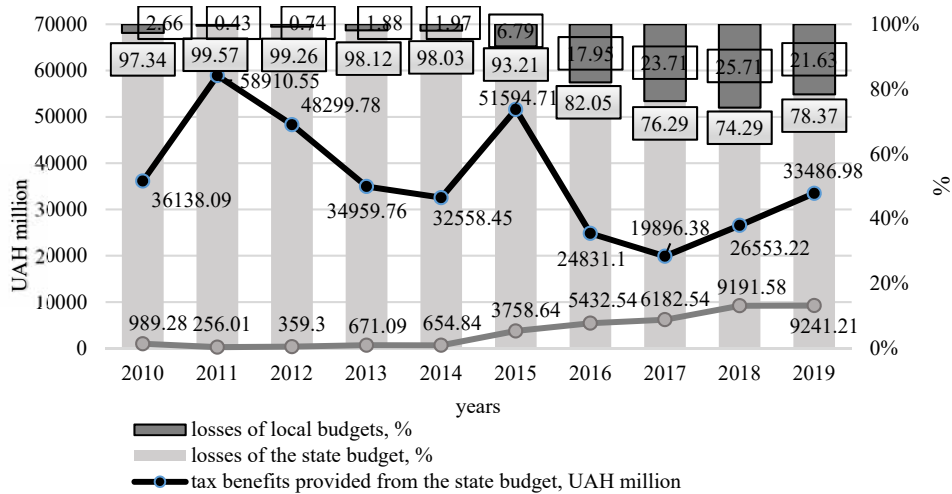
One of the forms of encouraging business participation in the financing of PPP projects is tax incentives, the main tool of which is tax benefits. In the scientific community, there are different interpretations of this concept. Thus, Yu. Ivanov, A. Krysovaty, O. Desyatniuk believe that «tax benefits are statutory exceptions to the general rules of taxation, which give the payer the opportunity to reduce the amount of tax (fee) payable, or exempt him from certain responsibilities and rules related to taxation» (Ivanov et al., 2006). According to scientists, such benefits can reduce the tax liability of the taxpayer, or be exempt from it.

However, despite the variety of tax benefits and the legal field in which they operate, the current tax legislation of Ukraine does not provide for a special tax climate for a private partner in the case of public-private partnership (exemption from certain taxes, lower tax rates and their differentiation according to the complexity of the PPP project, etc.). Therefore, the private partner must pay the taxes and mandatory payments that apply in the national tax system. In addition, the scientific community is constantly discussing the feasibility of introducing preferential taxation in this area.

During 2010-2019, the amount of tax benefits provided by the state budget was cyclical. Its highest value was observed in 2011 and 2015 (indicators amounted to UAH 58,910.55 million and UAH 51,594.71 million, respectively), the lowest – in 2016-2017 (UAH 24,831.1 million and UAH 1,996.38 million) (Figure 7). Instead, the amount of benefits provided from local budgets increased: from UAH 989.28 million in 2010 to UAH 9241.21 million in 2019. A significant part of benefits was provided by national taxes, among which the dominant were corporate income tax and value-added tax cost. The data of Figure 6 shows that the state budget suffered the greatest losses and with the intensification of the decentralization process – and local budgets, due to the provision of property tax benefits.

Increasing tax breaks exacerbates the budget deficit. As a result, the government of Ukraine, attracting additional sources to cover it, reduces tax benefits. This leads to a loss of business confidence in benefits as a stimulus to attract investment, including in the field of public-private partnership. Therefore, the amount of tax support should, on the one hand, not disturb the balance of budgets, taking into account the possibility of meeting the expenditure obligations of the state, and on the other – be an effective stimulus to economic development.

**Figure 7. Dynamics of the volume of tax benefits and the share of losses of state and local budgets from their provision for 2010-2019**



Source: [https://kse.ua/wp-content/uploads/2021/02/23-02-21-Annual-report-KSE\\_web.pdf](https://kse.ua/wp-content/uploads/2021/02/23-02-21-Annual-report-KSE_web.pdf).

Thus, both in theory and in practice, there is an opinion that the provision of tax benefits is a negative factor in taxation. After all, they benefit some businesses at the expense of other taxpayers. At the same time, tax benefits are an important stimulus to the state's financial policy. They are aimed at encouraging the implementation of priority activities, in particular, on the basis of public-private partnership. This is confirmed by successful examples of their application in world practice. For example, in Indonesia, there are the following tax incentives:

- exemption from income tax for up to 15 years with its possible extension for another 5 years at the discretion of the Minister of Finance. Such tax holidays are provided to strategically important PPP projects;
- the rate of income tax on dividends paid to foreign taxpayers is 10% or less;
- the possibility of carrying forward losses to future tax periods (up to 10 years), if the private partner implements important infrastructure projects, reinvests capital, etc. (Indonesian Investment Coordinating Board).

In view of the above, in Indonesia, much attention is paid to stimulating private investment in PPP projects through active business support, especially in the initial stages of project implementation and risk sharing between partners. In addition, the government of this country allows businesses to borrow from international financial institutions by providing government guarantees.

In the Republic of Korea, the implementation of PPP projects has a zero rate for value-added tax and real estate registration, as well as reducing the interest tax on concession bonds (up to 15%) for projects with a maturity of more than 15 years (Solntsev, 2017).

In India and Korea, public priorities dominate commercial benefits. Tax benefits are provided to the concessionaire in the event of a reduction in the fee for services provided to end users. This makes it possible to ensure the availability of services to various segments of the population.

Thus, tax incentives are an effective lever for influencing the development of public-private partnerships, as they help to encourage private partners to invest in PPP projects. The state, losing tax revenues, is able to further increase them due to the growth of private partner profits, resulting in increased taxes.

In addition to tax incentives, the state may apply other types of guarantees. In particular, in order to ensure a minimum level of profitability, the state can create favourable tariffs for a private partner, provide benefits for rent or lease, and so on.

## **5. Conclusions**

As a result of the research, we came to the following conclusions:

- implementation of direct state support by the state requires the active participation of state authorities in these processes, since it is carried out by signing international agreements, attracting state funds or taking certain financial obligations;
- a common form of PPP stimulation is the provision of state guarantees and liability insurance of the state partner. They are used to implement significant socioeconomic projects, creating favourable conditions for attracting credit resources. This makes it possible to stimulate the attraction of private investments;
- in contrast to state guarantees, guarantees issued by development banks have a higher credit rating, the use of which makes it possible to complete the project on time in compliance with the initially determined budget;
- it was investigated that a promising stimulating means of crediting public-private partnership projects is the subsidy tool, which is due to the low level of development of the domestic financial market. In domestic practice, it is used for investment projects implemented in agriculture, transport, food industry, construction of infrastructure facilities, small and medium-sized businesses;
- the use of tax incentives leads to an increase in the budget deficit. Therefore, the amount of tax support should, on the one hand, not disturb the balance of budgets, taking into account the possibility of fulfilling the state's expenditure obligations, and on the other hand, be an effective stimulating lever of economic development.

Summing up, it should be noted that the governments of many countries are increasingly focusing on finding new, more effective means of financial incentives for PPPs. They are aimed at creating the preconditions for the development of effective partnerships between government and business. At the same time, the study shows that an unjustified mechanism of their application can lead to significant budget losses. To minimize the negative consequences, it is necessary to apply financial incentives, taking into account the impact on

the budget and financial and economic activities of economic entities, to implement an effective system of control over their use.

## References

- Analytical Report. (2020). Kyiv School of Economics, available at: [https://kse.ua/wp-content/uploads/2021/02/23-02-21-Annual-report-KSE\\_web.pdf](https://kse.ua/wp-content/uploads/2021/02/23-02-21-Annual-report-KSE_web.pdf).
- Blanc-Brude, F., Strange, R. (2007). How Banks Price Loans to Public-Private Partnerships: Evidence from the European Market. – *Journal of Applied Corporate Finance*, 19(4), pp. 94-106, available at: <https://onlinelibrary.wiley.com/doi/10.1111/j.1745-6622.2007.00163.x>.
- Faure, R., Prizzon, A., Rogerson, A. (2015). *Multilateral Development Banks*. Overseas Development Institute, available at: [https://www.academia.edu/21819065/Multilateral\\_development\\_banks\\_A\\_short\\_guide\\_December\\_2015](https://www.academia.edu/21819065/Multilateral_development_banks_A_short_guide_December_2015).
- Ivanov, Yu. B., Krysovaty, A. I., Desyatnyuk, O. M. (2006). *Tax System: a Textbook*. Kyiv: Attica, 920 p.
- Kireeva, A. V., Sokolov I. A., Tishchenko T. V., Khudko E. V. (2012). *Public-Private Partnership as a Tool to Support Innovation*. Publishing House «Delo» RANKhIGS, 516 p.
- Komarnytska, H. O. (2019). Directions of Activation of Public-Private Partnership in the Conditions of Development of Investment and Innovation Activity. – *Economy and State*, 5, pp. 60-63.
- Kryshtal, H. O. (2017). Mechanisms and Instruments of Partnership on the Part of the State in Cooperation with the Banking Sector. – *Economics: Theory and Practice*, 1, pp. 54-61.
- Linh, N., Wan, X., Thuy, H. Th. (2018). Financing a PPP Project: Sources and Financial Instruments – Case Study from China. – *International Journal of Business and Management*, 13(10), pp. 240-248.
- Prorochuk, M. V. (2020). The Mechanism of Interaction Between Government and Business in the Field of Infrastructure. – *Scientific Notes of TNU Named After V. I. Vernadsky. Series: Public Administration*, 31(70), 4, pp. 126-133.
- Public-Private Partnerships Reference Guide. Version 2.0. (2014). World Bank Group, available at: <https://www.worldbank.org/en/topic/publicprivatepartnerships/publication/the-ppp-reference-guide-version-20>.
- Solntsev, K. D. (2017). Projects of Public-Private Partnership and Measures of their Support in World Practice. – *Public private partnership*, 4(1), pp. 23-42.
- Stefankiv, O. M., Danylyshyn, V. I. (2016). Theoretical Aspects of Financial and Credit Instruments of Public-Private Partnership. – *Economy and Society*, 3, pp. 93-98.
- Tax Holiday. Indonesian Investment Coordinating Board, available at: <https://www3.investindonesia.go.id/en/how-we-can-help/incentives>.
- Verkhovna Rada of Ukraine. (n.d.). About the Concession: Law of Ukraine of October 3, 2019. № 155-IX., available at: <https://zakon.rada.gov.ua/laws/card/155-20>.
- Verkhovna Rada of Ukraine. (n.d.). About the Lease of State and Communal Property: Law of Ukraine of October 3, 2019. № 157-IX., available at: <https://zakon.rada.gov.ua/laws/card/157-20>.
- World Bank Information on the Number and Financing of PPP Projects by Form, available at: <https://ppi.worldbank.org/en/visualization#sector=&status=&ppi=&investment=&region=&ida=&income=&ppp=&mdb=&year=&excel=false&map=&header=true>.

## ESTIMATION OF THE VALUE, DISTRIBUTION AND CONCENTRATION OF WEALTH IN BULGARIA, 1995-2020<sup>2</sup>

*This paper estimates private wealth in Bulgaria using different official sources of macroeconomic and survey data. Due data availability reasons, the 1995-2020 period is analysed. Net wealth is calculated by capitalising incorporated and non-incorporated entrepreneurs' income, combining it with administrative and survey sources of data on real and financial wealth and liabilities. The net wealth of Bulgarian households is rising in nominal EUR and PPP terms, so is inequality. From the end of 1995 until the end of 2020 net wealth of Bulgarian households (individuals) has grown eightfold, from EUR 41.7 bln to EUR 381.8 bln, while per adult and per capita measures have grown tenfold, from 8.5 thousand euro to 92.2 thousand euro and from 4.9 to 55.2 thousand euro respectively. The geometric average rate of growth (CAGR) amounts to 9.3% yearly for the net wealth, 10% for the net wealth per adult and 10.1% for the net wealth per capita. For the period under review, the bottom half of individuals own less than 5.1% of net wealth on average, while the top decile and percentile own 65.3% and 10.6% of total net wealth on average, respectively, while the Gini coefficient grows to 0.75 at the end of the period but accepting values between 0.63 and 0.81 over the analysed period.*

*Keywords: wealth; inequality; wealth distribution; wealth concentration; income capitalisation; GINI*

*JEL: D31; E01; G51; D63*

### 1. Introduction

The topic of wealth accumulation and distribution is maintaining the interest of economists, researchers and decision-makers in the government and private sector on a global and, recently, on a national level. Effective policies about more equal wealth distribution are needed, but at the same time, they should not prevent individuals from accumulating wealth and stimulating the investment process. The lack of reliable sources of wealth data for most

---

<sup>1</sup> Petar Peshev, Chief(senior) assistant professor, PhD, University Of National And World Economy, +359898438776.

<sup>2</sup> This scientific publication contains results of a study financed with funds from a targeted subsidy for Scientific research activity of UNWE under contract “№ НИД НИ-16/2020“.

This paper should be cited as: Peshev, P. (2023). *Estimation of the Value, Distribution and Concentration of Wealth in Bulgaria, 1995-2020*. – *Economic Studies (Ikonomicheski Izsledvania)*, 32(3), pp. 104-129.



of countries around the world challenges addressing the problem of rising wealth concentration.

Wealth is one of the highest needs and wants of people, even being an ultimate goal for many, providing a higher degree of utility for individuals, according to the work of Michailat and Saez (2018). Deaton (2003) suggests the existence of a strong association between wealth and well-being and life expectancy. The high-wealth and high-income concentration prevents societies from reaching higher overall well-being and causes obstacles to economic growth (see Barro, 2000; Bagachi, Svejnar, 2013). Wealth and income inequality are threatening the functioning of modern democratic societies, according to Mankiw (2015) and the economic and political development's agenda is tightly related to top wealth percentiles (see Stiglitz, 2012). Wilkinson and Pickett (2020) find a positive association between inequality (wealth and income) and addictions to the use of drugs and alcohol, suicides and mental diseases.

According to Saez and Zucman (2017), the wealthiest 0.1% of the US owns net wealth equal to the bottom 90% of the population. Piketty (2014) estimates that the wealthiest 0.1% in the world own as much wealth, as the bottom 50% of the population. According to Shorrocks et al. (2021), the wealthiest 1% own around 90% of global wealth. Wealth dynamics follows a distinct upward trend in the last couple of decades, according to the works of Wolf (2015), Zuckman (2019), Grabka (2015) of Lundberg & Waldenström (2018), Peshev (2015), Peshev et al. (2019) and many more. Results of the just-cited authors' research assume that wealth Gini coefficients vary between 0.7 and 0.9, confirming that wealth is times more concentrated than salaried incomes.

Negative economic shocks, caused by different events, e.g. the COVID-19 pandemic, the Financial Crises, etc., are causing wealth concentration to grow (see Stewart, 1939). Higher economic and social inequality is in a position to cause social unrest and become a factor for long-term political, social, and institutional changes in separate countries and regions. This fact raises the need to effectively address poverty and wealth concentration. Wealth Inequality needs to be modelled and included in institutional macroeconomic models in order better explain wealth variation and coin effective distributional policies (see De Nardi, Fella, 2017; Cagetti, De Nardi, 2006).

Bulgarian economic development aligns with the EU and global business cycle and experiences ascending dynamics. Economic growth is associated with higher productivity, higher incomes, improved living conditions and increased financial and real wealth. During the 25-year period between 1995 and 2020, the Bulgarian economy went through a tremendous transformation, starting as a post-communist economy and turning itself into an upper-middle-income market-based economy according to World Bank's classification. Periods of hyperinflation, high-unemployment rate, currency board introduction, ageing population, negative migration, NATO and EU accession, assets bubbles and bursts, local and global financial crises, COVID-19 lockdowns, and many other negative and positive local and global shocks shaped the economy of Bulgaria.

Dealing with wealth concentration is not an easy task since taxing the wealthiest people makes them more creative in tax evasion (see Kanbur, Stiglitz, 2015; Scheuer, Slemrod, 2020). Wealth is on the path of self-fulfilling prophecy, because the rich communicate and date rich people, and rich parents send their kids to quality schools and prepare them better

for life challenges, giving them an advantage (see Milanovic, 2019; Pfeffer, Schoeni, 2016; Stiglitz, 2018).

In this study, the net wealth of Bulgarian households is analysed, on an aggregate level, on the “per capita” and “per adult” level, during the 1995-2020 period. The main objective of the article is to estimate the level of wealth and its distribution and to analyse them using commonwealth inequality indicators. Financial and real assets and financial liabilities of households are considered, through combining reported data for wealth components and by capitalising entrepreneurs’ income. The article is organised as follows: a brief survey on the wealth inequality literature is performed; a data and methodological section follows, laying down the foundations and assumptions for the calculation of net wealth and its components and for estimating the wealth distribution; in the results, main section findings are summarised and analysed.

## **2. Survey on the Wealth Inequality Measurement Literature**

Wealth concentration around the world has been on the rise since the 80s and 90s in various developed and developing countries, opposing the theory of Kuznets (1955) of declining inequality with reaching developed status. The Gini coefficient ranges between 0.70 and 0.95; the top 1% wealth share accepts values between 19 and 37% based on Wolf’s (2015) and Zuckman’s (2019) analysis for the US, Grabka’s (2015) results for Germany and Lundberg & Waldenströms’ (2018) analysis of Sweden. Analysing the long-term trend of US wealth development, Saez & Zucman (2017) conclude that since the 1980s, there has been a distinct upward trend of rising wealth inequality, with TOP 0.1% increasing its wealth share from 7% in 1979 to 22% in 2012. The TOP 1% steadily increased its wealth share in the EU, China and the US since the 80s and 90s, owning between 33 to 40% of the wealth, while the wealth of the bottom 90% steadily deteriorated (Zuckman, 2019).

Top tails of the distribution usually don’t provide the real value of their income and/or net worth by intentionally or non-intentionally underestimating income and wealth. Nevertheless, it is hard for extreme tails of the real distribution to be surveyed. In the analysis of Estonian households’ survey data Meriküll and Rõõm (2022) find that not-contacted high-income and wealthy households have much higher possession of net wealth, with net worth Gini being suppressed by around 6 percentage points, while the top decile net wealth share is underestimated by hefty 11.3 percentage points. The top percentiles of net wealth also seem heavily underestimated (ibid.). Contacted but non-reported wealthy households also have a higher share of wealth in comparison to reporters (ibid.). Survey data heavily underestimate the more realistic wealth pattern presented by tax (administrative data), according to the results of Saez and Zuckman (2016). In 2012 tax data shows a net wealth share of 42% for the wealthiest 0.1%, while survey data points to 30% share, or an underestimation equal to 12 pp (see ibid.). Atkinson (1975) finds that the reported wealth Gini coefficient has values of 0.68, while adjusted for unreported wealth sources increases the Gini coefficient to 0.87, supporting the hypothesis that reported data omitted important sources of wealth in the right tail of the distribution. Survey data underestimate financial wealth since regression dummy for surveyed data negatively affects wealth (see Davies et al., 2011).

According to OECD Data bottom, 40% of net wealth own a negative net wealth on average in the US, Norway, Netherlands and Denmark, during the period between 2010 and 2019, with values between -7.7% (For Denmark) and -0.24% (For USA), with an average value of -3.7% share of total net wealth. In Ireland, Chile, Canada, Hungary and Latvia, a negative net worth has been recorded for some of the years throughout the above-mentioned period. For all OECD countries, the share of net wealth for the bottom four deciles is between -7.7 and 11.14% of total wealth, with an average value of 3%. During the 2009-2019 period top decile's share of net wealth has grown from 45% to 63% on average for OECD countries. For the period considered, the top decile owns between 36 and 78% on average of total net wealth for the OECD countries. According to this variable, in the US, wealth inequality is highest while being lowest in Slovakia.

According to WID.org data of Blanchet et al. (2021), during the period 1995-2021, the bottom five deciles own around 5%(between 4.7 and 5.1% for the period ) of net wealth in Bulgaria, 2.5% on average for East European countries and 3.6% on average for the EU. The bottom decile's share of net wealth is negative for Bulgaria, Eastern Europe and the EU, owning on average minus 1.8% of total net wealth, i.e. debts exceed assets. The second decile owns around 0.3 % of net wealth in Bulgaria for the period of 1995-2021; 0.2% on average for Eastern Europe and 0.1% for the EU. The third decile owns around 0.9% of net wealth in Bulgaria for the period of 1995-2021; 0.5% on average for Eastern Europe and 0.6% for the EU. During the 1995-2021 period, the average net wealth owned by the top decile ranges between 57 and 61% for Bulgaria, the EU and Eastern Europe. In Bulgaria, the top decile owns between 56 and 59% of the total net wealth, between 56 and 61% in the EU, and between 60 and 62% in Eastern Europe. The share of the total wealth of the top decile advances in the EU, while in Bulgaria and in Eastern Europe, the trend is flat.

In the research of Davies et al. (2017), the bottom decile holds more debt than assets, hence having negative net wealth. The Bottom 10% of households (individuals in some data) in selected countries possess minus 1.2% of net wealth. Households (individuals) from the bottom decile have the highest gap between debts and assets, i.e., the lowest share of total net wealth, of minus 15.3% in Denmark, minus 5 in Norway and -3.5% in Ireland and Netherlands, while for other selected EU countries (Greece, Cyprus, Finland, France, Italy, Portugal, Slovakia, Slovenia, Spain) the bottom decile net wealth amounts to minus 0.3%. In the same research, authors reveal that on a World regional level, the bottom decile owns a negative portion of total net wealth, in the range of -0.8 – -0.1%, with European representative members of the bottom decile having on average -0.8% of total net wealth (see Davies et al. 2017). Yet, the top decile on a world regional level owns between 70 and 88% of total net wealth, with around 80% for Europe and 76% for the US (see *ibid.*).

In this direction are the main findings of Thomas Piketty. World wealth concentration has grown since the fourth quarter of the 20<sup>th</sup> century, according to the results of Piketty (2014). He claims that faster return to capital, than the growth of GDP results in higher inequality and it is inevitable in the modern economy when tech start-ups help their creators join the top of the wealth of distribution (*ibid.*). Davies & Shorrocks (2000) analyse different methods of evaluating wealth, incl. the capitalising of income methods, and in their study, they assume the existence of a common descending trend of wealth concentration during the 20th century, especially for the UK, Sweden, Australia and mostly USA (*ibid.*).

In 2014, the Gini coefficient ranged between 0.72 и 89.5 for selected countries, while accepting a value of 0.83 for Europe and North America, according to Davies et al. (2017). The world Gini coefficient accepts values of 0.91 and signals even higher inequality (ibid.). The richest decile in Europe, North America and the World owns between 69 and 88% of the net wealth. Liabilities of Low and Min-wealth families grow faster in comparison to High-income members of society, while real assets grow faster for high-wealth individuals. In their research, Davies et al. (2017) use a combination of household balance sheets, survey data and econometric techniques to derive missing data for countries and groups of countries.

Analysing US wealth inequality over the 1989-2013 period reveals that the Top wealth percentile in the US increased its wealth share from 30 to 35.5% respectively, the top decile increased its holdings from 67 to 75%, and the Gini Coefficient rose from 0.79 to 0.85 (see Pfeffer & Schoeni, 2016). Using SCF data for 1989-2019, a distinct up trend in wealth concentration exists, with the top 10% wealth owning 85.3% of total wealth as of the end of the period, starting from 79% at the beginning of the period (ibid).

Wealth inequality is usually two-three times higher than income inequality, justified by Gini coefficient values and top deciles, top percentile values and by bottom decile and quartile values. Assets' structure varies within wealth deciles and percentiles of the distribution of households' wealth, according to Wolf (2015). Mainly housing assets comprise the middle class's wealth, while the top decile and top percentiles possess much more financial assets.

Different factors affect wealth inequality, and it is common to vary over countries with different traditions, political and economic systems

In the modern meritocratic world, there is a tendency for the “winner takes it all” when it comes to wealth and inequality (see David et al. 2017). Income inequality is a growing factor of wealth inequality, according to Piketty and Saez (2014). Usually, the older and better-educated part of the population concentrates a higher share of wealth, owning larger value assets, mostly real estate (Gale et al., 2020; Fuller et al., 2020). Wealth is concentrated not only among old and educated people, but also members of the white race have a higher chance of climbing the distributional ladder (Zhan and Xiang, 2016). In modelling wealth, inequality Humber et al. (2016) find that lower progressiveness of tax rates in the post-60s period is the main factor for higher wealth inequality.

The regression results of Davies et al. (2017) reveal that consumption is in positive association with financial and real assets, and with debt accumulation, so is the density of the urban population. GDP per capita growth rate leads to lower financial assets; on the other hand, the market capitalisation of traded companies' is in positive association with financial asset accumulation. Publicly and non-publicly traded equity (sold shares, distributed dividends, retained corporate earnings) is the biggest contributor to wealth inequality, especially in the right tail (see Benhabib et al. 2017).

Income capitalisation for deriving wealth and wealth distribution is a well-known method, suggested by various analysts on the topic of wealth, e.g. Stewart, C. (1939), Saez & Zucman (2016), Lundberg & Waldenström (2018), Hubmer, et al. (2016, 2018). The method of capitalising incomes for deriving wealth values is sensitive to assumptions and to the quality of source data; however, it is in a position to hypothesise direction and overall wealth levels

(see Lundberg & Waldenström, 2018). Nevertheless, capitalising income for deriving wealth matches wealth values and distribution from the Survey of Consumer Finances in the US, according to Saez & Zucman (2016).

By shifting the focus to Bulgaria, it could be concluded that not many research papers cover the evaluation of wealth in Bulgaria, solely or as a larger study, including more countries. According to Grimm et al. (2019), in 2018, Financial wealth in Bulgaria stood at 72 bln. EUR, with 10 258 EUR gross financial assets per capita and 8 033 EUR net financial assets per capita, and a Gini coefficient of 0.69. Financial assets include cash and bank deposits, receivables from insurance companies and pension institutions, securities (shares, bonds and investment funds) and other receivables (see *ibid.*).

Deposit wealth GINI's value in Bulgaria oscillates between 0.85 and 0.88 in the 12.2005-02.2015 period, while Loans' (mostly backed by collateral) Gini is in a steady uptrend, accepting values between 0.73 and 0.8 (see Peshev, 2015).

Shorrocks et al. (2019) identify the country's level of wealth after that, use a pattern distribution of wealth based on existing data of peers, and lastly, use Forbes world billionaires' lists. In mid-2019 average net wealth per Bulgarian adult equals 42 700 USD, or 243 billion USD in total for Bulgaria, assuming that in mid-2019 the population amount to 7.013 mln. citizens and 5.697 adults (see *ibid.*). In mid-2019, the average financial wealth per adult accounts for 26 070 USD, non-financial wealth stood around 19 900 USD and Debt per adult amounts to 3 273 USD, with a median wealth per adult equal to 18 950 USD. The financial wealth is comprised of 37% liquid assets (deposits mostly), 46.3% equities and 20% other financial assets (pensions, life-insurance accumulated contribution) (see *ibid.*). The Gini coefficient has a value of 0.659 (see Shorrocks et al., 2019).

In comparison to the mid-2019 data of Shorrocks et al. (2019), using the end of the 2019 year data of Shorrocks et al. (2021), the total wealth of Bulgaria declined to USD 198 bln. USD, with the adult population declining to 5.64 mln., wealth per adult declined to USD 35 154; financial wealth shrank to 17 540 USD, non-financial wealth rising and having a value of 21 165 USD, with debt per adult also rising to USD 3 550 USD, respectively.

For the six-month period between mid-2019 and the end of 2019, wealth per capita fell by 17.7%, financial wealth per capita declined by 33% and non-financial wealth grew by 6.3%. The decline in overall net wealth and financial wealth, in particular, is not justified by the facts, however. Bulgarian stock exchange benchmark, the SOFIX index, declined by only 3.3%, while the euro appreciated against the dollar by 1.2%. Bank deposits have the largest share in financial wealth in Bulgaria and experienced modest growth in the respective 6 months period, so are assets under the management of institutional investors (Private pension companies, life insurers, investment funds, etc.). One can expect at least financial wealth to be subject to a negligent change. Comparing wealth data for older periods in the Shorrocks et al. (2021, 2019), it seems that only the mid-2019 wealth value and wealth structure differ in comparison to data for other years. For the closest mid- and end-year period, the wealth pattern changes smoothly, e.g. the ratio between financial wealth and total wealth, the ratio between non-financial wealth to total wealth and the ratio between debt to total wealth maintain relatively constant proportions, around 50% is the share of financial wealth to total wealth; around 60% is the share of non-financial assets to total assets and around 10% is the

share of debt to total assets. This leads to the conclusion that mid-2019 data of Shorrocks et al. (2019) for Bulgaria is wrongly calculated and confirms how difficult it is to derive reliable data for wealth on countries.

Davies et al. (2011) combine Household balance sheets and survey data and regression equations to identify households' gross and net wealth across a different set of countries. Davies et al. (2011) regression results suggest that consumption is in a strongly positive association with non-financial wealth, financial wealth, and liabilities, hence with net wealth. Life expectancy is in positive association with net wealth, financial and non-financial wealth and in negative correlation with liabilities. Population density is a factor for non-financial wealth and for net wealth, while market capitalisation is a factor for financial wealth accumulation, while urban population and domestic credit are positively related to liabilities growth (see *ibid.*).

According to the World inequality database (WID), the average market value of Bulgarian wealth per adult in 2019 has a value of 55 958 USD, down from 57 884 USD in 2018 and up from the 2017 value of USD 56 972. Total wealth in 2019 accepted a value of USD 317.04 bln., down from USD 331.24 bln. in 2018 and down from a 2017 value of USD 329.8 bln. According to WID data, the top 10% owns between 55 and 57.8 % of total wealth in Bulgaria, during the period 1995-2019., and 57.8% as of 2019. The bottom 50% own between 6.2 and 5.7% for the same period and hold 5.7% of total wealth as of the end of 2019. The top percentile holds between 21.9 and 24.5% of the wealth during the respective period, owning 24.5% of total wealth as of 2019.

According to Kuypers & Marx (2019), the wealth-to-income ratio for the elderly is much higher in comparison to non-elderly Belgium people in the survey data. The elderly possess a much higher value of net assets in comparison to younger participants in the survey. Bottom income decile may have negative net worth if they are less educated, young and from minority groups, with a wealth-to-income ratio having a value of 5.1, while elderly representatives from the bottom income deciles usually have low income and high net assets value, with their wealth-to-income ratio having a meaning of 28.1.

Petranov et al. (2022) find that the shadow economy in Bulgaria is shrinking, from 32 to 21% in the 2006-2019 period, but still, its share is the highest among EU members. The structural break of the EU accession and related legislation synchronisation, together with financial innovation and digitalisation and other factors, decrease the share of the shadow economy (see *ibid.*) Shadow economy prevents recording real wealth meaning and its distribution, proving that wealth is supposed to be underreported and undervalued. Zucman (2013) provides proof of why real wealth distribution is hard to measure- because of off-shore zones wealth, which accounts for about 10% of global wealth. Wealth inequality is underestimated in survey data (Meriküll and Rõõm, 2022), and so is income inequality (Peshev et al., 2022).

Among the long-term determinants of financial wealth (deposits) inequality in Bulgaria are: inflation (increasing inequality); financial deepening (increasing inequality); equity prices (increasing inequality); real estate prices (lowering inequality) (see Peshev et al., 2019). The Global recession and the flat rate introduction in Bulgaria have helped lower the financial (deposit) wealth inequality in Bulgaria (*ibid.*).

Addressing wealth and income inequality is not an easy task, but Yotzov (2014) suggests the following measures for tackling growing inequality in Bulgaria: taxing progressively large and expensive real estate assets, applying higher marginal tax rates for higher corporate incomes; lowering the value added tax for goods and services of higher importance to poorer society groups; heavily taxing bequests and taxing idle homes in cities. Tosheva et al. (2016) conclude that social transfers and income level criteria benefit lower income inequality using the tax-benefit EUROMOD model. The lack of survey and/or administrative data on wealth level and distribution, however, is challenging to create and direct effective policies for supporting households and individuals with negative or very low net wealth and making analysis similar to the work of Tosheva et al. (2016).

### 3. Data and Methodology of the Research

In this paper, only official sources of survey and aggregated data have been considered for the period 1995-2020. The main source of raw data considered are: The national statistical institute (NSI); Bulgarian national bank (BNB); EUROSTAT; European central bank (ECB); Missing data have been imputed for some of the unavailable variables' years in the dataset. Human capital is also an important source and component of wealth but is not subject to analysis.

In this scientific article, wealth has been defined as net wealth, or the difference between real assets wealth- $W_r$  and financial wealth- $W_f$ , on one side and debts of households, comprised mainly by financial banking and non-banking loans and lease claims, on the other. A common representation of the wealth accumulation process is to present current wealth as a function of the last period's wealth multiplied by different asset yearly returns for the period and adding the difference between disposable income and consumption, as laid out in the work of Saez & Zucman (2016). Nevertheless, this study considers wealth components as of the end of the period. The net wealth calculation follows the formal representation given in eq.1.

$$W = W_r + W_f - D \quad (1)$$

where:

W-net wealth;

$W_r$ -Wealth is comprised by real assets (residential real estate and utilised agricultural land) owned by individuals. Due to the lack of foreign real assets ownership data, only Bulgarian real wealth components are considered.;

$W_f$ -Wealth is comprised by financial assets (deposits, equity of public and non-public companies, life-insurance and non-life insurance claims on accumulated premiums by individuals, investment funds investments of local individuals). Only Bulgarian financial assets are considered due to the lack of data for foreign financial assets holdings.

Debt-financial liabilities of households (bank loans lent to individuals, loans lent by companies specialised in lending, including leasing claims on individuals). Foreign financial liabilities of individuals are not considered due to the lack of data.

In the following subsections are presented some of the variables' calculation assumptions and techniques.

### 3.1. Calculating the equity in the Bulgarian economy

Income capitalising is a common technique supporting the works of many researchers, incl. the works of Stewart, C. (1939), Saez & Zucman (2016), Lundberg & Waldenström (2018), Hubmer et al. (2016, 2018). Saez & Zucman (2016) multiply each individual capital income component by 1/rate of the return for the respective assets. Saez & Zucman (2016), however, use tax data of returns of wealth components. In the current study, only incorporated and non-incorporated income is capitalised for deriving equity owned by individuals. For the purpose of calculating the monetary amount of equity owned by individuals, the entrepreneurship income in the economy is capitalised, following the logic of eq. 2-5 and the results.

$$\text{Equity} = \text{FV} - \text{debt} \quad (2);$$

where:

Equity-value of the equity of the firm;  
 FV-Firm value= value of the capital of the firm (equity+debt);  
 Debt-Interest bearing liabilities;

$$\text{FV} = \frac{\text{FCFF}}{k} \quad (3)$$

where:

FCFF-free cash flow to the firm;  
 k-cost of capital rate;

$$\text{FCFF} = \text{Sales} - \text{COGS} - \text{OE} + \text{DnA} - \text{CAPEX} - \text{NWCI} + \text{NFCFI} + \text{IE} * (1 - \text{TxR}) - \text{Tx} \quad (4)$$

where:

Sales-revenues from common activity=quantity \* item price;  
 COGS-cost of goods sold;  
 OE-Operating expenses;  
 DnA-Depreciation and amortisation;  
 CAPEX-Capital expenditures;  
 NFCFI -Net foreign capital factor income;  
 NWCI-Net working capital investments;  
 IE-interest expenses;  
 TxR- Corporate tax rate;  
 Tx-corporate tax.

Calculating the firm value and then the equity value on an aggregate national level is done through National accounts for Gross domestic product calculation using the income approach. In this paper, it is assumed that the capital income can be capitalised for the purpose of estimating the equity value of equity owners. Gross value added in the economy is a source of income for factor owners in the economy; respectively, the gross domestic product under the income approach is comprised by labour income, gross operating surplus(GOS), gross mixed income(GMI) and net taxes. For deriving FCFF, the GOS and GMI, together with additional positive and negative cash flow adjustments, are capitalised since they represent entrepreneurs' income (see eq. 5).



$$FCFF = GOS + GMI - CAPEX - NWCI + NFCFI - Tx \quad (5)$$

where:

- GOS – gross operating surplus;
- GMI – gross mixed income;
- DnA – Depreciation and amortisation;
- CAPEX – Capital expenditures;
- NWCI – Net working capital investments;
- NFCFI – Net foreign capital factor income;
- Tx – corporate tax.

The following assumptions for the variables have been made in accordance with the calculation in eq.5 derived as the difference between primary investment income received from abroad and paid to foreigners. FCFF is adjusted for corporate tax paid and the tax reduction due to interest payments. In Table.1 in mln. EUR and in current prices (without inflation adjustment) are presented as the values of: FCFF; the capitalisation rate-k (being WACC itself); the Firm value (derived as capitalised FCFF using capitalisation rate-k) and equity (difference between the . The corporate tax accounts for interest expenses and is adjusted accordingly. NFCFI is firm value and debt, assuming that debt comprises 40% of the firm value).

**Table 1. FCFF capitalisation, in mln. EUR and current prices**

Year	FCFF	k	FV	Eq
1995	5 331	14.7%	36 259	21 755
1996	4 679	11.4%	41 026	24 616
1997	3 755	8.5%	44 116	26 469
1998	3 546	7.6%	46 864	28 118
1999	2 919	8.5%	34 467	20 680
2000	3 322	9.4%	35 286	21 172
2001	3 333	9.7%	34 518	20 711
2002	4 278	10.8%	39 501	23 701
2003	4 137	8.8%	47 220	28 332
2004	4 216	8.3%	50 710	30 426
2005	4 095	6.9%	59 212	35 527
2006	3 295	7.5%	43 710	26 226
2007	4 314	8.5%	50 864	30 519
2008	3 827	20.3%	18 870	11 322
2009	7 498	11.2%	66 947	40 168
2010	9 798	12.1%	80 877	48 526
2011	11 125	16.4%	67 880	40 728
2012	10 867	11.5%	94 891	56 935
2013	9 783	8.3%	117 294	70 376
2014	9 783	9.0%	108 810	65 286
2015	9 890	7.5%	132 496	79 498
2016	11 110	6.1%	182 627	109 576
2017	11 048	5.3%	208 960	125 376
2018	10 797	5.2%	208 748	125 249
2019	12 139	4.3%	281 503	168 902
2020	11 944	3.8%	310 626	186 375

Source: Own calculations.

Capitalising of the non-labour factor income derived from the GVA macroeconomic statistics has been performed using a capitalising rate equal to the weighted average cost of capital (WACC) formula, as follows:

$$WACC = [E/(E+D)](r_e) + [D/(E+D)](r_d)(1-t) \quad (6)$$

where:

- WACC – is weighted average cost of capital;
- E – equity;
- D – Debt (interest-bearing liabilities);
- $r_e$  – is cost of equity;
- $r_d$  – is cost of debt;
- t – corporate tax rate.

For the WACC calculation, an assumption is made that equity comprises 60% of capital, whilst the rest 40% belong to debt financing. The corporate tax rate uses values laid out in Table.2. The **corporate tax rate** denotes the upper boundary rate for the marginal tax rate on corporate income prior to the years of 2007 and the tax rates equal the flat tax rate introduced in the post-2007 period. In 2007 flat corporate tax rate of 10% was introduced. Cost of equity is calculated by using the Capital assets pricing model (CAPM) as presented in eq. (7).

$$r_e = r_f + \beta \cdot ERP \quad (7)$$

where:

- ERP – equity risk premium derived as the difference between the cost of equity and the risk-free rate of return;
- $r_f$  – is risk-free rate of return;
- $\beta$ -beta – correlation between the individual rate of return and market return, i.e. being a systematic risk measure.

For calculating the equity risk premium, an **ERP/risk-free rate ratio**, readily available at the data section of the Aswath Damodaran's website, has been employed<sup>3</sup>. The ratio is applied to the Bulgarian risk-free rate in order to derive the ERP values. If Bulgarian ERP accepts lower values in comparison to a developed equity market, e.g. US implied ERP, then values for the developed equity market apply. In this regard, for the period 2016-2020, calculated ERP values are lower than the ones from the Implied ERP for the US market; hence US market ERP values, calculated by Aswath Damodaran, have been applied<sup>4</sup>. The risk-free rate is the yield to maturity (YTM) on Bulgarian 10-year government bonds and no data has been available for 1995-2001, applying a 5-year average on the ratio between YTM on Bulgarian gov bonds and German peers. For missing 1995-2001 years, **RFR** has been calculated by

---

<sup>3</sup> [https://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/datafile/histimpl.html](https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histimpl.html) (Implied Equity Risk Premiums – United States), Aswath Damodaran's web site:

[https://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/data.html](https://pages.stern.nyu.edu/~adamodar/New_Home_Page/data.html) (the data section).

<sup>4</sup> [https://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/datafile/histimpl.html](https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histimpl.html) (Implied Equity Risk Premiums – United States), Aswath Damodaran's web site:

[https://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/data.html](https://pages.stern.nyu.edu/~adamodar/New_Home_Page/data.html) (data section).

multiplying German 10-year gov bonds YTM by the 5-year average ratio of 1.357(see Table.2 for **RFR** values). The Bulgarian ministry of finance does not issue treasury bills or treasury notes, while the ministry of finance issues only mid-term and long-term bonds. The 10-year government bonds are the most liquid and tradable, and their prices are referred to in this regard. Due to higher yields to maturity of 10-year government bonds compared to shorter maturities, the RFR variable in this study leads to a higher cost of equity, a higher weighted average cost of capital and to lower valuation of equity. In Table 2 the cost of debt ( $r_d$ ) has been derived as an average of interest rates on newly lent loans in euro, with data being fetched from the Bulgarian national bank's database and reports. The **Tr** (tax rate) denotes the upper boundary rate for the marginal tax rate on corporate income prior to the year 2007 and the tax rate equals the flat tax rate introduced in the post-2007 period (see Table.2).

**Table 2. WACC components, in %**

Year	ERP	RFR	$r_c$	$r_d$	WACC	Tr
1995	4.82	8.16	12.98	26.32	14.70	0.34
1996	3.93	7.87	11.79	16.47	11.40	0.34
1997	3.45	7.26	10.71	7.94	8.51	0.34
1998	2.55	5.24	7.79	11.01	7.57	0.34
1999	2.31	7.26	9.57	10.38	8.47	0.34
2000	3.70	6.59	10.29	12.00	9.42	0.33
2001	4.86	6.78	11.64	9.28	9.66	0.28
2002	6.78	6.30	13.08	9.74	10.83	0.24
2003	5.07	5.84	10.91	7.24	8.76	0.24
2004	4.50	5.20	9.70	7.75	8.31	0.20
2005	3.61	3.89	7.50	7.11	6.92	0.15
2006	3.69	4.17	7.85	8.31	7.54	0.15
2007	4.84	4.45	9.29	8.07	8.48	0.10
2008	21.44	7.37	28.81	8.31	20.28	0.10
2009	7.35	6.47	13.81	8.09	11.20	0.10
2010	9.13	5.78	14.90	8.81	12.11	0.10
2011	16.75	5.24	22.00	8.87	16.39	0.10
2012	11.27	3.43	14.70	7.31	11.45	0.10
2013	5.87	3.60	9.47	7.38	8.34	0.10
2014	8.39	3.15	11.54	5.75	8.99	0.10
2015	7.07	2.62	9.69	4.59	7.46	0.10
2016	5.69	1.95	7.64	4.17	6.08	0.10
2017	5.08	1.40	6.48	3.89	5.29	0.10
2018	5.96	0.90	6.86	2.93	5.17	0.10
2019	5.20	0.40	5.60	2.65	4.31	0.10
2020	4.72	0.40	5.12	2.15	3.85	0.10

Source: Aswath Damodaran's web page, BNB, Own calculations.

### 3.2. Financial wealth (other forms)

Commercial bank deposits of Households and NPISH comprise a large portion of households' wealth. In the analysis, the bank deposits of Households and NPISH include all

money of the institutional sector held in banks, e.g. current accounts holdings and short-term and long-term deposits.

Still lower, but the increasing source of wealth is funds accumulated in private mandatory individual pension accounts. With the pension system reform at the beginning of the century, the second pillar of the pension system was introduced. Contributions made from their social security payments are added to individual universal pension funds, professional pension funds and voluntary pension funds. Wealth in universal pension funds accounts for 85% of total private pension funds wealth in Bulgaria.

Another small, but growing source of financial wealth, are the investment funds and life insurance holdings of households. Various mutual funds, alternative funds and investment funds are increasing assets under the management of households. The life-insurance funds held in individuals' insurance policies and funds accumulated in non-expired general insurance policies are also considered. Due lack of data, direct investments of households in bonds, equities and other financial instruments are excluded from the analysis. Nevertheless, capitalising the income of companies and adjusting it for capital outflows, it is assumed that the ultimate owners of publicly traded equity and non-public companies' equity are households (individuals).

### *3.3. Real assets wealth*

In the analysis, the value of the living area of residential buildings and dwellings and the value of usable agricultural land is included. Sources of information are NSI and the Ministry of Agriculture, Food and Forestry reports. These real assets are usually a main component of the wealth of the middle class and due high-ownership rate of homes and agricultural land of Bulgarian households<sup>5</sup>. A strong positive association is assumed between net households' wealth and real asset values. An important source of wealth that is omitted in the analysis is vehicles owned by households. Currently, the number of vehicles and motorcycles is close to 3 mln. units, according to open-source Bulgarian government data<sup>6</sup>.

### *3.4. Debt*

Households' debt is comprised mainly of various loans lent to households and NPISH (commercial, mortgage and other short- and long-term bank loans lent to households and NPISH) and, to a lesser extent, by loan claims of corporations specialised in lending and by lease agreement claims of lease companies.

---

<sup>5</sup> The homeownership rate for Bulgarian households stood at 84.3% for 2020 according to Housing in Europe – 2021 interactive edition ([https://ec.europa.eu/eurostat/web/products-eurostat-news/-/wdn-202112301#:~:text=In%202020%2C%2070%25%20of%20the,and%20Croatia%20\(both%2091%25\).](https://ec.europa.eu/eurostat/web/products-eurostat-news/-/wdn-202112301#:~:text=In%202020%2C%2070%25%20of%20the,and%20Croatia%20(both%2091%25).))

<sup>6</sup> [https://data.egov.bg/data/resourceView/d3695872-380d-4440-b56a-29dcd4debc3b?rpage=2.](https://data.egov.bg/data/resourceView/d3695872-380d-4440-b56a-29dcd4debc3b?rpage=2)

### 3.5. *Distribution of wealth*

Deriving wealth distribution is a difficult endeavour since there is no complete information on individuals and their assets and liabilities in Bulgaria, neither through survey data, nor through administrative data. Bulgarian national bank provides distributional data on households' deposits and loans, but it is impossible to match individual deposits and loans. There is a large concentration in deposits and loan distributions, evidenced by BNB data and the research of Peshev (2015) and Peshev et al. (2019). The provided by the Financial Supervision Commission distributional data of pension fund wealth reveals more even distribution with much lower Gini and other inequality measures in comparison to the distribution of loans, wealth and overall wealth. Distributional data for other assets and liabilities of households/individuals is not available, neither gathered through a survey nor through an administrative approach. For calculating the distribution of wealth, several assumptions have been made. First, it is assumed that the bottom decile has a negative worth in accordance with its own calculations and in accordance with averages for the OECD countries and for the WID.org of Blanchet et al. (2021) that are also considered, and inferring from HBS of NSI, regarding incomes, expenditures, loans and savings of households. Second, the distribution of the property income of Bulgarian households laid out in HBS of NSI is considered. Third, the distribution of the property income is adjusted under the assumption that survey data underestimates reality, which is better represented by administrative data applying specific decile ratios between administrative and survey data of Peshev et al. (2022).

Comparing households' income and expenses (excluding loans and deposits), using NSI HBS data, it is common for the first three deciles during the period of 1990-1995 to have higher expenses than income, hence having negative savings. In the crisis of 1996, the bottom five deciles had higher expenses than income, while in the also crisis of 1997, the first two deciles couldn't meet ends, which also kept a tendency until 2004. In 2004, 2005, 2007, 2011, 2014, 2015, 2018 and 2019, the bottom three deciles recorded higher expenses than income, while in 2006, 2008-2010, 2013, 2016 and 2017 bottom two deciles experienced negative savings. In 2012 bottom four deciles had expenses exceeding income. On the contrary, in 2020, the bottom decile had negative savings. If the total income (loans lent and savings withdrawn included) and total expenses (with deposited funds and repaid loans included), then in 18 years in the 1990-2020 timespan, the first decile has a negative income, i.e., total expenses exceed total income, whilst in 10 years of the selected period the first two deciles are with negative income, in 2011 first bottom three deciles have negative income and in 1990 bottom four deciles expense more than their total income.

The assumption of negative wealth comes not only from property income data of Bulgarian households but also is supported by empirical research. In the research of Davies et al. (2017), the bottom (first) decile holds more debt than assets, hence having negative net wealth. The Bottom 10% of households (individuals in some data) in selected countries possess minus 1.2% of net wealth. The negative wealth assumption of the bottom decile is also supported by OECD and WID data. The wealth of the bottom 90% consists of pension wealth and housing (net of mortgages), while the wealth of the top 0.01% comprises equities and fixed-income claims mainly, in the findings of Saez and Zuckman (2016).

#### 4. Results

Using the methodology and consideration, laid out in the before section, the value of the wealth of households in Bulgarian has been evaluated. In Table 3, the variables for wealth, wealth per capita and wealth per adult, over the 1995-2020 period have been revealed. All values are in current EUR prices<sup>7</sup>. During the analysed period Bulgarian economy went through tremendous structural change and lifetime challenges: the financial crisis of the mid-90-s; galloping and hyper-inflation; high unemployment; the introduction of the currency board arrangement; the structural unemployment and mass privatisation during the 90s; the mass emigration and the ageing population which led to a severe deterioration of the local demographics; the 2008-2009 global financial crisis; COVID-19 pandemics and caused by it lockdowns and supply chain bottlenecks; asset bubble; the economic convergence in response to the 2007 EU acceptance of Bulgaria, the low-inflation period post the currency board arrangement introduction in 1997; FDI inflows and the know-how and technology transfers made Bulgarian incomes, asset prices and net worth grow; the 2007 and 2008 introduction of the 10% flat tax rate on incomes of firms and individuals. Facts that are more detailed can be provided on the negative and on the positive side, justifying net wealth evolution during the period covered in this research.

**Table 3. Nominal wealth in Bulgaria**

Year	Net Wealth in EUR billion	Net wealth per adult in EUR	Net wealth per capita in EUR
1995	41 699.13	8 535.80	4 973.24
1996	37 707.88	7 759.33	4 520.84
1997	29 359.24	6 083.47	3 544.43
1998	63 686.70	13 281.06	7 737.98
1999	62 828.75	13 165.33	7 670.56
2000	63 486.82	13 370.85	7 790.30
2001	63 825.59	13 657.74	8 088.31
2002	65 453.65	13 890.69	8 342.46
2003	71 389.93	15 040.44	9 151.06
2004	83 134.86	17 385.81	10 711.81
2005	104 799.97	21 769.33	13 577.32
2006	105 995.76	21 991.57	13 802.81
2007	132 515.63	27 509.42	17 344.44
2008	138 733.26	28 867.33	18 238.66
2009	144 322.78	30 231.45	19 080.95
2010	145 401.03	30 932.40	19 374.23
2011	155 516.02	34 385.13	21 224.41
2012	175 459.22	38 947.52	24 086.48
2013	190 431.29	42 586.52	26 282.06
2014	189 939.79	43 135.06	26 372.48
2015	215 508.50	49 552.38	30 125.11
2016	256 623.77	59 618.44	36 134.73
2017	287 100.29	67 576.81	40 723.25
2018	297 674.68	70 859.59	42 524.72
2019	353 288.01	85 002.69	50 821.97
2020	381 767.53	92 235.41	55 196.25

*Source: own calculations.*

<sup>7</sup> Using Eurostat's EUR to BGN exchange rate.

From the end of 1995 until the end of 2020 net wealth of Bulgarian households(individuals) has grown eightfold, from EUR 41.7 bln to EUR 381.8 bln, while per adult and per capita measures have grown tenfold, from 8.5 thousand euro to 92.2 thousand euro and from 4.9 to 55.2 thousand euro respectively and in nominal terms (see Table 3). The geometric average rate of growth (CAGR) is 9.3% yearly for the net wealth, 10% for the net wealth per adult and 10.1% for the net wealth per capita.

In Table 4, the inflation adjustment challenge of using nominal monetary values in euro has been addressed by using PPP indexes for comparing prices and volumes of products in Bulgaria and EU (for the 27 members and in 2020 prices) for deriving Net wealth, Net wealth per adult and Net wealth per capita variables in PPP terms, revealed in Table 4. As of 1995, Net wealth stood at EUR 156.6 bln, while at the end of the period, the value of the variable rose to EUR 708.4 bln. The same upward tendency is valid for per-adult and per-capita values. According to the calculations of Grimm et al. (2019), in 2018 the net financial wealth in Bulgaria amounted to 8 033 EUR per capita. Shorrocks et al. (2019) identify the country's level of wealth per adult as having a meaning of 42 700 USD. Blanchet et al. (2021) assign a net wealth per adult value of 49.5 000 EUR. All those calculations are in nominal currency terms.

**Table 4. Wealth in Bulgaria in PPP**

Year	Net Wealth in PPP billion	Net wealth per adult in PPP	Net wealth per capita in PPP
1995	156 566.3	32 049.1	18 672.9
1996	186 206.6	38 316.6	22 324.5
1997	116 652.3	24 171.3	14 083.0
1998	201 150.8	41 947.5	24 440.0
1999	195 513.0	40 968.4	23 869.5
2000	192 055.7	40 448.5	23 566.7
2001	185 148.4	39 619.0	23 463.0
2002	187 302.0	39 749.6	23 872.8
2003	204 041.2	42 987.4	26 154.9
2004	228 637.6	47 814.5	29 459.6
2005	281 373.1	58 447.6	36 453.2
2006	266 520.8	55 296.6	34 706.4
2007	311 724.6	64 712.1	40 800.4
2008	310 653.2	64 640.1	40 840.2
2009	307 440.9	64 400.0	40 646.8
2010	317 934.0	67 636.8	42 363.7
2011	323 397.1	71 504.2	44 136.4
2012	365 903.7	81 221.4	50 230.1
2013	395 128.0	88 363.2	54 532.9
2014	402 535.0	91 415.1	55 890.6
2015	446 432.6	102 649.3	62 405.1
2016	522 750.0	121 444.5	73 607.5
2017	570 156.2	134 201.7	80 872.8
2018	580 567.5	138 200.5	82 937.8
2019	667 200.0	160 531.3	95 979.5
2020	708 433.9	171 158.3	102 425.9

Source: own calculations.

Applying the assumptions for the wealth distribution on the net wealth measures from the methodological section in the article, the following decile and cumulative distribution results are produced. In Table 4, the decile distribution has been revealed, while in Table 5, the cumulative distribution has been presented. The first decile D1 has a negative net worth on average. Different deciles' wealth declines over time, with only the top decile benefiting the most, concentrating an even larger share of wealth. During the beginning of the period, the wealth distribution was much more even, because of the unreformed former socialist economy. The top decile's net wealth concentration, together with the negative net wealth of the bottom decile and declining net wealth for the other deciles, is a common pattern of wealth distribution.

**Table 5. Decile distribution of wealth**

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
1995	-0.6%	1.3%	1.8%	2.3%	3.6%	5.2%	7.4%	10.3%	12.4%	56.1%
1996	-1.0%	0.5%	0.8%	1.6%	2.3%	2.8%	5.0%	8.0%	14.7%	65.3%
1997	-0.7%	0.9%	2.1%	2.6%	3.8%	4.8%	7.7%	13.7%	16.9%	48.1%
1998	-0.3%	1.0%	2.4%	1.5%	3.6%	4.3%	5.3%	7.4%	9.6%	65.1%
1999	-0.6%	0.6%	1.3%	2.2%	4.2%	4.2%	7.3%	10.0%	14.5%	56.5%
2000	-0.6%	1.7%	2.0%	1.6%	3.0%	4.2%	5.4%	8.5%	11.8%	62.3%
2001	-1.4%	0.6%	1.4%	1.8%	2.6%	3.9%	5.3%	8.5%	13.6%	63.6%
2002	-0.6%	0.5%	2.4%	3.0%	2.7%	3.8%	6.1%	9.2%	14.0%	58.8%
2003	-1.4%	1.1%	2.0%	2.2%	3.0%	4.2%	5.4%	10.7%	11.2%	61.7%
2004	-0.8%	0.8%	1.4%	2.7%	4.6%	3.4%	4.7%	7.0%	11.6%	64.6%
2005	-0.8%	0.8%	1.3%	1.8%	3.6%	4.0%	5.2%	9.0%	16.7%	58.5%
2006	-0.3%	0.8%	0.9%	1.1%	3.2%	5.1%	6.9%	10.9%	15.8%	55.7%
2007	-1.1%	0.9%	1.3%	1.1%	1.9%	4.0%	7.5%	9.1%	11.3%	63.9%
2008	-1.4%	0.2%	0.5%	1.1%	1.8%	2.3%	5.2%	9.9%	16.6%	63.9%
2009	0.3%	0.9%	2.3%	1.6%	2.4%	3.0%	4.2%	8.2%	10.9%	66.3%
2010	-1.4%	0.7%	1.1%	1.2%	2.0%	4.6%	3.4%	4.0%	12.7%	71.7%
2011	-1.4%	0.3%	1.3%	0.8%	1.7%	2.8%	7.6%	3.8%	15.2%	68.1%
2012	-1.2%	0.5%	1.3%	0.6%	0.7%	1.0%	3.7%	7.3%	9.6%	76.3%
2013	-1.0%	0.5%	0.6%	0.6%	1.0%	1.2%	3.1%	5.1%	15.2%	73.7%
2014	-1.4%	1.6%	0.4%	0.7%	1.3%	2.2%	4.7%	5.7%	10.7%	74.2%
2015	-0.7%	0.3%	0.6%	1.7%	2.1%	2.1%	5.1%	9.2%	9.4%	70.3%
2016	-0.9%	0.1%	0.4%	1.2%	1.8%	2.4%	4.3%	6.4%	10.9%	73.4%
2017	-1.2%	0.0%	0.2%	0.8%	1.4%	2.7%	3.4%	3.7%	12.5%	76.6%
2018	-0.1%	0.2%	1.6%	1.7%	1.9%	2.1%	4.1%	8.0%	12.6%	67.8%
2019	-1.2%	0.5%	1.1%	1.1%	3.2%	4.3%	5.2%	9.3%	9.3%	67.1%
2020	-1.4%	0.2%	1.3%	1.9%	2.1%	2.6%	4.9%	9.5%	9.7%	69.2%

Source: Own calculations

Analysing the cumulative distribution, provided in Table 6, it can be concluded that the bottom 20% of the population usually have more liabilities in comparison to assets; hence their wealth has negative values. The bottom 50% of individuals owned around 8% of the net wealth at the beginning of the period, while their share experienced a steady downward trend in the years prior to the EU accession of Bulgaria onwards, rarely exceeding 4% in some of the years, and reaching a minimum of 1.1% share in 2017. The bottom 80% owned an average 24.4% of net wealth for the respective period, while in the post-2007 period, the average



share fell to 17.4%. The cumulative distribution obeys the Pareto principle, paraphrasing it as that the upper two deciles hold 80% of the net wealth.

The results suggest that half of the adults have net wealth between 7065 and 59 906 PPP euro and between 1156 EUR and 18 956 EUR in nominal terms, over the course of the analysed period. Data in table 7 can justify the hypothesis that Bulgarians become wealthier, with median and mean net wealth exhibiting and distinct upward dynamics. The top decile and percentile, however, benefit the most, by increasing their net worth much faster. During the 1995-2020 period, average and median Net wealth per adult in PPP EUR terms rose by 434 and 186%, respectively. The top decile average net wealth per adult rose by 558% in PPP terms and by 1267% in nominal EUR terms, while the top percentile average net wealth per adult rose by 1158% in PPP terms and by 2514% in nominal EUR terms. A more distinct upward trend can be revealed around and after the years of the EU accession of Bulgaria. As of the end of the period, the wealthiest decile and percentile own 1 183 622 and 3 375 780 in PPP euro terms and EUR 381 702 and EUR 1 088 644 in nominal EUR terms(see Table 7). Due to the different methodologies in this paper, the net wealth per adult and wealth per capita of this study exceed the results of Blanchet et al. (2021), Shorrocks (2019, 2021) and Grimm et al. (2019).

**Table 6. Cumulative distribution of wealth**

year	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1995	-0.6%	0.7%	2.6%	4.9%	8.5%	13.7%	21.1%	31.5%	43.9%	100.0%
1996	-1.0%	-0.6%	0.3%	1.9%	4.2%	7.0%	12.0%	20.0%	34.7%	100.0%
1997	-0.7%	0.2%	2.3%	4.9%	8.7%	13.5%	21.3%	34.9%	51.9%	100.0%
1998	-0.3%	0.7%	3.1%	4.6%	8.2%	12.5%	17.8%	25.3%	34.9%	100.0%
1999	-0.6%	0.0%	1.3%	3.5%	7.7%	11.8%	19.1%	29.0%	43.5%	100.0%
2000	-0.6%	1.1%	3.1%	4.7%	7.7%	11.9%	17.3%	25.9%	37.7%	100.0%
2001	-1.4%	-0.8%	0.7%	2.4%	5.0%	8.9%	14.2%	22.7%	36.4%	100.0%
2002	-0.6%	-0.1%	2.3%	5.3%	8.1%	11.9%	18.1%	27.3%	41.2%	100.0%
2003	-1.4%	-0.3%	1.7%	3.9%	6.9%	11.0%	16.5%	27.1%	38.3%	100.0%
2004	-0.8%	0.0%	1.4%	4.1%	8.7%	12.0%	16.7%	23.8%	35.4%	100.0%
2005	-0.8%	-0.1%	1.2%	3.0%	6.6%	10.6%	15.8%	24.8%	41.5%	100.0%
2006	-0.3%	0.5%	1.3%	2.4%	5.6%	10.8%	17.6%	28.5%	44.3%	100.0%
2007	-1.1%	-0.2%	1.2%	2.2%	4.2%	8.2%	15.7%	24.8%	36.1%	100.0%
2008	-1.4%	-1.2%	-0.7%	0.4%	2.2%	4.5%	9.7%	19.6%	36.1%	100.0%
2009	0.3%	1.1%	3.4%	5.1%	7.4%	10.4%	14.6%	22.8%	33.7%	100.0%
2010	-1.4%	-0.7%	0.5%	1.6%	3.7%	8.2%	11.6%	15.6%	28.3%	100.0%
2011	-1.4%	-1.1%	0.1%	0.9%	2.6%	5.5%	13.0%	16.8%	31.9%	100.0%
2012	-1.2%	-0.7%	0.7%	1.3%	2.0%	3.1%	6.8%	14.1%	23.7%	100.0%
2013	-1.0%	-0.5%	0.1%	0.7%	1.7%	2.9%	6.0%	11.1%	26.3%	100.0%
2014	-1.4%	0.2%	0.6%	1.3%	2.5%	4.7%	9.4%	15.1%	25.8%	100.0%
2015	-0.7%	-0.4%	0.2%	1.9%	4.0%	6.1%	11.2%	20.4%	29.7%	100.0%
2016	-0.9%	-1.1%	-0.7%	0.5%	2.3%	4.7%	8.9%	15.3%	26.3%	100.0%
2017	-1.2%	-1.2%	-1.0%	-0.3%	1.1%	3.8%	7.2%	10.9%	23.4%	100.0%
2018	-0.1%	0.2%	1.7%	3.5%	5.4%	7.5%	11.6%	19.6%	32.2%	100.0%
2019	-1.2%	-0.7%	0.4%	1.5%	4.7%	9.0%	14.2%	23.5%	32.9%	100.0%
2020	-1.4%	-1.2%	0.0%	1.9%	4.0%	6.7%	11.6%	21.1%	30.8%	100.0%

Source: Own calculations

Wealth concentration in Bulgaria is rising since the bottom half of the population owns a lower share of total net wealth, while the top decile, the top five percentiles and the top percentile own larger shares of wealth. The Gini coefficient, the P90/P50 ratio and the Palma ratio exhibit an upward tendency over the analysed period, of course oscillating around the central tendency with some local extremums, as can be seen in Table 8. The Gini coefficient ranges between 0.63(reached in 1997) and 0.81 (reached in 2013) during the period and has a meaning of 0.75 at the end of the period. Palma ratio, the P90/P50 and S80/S20 ratios also support the hypothesis of a high and growing concentration of wealth.

**Table 7. Monetary value of main wealth indicators**

Year	Net wealth per adult in PPP				Net wealth per adult in nominal EUR			
	Top10%	TOP1%	Median	Mean	Top10%	TOP1%	Median	Mean
1995	179924	268429	14188	32049	27920	41654	2202	4973
1996	250344	375016	9795	38317	29537	44247	1156	4521
1997	116297	160939	10444	24171	17054	23600	1531	3544
1998	273177	429910	16539	41947	50392	79305	3051	7738
1999	231451	335431	17049	40968	43335	62803	3192	7671
2000	251990	379480	14423	40449	48533	73087	2778	7790
2001	252102	373615	12842	39619	51467	76274	2622	8088
2002	233657	344178	13084	39750	49039	72235	2746	8342
2003	265163	398239	15328	42987	56447	84776	3263	9151
2004	308975	474110	19067	47814	69219	106214	4272	10712
2005	341982	502916	22004	58448	79442	116827	5111	13577
2006	307974	449988	23001	55297	76875	112323	5741	13803
2007	413439	608810	19222	64712	110812	163176	5152	17344
2008	412803	599935	13385	64640	116475	169276	3777	18239
2009	427142	650984	17225	64400	126557	192879	5103	19081
2010	485195	740035	22386	67637	138982	211979	6412	19374
2011	486611	777591	16315	71504	144439	230810	4843	21224
2012	619716	984834	7063	81221	183779	292056	2095	24086
2013	651416	962474	9696	88363	193752	286271	2884	26282
2014	678320	1159493	15878	91415	195690	334504	4581	26372
2015	721338	1257608	21697	102649	211695	369078	6368	30125
2016	891798	1611672	25144	121444	265347	479539	7481	36135
2017	1027891	1780971	27204	134202	311912	540432	8255	40723
2018	936566	1526386	27931	138200	288184	469674	8594	42525
2019	1077604	2090655	59906	160531	341154	661872	18965	50822
2020	1183622	3375780	40645	171158	381702	1088644	13108	55196

*Source: Own calculations.*

Data, presented in the following tables and figures, reveal the dynamics of major wealth components. Wealth and liabilities structure over the years reveal that Bulgarian individuals have a low average level of debt (banking and non-banking financial companies' liabilities); however, the distribution assumptions suggest that usually bottom deciles are heavily indebted in comparison to their assets; hence they possess a low level of net wealth.

**Table 8. Wealth inequality indicators**

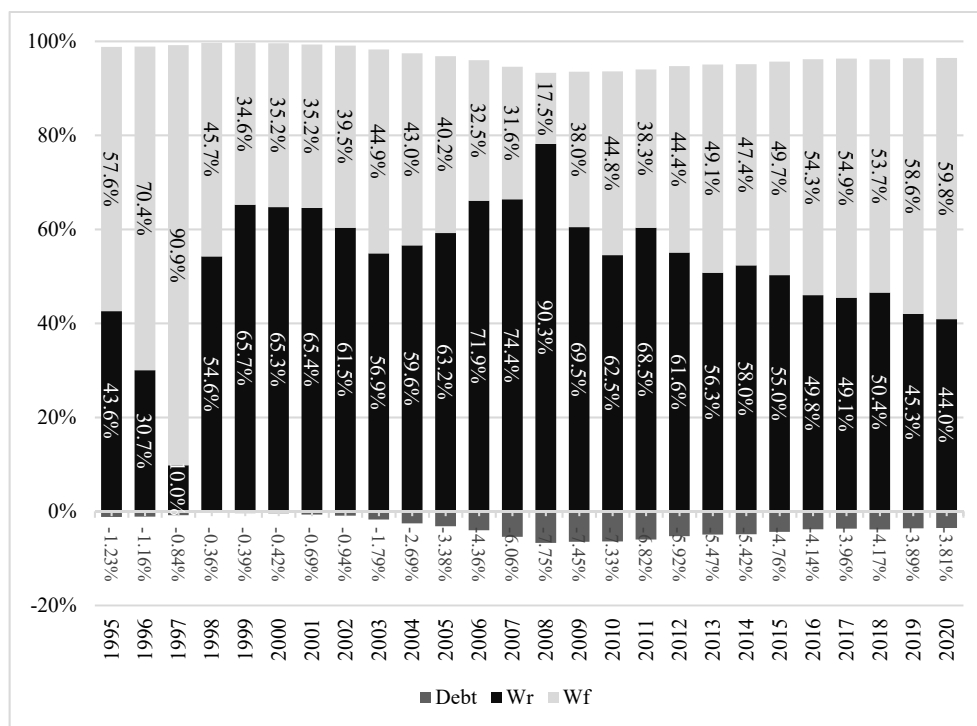
year	Bottom 50%	Top 10%	Top 5%	Top 1%	P90/P50	Palma ratio	Gini
1995	0.08	0.56	0.34	0.08	6.62	11.53	0.65
1996	0.04	0.65	0.40	0.10	15.73	35.11	0.74
1997	0.09	0.48	0.28	0.07	5.52	9.85	0.63
1998	0.08	0.65	0.40	0.10	7.90	14.05	0.69
1999	0.08	0.56	0.34	0.08	7.37	16.18	0.67
2000	0.08	0.62	0.38	0.09	8.06	13.12	0.68
2001	0.05	0.64	0.39	0.09	12.64	26.13	0.72
2002	0.08	0.59	0.36	0.09	7.27	11.02	0.67
2003	0.07	0.62	0.37	0.09	8.99	15.87	0.69
2004	0.09	0.65	0.40	0.10	7.43	15.88	0.70
2005	0.07	0.59	0.35	0.09	8.84	19.23	0.69
2006	0.06	0.56	0.33	0.08	9.93	22.87	0.68
2007	0.04	0.64	0.39	0.09	15.38	28.42	0.72
2008	0.02	0.64	0.38	0.09	28.70	167.65	0.76
2009	0.07	0.66	0.41	0.10	8.92	13.12	0.70
2010	0.04	0.72	0.45	0.11	19.56	44.14	0.77
2011	0.03	0.68	0.43	0.11	25.83	73.98	0.76
2012	0.02	0.76	0.47	0.12	37.65	57.39	0.80
2013	0.02	0.74	0.45	0.11	43.18	98.94	0.81
2014	0.03	0.74	0.50	0.13	29.27	59.26	0.78
2015	0.04	0.70	0.49	0.12	17.63	37.62	0.76
2016	0.03	0.73	0.52	0.13	28.42	89.11	0.78
2017	0.01	0.77	0.52	0.13	68.48	-270.76	0.81
2018	0.05	0.68	0.45	0.11	12.59	19.48	0.74
2019	0.05	0.67	0.48	0.13	14.36	44.28	0.73
2020	0.04	0.69	0.54	0.20	1709	35.54	0.75

Source: Own calculations.

Real wealth, mostly housing assets, is the largest wealth component of wealth for Bulgarian households, as can be seen in Figure 1. Financial wealth, mainly equity, takes advantage in the post-2010 period, when abundant liquidity and decreasing interest rates, hence lower WACC, support higher valuations. Both wealth components have a largest wealth shares in accordance with the author's calculations. Privately owned equity is among the largest contributors to wealth inequality, also in the works of Bivens and Mishel (2015), Wilkinson and Picketty (2020) and Wolf (2015) supporting the author's results.

In Figure 2, the accumulated funds in private pension funds have been laid out. Individuals accumulated around 8.8 bln.EUR individual private pension accounts, Strong positive dynamics can be seen, with just 170 mln. EUR allocated in private pension funds in the first year of their introduction to 8.8 bln. EUR 20 years later (without adjustments for inflation). Private pension wealth is far more evenly distributed than other sources of wealth, due to its specifics, e.g. the maximum amount of the insurance income and related normatively defined social security contributions.

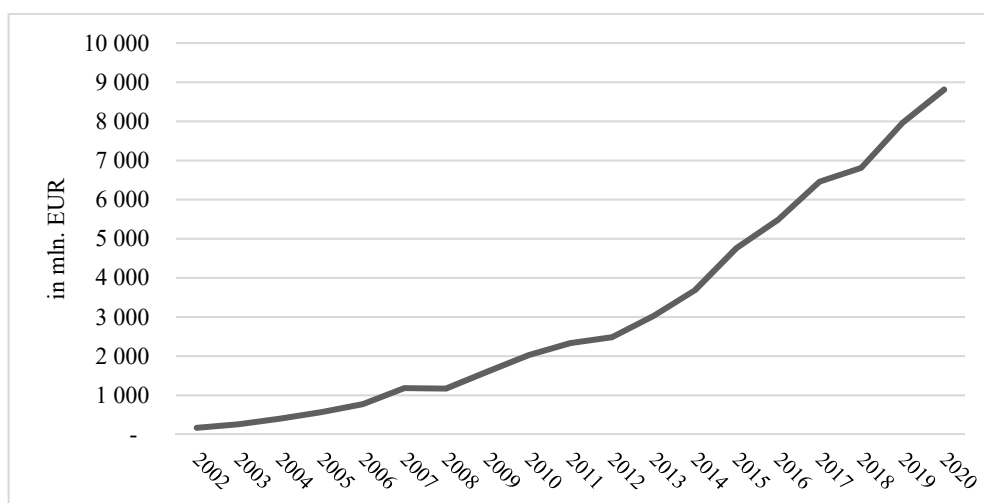
Figure 1. Wealth components



Source: Own calculations.

Loan claims of corporations specialised in lending amount to 1.57 mln. EUR as of the end of 2020 and having a value of around 1 mln. EUR in 2007, when the first available data was provided by the Bulgarian national bank. Loans lent by corporations specialised in lending are a small source of indebtedness, but it is worth mentioning that households and individuals from bottom deciles are usually the consumers using such kinds of loans. Households and individuals who don't qualify for bank loans, usually have no regular labour income and are with poor education. That kinds of loans are of lower importance to middle- and higher-wealth and income deciles but are a common source of debt to poorer and ill-educated individuals.

**Figure 2. Pension funds wealth**



Note: Monetary values are not adjusted for inflation.

Source: FSC, Own calculations.

Commercial bank deposits of Households and NPISH comprise a large portion of households' wealth, while bank consumer and mortgage loans are the main source of external funding for households. In Table 9, bank loans and deposits of households in mln. EUR without inflation adjustment has been revealed, using the Bulgarian national bank's database. Deposits rose from 6 bln. EUR in 2005 to 31.2 bln. EUR in 2020, while loans grew from 3.5 bln. EUR to 13 bln. EUR during the respective period, reducing the loans-to-deposit ratio from 0.59 to 0.42.

Residential buildings and dwelling are the most common and with largest share source of wealth for individuals and households. NSI" survey covers all residential buildings and dwellings in the country. Valuing housing wealth is made through applying average prices to the floor area of living rooms, bedrooms, recesses for sleeping, dining rooms, rooms for day-stay, cabinets and libraries of scientists, drawing rooms, and the space of the kitchens with over than 4 square meters floor space. Until the end of 2018, the kitchen area was presented separately. Values in mln. EUR (non-inflationary adjusted) of housing wealth can be seen in Figure 3. This wealth component has grown in value from 16.6 bln. EUR in 1995 to 148 bln. EUR in 2020, and achieving local extremums between both cited years, especially the 1997 trough, the 2008 peak and the consequent trough, reached in 2010<sup>8</sup>.

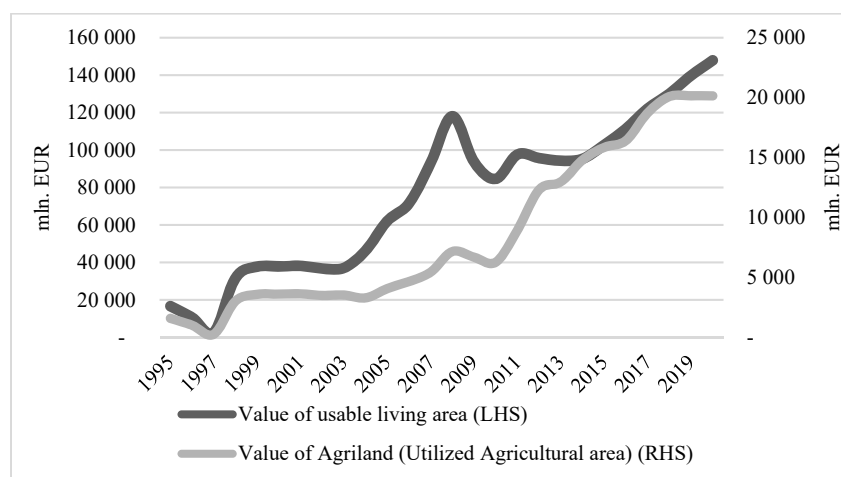
<sup>8</sup> Missing values for 1995-2003 have been imputed as an average ratio between the value of usable living area and value of utilized agricultural land for available years and applied to missing years.

**Table 9. Households and NPISH' bank loans and deposits. in mln. EUR**

year	Households and NPISH' bank loans	Households and NPISH' bank deposits
1995	511	2 258
1996	439	1 940
1997	246	1 088
1998	228	1 007
1999	246	1 085
2000	265	1 154
2001	441	1 787
2002	616	1 971
2003	1 279	3 490
2004	2 236	4 959
2005	3 542	6 000
2006	4 624	7 460
2007	7 045	9 645
2008	9 251	11 226
2009	9 787	12 445
2010	9 708	13 981
2011	9 665	15 792
2012	9 570	17 641
2013	9 554	19 275
2014	9 399	20 076
2015	9 276	21 774
2016	9 463	23 201
2017	10 036	24 454
2018	11 161	26 347
2019	12 224	28 451
2020	13 034	31 210

Note: Data for 1995-2005 and especially for the 90s period was derived under authors assumptions  
Source: Bulgarian national bank, own calculations

**Figure 3. Value of usable living area and of agricultural land**



Notes: LHS-Left-hand side, RHS-Right-hand side.

Source: Eurostat, National statistical institute, Bulgarian national bank, the Ministry of Agriculture, Food and Forestry, the World economic outlook database of International Monetary Fund, own calculations

Nevertheless, agricultural land is among the most important contributors to households' and individuals' wealth in Bulgaria. Agricultural land wealth is presented in Figure 3, ranging between 254 mln. EUR to 20.1 bln. EUR, during the time span between 1995-2020.

## 5. Conclusions

In this scientific article, the net wealth of Bulgarian individuals has been estimated and calculated as the difference between assets (real and financial) and reported financial debt (bank loans of households and other financial companies' claims). Net wealth distribution and inequality indicators have been derived following a series of assumptions and limitations laid out in the methodological section of the study. Evaluation of Bulgarians' net wealth and its distribution is always an immense challenge, due to the limited availability of public data on wealth and liabilities components. The lack of administrative and/or survey data on households' wealth is worth addressing since proper distributional policies require precise data assessment and modelling.

The findings of this scientific article reveal strong upward dynamics for average and median net wealth per adult and per capita. Larger mean values than median values justify right-skewed distribution, with large right tails of the distribution. Top deciles and percentiles benefit much more than the bottom deciles and percentiles, contributing to growing inequality. A more distinct upward trend can be revealed around and after the years of the EU accession of Bulgaria. As of the end of the period, the wealthiest decile and percentile representatives own an average of 1 183 622 and 3 375 780 in PPP EUR terms and EUR 381 702 and EUR 1 088 644 in nominal EUR terms, while median and average wealth per adult stood at 40 645 and 171 158 in PPP terms and at EUR 13 108 and 55 196 EUR in nominal terms.

For the period under review bottom half of individuals own less than 5.1 % of net wealth on average, while the top decile and percentile own 65.3% and 10.6% of total net wealth on average, respectively. A positive long-term tendency for growing wealth and wealth concentration is evident from data, despite a short-lived declining wealth concentration in the post-2012 period.

The Gini coefficient ranges between 0.63(reached in 1997) and 0.81 (reached in 2013) during the period and has a meaning of 0.75 at the end of the period. Palma ratio, the P90/P50 and S80/S20 ratios also support the hypothesis of a high and growing concentration of wealth.

Real assets' wealth prevails over financial assets' wealth during most of the years, with housing assets having the largest share in wealth formation. Equity, agricultural land and bank deposits are among the other major contributors to households' wealth.

This article should also be considered as an attempt to raise awareness of the much-needed survey and/or administrative data on the matter of wealth and wealth distribution in order for effective measures to be promoted and taken.

## References

- Atkinson, A. B. (1975). The distribution of wealth in Britain in the 1960s the estate duty method reexamined. In *The personal distribution of income and wealth*. – NBER, pp. 277-328.
- Bagchi, S., Svejnar, J. (2015). Does wealth inequality matter for growth? The effect of billionaire wealth, income distribution, and poverty. – *Journal of Comparative Economics*, 43(3), pp. 505-530.
- Barro, R. J. (2000). Inequality and Growth in a Panel of Countries. – *Journal of economic growth*, 5(1), pp. 5-32.
- Blanchet, T., Martinez-Toledano, C. (2021). *Distributional Financial Accounts in Europe*.
- Bagchi, S., Svejnar, J. (2015). Does wealth inequality matter for growth? The effect of billionaire wealth, income distribution, and poverty. – *Journal of Comparative Economics*, 43(3), pp. 505-530.
- Barro, R. J. (2000). Inequality and Growth in a Panel of Countries. – *Journal of economic growth*, 5(1), pp. 5-32.
- Benhabib, J., Bisin, A., Luo, M. (2017). Earnings inequality and other determinants of wealth inequality. – *American Economic Review*, 107(5), pp. 593-597.
- Bivens, J., Mishel, L. (2015). Understanding the historic divergence between productivity and a typical worker's pay: Why it matters and why it's real. Economic Policy Institute.
- Brülhart, M., Gruber, J., Krapf, M., Schmidheiny, K. (2016). Taxing wealth: evidence from Switzerland (No. w22376). National Bureau of Economic Research.
- Cagetti, M., De Nardi, M. (2006). Wealth inequality: Data and models (No. w12550). National Bureau of Economic Research.
- Davies, J. B., Shorrocks, A. F. (2000). The distribution of wealth. – *Handbook of income distribution*, 1, 605-675.
- Davies, J. B., Lluberas, R., Shorrocks, A. F. (2017). Estimating the level and distribution of global wealth, 2000-2014. – *Review of Income and Wealth*, 63(4), pp. 731-759.
- Davies, J. B., Sandstrom, S., Shorrocks, A. F., Wolff, E. N. (2011). The level and distribution of global household wealth. – *Economic Journal*, 121, pp. 223-254.
- Deaton, A. (2003). Health, inequality, and economic development. – *Journal of economic literature*, 41(1), 113-158.
- De Nardi, M., Fella, G. (2017). Saving and wealth inequality. – *Review of Economic Dynamics*, 26, pp. 280-300.
- Domanski, D., Scatigna, M., Zabai, A. (2016). Wealth inequality and monetary policy. *BIS Quarterly Review* March.
- Elinder, M., Erixson, O., Waldenström, D. (2018). Inheritance and wealth inequality: Evidence from population registers. – *Journal of Public Economics*, 165, pp. 17-30.
- Fuller, G. W., Johnston, A., Regan, A. (2020). Housing prices and wealth inequality in Western Europe. – *West European Politics*, 43(2), pp. 297-320.
- Garbinti, B., Goupille-Lebret, J., Piketty, T. (2017). Accounting for wealth inequality dynamics: Methods, estimates and simulations for France (1800-2014).
- Gale, W. G., Gelfond, H., Fichtner, J. J., Harris, B. H. (2020). The wealth of generations, with special attention to the millennials (No. w27123). National Bureau of Economic Research.
- Gokhale, J., Kotlikoff, L. J., Sefton, J., Weale, M. (2001). Simulating the transmission of wealth inequality via bequests. – *Journal of Public Economics*, 79(1), pp. 93-128.
- Grabka, M. K. (2015). Income and wealth inequality after the financial crisis: the case of Germany. – *Empirica*, 42, pp. 371-390.
- Grimm, M., Junge, J., Holzhausen, A., Pelayo Romero, P. (2019). Allianz global wealth report 2019.
- Hubmer, J., Krusell, P., Smith Jr, A. A. (2016). The historical evolution of the wealth distribution: A quantitative-theoretic investigation. National Bureau of Economic Research (No. w23011).
- Hubmer, J., Krusell, P., Smith Jr, A. A. (2018). A comprehensive quantitative theory of the US wealth distribution. Working paper.
- Kanbur, R., Stiglitz, J. (2015). Wealth and income distribution: New theories needed for a new era. *Voxeu.org*
- Kuyppers, S., Marx, I. (2019). The truly vulnerable: integrating wealth into the measurement of poverty and social policy effectiveness. – *Social Indicators Research*, 142(1), pp. 131-147.
- Kuznets, S. (1955). Economic Growth and Income Inequality. – *The American Economic Review*, 45(1), pp. 1-28. <http://www.jstor.org/stable/1811581>.
- Lundberg, J., Waldenström, D. (2018). Wealth inequality in Sweden: What can we learn from capitalised income tax data?. – *Review of Income and Wealth*, 64(3), pp. 517-541.
- Mankiw, N. G. (2015). Yes,  $r > g$ . So what?. – *American Economic Review*, 105(5), pp. 43-47.
- Meriküll, J., Rööm, T. (2022). Are survey data underestimating the inequality of wealth?. – *Empirical Economics*, 62(2), pp. 339-374.
- Michaillat, P., Saez, E. (2018). A new keynesian model with wealth in the utility function. National Bureau of Economic Research.



- Milanovic, B. (2019). *Capitalism, alone*. Harvard University Press.
- Peshev, P. (2015). Analysis of the wealth inequality dynamics in Bulgaria: Different approach. – *Economic Alternatives Journal*, (4), pp. 29-33.
- Peshev, P., Stefanova, K., Bozhikin, I., Stamenova, R., Mancheva, I. (2022). Is income inequality in Bulgaria underestimated in survey data?. – *Economic Thought journal*, (3), pp. 301-326.
- Peshev, P., Stattev, S., Stefanova, K., Lazarova, M. (2019). Financial Wealth Inequality Drivers in a Small EU Member Country: An Example from Bulgaria during the Period 2005-2017. – *Economic Studies journal*, (2), pp. 41-72.
- Petranov, S., Zlatinov, D., Atanasov, I. (2022). The Shadow Economy in Bulgaria During the Period 2006-2019. – *Economic Studies journal*, (5), pp. 3-18.
- Pfeffer, F. T., Schoeni, R. F. (2016). How wealth inequality shapes our future. – *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 2(6), pp. 2-22.
- Piketty, T. (2014). *Piketty, Thomas. 2014. Capital in the Twenty-First Century*. Cambridge, Mass.: Belknap Press of Harvard University Press.
- Saez, E., Zucman, G. (2016). Wealth inequality in the United States since 1913: Evidence from capitalised income tax data. – *The Quarterly Journal of Economics*, 131(2), pp. 519-578.
- Scheuer, F., Slemrod, J. (2019). Taxation and the Superrich (No. w26207). National Bureau of Economic Research.
- Shorrocks, A. F., Davies, J. B., Lluberas, R. (2021). *Global Wealth Databook 2021*, Credit Suisse Research Institute.
- Shorrocks, A. F., Davies, J. B., Lluberas, R. (2019). *Global Wealth Databook 2019*, Credit Suisse Research Institute.
- Stewart, C. (1939). Income capitalisation as a method of estimating the distribution of wealth by size groups. In *Studies in Income and Wealth*, NBER. Vol. 3, pp. 95-146.
- Stiglitz, J. E. (2012). Macroeconomic fluctuations, inequality, and human development. – *Journal of Human Development and Capabilities*, 13(1), pp. 31-58.
- Tosheva, E., Tasseva, I., Draganov, D., Boshnakov, V. (2016). Effects of changes in tax-transfer system on households income distribution in Bulgaria: simulation analysis using EUROMOD for 2011-2015. – *Economic Thought journal*, (5), pp. 51-71.
- Wilkinson, R., Pickett, K. (2020). *The inner level: How more equal societies reduce stress, restore sanity and improve everyone's well-being*. Penguin Books.
- Wolff, E. N. (2015). Household Wealth Trends in the United States, 1962-2013: What Happened Over The Great Recession?. NBER Working Paper No. 20733.
- Yotov, S. (2014). Vazmozhni politiki za namalyavane na neravestvoto. – *Ikonomicheski Izsledvania*, (In BG: Възможни политики за намаляване на неравенството. Икономически изследвания), (4), 67-107.
- Zhan, M., Xiang, X., Elliott III, W. (2016). Education loans and wealth building among young adults. – *Children and Youth Services Review*, 66, pp. 67-75.
- Zucman, G. (2013). The missing wealth of nations: Are Europe and the US net debtors or net creditors?. – *The Quarterly journal of economics*, 128(3), pp. 1321-1364.

*Other sources*

Survey of Consumer Finances, 1989-2019, Economic Research, Board of Governors of the Federal Reserve system, [https://www.federalreserve.gov/econres/scf/dataviz/scf/chart/#series:Net\\_Worth;demographic:inccat:population:all;units:mean](https://www.federalreserve.gov/econres/scf/dataviz/scf/chart/#series:Net_Worth;demographic:inccat:population:all;units:mean).

Maria Blikhar<sup>1</sup>  
Valerii Syrovatskyi<sup>2</sup>  
Ulyana Bek<sup>3</sup>  
Maria Vinichuk<sup>4</sup>  
Lesia Kucher<sup>5</sup>  
Maryana Kashchuk<sup>6</sup>

## SHADOW ECONOMY VS ECONOMIC SECURITY: TRENDS, CHALLENGES, PROSPECTS<sup>7</sup>

*The purpose of the article is to highlight the results of the study of counteracting the shadow economy in the system of ensuring the economic security of the agricultural sector and its impact on the poverty level of the population. The relationship between the shadowing of the economy and the growth of the poverty level in Ukraine is substantiated, which is confirmed by the results of cluster and regression analysis. A study of the dynamics of the integral indicator of the level of the shadow economy and changes in the volume of real GDP in Ukraine is conducted and the volume of official GDP created by shadow wages is estimated. Predictive assessments of the level of the shadow economy and poverty in the coming years have been made, and growth trends have been established. It has been found that the growth of the level of the shadow economy has a significant impact on the population poverty indicator. The regional features of the spread of the shadow economy and population poverty are analyzed, as a result of which it has been proved that a higher standard of living of the population and a lower level of poverty are observed in the border and industrially developed regions.*

*Keywords: shadow economy; economic security; legal relations; agricultural sector; economic security of agriculture; Ukraine*

*JEL: O17; Q10; Q14*

<sup>1</sup> Maria Blikhar, DrS, Prof., Lviv Polytechnic National University, blikharm@ukr.net.

<sup>2</sup> Valerii Syrovatskyi, DrS, independent researcher, valerakyiv789@gmail.com.

<sup>3</sup> Ulyana Bek, PhD, Lviv Polytechnic National University, ulyana.bek@gmail.com.

<sup>4</sup> Maria Vinichuk, PhD, Assoc. Prof., Lviv State University of Internal Affairs, vinichukm@i.ua.

<sup>5</sup> Lesia Kucher, DrS, Prof., Lviv Polytechnic National University, lesia.y.kucher@lpnu.ua.

<sup>6</sup> Maryana Kashchuk, PhD, Assoc. Prof., Lviv State University of Internal Affairs, m\_kashchuk@ukr.net.

<sup>7</sup> This paper should be cited as: Blikhar, M., Syrovatskyi, V., Bek, U., Vinichuk, M., Kucher, L., Kashchuk, M. (2023). Shadow Economy vs Economic Security: Trends, Challenges, Prospects. – *Economic Studies (Ikonomicheski Izsledvania)*, 32(3), pp. 130-147.

## 1. Introduction

Threatening trends in ensuring the economic security of the state and the deepening of macroeconomic and political instability in Ukraine present the state with a number of problematic issues of effective counteraction to destabilizing factors, phenomena and processes associated with the economic activities outside the official sector of the economy and the implementation of illegal acts in all spheres of the economy. The increase in the amount of shadowing of the economy calls into question the effectiveness of reforming the national economy, the correctness of choosing the vector of socioeconomic development and reduces the level of its economic security, and the incompleteness of the process of transformation of the economy strengthens negative trends, which are especially noticeable in the agricultural sector of the economy. Taking into account the insufficient level of efficiency of the agricultural sector and the effectiveness of the country's agrarian policy, which the protection of national interests in the agricultural sphere and sustainable socioeconomic growth of the country depends on, today there is a significant destructive effect of the spread of shadow economic activity and the discovery of new methods, ways and tools of shadowing the economy, which actualizes the need to deepen research in the direction of institutionalizing countermeasures against the shadow economy in the system of ensuring the economic security of the agricultural sector.

Analysis of recent research and publications. Theoretical and applied aspects of the study of the shadow economy in the system of ensuring the economic security of the agricultural sector were conducted by many scientists, including S. Cherniavskiy, O. Dzhuzha, V. Babanina and Y. Harust (2021), T. Drape, N. Magerkorth, A. Sen, J. Simpson, M. Seibel, R. Murch, S. Duncan (2021), S. Esaku and F. Tajani (2021), D. Nchor (2020), K. Pawlak and M. Kołodziejczak (2020), H. Mohammad (2019), M. Petrushenko, B. Burkynskiy, H. Shevchenko, Ye. Baranchenko (2021), H. Pohrishchuk, V. Semtsov, N. Dobizha, A. Kucher, I. Sysoieva (2021), A. Prosekov and A. Ivanova (2018), L. Shemaeva, Ya. Zhalilo (2021), N. Yurkiv (2021) and others. However, without denying significant achievements in this area, it has not yet been possible to solve the set tasks, and the scale of the spread of the shadow economy continues to grow.

It is obvious that the problem of counteraction to shadowing of the economy is extremely important both for science and for practice and requires detailed research in order to find effective methods of counteracting it and minimizing the impact on the socioeconomic development of the country and protecting national interests in the agricultural sphere.

Many Ukrainian scientists (Blikhar et al. (2019), Mukoviz et al. (2022)), including foreign ones (Baklouti et al., 2019; Grundler et al., 2019; Nguyen and Duong, 2021; Zouhaier et al., 2021) focus their attention on the presence of an emphasized negative causal effect of the shadow economy on the economic growth of the state in general, and economic security in particular. Therefore, scientists are convinced that, nevertheless, the size of the so-called informal sector positively depends on the indicators of tax legislation, government policy and regulatory acts. In addition, the urgent need to control and prevent corruption is emphasized, which significantly activates the economic component of state security. Ultimately, reducing corruption will necessarily reduce the size of the shadow economy and also reduce the negative impact of corruption on economic growth through the shadow economy.

For example, T. Luong and T. Nguyen (2020) substantiated in their study that indicators of the state's economic development have a negative and statistically significant impact on the shadow economy. Moreover, according to these scientists, in countries with a transition economy, the size of the shadow economy is negatively related precisely to the quality of the rule of law. However, there is also a positive relationship between inflation, state expenses and the size of the shadow economy. Therefore, the size of the shadow economy can be controlled by improving the effectiveness of the rule of law and economic growth, especially in countries with transitional economy.

Instead, a number of other scientists (Polese et al., 2022), nevertheless, emphasize the traditional measurement of the shadow economy, which will allow quantitative assessment of some socioeconomic phenomena that correlate with the low efficiency of the state. However, in their opinion, in this case, the causal relationship is not always clear and, most importantly, it should be found out whether the non-compliance with the law is connected with the ineffectiveness of the state, or, on the contrary, the ineffectiveness of the state arises from its citizens' non-compliance with the law. A situation with a high level of dissatisfaction with economic governance, a high level of solidarity with fellow citizens seems to be the ideal context for relying on alternative social support structures as a kind of necessity.

In this context, the research of H. Mohammad (2019), in which the author defends the thesis that global danger is more widespread today than ever, because many states have internal conflicts, and acts of violence, such as terrorism, are becoming more brazen than anyone could predict, becomes important today. The author's position is also interesting regarding the fact that the security threats of the 21st century are not limited to military threats, but also include non-military ones such as terrorism, gun violence and natural disasters. The relationship between security challenges around the world is complex, and it has been proved that as intergroup and interpersonal conflict decreases, there is a corresponding increase in less understood and less well-known threats, including threats to natural, economic and social systems. That is why there is an urgent need for a comprehensive understanding of these multidimensional problems in order to develop idea-based solutions to them that will be implemented by the government and other politicians. These solutions should take a multifaceted approach so that key players in society could integrate different strategies into different sectors to ensure multiple returns on public investments and initiatives, thus meeting the requirements of sustainable development.

Continuing in this direction, I. Romyk (2021) substantiates the methods of economic modelling to ensure the safety and stability of the food supply system, which will ensure the complementarity of the activities of various business entities and create an appropriate basis for the development of the industry as a whole. Therefore, theoretical and methodological approaches to the study of food safety should be based on two general scientific approaches – systemic and integrated. Moreover, to assess the level of agricultural production, it is advisable to use the tools of economic and mathematical descriptive modelling.

For example, S. Zhanabekov (2022) states that reducing bureaucratic complexity by eliminating burdensome regulations could help reduce both wasteful government spending on enforcing these regulations and the size of the shadow economy. Since shadow activities are created to avoid being detected by the government, it is difficult to reliably estimate the

extent of the shadow economy. Moreover, according to this author, the ever-changing nature of the shadow economy may undermine current anti-shadow economy policies and create new challenges for the economy and society in general. After all, it is believed that the shadow economy is a reflection of economic difficulties in the state.

In this context, M. Vinichuk and A. Ryzhkova (2021) prove the urgent need to detinize the economy of Ukraine, considering the shadow economy as a threat to the socioeconomic development of the country and justify the expediency of revising and improving the state policy of detinization of economic relations, mechanisms of distribution and redistribution of financial resources and capital.

The strengthening of processes of globalization and instability in the world financial market necessitate the protection of national economic systems and ensuring the proper level of functioning of all sectors of the economy. Under such conditions, the protection of the agricultural sector from the influence of destabilizing factors of the external and internal environment becomes of primary importance, because the chronic underfinancing of the needs of agriculture, the imperfect mechanism of access to credit resources, the imperfection of the tax system and the limitations of the normative and legal regulation of agricultural relations create significant threats and risks of ensuring a proper standard of living of the population.

Ensuring the stable development of the agricultural sector and strengthening its economic security for a long time is the subject of scientific and practical discussions both at the national and international levels. The existence of a number of problems related to ensuring the economic security of the agricultural sector is felt not only in Ukraine, but also in most of the countries of the European Union. Confirmation of this can be the formation and implementation of a common agricultural policy at the level of the member states of the European Union and giving due attention to this issue through the prism of the need to support the agrarian policy of less developed countries by highly developed ones.

The most tangible problems in ensuring the economic security of the agricultural sector are the lack of motivation to carry out activities in agriculture, the increase in the level of unemployment in the agricultural sector, the strengthening of the processes of labour migration both within the country and within the European Union, the impoverishment of the population of rural areas and the decrease in growth rates and competitiveness of the agricultural sector, as well as inefficiency in the use of available resources and conducting economic activities outside the official segment. It is obvious that the outlined problems are extremely relevant for Ukraine; however, possessing significant agricultural potential thanks to a good geographical location and favourable climatic conditions for agriculture, the effectiveness of the functioning of the agricultural sector of Ukraine is not able to ensure a high level of its economic security and is not able to resist illegal processes and phenomena. Therefore, under such conditions, at the level of combating the shadow economy, there is also the problem of deepening research in the field of ensuring economic security of the agricultural sector of the economy.

We should note that the analysis of available scientific developments in the field of security of the agricultural sector of the economy does not allow us to formulate a clear position regarding the conceptual and categorical apparatus, which complicates the process of

forming a methodological toolkit for assessing the level of security. In particular, some scientists consider the category “economic security of the agricultural sector” and others – “agricultural security”. The current normative legal act of Ukraine, according to which assessments of the level of economic security in certain areas are carried out – Methodical recommendations for calculating the level of economic security of Ukraine [12] does not provide for the assessment of agricultural security, but is limited only to the assessment of food security, which, in fact, is not objective and does not reflect the completeness of the necessary calculations. In addition, there is still no legislative regulation of either term, and food security is only part of the studied phenomenon. At the international level, the majority of scientific views are focused on the concept of “economic security of the agricultural sector”, however, some scientists in recent years have begun to substantiate the expediency of the term “agricultural security”. In particular, K. Utenkova (2018) emphasizes that scientific approaches to agricultural security are characterized by absolute uncertainty and ambiguity is observed regarding the interpretation of the economic security of the agricultural sector, as very often this definition is equated with the economic security of the agricultural sphere. In turn, such authors as A. Balian et al. (2021) proposed the author’s interpretation of the term “food security” as a complex of socioeconomic relations that develop thanks to the provision of people with food, appropriate standards of quality and quantity based on the innovative development of reproductive processes in agriculture and the economic security of the agro-food complex. At the same time, according to these authors, the issue of ensuring food security by the state is combined with the tasks of innovative development of reproductive processes in the regions in general, and agricultural producers, in particular. Based on this definition, a system of principles of state regulation of food safety issues was proposed: stability of the legal framework regulating economic processes; production stability; competitiveness of food products, enterprises, organizations; availability of food products for all population groups; effective use of land, production, labour resources; diversification of food supplies; protection from external and internal threats of the agro-food sector of the economy; socioeconomic direction of state development, etc. In this context, it is expedient to talk about guaranteeing the food independence of the state and to single out food security in the general structure of the economic security of the agricultural sector.

The same opinion is held by V. Zamlinsky and S. Kushnir (2019), who associate the provision of economic security in the agricultural sector with the provision of food security, justifying this by the fact that the agricultural sector is the material basis of economic security. We consider it appropriate to note that in relation to food security, an institutional and methodological basis has been formed and indicators for assessing its level have been determined, however, it is insufficient to assert the state of security of the agricultural sector only on the basis of the indicator of food security, since in the structure of the economic security of the agricultural sector there are also financial, personnel-intellectual, production-technological, political-legal, informational, environmental, investment-innovative, social, marketing, resource-technical, energy, transport and foreign economic components (Slyusarenko and Klyuchnik, 2020). Moreover, for example, O. Pronina et al. (2021) claim that the sustainable development of the agricultural sector is not limited to ensuring an adequate level of food, but includes indicators of agricultural development, economic security of enterprises of the agricultural sector, and counteraction to shadowing processes.

Instead, Yu. Maevsky (2020) proves that the need to reform the agrarian policy of the countries of the European Union arose in the process of the need to ensure food security, which proves the importance of this component of the economic security of the agricultural sector, and connects it with the need for self-sufficiency in food and strengthening food security. In this context, K. Utenkova (2021) considers the economic security of the agricultural sector as a state of the system, regardless of the permanent influence of external and internal environmental factors, ensuring the stability of functioning, detinization and progressive development of the agricultural sector in such a way that the preservation and further reproduction of the resource potential becomes possible.

In addition, the processes of globalization significantly affect the regional features of the functioning of the agricultural sector, and European integration strengthened the development of cross-border cooperation, as a result of which there was a need for the formation of a regional policy for the management of the agricultural sector, which led to the need for the implementation of a common agricultural policy.

For example, such authors as R. Lile et al. (2015) consider the increase in the competitiveness of the entire agricultural market of the European Union and stimulation of the effective development of rural areas to be the main goal of the common agrarian policy of the European Union. Positively assessing the idea of introducing a common agrarian policy of the European Union, S. Stanciu (2013) singles out additional opportunities received by rural youth who are employed in the agricultural sector. In particular, we are talking about significant financial support for young farmers and preferential employment conditions. Therefore, in this context, the aspirations of Ukraine to integrate into the European Union and to obtain the opportunity to ensure the sustainable development of the agricultural sector on the basis of environmental friendliness and social responsibility are substantiated.

Many modern researchers of the improvement of analytical management of the economic security of agricultural enterprises, in particular S. Vasylyshyn et al. (2021), focus their attention on the fact that in the conditions of the strengthening of the destructive effects of the world economic crisis and the growing number of risks of the agrarian business, there is the problem of finding ways to improve accounting and analytical support as the only reliable source of reliable, relevant and accurate information necessary for managing the economic security. In this case, the authors proposed to implement a model of analytical support for the management of economic security in conditions of uncertainty and growing risks and threats to the business environment of agricultural enterprises, which should be based on the use of general economic, statistical, integral and econometric approaches. Moreover, in their opinion, in the process of counteracting the risks and threats to the external and internal environment of agrarian business, the use of integral methods of assessing the economic security of agrarian enterprises becomes crucial.

In general, D. Puyiriyani et al. (2020) claim that agricultural security as a separate scientific category began to form in the context of the study of deagrarianization of the economy and is associated with limited access to agricultural activities, use of land resources, and a slowdown in the sustainable development of the agricultural sector, as a result of which shadowing processes are intensifying. Although, according to A. Zolkover and V. Terziev (2020), the financial market and financial intermediaries are becoming an essential part of the problems and the topic of urban poverty, low incomes, drug abuse and problems of female

employment, gender inequality in incomes are very popular in works that analyze the problems of the shadow economy. In the end, summarizing the analysis of the latest research and publications, it is necessary to state a sufficiently significant scientific development in the field of shadow economy research and significant achievements, the results of which prove the severity of the outlined problem and the need to counteract the shadow economy.

## **2. Methodology**

The purpose of the article is to highlight the results of the study of the counteracting of the shadow economy in the system of ensuring the economic security of the agricultural sector and its impact on the poverty level of the population.

The research uses general scientific and special methods of economic analysis, namely: analysis and synthesis to determine the essence of the shadow economy and economic security of the agricultural sector, comparison and analogy in order to assess the state and trends of the shadow sector of the economy and the level of ensuring the economic security of the agricultural sector, as well as their interrelationship and mutual influence, generalization and systematization for the formulation of hypotheses and the formation of conclusions, graphical for the purpose of visual display of the obtained research results, grouping and cluster analysis for the grouping of the regions of Ukraine according to indicators of the level of poverty and the level of the shadow economy.

It is worth noting that due to the rapid development of innovative information and technical technologies and the development of a complex of measures to combat illegal economic activity, it is extremely difficult today to obtain accurate, true, unbiased and complete information on the volume of shadowing of economic sectors. It is obvious that the mechanism for assessing the level of the shadow economy in Ukraine is imperfect, despite the existing legally regulated methodological tools for assessing the level of the shadow economy and the approved Methodical recommendations for calculating the level of the shadow economy (Methodical recommendations..., 2021), according to which the assessment of the level of the shadow economy is carried out on the basis of four methods (“costs of the population – retail turnover and services”, unprofitability of enterprises, electrical and monetary) and calculation of the integral indicator of the level of the shadow economy as a percentage of the official GDP, approved by Order of the Ministry of Economic Development, Trade and Agriculture dated January 20, 2021 No. 104.

The peculiarity of the method of calculating the integral indicator of the level of the shadow economy is that it is carried out by summing the results of estimates of the levels of the shadow economy of four methods for a certain specific period of time, weighted by the weighting factors inherent in each of the methods. Thus, the integral indicator of the level of the shadow economy is calculated as the sum of the weighted average estimates of the level of the shadow economy of the set of methods using the formula (1):

$$T_{int t} = \sum_{k=1}^4 T_{k t} \times a_{k t} \quad (1)$$

where:



$T_{int t}$  – estimate of the level of the shadow economy by one of the methods in the specific analyzed period;

k – one of the methods of assessing the level of the shadow economy;

$a_{k t}$  – a coefficient that reflects the calculation of the average value of estimates of the level of the shadow economy for previous years, the root mean square deviation of estimates by one of the methods from their average value, and the calculation of the coefficient of variation.

However, the Methodical recommendations for calculating the level of the shadow economy regulated by law in Ukraine are universally binding, and on their basis, the government organization – the Ministry of Economy of Ukraine forms annual analytical studies, in particular: Shadow economy: general trends in 2020: an analytical note of the Ministry of Economy of Ukraine (2021), Shadow economy: general trends of January-September 2021: an analytical note of the Ministry of Economy of Ukraine (2022), which are official documents formed only in the Ukrainian language, which fully reflect the parameters of the shadow sector of Ukraine's economy, are acceptable for use in scientific research and do not require the formation of additional author's methods for calculating the integral indicator of the level of the shadow economy. Therefore, we consider it appropriate to use them in the study of trends in the shadowing of the economy of Ukraine and to confirm the proposed hypothesis about the deepening of the processes of shadowing of the economy and the growth of its volumes, which is proved by the calculations shown in Figure 1.

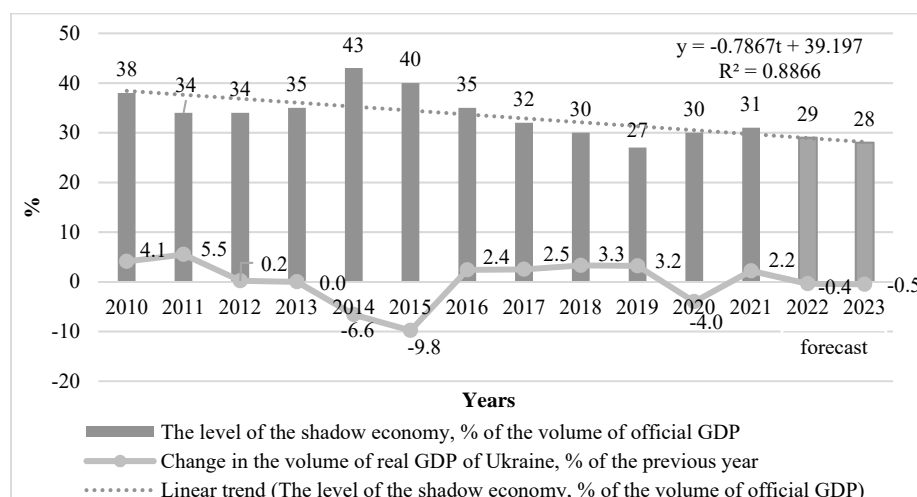
### 3. Results and Discussion

The increase in the volume of shadowing of the national economy and the emergence of destabilizing factors in the socioeconomic development of Ukraine led to the aggravation of problems related to the uneven distribution of resources, the strengthening of structural deformations and disproportions in the sustainable development of the economy and society, and the growth of the influence of informal institutions. The outlined trends, which are a consequence of the incompleteness, imperfection and inefficiency of the reform of all spheres of the economy, are in close interaction with the indicators of the socioeconomic development of the country and significantly influence the formation of their values and, at the same time, contribute to the development and expansion of the shadow sector of the economy, as well as to a decrease in the economic security level of the agricultural sector of the economy.

Counteraction to the shadow economy in the system of ensuring the economic security of the agricultural sector of Ukraine under the conditions of persistent financial-economic and socio-political instability and the incompleteness of the process of transformation of the economy requires due attention to the evaluation of the level of the shadow economy in the country, the identification of the main factors that contribute to the development and spread of this destructive phenomenon and determining the trends of the consequences caused by the tinization of the economy.

As evidenced by the results of studies, conducted on the level of the shadow economy in Ukraine, the dynamics of the integral indicator during 2010-2021 do not have a stable trend, and the periods of aggravation of the financial and economic as well as political crisis testify to the growth of the volume of the shadow sector of the economy (Figure 1). In particular, in 2013-2014 (a period of political crisis associated with the Revolution of Dignity and the annexation of the Autonomous Republic of Crimea) and 2019-2021 (coronavirus crisis and the spread of the COVID-19 pandemic), an increase in the integral indicator by 9 and 4 points respectively, and a simultaneous drop in real GDP to -9.8 % in 2014 and -4 % in 2020 were recorded. Forecast estimates of the analyzed indicator in the conditions of 2022-2023 indicate that the level of the shadow economy in Ukraine will continue to be at the level of 29-30 % of the country's official GDP. The value of the level of the shadow economy in Ukraine in 2022 and 2023 was calculated as a result of forecasting (using the linear trend).

**Figure 1. Dynamics of the integral indicator of the level of the shadow economy in Ukraine and changes in the volume of real GDP in 2010-2023\*, %**  
(2022-2023 – forecast estimates)

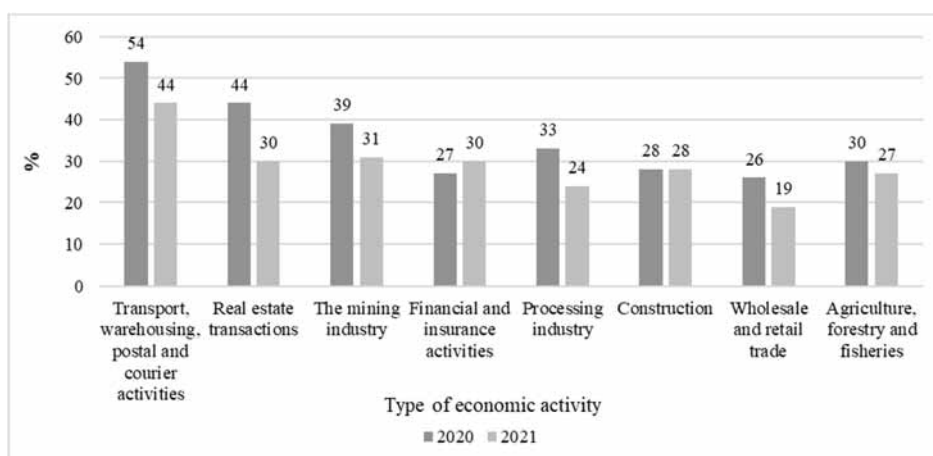


\* data for 2021 are given for the period January – September.  
Source: (Shadow economy..., 2020; 2021), authors' forecast.

Detailed studies of the shadowing of the economy by types of economic activity (Figure 2) allow us to state that the level of shadowing of the agricultural sector in 2020 is 30%, and in 2021 – 27%. We should note that estimates of the level of the shadow economy by types of economic activity in Ukraine are also carried out on the basis of legally regulated Methodical recommendations for calculating the level of the shadow economy, which were approved by the Order of the Ministry of Economic Development, Trade and Agriculture dated January 20, 2021 No. 104. Accordingly, the calculations of analyzed in the article indicators of the level of the shadow economy, including by types of economic activity, are carried out on the basis of the current national methodology.

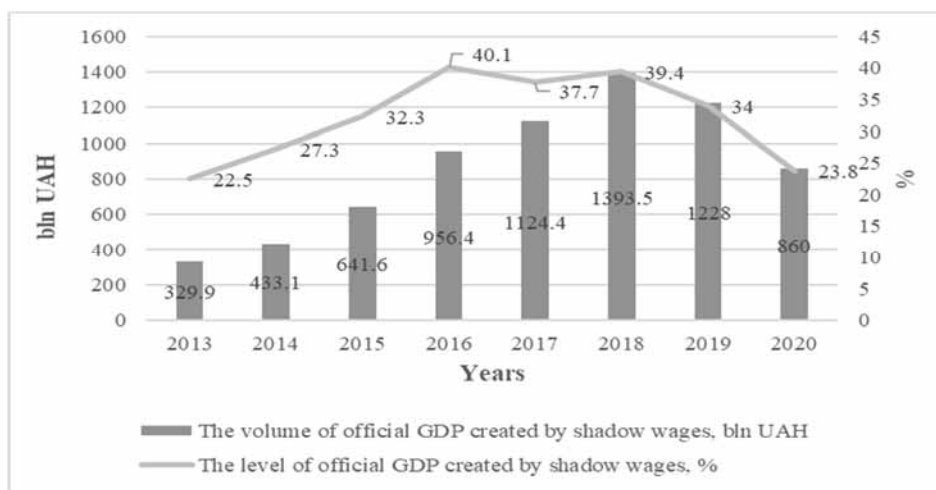
Along with the growth of the volume of shadow economic activity, the importance of such a problem as shadow wages is growing, which is in close interdependence with other destabilizing factors of the development of the shadow economy and forms quite significant volumes of GDP, in particular in the agricultural sector.

**Figure 2. Dynamics of the level of the shadow economy of Ukraine according to types of economic activity in 2020-2021**



Source: (Shadow economy..., 2021).

**Figure 3. Dynamics of the volume of official GDP created by shadow wages and the level of official GDP created by shadow wages, UAH billion, %**

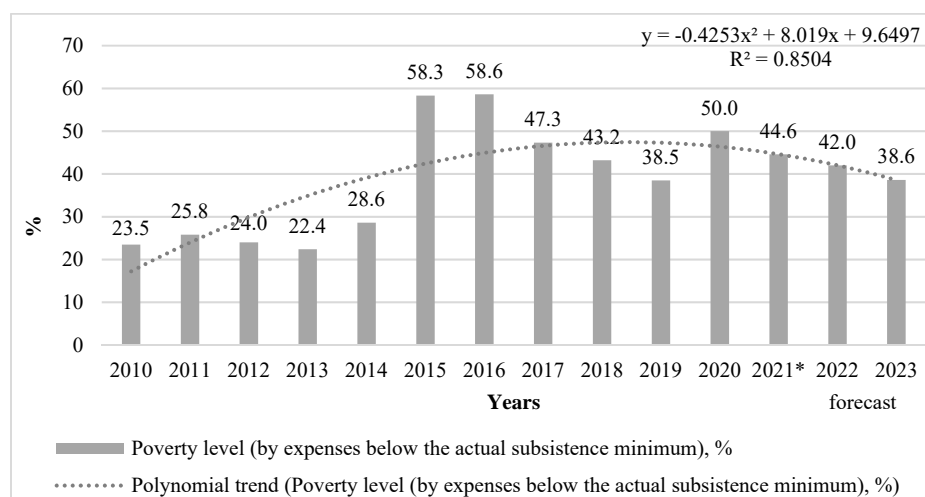


Source: (Shadow economy..., 2021).

The assessment of the dynamics of the volume of official GDP created by shadow wages and the level of official GDP created by shadow wages during 2013-2020 (Figure 3) shows a steadily growing trend relative to these indicators in the period 2013-2018 from UAH 329.9 billion up to UAH 1,393.5 billion (by 322.4%). Positive trends were observed during 2019-2020, and the reduction of official GDP created by shadow wages reached UAH 860 billion, which is 38.3% less than in 2018.

It should be recognized that the increase in the volume of official GDP created by shadow wages has a positive social effect in the short term, as illegal shadow incomes reduce the level of social tension in society due to the opportunity to improve the material situation of the population and increase the level of its purchasing power. However, in a strategic perspective, incomes received as a result of employment in the shadow sector of the economy and received in the form of shadow wages generate significant deformations and disproportions of the security system of socioeconomic transformations and have a particularly negative impact on the population of rural areas, which threaten the growth of differentiation of population incomes, decrease in the share of the very rich and an increase in the share of the very poor population. The formation of social inequality, in addition to all the above, intensifies the processes of population poverty, the level of which by the estimates of the Institute of Demography and Social Research, named after M. V. Ptukha of the National Academy of Sciences (Information and analytical note on living standards in January-March 2021) has acquired critical importance and has an upward trend (Figure 4). According to forecast estimates, by 2022, the level of poverty in Ukraine will be in the range of 41-43 %, which is an extremely negative phenomenon and requires deepening of research in the direction of identifying features, causes and finding methods of counteracting both the shadowing of the economy and poverty in Ukraine.

**Figure 4. Dynamics of the level of poverty in Ukraine in 2010-2022 (by expenses below the actual subsistence minimum), % (2022-2023 – forecast estimates)**

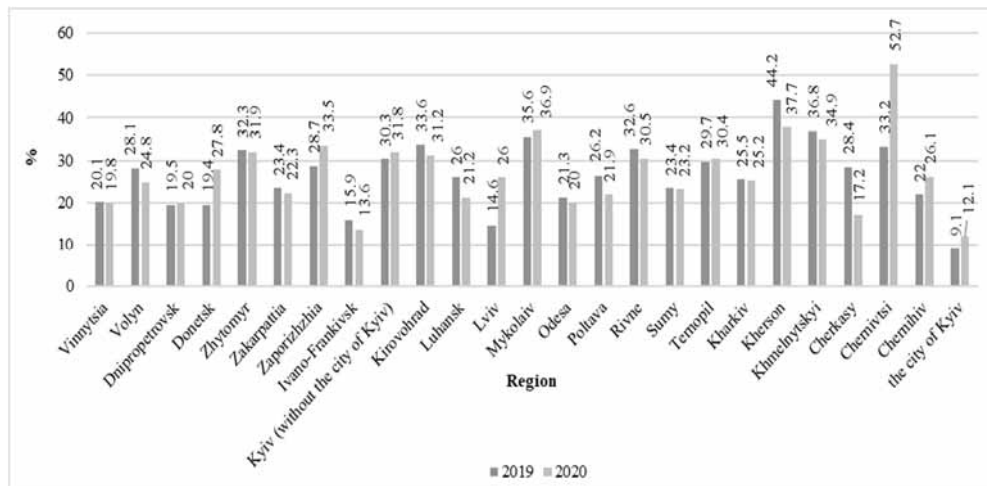


\* Preliminary evaluation.

Source: (Information and analytical note..., 2021), authors' forecast.

No less important is the study of regional features of the spread of poverty in Ukraine. As evidenced by the results of assessments of the level of poverty in the regions of Ukraine (Figure 5), the state of differentiation of the population's incomes in them is diverse: some regions show sufficiently low values of the analyzed indicator, and in some regions, they are extremely high, which indicates a decrease in the incomes of the population, or, more likely, their informal redistribution in favour of a small part of society.

**Figure 5. Dynamics of the poverty level in Ukraine in 2019-2020, %**



Source: (Information and analytical note..., 2021).

The grouping of the regions of Ukraine according to indicators of the level of poverty and the level of the shadow economy in 2019-2020 with the help of multidimensional (cluster) analysis based on the k-means method using the Statistica 7.0 software package made it possible to distinguish three groups of regions (Table 1), which are characterized by common signs of the spread of poverty and the use of measures to raise the standard of living of the population and reduce the level of the shadow economy.

The first group, both in 2019 and in 2020, included such regions as Vinnytsia, Dnipropetrovsk, Ivano-Frankivsk, Odesa regions and the city of Kyiv, which are characterized as highly developed regions where industrial production is concentrated, and agricultural production has a negligible share, there is a high level of employment in the formal sector of the economy and a low level of poverty.

Volyn, Ternopil, Kharkiv, Zaporizhzhya, and Kyiv regions (without the city of Kyiv) are stable in the second group, but in 2020, Zakarpattia, Luhansk, Poltava, Sumy, and Cherkasy regions, which were in the second cluster, moved to the first. On the other hand, Donetsk and Lviv regions dropped from the first cluster to the second. The regions included in the second cluster are considered as border regions, which have a number of advantages related to cross-border cooperation with neighbouring countries and socioeconomic integration.

The third group includes Mykolaiv, Kherson, Khmelnytskyi and Chernivtsi regions, which are recognized at the state level as depressed regions of the country that require additional funding and constant financial support from the state.

So, it becomes obvious that the problem of shadowing the economy of Ukraine causes significant destructive changes in the socioeconomic development of the country, the most serious of which is the total impoverishment of the population, in particular, those living in rural areas, who do not have the possibility of official employment, and their desire to take participation in illegal production and expand the volume of the shadow sector of the economy.

**Table 1. Grouping of the regions of Ukraine according to indicators of the level of poverty and the level of the shadow economy in 2019-2020**

2019			2020		
No.	Region	Cluster number	No.	Region	Cluster number
1.	Vinnytsia	1	1.	Vinnytsia	1
2.	Dnipropetrovsk		2.	Dnipropetrovsk	
3.	Donetsk		3.	Zakarpattia	
4.	Ivano-Frankivsk		4.	Ivano-Frankivsk	
5.	Lviv		5.	Luhansk	
6.	Odesa		6.	Odesa	
7.	Chernihiv		7.	Poltava	
8.	the city of Kyiv		8.	Sumy	
9.	Volyn		9.	Cherkasy	
10.	Zakarpattia	2	10.	the city of Kyiv	2
11.	Zaporizhzhia		11.	Volyn	
12.	Kyiv (without the city of Kyiv)		12.	Donetsk	
13.	Luhansk		13.	Zhytomyr	
14.	Poltava		14.	Zaporizhzhia	
15.	Sumy		15.	Kyiv (without the city of Kyiv)	
16.	Ternopil		16.	Kirovohrad	
17.	Kharkiv		17.	Lviv	
18.	Cherkasy		18.	Rivne	
19.	Zhytomyr	3	19.	Ternopil	3
20.	Kirovohrad		20.	Kharkiv	
21.	Mykolaiv		21.	Khmelnytskyi	
22.	Rivne		22.	Chernihiv	
23.	Kherson		23.	Mykolaiv	
24.	Khmelnytskyi		24.	Kherson	
25.	Chernivtsi		25.	Chernivtsi	

*Source: authors' research on the basis (Information and analytical note..., 2021).*

In this context, we consider it expedient to carry out a regression analysis of the influence of the level of the shadow economy on the poverty level of the population in Ukraine, which will allow us to determine the stochastic dependence between the parameters of the economic model, in which several values of the effective indicator will correspond to the value of the indicator, which is the influencing factor. At the same time, regression analysis will help to find out the forms and density of the relationship between the parameters of the poverty level of the population, which is defined as an effective indicator (Y), and we will consider the

level of the shadow economy ( $x_1$ ) as a factor indicator. We will perform the necessary calculations using the Statistica 7.0 software package.

According to the results of research using the regression analysis technology (equation 2), the relationship between the analyzed indicators is characterized as strong, as evidenced by the correlation coefficient  $R = 0.817$ , and the statistical significance of the model is confirmed by the Fisher's test –  $F(3.29) = 36.017$ .

$$Y = 17.07 + 0.72x_1 \quad (2)$$

where:

Y – the poverty level of the population, %;

$x_1$  – level of the shadow economy, %.

Detailing the impact of the specified factors of the shadowing of the economy on the level of poverty of the population allows us to state that the growth of the level of the shadow economy deepens the processes of impoverishment of the population, which characterizes the positive directly proportional influence of this factor on the performance indicator, which confirms the regression indicator +0.72.

The importance of such scientific research is the personal scientific contribution of the authors to the deepening of methodological aspects of identifying the dynamics of the influence of the shadow economy on the level of poverty in Ukraine based on the study of relative indicators, which was initiated by one of the co-authors of this article and is presented in a monographic study (Vinichuk, 2016), where the author's own methodology is proposed on the basis of supplementing the existing indicators with indicators of the level of poverty and the level of the shadow economy, which makes some contribution to science. Such studies, unlike the existing ones, are based on conducted research of not quantitative, but qualitative indicators that characterize the parameters of the shadow sector of the economy and the level of life quality of the population.

Since the main goal is to highlight the results of the study of the institutionalization of countering the shadow economy in the system of ensuring the economic security of the agricultural sector and its impact on the poverty level of the population, and taking into account the limited scope of the article, we do not detail the calculations of indicators, but rely on their analysis, a reflection of changes in dynamics and establishing relationships between them.

Considering the proven threatening impact of the shadow economy on the socioeconomic development of the state as a whole, and the agricultural sector in particular, the problem of counteracting the shadow economy and ensuring the economic security of the agricultural sector needs immediate resolution. Therefore, the need to develop a complex of measures for the detinization of the economy of Ukraine, which we propose to direct in the following directions, becomes extremely urgent:

- 1) improvement of methods of assessing the level of the shadow economy by taking into account shadow economic relations arising in the temporarily occupied territories of the

- country and in the direction of improving the assessment of the shadow sector by its structural components;
- 2) formation of an optimal taxation system taking into account the rationality of the tax burden, reducing the tax pressure on small and medium-sized businesses, especially in the agricultural sector;
  - 3) improvement of the accounting system of income and expenses of business entities, which consists in ensuring conditions for voluntary payment of taxes, simplification of declarativeness and reporting;
  - 4) ensuring the transparency of the use of state resources through transparent redistribution and use of available financial resources, obtaining free access to information about these resources and strict accountability of responsible persons;
  - 5) increasing the effectiveness of monetary policy and establishing the management position of the National Bank of Ukraine regarding the regulation of the monetary and credit sphere and weakening the dependence of internal money circulation on “shocks” of the external environment;
  - 6) improvement of current legislation in the field of prevention and counteraction to shadow economic activity, strengthening of criminal responsibility for committing crimes in the financial and economic sphere and the agricultural sector of the economy.

Thus, the results of the conducted research on counteracting the shadow economy in the system of ensuring the economic security of the agricultural sector allow us to assert the significant shadowing of the economy of Ukraine, in particular, the agricultural sector, which leads to the emergence of significant negative processes in the financial and economic, as well as socio-political spheres, the main of which are population poverty, especially those living in rural areas, and informal employment. At the same time, in the regional dimension, three groups of regions have been formed, which are characterized by the degree of socioeconomic development, the level of development of the agricultural sector, the favourable geographical location and the differentiation of the population's incomes. The outlined factors indicate the level of well-being in the country and the poverty of the population.

#### **4. Conclusion**

The article defines the essence of the shadow economy in the process of socioeconomic transformations and economic security of the agricultural sector, outlines the main factors of the formation of the shadow sector and the consequences caused by the shadow economic activity in the agricultural sector. The results of the research into the problematic aspects of the institutionalization of counteracting the shadow economy in the system of ensuring the economic security of the agricultural sector give grounds for asserting that in Ukraine, the need to effectively counteract the shadow economic activity has become of critical importance, the level of which has reached a mark of more than 30% of the official GDP and continues to grow, which has a significantly destructive effect on the economic and socio-



political sphere, poses a significant threat to the formation and functioning of the agricultural sector. The growth of the volume of the shadow sector of the economy led to the emergence of dangers in the structure of the economic security of the agricultural sector, as a result of which there is a mass impoverishment of the population in the country, the poverty level of which is in the range of 22.4-58.6 %, which, in turn, intensifies the processes of development of the shadow economy.

The existing methodological tools for assessing the influence of the level of the shadow economy on certain indicators of the socioeconomic development of the country have been improved by proposing the grouping of regions of Ukraine according to indicators of the level of poverty and the level of the shadow economy in order to identify highly developed and depressed ones. The use of regression analysis is proposed to identify the relationship and mutual influence of the level of the shadow economy with the poverty level of the population. The results of research using the technology of cluster analysis based on the k-means method allow us to state that the grouping of regions of Ukraine based on the indicators of population poverty and shadowing of the economy in them indicates the separation of highly developed and depressed regions. It was established that the first group includes industrially developed, border and port regions, characterized by a high level of employment in the formal sector of the economy and lower poverty rates, and depressed regions include those areas that require additional state funding and constant support. At the same time, the results of the regression analysis of the impact on the poverty level of the population of the shadow economy confirm a strong relationship between the studied indicators, which is confirmed by the correlation coefficient  $R = 0.817$ .

The obtained results can be used by local self-government bodies in the formation of state regional policy, in determining the directions of its implementation, as well as by state authorities in the development of the Strategy for the development of the economic security of the agricultural sector. The prospects for further research should be determining the improvement of the system of state social protection of the population, since it has been established that it is insufficiently effective and there are a number of problematic issues regarding the protection of the population in conducting their own agricultural activities, which leads to the activation of integration into the system of shadow financial flows and, at the current stage, requires effective regulatory and legislative opposition.

## References

- Baklouti, N., Boujelbene, Y. (2019). Shadow Economy, Corruption, and Economic Growth: An Empirical Analysis. – *The Review of Black Political Economy*, 47(3), pp. 276-294. <https://doi.org/10.1177/0034644619885349>.
- Balian, A., Koshkalda, I., Sheludko, L., Sedikova, I., Savenko, I., Zhemoyda, O. (2021). Food Security Issues in The Context of State Regulation and Public Administration. – *Elementary Education Online*, 20(3), pp. 1625-1634. <https://doi.org/10.17051/ilkonline.2021.03.184>.
- Blikhar, M., Savchenko, L., Komarnytska, I., Vinichuk, M. (2019). Strategic orientaries of legalization of the economy of Ukraine: economic and legal aspects. *Financial and credit activities: problems of theory and practice*, 2(29), pp. 101-112. <https://doi.org/10.18371/fcftp.v2i29.171850>.
- Cherniavskiy, S., Dzhuzha, O., Babanina, V., Harust, Y. (2021). System of ensuring the economic security of the state: world experience and ways of its reform in Ukraine. – *Revista Gênero E Interdisciplinaridade*, 2(1). <https://doi.org/10.51249/gei.v2i01.132>.

- Drape, T., Magerkorth, N., Sen, A., Simpson, J., Seibel, M., Murch, R., Duncan, S. (2021). Assessing the role of cyberbiosecurity in agriculture: a case study. – *Frontiers in Bioengineering and Biotechnology*, 9, 737927. <https://doi.org/10.3389/fbioe.2021.737927>.
- Esaku, S., Tajani, F. (2021). Does corruption contribute to the rise of the shadow economy? Empirical evidence from Uganda. – *Cogent Economics & Finance*, 9(1), 1932246. <https://doi.org/10.1080/23322039.2021.1932246>.
- Grundler, K., Potrafke, N. (2019). Corruption and economic growth: new empirical evidence. – *European Journal of Political Economy*, 60, 101810. <https://doi.org/10.1016/j.ejpoleco.2019.08.001>.
- Information and analytical note on living standards in January-March 2021. (2021). Available at: <https://fpsu.org.ua>.
- Lile, R., Stanciu, S., Martin, S., Meszleni, R. (2015). Common agricultural policy for the period 2014-2020 – a solution for agricultural management. – *Journal of Economics and Business Research*, 21(2), pp. 134-144. [https://www.academia.edu/70093555/Common\\_Agricultural\\_Policy\\_for\\_the\\_Period\\_2014\\_2020\\_A\\_Solution\\_for\\_Agricultural\\_Management](https://www.academia.edu/70093555/Common_Agricultural_Policy_for_the_Period_2014_2020_A_Solution_for_Agricultural_Management).
- Luong, T., Nguyen, T. (2020). Rule of law, economic growth and shadow economy in transition countries. – *Journal of Asian Finance, Economics and Business*, 7(4), pp. 145-154. <https://doi.org/10.13106/JAFEB.2020.VOL7.NO4.145>.
- Maevsky, Yu. (2020). Paradigms of national security through the prism of Ukraine's agrarian policy. – *Honor and law*, 3(74), pp. 66-70. Available at: <http://chiz.nangu.edu.ua/article/view/215683/215836>.
- Methodical recommendations for calculating the level of economic security of Ukraine: Order of the Ministry of Economic Development and Trade of Ukraine. Available at: <https://me.gov.ua/Documents/List?lang=uk-UA&id=d4c96730-ea46-4ebd-ba92-60631a3e2e69&tag=MetodichniRekomendatsiiMakroekonomika>.
- Methodical recommendations for calculating the level of the shadow economy: Order of the Ministry of Economic Development, Trade and Agriculture. Available at: <https://me.gov.ua/Documents/List?lang=uk-UA&id=d4c96730-ea46-4ebd-ba92-60631a3e2e69&tag=MetodichniRekomendatsiiMakroekonomika>.
- Mohammad, H. (2019). The role of security sector and democracy in promoting sustainable development: global challenges and solutions. *Central European Journal of International and Security Studies*, 13(4), pp. 8-10. <https://cejiss.org/the-role-of-security-sector-and-democracy-in-promoting-sustainable-development-global-challenges-and-solutions>.
- Mukoviz, V., Leshchii, L., Khodakivska, O., Prokopova, O., Kuzub, M. (2022). Accounting for transactions costs of agricultural producers in the shadow economy. *Agricultural and Resource Economics*, 8(2), pp. 67-85. <https://doi.org/10.51599/are.2022.08.02.04>.
- Nchor, D. (2020). Shadow economies and tax evasion: The case of the Czech Republic, Poland and Hungary. – *Society and Economy*, 43(1), pp. 21-37. <https://doi.org/10.1556/204.2020.00029>.
- Nguyen, D., Duong, M. (2021). Shadow economy, corruption and economic growth: an analysis of BRICS countries. *The Journal of Asian Finance, Economics and Business*, 8(4), pp. 665-672. <https://doi.org/10.13106/JAFEB.2021.VOL8.NO4.0665>.
- Pawlak, K., Kołodziejczak, M. (2020). The role of agriculture in ensuring food security in developing countries: considerations in the context of the problem of sustainable food production. – *Sustainability*, 12(13), 5488. <https://doi.org/10.3390/su12135488>.
- Petrushenko, M., Burkynskyi, B., Shevchenko, H., Baranchenko, Ye. (2021). Towards sustainable development in a transition economy: The case of eco-industrial parks in Ukraine. – *Environmental Economics*, 12(1), pp. 149-164. [https://doi.org/10.21511/ee.12\(1\).2021.13](https://doi.org/10.21511/ee.12(1).2021.13).
- Pohrishchuk, H., Semstov, V., Dobizha, N., Kucher, A., Sysoieva, I. (2021). Conflictological model of institutionalization of economic processes in the agriculture. – *TEM Journal*, 10(4), pp. 1813-1821. <https://doi.org/10.18421/TEM104-44>.
- Polese, A., Marco, G., Lysa, O., Kerikmäe, T., Sauka, A., Seliverstova, O. (2022). Presenting the results of the shadow economy survey in Ukraine while reflecting on the future(s) of informality studies. – *Journal of Contemporary Central and Eastern Europe*, 30(11), pp. 101-123. <https://doi.org/10.1080/25739638.2022.2044585>.
- Pronina, O., Dynnyk, I., Lazebna, I., Shchurevych, L., Krapko, O. (2021). Mechanisms for the development of the agricultural sector in the economic security of the state. – *International Journal of Agricultural Extension, spec. is.*, pp. 101-109. <https://doi.org/10.33687/ijae.009.00.3725>.
- Prosekov, A., Ivanova, A. (2018). Food security: the challenge of the present. – *Geoforum*, 91, pp. 73-77. <https://doi.org/10.1016/j.geoforum.2018.02.030>.
- Puyiriyani, D., Soetarto, E., Santosa, A., Ivanovich, A. (2020). The future of agrarian village: agrarian security and deagrarianization problem in Indonesia. – *RJOAS*, 8(104), pp. 81-87. <https://doi.org/10.18551/rjoas.2020-08.06>.

- Rumyk, I. (2021). Modeling the impact of economic indicators on food security. – *Economics, Finance and Management Review*, 2(6), pp. 4-13. <https://doi.org/10.36690/2674-5208-2021-2-4>.
- Shadow economy: general trends in 2020: an analytical note of the Ministry of Economy of Ukraine (2021). Available at: <https://me.gov.ua/Documents/List?lang=uk-UA&tag=TendentsiiTinovoiEkonomiki&showArchive=true>.
- Shadow economy: general trends January-September 2021: analytical note of the Ministry of Economy of Ukraine (2022). Available at: <https://me.gov.ua/Documents/List?lang=uk-UA&tag=TendentsiiTinovoiEkonomiki&showArchive=true>.
- Shemaeva, L., Zhalilo, Ya., Yurkiv, N. (2021). Problems and prospects of strengthening the stability of the financial system of Ukraine: an analytical report. Available at: <https://niss.gov.ua/publikatsiyi/analitichni-dopovidi/problemy-ta-perspektyvy-zmitsnennya-stiykosti-finansovoyi-systemy>.
- Slyusarenko, A., Klyuchnik, A. (2020). Foreign economic security of agricultural enterprises in the national security system: the theoretical aspect. – *Bulletin of Agrarian Science of the Black Sea Region*, 22, pp. 4-14. [https://doi.org/10.31521/2313-092X/2020-2\(106\)-1](https://doi.org/10.31521/2313-092X/2020-2(106)-1).
- Stanciu, S. (2013). Study regarding institutional environment and legal regulations for European cooperatives. – *Lucrări Științifice Management Agriculture*, 3(13), pp. 64-68. Available at: <https://www.lsma.ro/index.php/lisma/article/view/318>.
- Statistical Factsheet European Union: Agriculture and Rural Development. (2021). European Commission, 23. Available at: [https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/agri-statistical-factsheet-eu\\_en.pdf](https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/agri-statistical-factsheet-eu_en.pdf).
- Ukrainian Agrarian Association (2020). Review of agro-industry in 2020. Available at: [https://uagra.com.ua/images/uagra/ohlyady/2020/06/Ohlad\\_ahropromyslovosty\\_tsherven\\_2020.pdf](https://uagra.com.ua/images/uagra/ohlyady/2020/06/Ohlad_ahropromyslovosty_tsherven_2020.pdf).
- Utenkova, K. (2018). Economic security of the agricultural sector: essence and functional components. – *Agrosvit*, 17, pp. 42-47. Available at: [http://www.agrosvit.info/pdf/17\\_2018.pdf](http://www.agrosvit.info/pdf/17_2018.pdf).
- Utenkova, K. (2021). Economic security mechanism of the agrarian sector. – *Ukrainian Journal of Applied Economics*, pp. 104-114. Available at: [http://elartu.tntu.edu.ua/bitstream/lib/35255/2/NFEPSEV\\_2021\\_Utenkova\\_K-Economic\\_security\\_mechanism\\_104-114.pdf](http://elartu.tntu.edu.ua/bitstream/lib/35255/2/NFEPSEV_2021_Utenkova_K-Economic_security_mechanism_104-114.pdf).
- Vasylyshyn, S., Ulyanchenko, O., Bochulia, T., Herasymenko, Y., Gorokh, O. (2021). Improvement of analytical support of economic security management of the agricultural enterprises. – *Agricultural and Resource Economics*, 7(3), pp. 123-141. <https://doi.org/10.51599/are.2021.07.03.08>.
- Vinichuk, M. V. (2016). The social component of the economic security of Ukraine: monograph; eds. Ya. A. Honcharuka, M. I. Leichuk. Lviv, Liga-Press, 168 p.
- Vinichuk, M., Ryzhkova, A. (2021). Problem-based programming of de-shadowing of Ukraine's economy in the context of balanced socioeconomic development. – *Socio-legal studies*, 2(12), pp. 122-129. <https://doi.org/10.32518/2617-4162-2021-2-122-129>.
- Zamlinsky, V., Kushnir, S. (2019). Implementation of Ukraine's economic security in the context of the application of indicators of institutional support of the Agricultural sector. *Economics: time realities*, 1(41), pp. 25-34. <https://doi.org/10.5281/zenodo.3387288>.
- Zhanabekov, S. (2022). Robust determinants of the shadow economy. – *Bulletin of Economic Research*, pp. 1-36. <https://doi.org/10.1111/boer.12330>.
- Zolkover, A., Terziev, V. (2020). The shadow economy: a bibliometric analysis. – *Business Ethics and Leadership*, 4(3), pp. 107-118. [https://doi.org/10.21272/bel.4\(3\).107-118.2020](https://doi.org/10.21272/bel.4(3).107-118.2020).
- Zouhaier, H., Fatma, M., Mosbah, L., Hamida, A., Hedhli, M. (2021). Shadow economy and economic growth. – *Review of Economics and Finance*, 19, pp. 246-254. <https://doi.org/10.55365/1923.x2021.19.25>.

## CIRCULAR USE OF MATERIALS: DRIVERS OF THE CIRCULARITY RATE IN THE EUROPEAN UNION<sup>2</sup>

*In the transition to a greener economy, countries need suitable indicators to follow progress on sustainability. One such metric, the 'circularity rate', indicates the share of recovered resources used in the economy which substitute for primary raw materials. The current paper analyses 27 European Union member countries to study the effects of selected waste management and resource efficiency indicators as well as several socio-economic determinants on the circularity rate. Results indicate that four factors emerge as equally important – GDP per capita, research and development expenditure, resource productivity and environmental tax revenues, where past values of R&D expenditure and resource productivity are especially useful in predicting the circularity rate. The research findings also emphasise the importance of adequate environmental taxation policy and its role in driving circularity. Finally, suggestions for future research on the topic are made to expand the model and allow for comparisons with other countries on their path to a circular economy.*

*Keywords: Circularity rate; Circular economy; Resource efficiency; Recyclable materials; Environmental taxation*

*JEL: H23; O13; Q53; Q56*

### 1. Introduction

Unsustainable production and consumption practices throughout the years have continuously supported the unhealthy exploitation of environmental, social, and economic resources. Overpopulation, overconsumption, deforestation and desertification extend society's demand on nature beyond planetary limits. A system which puts quantity over quality causes natural resource depletion, waste and pollution (Bocken, Short, 2021). This practice requires huge energy inputs and leads to ecosystem disruptions. Together with diminishing resources, it lowers the resource productivity of many industries and increases long-term costs for both humankind and the environment (Villena, 2018).

The circular economy aims at breaking this pattern with its restorative and regenerative nature (Ellen MacArthur Foundation, 2022). It is a system that minimises the input of energy

---

<sup>1</sup> Reni Pantcheva, Faculty of Economics and Business Administration, Sofia University "St. Kliment Ohridski", e-mail: reni@feb.uni-sofia.bg.

<sup>2</sup> This paper should be cited as: Pantcheva, R. (2023). Circular Use of Materials: Drivers of the Circularity Rate in the European Union. – *Economic Studies (Ikonomicheski Izsledvania)*, 32(3), pp. 148-161.

and materials as well as waste and pollution through practices such as eco-design, repair, reuse and recycling. The circular economy is often viewed as a necessary condition for sustainable development, which in turn balances social, economic, and environmental interests at present without compromising the welfare of future generations (Geissdoerfer et al., 2017). The wide scope and lack of a precise definition of the circular concept make it difficult to assess using a single indicator. Saidani et al. (2019) review 55 circular economy indicators, while Parchomenko et al. (2019) propose a taxonomy of 63 metrics, divided into resource-efficiency, product-centric, material-stocks and material-flows clusters. The majority of indicators appear to be associated with the preservation of materials (Moraga et al., 2019). This dimension, however, fails to account for energy, land and water management, environmental impacts, product lifecycle, institutional and social factors (Llorente-González, Vence, 2019). Material-related metrics are more easily comprehensible, but they may actually reduce material consumption at the cost of social, economic, and environmental welfare (Corona et al., 2019). One of the reasons is that resource-efficiency metrics target the reduction of used resources but are not directly aimed at the circulation of products and materials (Bocken et al., 2006).

Waste recycling and recovery goals promote waste reduction, but they only partially recover materials and energy (Morseletto, 2020). The recycling rate, for example, indicates the share of recycled waste in the total amount of solid municipal waste. It acts as a promise that a certain fraction of the generated waste will be transformed into a secondary resource. However, it does not guarantee the actual recovery and preservation of the original quality (Moraga et al., 2019). To enhance the circular transition, recycling and material substitution targets should be combined to ensure the share of renewable or secondary materials in products (Fellner, Lederer, 2020). Moreover, although waste recovery is indeed a pillar of the circular economy, secondary materials are of little use without a well-developed market for recycled raw materials (Sagan, Sobotka, 2021). These materials need a proper collection and distribution infrastructure to be safely delivered to the demand side without posing an additional threat of contamination (Tansel, 2020).

The circular economy monitoring framework developed by the European Commission covers four categories: production and consumption, waste management, secondary raw materials, and competitiveness and innovation (Eurostat, 2022a). In an attempt to create a single macroeconomic circular indicator, Eurostat has developed the *circular materials use rate*, known as the *circularity rate*. It measures the share of domestically recovered materials, including biomass, metal ores, non-metallic minerals and fossil energy materials, which are re-fed into the economy. The circularity rate is used as an approximate measure for circular economy in a few previous studies (Giannakitsidou et al., 2020; Kumar et al., 2021; Neves, Marques, 2022).

This research paper conducts an econometric analysis of 27 European countries from 2010 to 2019. Its main purpose is to identify important factors that promote the circularity rate among a set of macro-level indicators related to socio-economic and sustainable development. Understanding circularity drivers is beneficial to society, businesses and policymakers on their path to a circular economy. Below, five initial hypotheses are formulated.

**H1:** GDP per capita as an approximation for economic development has a significant positive impact on the circularity rate.

**H2:** Research and development expenditure as an approximation for innovation has a significant positive impact on the circularity rate.

The first two hypotheses are used to confirm previous research findings (Kostakis, Tsagarakis, 2021, 2022) by expanding the set of countries included in the analysis. Hypotheses 3-5 are developed based on reviewed literature and tested for the purposes of the current study.

**H3:** Resource productivity has a significant positive impact on the circularity rate.

Resource productivity enhances resource efficiency by reducing the input of primary raw materials for the same production level and thus increases the circularity rate (Lehmann et al., 2022).

**H4:** The environmental tax revenues influence the circularity rate positively.

According to Tchorzewska et al. (2022), low ecotaxation does not prove effective unless in combination with public financing. However, with increasing levels, it acts as a positive stimulus for green investment, respectively, as a circularity enabler. Another study on environmental taxes finds that a linear tax is preferred to a constant or a zero tax, and promotes sustainable product design that prevents wastes, reduces the environmental impact and brings additional social benefits (Cai et al., 2022). Delving more deeply into the matter, Kim et al. (2017) show that if the tax is imposed on the resources supplier instead of the manufacturer, an increasing tax burden may not stimulate innovation and that better results are obtained under a cost-sharing model. However, excessive tax levels do not prove beneficial in either case, which should be a key assumption in optimising taxation policies.

**H5:** Government effectiveness is positively correlated with the circularity rate.

A stable and effective government is vital for the creation of a healthy business environment, sound environmental policies and social involvement to facilitate the transition to a circular economy (Cramer, 2022).

## **2. Data and Methods**

Most research on circular economy indicators focuses on the recycling rate as a simple, understandable and easy-to-communicate metric. Recycling rates do influence circularity, but there are additional factors, such as renewable energy, sustainable production and product life extension, that further improve it (Eurostat, 2022b). There are few previous studies on the circularity rate in particular. Kostakis and Tsagarakis (2021) outline the positive impact of GDP per capita, R&D expenditure, the fertility rate, higher education, environmental taxes and urbanisation. In a later study, they confirm the role of economic growth and innovation. They also discover a positive influence of entrepreneurship and social development (Kostakis, Tsagarakis, 2022). Neves and Marques (2022) suggest that the age distribution of the population may also play an important part in the circular economy as older people

usually display change-averse behaviour and are less likely to quit the ‘take-make-waste’ approach.

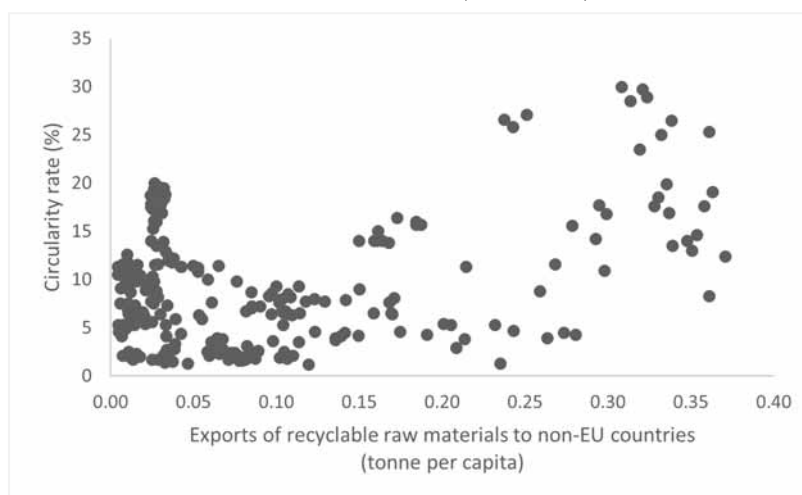
The circularity rate is calculated using the following equation:

$$CMU = \frac{U}{DMC + U} = \frac{(Rw - IMPw + EXPw)}{DMC + (Rw - IMPw + EXPw)} \quad (1)$$

In equation (1), *CMU* stands for circular materials use. Domestic material consumption (*DMC*) is used as an approximation for raw material consumption in the economy. *U* is the amount of re-fed materials, which is approximated by the amount of recyclable waste sent to domestic recovery plants. For this purpose, domestically recycled waste — *R<sub>w</sub>* (excluding energy recovery and backfilling) is corrected by *IMP<sub>w</sub>* (amount of imported waste for recovery in domestic plants) and *EXP<sub>w</sub>* (amount of waste exported for recovery outside the country) (Eurostat, 2018). Therefore, the substitution of primary raw materials with secondary raw materials saves the extraction of primary resources as long as the total amount of materials used by the economy remains unchanged.

Richer countries usually generate less biowaste and more packaging waste, while the situation in low-income countries is the exact opposite (Kaza et al., 2018). Some countries that produce recyclable waste, however, cannot deal with it and export it for recycling abroad. Trade in recyclables manages wastes and supports the supply of raw materials. Yet, the impact on material circularity is questionable since recyclable wastes are unusable until they undergo recovery procedures (Llorente-González, Vence, 2019).

**Figure 1. Circularity rate in EU-27 as a function of exports of recyclable raw materials to non-EU countries (2010-2019)**



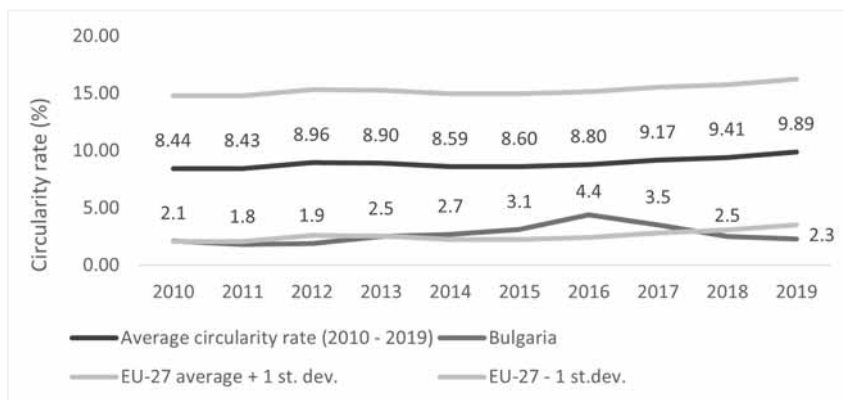
Source: Eurostat, 2022a.

Although the export of recyclable raw materials is beneficial to limiting primary resources extraction and promoting circularity, as seen in Figure 1, there are some adverse effects to consider. Developing countries, which are usually recipients of such wastes, often burn or

landfill them instead of recycling them, which is a step back from the circular economy. Still, exports to non-European countries are significantly increasing over the years (Eurostat, 2022a). With this regard, one of the primary EU waste goals should be to deal with European waste domestically and not via exports to low-income countries (European Commission, 2010).

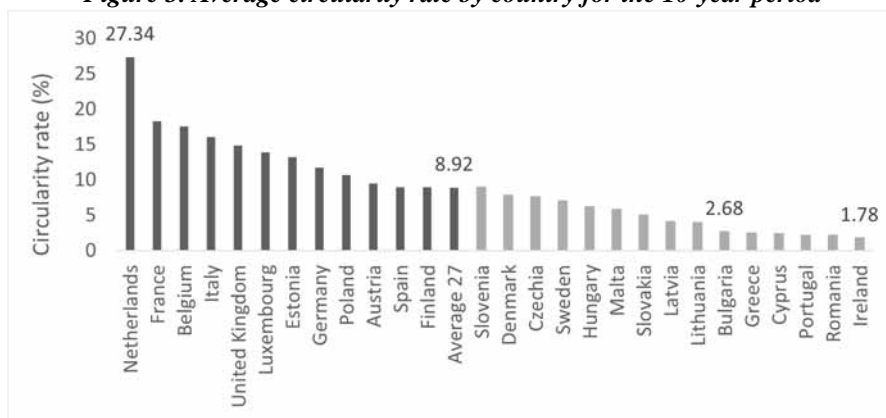
The current analysis begins with a review of basic tendencies among 27 European Union countries in recent years (Figure 2 and Figure 3). All member states are included except for Croatia, which joined in 2013 and data from previous years are scarce. The average circularity rate increases over the period by approximately 17% and displays steady growth, especially since 2015. As seen in Figure 3, the average circularity rate over the 10-year period is approximately 8.9%. The Netherlands leads the way, followed by France and Belgium, while Ireland, Romania and Portugal score the lowest. Bulgaria consistently displays a low circularity rate throughout the years. The years 2015 and 2016 mark a slight improvement, but 2018 sets a downward tendency.

**Figure 2. Average circularity rate for the 27-EU countries by year (2010-2019)**



Source: Eurostat, 2022a.

**Figure 3. Average circularity rate by country for the 10-year period**



Source: Eurostat, 2022a.



The year 2015 marked an important step up in the European Union climate policy. It was when the Paris agreement was signed, aimed at limiting global warming below 2 degrees Celsius. The same year the European Commission adopted the initial circular economy action plan, paving the road to a transition from linear to circular economy. It proposed certain actions to change production and consumption practices, close the loop, limit waste and pollution and bring about economic, social, and environmental benefits.

This study adds to existing knowledge by testing a new set of factors that potentially affect the circular materials use rate. Table 1 presents the independent variables which cover aspects, such as waste management, resource efficiency and socio-economic development.

**Table 1. Description of used variables**

Independent variable	Unit of measure	Description
Energy productivity	PPS per kgoe (kilograms of oil equivalent)	The indicator is the result from the division of GDP by the gross available energy for a specific calendar year.
Environmental tax revenues	Percentage	The indicator is measured as the share of environmental tax revenues in GDP.
Gross domestic product	PPS per capita	GDP per capita is the ratio of GDP to the average population in a specific year. It measures the value of the total output of goods and services produced by an economy and the purchasing power standards expression allows for comparisons among countries.
Greenhouse gas emissions (GHGE) intensity of energy consumption	Index	The indicator is calculated as the ratio between energy-related greenhouse gas emissions and gross inland consumption of energy. It expresses how many tonnes of CO <sub>2</sub> equivalents of energy-related greenhouse gases are emitted in a certain economy per unit of energy consumed.
Government effectiveness	Index	The index reflects perceptions of the government's performance.
Recycling rates of: – glass packaging – metallic packaging – paper and cardboard packaging – plastic packaging – wooden packaging	Percentage	The indicators are defined as the share of recycled packaging waste in all generated packaging waste.
Research and development expenditure	Percentage	The indicator shows gross domestic expenditure on research and development (R&D) in business, government, higher education and private non-profit organisations, expressed as percentage of GDP.
Resource Productivity	PPS per kg	The indicator reflects the GDP generated per unit of resources used by the economy.
Trade in recyclable raw materials: – imports from EU countries (imports-intra) – imports from non-EU countries (imports-extra) – exports to non-EU countries (exports-extra)	Tonnes per capita	The indicators are calculated as the ratio of traded amounts to the average population in a specific year. Quantities include plastic, paper and cardboard, precious metal, iron and steel, copper, aluminum and nickel that are shipped between the EU members states and across the EU borders.
Municipal waste generation	Kg per capita	Municipal waste is mostly produced by households, commerce, offices and public institutions.
Share of children and young people	Percentage	The indicator reveals the share of people below 18 years of age in the total population.

Source: Eurostat, 2022a; GOV.UK, 2022; The World Bank, 2022.

Most of the variables are sourced from Eurostat (2022a). The only exceptions are the *recycling rates of packaging waste* of the United Kingdom (GOV.UK, 2022) and *research and development expenditure* (The World Bank, 2022).

The *energy* and *resource productivity* indicators relate to decoupling economic growth from energy consumption and the use of natural resources, respectively. *GDP* accounts for economic development, while R&D is an approximation of innovation. The *trade-in recyclable raw materials* (TRRM) is part of the 'secondary raw materials category', which follows progress on the reuse of materials, prevention of primary resources extraction and security of raw materials supply.

### 3. Results

First, correlations among the variables are reviewed to gain a general understanding of their relationships. The correlation analysis suggests no potential multicollinearity issues. The strongest positive correlations are between the *circularity rate* and *resource productivity*, *research and development expenditure*, *government effectiveness*, the *recycling rates of glass and metallic packaging*, *GDP per capita* and *TRRM (exports-extra)*. *Government effectiveness* displays a moderate positive correlation of 43% with the circularity rate, which supports H5 as seen on Figure 4. However, this variable does not find a place in the final model and neither does the *recycling rate of glass and metallic packaging* or *TRRM (exports-extra)*.

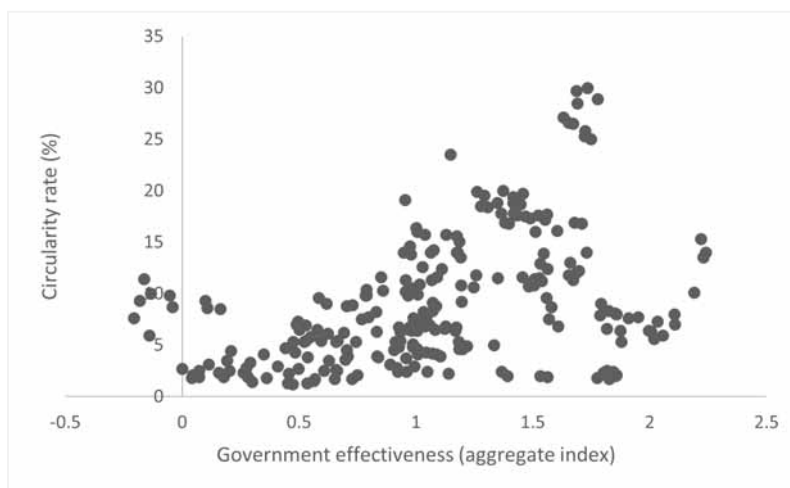
All variables are log-transformed to achieve close to normal data distribution and improve data quality. To determine the order of integration, unit root tests on the variables of interest are performed. The results show that most variables are non-stationary, but the unit root is overcome after the first difference, which means the data are integrated of first order. The KAO panel cointegration test indicates that the series have a long-run equilibrium which rejects the possibility of spurious relationships. Therefore, a Granger causality test is performed to examine potentially significant factors. Table 2 presents the two significant outcomes of the Granger causality tests using the first differences of the log-transformed variables.

The null hypothesis of the test is that the specific variable does not Granger cause the *circularity rate*. For both *research and development expenditure* and *resource productivity*, the null hypothesis can be rejected at 1% significance level. This means that past values of *research and development expenditure* and *resource productivity* can help predict the dependent variable.

Considering the information so far and following a forward selection procedure, an initial panel regression model is constructed. Table 3 presents the regression output results. Model A shows the specifics of a mixed OLS panel regression model. It indicates that *R&D*, *resource productivity* and *environmental tax revenues* explain the variations in the European circularity rate well. Results show that innovation, which is approximated by *research and development expenditure*, promotes circularity, as stated in previous studies. However,

despite the significant coefficient of *GDP per capita*, it enters the model with a negative sign, contradicting earlier expectations.

**Figure 4. Circularity rate in EU-27 as a function of government effectiveness (2010-2019)**



Source: Eurostat, 2022a.

**Table 2. Granger causality test in first differences**

Independent variable	F-statistic	P-value
$\Delta$ R&D expenditure	5.476	0.005
$\Delta$ Resource productivity	8.381	0.000

Number of observations: 189. Number of lags: 2.  $\Delta$  signifies 'difference'.

**Table 3. Regression models**

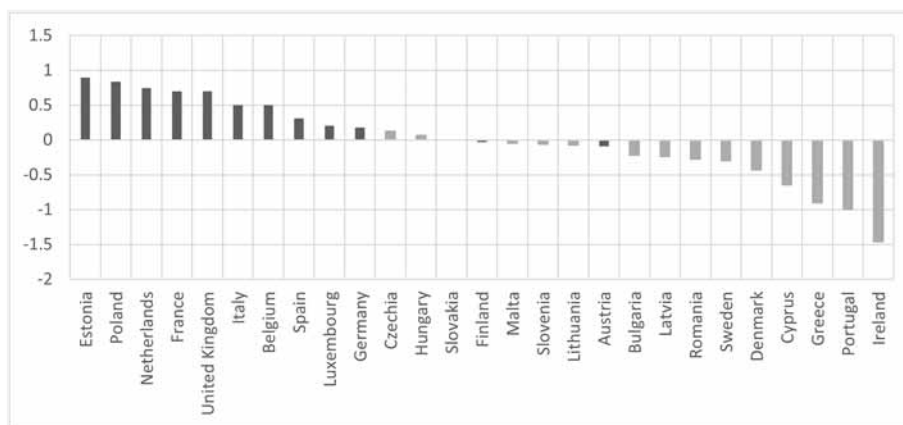
Coefficient	Initial model	Corrected model
GDP per capita	-0.349*** (0.138)	0.336** (0.146)
R&D expenditure	0.722*** (0.069)	0.388*** (0.076)
Resource productivity	0.877*** (0.096)	0.358*** (0.097)
Environmental tax revenues	0.177 (0.136)	0.460*** (0.146)
Intercept	4.606*** (1.389)	-2.241 (1.521)
R	0.723	0.968
R-squared	0.522	0.937
Adjusted R-squared	0.515	0.929
No. observations	270	270
Periods included	10	10

All variables are log-transformed. Standard errors are reported in parentheses.  
\*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level, respectively.

The same model is then run with cross-section and period-fixed effects. The redundant fixed effects test rejects the period fixed effects, which leaves only the cross-section fixed effects. The cross-section dependence test points to the possible presence of cross-sectional dependence. To correct for that, the model is estimated using White cross-section (period cluster) method that is robust to cross-sectional correlation and heteroskedasticity. The output from the final estimation is presented in Table 3 under Model B. It corrects the negative sign and confirms the significance of the other variables. Here, all four factors emerge as equally influential, with a slightly larger positive effect of *environmental tax revenues*.

Model B also introduces a fixed constant term which indicates a country-specific level of the circularity rate, depending on individual characteristics which are defined outside the model.

**Figure 5. Country-specific fixed effects**



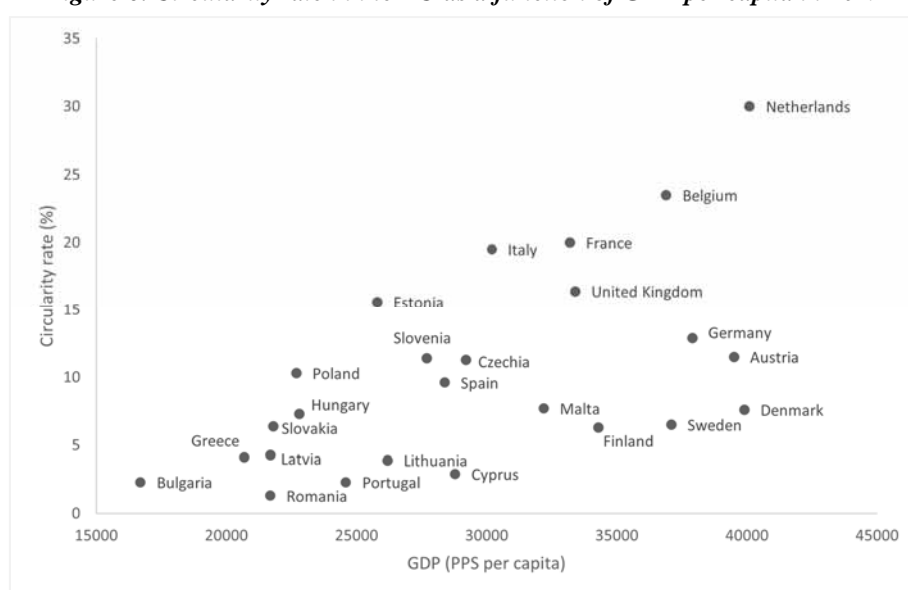
As seen from Figure 5, Austria and Finland, which are otherwise countries with above-average circularity rate, here demonstrate a negative country-specific constant. A possible explanation of this phenomenon is that both countries demonstrate below-average resource productivity and exports of recyclable raw materials for the studied period. They also generate more solid municipal waste than the EU average.

#### 4. Discussion

Economic growth across most European Union countries is still fueled by the input of natural resources and capital, which strains planetary limits. Developed countries are not yet decoupled from the use of primary raw materials, but they are gradually shifting from heavy industry to services. Higher GDP means better living standards, healthier business climate and new job opportunities. This enhances a more productive use of assets, while higher tax revenues and private investment can be directed to improve resource productivity, waste prevention, collection, and recycling technologies, thus promoting circularity. Model B shows that a 1% rise in the GDP of a country can potentially increase its circularity by 0.34%. Figure 6 displays the relationship between the circularity rate and GDP per capita in 2019.

Luxembourg and Ireland are removed as outliers. The above-average circularity section is predominantly occupied by Western, Central and Northern European countries, with the addition of Italy and Spain, which are also among the most competitive European economies. It can be seen that most countries which have joined the European Union at a later stage reside primarily in the lowermost region of the scatterplot. This is an indication that countries, especially less economically developed ones, which have started implementing green European policies more recently, still struggle to make considerable progress with respect to the circular economy.

**Figure 6. Circularity rate in the EU as a function of GDP per capita in 2019**



Source: Eurostat, 2022a.

Research and development is a source of knowledge for the creation of new products, services and technologies or the improvement of existing ones. R&D is closely linked to innovation and not only provides a competitive edge to businesses but also plays a key role in reducing materials and energy consumption as well as the environmental footprint. Innovation in product design and recycling as a result of research and development improves the material recovery process (Sagan, Sobotka, 2021). The estimated models also suggest that R&D is a significant determinant of circularity. For example, Model B indicates that 1% increase in research and development expenditure can increase circularity by up to 0.39%.

Sustainability requires a permanent reduction of inputs and wastes. Another driver of circularity is the resource productivity. As suggested by the final model, it is as important as economic development and R&D investment. Improved resource productivity means that the economy becomes even more competitive as it manages resources and pollution efficiently and limits environmental risks. Producing more with less decouples economic growth from the use of exhaustible resources and reduces raw materials consumption. This is a key prerequisite for promoting the circular economy because higher circular use of materials does

not necessarily indicate sustainability. As the overall input of materials increases on a global scale, the circularity rate cannot prove useful in tracking progress towards circularity if the use of secondary and primary raw materials increases at a similar pace.

Environmental damage can be limited to some extent with the use of environmental taxes. They are directly linked to the ‘polluter-pays-principle’ and are intended to tax production and consumption practices that threaten environmental health. Such taxes can be related to energy and materials, transport or pollution. Green policies regarding environmental taxation provide incentives to increase efficiency and switch to renewable resources and environmentally friendly technologies by putting a price on the generation of negative externalities. Moreover, revenues from environmental taxes can be used to subsidise the recycling and recovery industry, thus enhancing the circularity rate (Freire-González et al., 2022). In fact, while the four factors appear equally influential, the share of environmental tax revenues in GDP stands out as having a somewhat higher impact on circularity. According to Model B, a positive change of 1% has the potential to raise the level of circularity by 0.46%. This positive effect can have two possible explanations. First, higher revenues can result from larger environmental taxes imposed on producers and consumers who cause negative externalities. This can stimulate them to reduce the use of primary raw materials and improve resource recovery. Second, the additional income can be distributed towards environmental restoration, the increase of resource productivity and waste prevention, or towards the improvement of recycling and recovery processes. It should be noted, though, that higher environmental tax revenues can signal that rates are too low and more environmentally damaging products and services are produced, which offsets the positive effects of sustainable investment.

The empirical findings of this study should be considered in light of some limitations. First, the little prior research on the topic of circularity rate made it difficult to assess a larger set of potentially influential factors to form a deeper understanding of its role in tracking circular progress. Second, data availability limited the scope of the study in two ways: time range and a number of countries. Information about the circularity rate and several other indicators for most countries was limited to the period 2010 – 2019. Data was also scarce for non-EU members, which further influenced the sample size and did not allow for comparisons among EU and non-EU countries. These limitations, however, present an opportunity for further research that can account for the effect of the Covid-19 pandemic and the economic crisis, as well as the revisited targets and financial incentives related to the European Green Deal. Moreover, if data availability allows, this study can be carried out for other European countries, Asian countries, or the USA in order to make comparisons.

## **5. Conclusion**

Unlike other material sustainability indicators, the circularity rate is representative of the actual recirculation of materials. Recycling and recovery, for example, stimulate the reduction of waste, but materials are only partially recovered. Therefore, material recovery and resource efficiency are key determinants of circular progress. In order to effectively distribute secondary raw materials among all potential stakeholders, an efficient secondary

materials market is needed. A proper distribution network for secondary materials and the introduction of material substitution targets have the potential to significantly enhance the circular performance of countries.

The exports and imports of recyclable raw materials as building components of the circularity rate have an important role in balancing the world supply and saving primary resource extraction. Increasing exports from the European Union to non-EU countries indeed prove beneficial to EU member states. However, what happens to the recyclable materials, especially in developing countries, lacks transparency. Considering the possible incineration or landfill disposal of such materials, exports should be internalised in the EU in order to prevent pollution in low-income countries.

The study results support all five initial hypotheses. Economic development has a key role in promoting circularity through a stable business environment, higher private and public green investment and better waste management services. More R&D expenditure demonstrates a similar positive effect along with higher resource productivity, which allows economies to produce the same level of output by reducing inputs. Additionally, government effectiveness may not have a direct impact on the circularity rate according to the research model, but it is indeed positively correlated with circularity and indirectly increases the efficiency of policies that promote green investment and innovation.

This study adds to existing knowledge by showing that past levels of R&D expenditure and resource productivity help predict the circularity rate and results also reveal the importance of environmental taxation. The environmental tax revenues influence the circular use of materials positively and this factor emerges as having a somewhat higher impact than the rest.

As the current study outlines key circularity drivers, the results may prove beneficial to producers, consumers and policymakers as well as other researchers. Public and private investment in R&D is linked to improved resource productivity which enhances economic competitiveness and economic growth. Producer and consumer decisions often create negative externalities. In this respect, policymakers should optimise ecotaxation to avoid low or excessive rates. These should increase progressively, matching the degree of environmental impact. It should also be noted that environmental taxation alone cannot control environmental impacts and promote circularity. Governments should push for an increase in environmental awareness, a healthier business environment to promote sustainable growth, and stricter regulation of polluting activities.

## References

- Arduin, R. H. et al. (2019). Influence of scope definition in recycling rate calculation for European e-waste extended producer responsibility. – *Waste Management*, 84, pp.256-268. doi: 10.1016/j.wasman.2018.12.002.
- Bocken, N., & Short, S. (2021). Unsustainable business models — Recognising and resolving institutionalised social and environmental harm. – *Journal Of Cleaner Production*, 312, 127828. doi: 10.1016/j.jclepro.2021.127828.
- Bocken, N., de Pauw, I., Bakker, C. and van der Grinten, B. (2016). Product design and business model strategies for a circular economy. – *Journal of Industrial and Production Engineering*, 33(5), pp.308-320. doi: 10.1080/21681015.2016.1172124.

- Cai, Y., Choi, T., Feng, L., & Li, Y. (2022). Producer's choice of design-for-environment under environmental taxation. – *European Journal Of Operational Research*, 297(2), 532-544. doi: 10.1016/j.ejor.2021.04.048.
- Corona, B., Shen, L., Reike, D., Rosales Carreón, J., & Worrell, E. (2019). Towards sustainable development through the circular economy - A review and critical assessment on current circularity metrics. – *Resources, Conservation And Recycling*, 151, 104498. doi: 10.1016/j.resconrec.2019.104498.
- Cramer, J. (2022). Effective governance of circular economies: An international comparison. – *Journal Of Cleaner Production*, 343, 130874. doi: 10.1016/j.jclepro.2022.130874/.
- Ellen MacArthur Foundation. (2022). Circular economy introduction. Available at: <<https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>> [Accessed 7 June 2022].
- Espinoza, L. T. (2021). Critical appraisal of recycling indicators used in European criticality exercises and circularity monitoring. *Resources Policy*, 73, p.102208. doi: 10.1016/j.resourpol.2021.102208.
- European Commission. (2010). Being wise with waste: the EU's approach to waste management. Available at: <<https://op.europa.eu/en/publication-detail/-/publication/882ba217-fd06-4b65-8d72-8a793d99d9bd>> [Accessed 7 June 2022].
- Eurostat. (2018). Circular materials use rate: Calculation method. Available at: <<https://ec.europa.eu/eurostat/documents/3859598/9407565/KS-FT-18-009-EN-N.pdf/b8efd42b-b1b8-41ea-aaa0-45e127ad2e3f>> [Accessed 7 June 2022].
- Eurostat. (2022a). Database. Available at: <<https://ec.europa.eu/eurostat/data/database>> [Accessed 7 June 2022].
- Eurostat. (2022b). Circular economy - material flows - Statistics Explained. Available at: <[https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Circular\\_economy\\_-\\_material\\_flows#Circularity\\_rate](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Circular_economy_-_material_flows#Circularity_rate)> [Accessed 7 June 2022].
- Fellner, J. and Lederer, J. (2020). Recycling rate — The only practical metric for a circular economy?. – *Waste Management*, 113, pp.319-320. doi: 10.1016/j.wasman.2020.06.013.
- Freire-González, J., Martínez-Sánchez, V. and Puig-Ventosa, I. (2022). Tools for a circular economy: Assessing waste taxation in a CGE multi-pollutant framework. – *Waste Management*, 139, pp.50-59. doi: 10.1016/j.wasman.2021.12.016.
- Giannakitsidou, O., Giannikos, I., and Chondrou, A. (2020). Ranking European countries on the basis of their environmental and circular economy performance: A DEA application in MSW. – *Waste Management*, 109, pp. 181-191. doi: 10.1016/j.wasman.2020.04.055.
- Geissdoerfer, M., Savaget, P., Bocken, N. and Hultink, E. (2017). The Circular Economy – A new sustainability paradigm?. – *Journal of Cleaner Production*, 143, pp.757-768. doi: 10.1016/j.jclepro.2016.12.048
- Kaza, S. et al. (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. pp. 23-29. World Bank Publications. Available at: <<https://openknowledge.worldbank.org/handle/10986/30317>>.
- Kim, B., Kim, S., & Park, K. (2017). Promoting Supplier's Environmental Innovation via Emission Taxation. – *SSRN Electronic Journal*. doi: 10.2139/ssrn.3094878.
- Kostakis, I. and Tsagarakis, K. (2021). Social and economic determinants of materials recycling and circularity in Europe: an empirical investigation. – *The Annals of Regional Science*, 68(2), pp.263-281. doi: 10.1007/s00168-021-01074-x.
- Kostakis, I. and Tsagarakis, K. (2022). The role of entrepreneurship, innovation and socio-economic development on circularity rate: Empirical evidence from selected European countries. – *Journal of Cleaner Production*, 348, p.131267. doi: 10.1016/j.jclepro.2022.131267.
- Kumar, P., Singh, R., & Kumar, V. (2021). Managing supply chains for sustainable operations in the era of industry 4.0 and circular economy: Analysis of barriers. – *Resources, Conservation And Recycling*, 164, 105215. doi: 10.1016/j.resconrec.2020.105215.
- Lafforgue, G. and Lorang, E. (2022). Recycling under environmental, climate and resource constraints. – *Resource and Energy Economics*, 67, p.101278. doi: S0928765521000634.
- Lau, W. et al. (2020). Evaluating scenarios toward zero plastic pollution. – *Science*, 369(6510), pp.1455-1461. doi: 10.1126/science.aba9475.
- Lehmann, C., Cruz-Jesus, F., Oliveira, T., & Damásio, B. (2022). Leveraging the circular economy: Investment and innovation as drivers. – *Journal Of Cleaner Production*, 360, 132146. doi: 10.1016/j.jclepro.2022.132146.
- Llorente-González, L., & Vence, X. (2019). Decoupling or 'Decaffing'? The Underlying Conceptualization of Circular Economy in the European Union Monitoring Framework. – *Sustainability*, 11(18), 4898. doi: 10.3390/su11184898.
- Moraga, G., Huysveld, S., Mathieux, F., Blengini, G., Alaerts, L., & Van Acker, K. et al. (2019). Circular economy indicators: What do they measure?. – *Resources, Conservation And Recycling*, 146, 452-461. doi: 10.1016/j.resconrec.2019.03.045.



- Morseletto, P. (2020). Targets for a circular economy. – *Resources, Conservation And Recycling*, 153, 104553. doi: 10.1016/j.resconrec.2019.104553.
- Neves, S., & Marques, A. (2022). Drivers and barriers in the transition from a linear economy to a circular economy. – *Journal Of Cleaner Production*, 341, 130865. doi: 10.1016/j.jclepro.2022.130865.
- Nobre, G. and Tavares, E. (2021). The quest for a circular economy final definition: A scientific perspective. – *Journal of Cleaner Production*, 314, p.127973. doi: 10.1016/j.jclepro.2021.127973.
- Parchomenko, A., Nelen, D., Gillabel, J., & Rechberger, H. (2019). Measuring the circular economy - A Multiple Correspondence Analysis of 63 metrics. – *Journal Of Cleaner Production*, 210, 200-216. doi: 10.1016/j.jclepro.2018.10.357.
- Sagan, J., & Sobotka, A. (2021). Analysis of Factors Affecting the Circularity of Building Materials. – *Materials*, 14(23), 7296. doi: 10.3390/ma14237296.
- Saidani, M., Yannou, B., Leroy, Y., Cluzel, F., & Kendall, A. (2019). A taxonomy of circular economy indicators. – *Journal Of Cleaner Production*, 207, 542-559. doi: 10.1016/j.jclepro.2018.10.014.
- Schandl, H. et al. (2016). Decoupling global environmental pressure and economic growth: scenarios for energy use, materials use and carbon emissions. – *Journal of Cleaner Production*, 132, pp.45-56. doi: 10.1016/j.jclepro.2015.06.100.
- Schmidt, S. et al. (2020). Material efficiency to measure the environmental performance of waste management systems: A case study on PET bottle recycling in Austria, Germany and Serbia. – *Waste Management*, 110, pp.74-86. doi: 10.1016/j.wasman.2020.05.011.
- Tansel, B. (2020). Increasing gaps between materials demand and materials recycling rates: A historical perspective for evolution of consumer products and waste quantities. – *Journal of Environmental Management*, 276, p.111196. doi: 10.1016/j.jenvman.2020.111196.
- Tchorzewska, K., Garcia-Quevedo, J., & Martinez-Ros, E. (2022). The heterogeneous effects of environmental taxation on green technologies. – *Research Policy*, 51(7), 104541. doi: 10.1016/j.respol.2022.104541.
- Villena, M., & Greve, F. (2018). On resource depletion and productivity: The case of the Chilean copper industry. – *Resources Policy*, 59, 553-562. doi: 10.1016/j.resourpol.2018.10.001.

Muazza Muazza<sup>1</sup>  
Akhmad Habibi<sup>2</sup>  
Amirul Mukminin<sup>3</sup>

## THE SOCIALLY RESPONSIBLE HUMAN RESOURCES MANAGEMENT AND ITS IMPACTS ON THE ORGANIZATIONAL LEGITIMACY: THE CASE OF INDONESIAN EMPLOYEES<sup>4</sup>

*Socially responsible human resource management (SRHRM) is a basic action of human resource management (HRM) divisions used by businesses, companies, or organizations in accomplishing external corporate social responsibility (CSR) agendas. The purpose of this study is to examine the relationship between the CSR in human resources and organizational legitimacy in Indonesia. . Also, in our study, PLS-SEM was used to assess the relevance and effectiveness of various CSR strategies. The evaluations of 46 employees in Jambi, Sumatra, Indonesia, were used for this purpose. The data were analyzed by using PLS-SEM, which revealed a robust and positive link between employee-focused CSR actions and organizational legitimacy. The findings provide useful information for companies looking to improve their resource optimization and internal stakeholder management by implementing CSR policies correctly and efficiently.*

*Keywords: Human resources; management; organizational legitimacy*

*JEL: G4; H3; J24; L2; L3; O15*

### 1. Introduction

Organizations must manage their connections with stakeholders in today's marketplaces to produce value and mutual advantages (Horisch et al., 2014; Freudenreich et al., 2020; del-Castillo-Feito et al., 2022). Freeman (1984) popularized the stakeholder theory idea, which distinguishes many organizational interests and emphasizes the significance of not just being profitable but also recognizing and caring about the influence of business operations on various audiences. Organizational behaviour and actions influence stakeholder groups; nevertheless, it's crucial to remember that these activities also impact corporate stability (Silva et al., 2019). In reality, the capacity to meet stakeholders' requirements and comprehend their perspectives is critical to organizational survival (Ulmer, Sellnow, 2000).

<sup>1</sup> Muazza Muazza, Dr, Universitas Jambi, Indonesia, e-mail: Muazza.muazza@unja.ac.id.

<sup>2</sup> Akhmad Habibi, PhD, Universitas Jambi, Indonesia, e-mail: akhmad.habibi@unja.ac.id.

<sup>3</sup> Amirul Mukminin, Prof. PhD., Universitas Jambi, Indonesia, email: amirul.mukminin@unja.ac.id.

<sup>4</sup> This paper should be cited as: Muazza, M., Habibi, A., Mukminin, A. (2023). *The Socially Responsible Human Resources Management and Its Impacts on the Organizational Legitimacy: The Case of Indonesian Employees.* – *Economic Studies (Ikonicheski Izsledvania)*, 32(3), pp. 162-177.

As a result, if businesses want to be successful, they must be able to understand all of these demands and maintain long-term relationships with their stakeholders (Dmytryiev et al., 2021). Stakeholders' expectations of the social effect of the organizations with which they are affiliated are currently increasing. These groups expect businesses to react to societal requirements beyond profit (Carroll, 1999), and they will avoid doing business with institutions that do not match their social behaviour expectations (Fatma and Rahman, 2014; Fatma et al., 2019; Maignan and Ferrell, 2004; del-Castillo-Feito et al., 2022). To survive and prosper in the market, organizations need stakeholder support. As a result, implementing corporate social responsibility initiatives has become a vital component of meeting societal expectations. The majority of previous research on corporate social responsibility (CSR) has focused on determining how these policies influence the attitudes of external stakeholders, such as consumers, governments, and markets in general (Del-Castillo-Feito et al., 2021; Toussaint et al., 2021; del-Castillo-Feito et al., 2022). This literature contributes significantly to supporting research and practice of organizational social involvement.

On the other hand, internal management and the effect of these activities are mostly unknown (Blanco-Gonzalez, Diez-Martn, Cachon-Rodriguez, and Prado-Rom' an, 2020; del-Castillo-Feito et al., 2022). Organizations can implement various CSR initiatives and, given the importance of employees in organizational performance and success, implement socially responsible procedures within their management that will improve corporate knowledge and culture (Barrena-Martinez, Lopez-Fernandez, and Romero-Fernandez, 2019; Pedrini and Ferri, 2011). Social responsibility efforts, such as creating fluid interactions between workers and management or considering employees' interests, will help the organization create a trust (Blanco-Gonzalez et al., 2020; Scherer et al., 2013). Companies gain from social responsibility initiatives in a number of ways, but possibly the most noticeable influence is on their financial outcomes (Barnett and Salomon, 2006; Orlitzky, 2013; Wang et al., 2016). Del-Castillo-Feito et al. (2019) argue that social capital and business reputation are important intangible assets for long-term survival in any industry. Scholars have established a link between CSR activities and improved financial performance (Surroca et al., 2010; Zhang et al., 2018) since newly implemented ethical management practices will boost relationships with internal stakeholders (Ferrell et al., 2019). Furthermore, if the acts that these firms conduct are regarded to be socially responsible, workers will feel more engaged and devoted to the organizations to which they belong (Barrena-Martinez et al., 2019; Collier and Esteban, 2007; De Roeck, Delobbe, 2012; Jones, 2010; Kim et al., 2010; del-Castillo-Feito et al., 2022). Businesses can apply a range of CSR projects and improve their knowledge base and corporate culture, given the importance of employees to organizational performance and success.

Several authors support the positive and significant relationship between proper CSR policy implementation and a company's legitimacy (Bansal and Clelland, 2004; Campbell, 2007; Del-Castillo-Feito et al., 2019; Palazzo and Scherer, 2006; del-Castillo-Feito et al., 2022), which is defined as an organization's perceived appropriateness within a social system in terms of rules, values, and beliefs (Deephouse et al., 2017). These institutions are accepted by the systems in which they operate because their activities are consistent with society's values and norms, resulting in value creation for all stakeholders (Miotto et al., 2020). Because of the social support, they get within their sector, organizations with a high degree of legitimacy are often more successful and long-lived than those with a low level of

legitimacy (Dez-Martn et al., 2021; Glozer et al., 2019; Zamparini, Lurati, 2017). Legitimate businesses have greater access to vital resources and may grow more freely since they are not constantly scrutinized (Salancik, Pfeffer, 1978; Suchman, 1995; del-Castillo-Feito et al., 2022). As a result, properly adopting and sustaining this intangible asset is essential for increasing organizational performance. Companies must follow socially responsible behavioural principles to be viewed as legitimate institutions and to justify their right to exist. As a result, implementing CSR efforts will boost company credibility (Banerjee, Venaik, 2018; Khan et al., 2015; del-Castillo-Feito et al., 2022). A more empirical study is required because of the growing importance of integrating CSR concepts into HR management. The social foundation will be regarded as sincere both internally and outside. Considering these conditions, the primary goal of this study was to determine the relevance of CSR practices in employee management and to assess the positive and important influence that these efforts have on the organization's legitimacy (as measured through pragmatic, moral, and cognitive dimensions).

## **2. Literature Review**

### *2.1 Socially responsible human resource management (SRHRM)*

SRHRM is a basic action of human resource management (HRM) divisions used by businesses, companies, or organizations in accomplishing external corporate social responsibility (CSR) agendas which actually intend to persuade employee's attitudes and behaviours in a constructive track and assist the organizations' performance such as training, recruitment of socially responsible employee candidates, etc. (Shen, Benson, 2014; del-Castillo-Feito et al., 2022). In particular, corporate social responsibility encompasses integrating social, environmental, ethical concerns, and respect for human rights and consumer concerns, in an organization's operations (European Commission, 2011; Pfajfar et al., 2022; del-Castillo-Feito et al., 2022). In terms of the business organization, it deals with the introduction of socially responsible fundamentals in the day-to-day administration of its business, legitimizing its doings among the groups, including shareholders, partners, suppliers, customers, public institutions, non-governmental organizations, employees, and their families, communities, and society as a whole. For example, Google's CSR initiatives consider the needs of its employees as a key stakeholder group by offering a fun work environment.

In contrast, human resource management (HRM) is termed as the philosophy, policies, procedures and practices associated with the management of a company's employees (Barrena-Martínez, López-Fernández, Romero-Fernández, 2019; del-Castillo-Feito et al., 2022). Barrena-Martínez et al. (2019) classified eight SR-HRM policies, including (1) the attraction and retention of employees, (2) training and continuous development, (3) management of employment relations, (4) communication, transparency and social dialogues, (5) diversity and equal opportunity, (6) fair remuneration and social benefits, and (7) prevention, health, and safety at work; and (8) work-family balance. It is implied that HRM is related to all activities aiming to support successfully attracting, developing, and

preserving high-performing workers wanted to attain success within an organization (Inyang, Awa, Enuoh, 2011; Jamali, Dirani, Harwood, 2014; del-Castillo-Feito et al., 2022).

## 2.2 *Corporate Social Responsibility and Legitimacy*

Weber brought the notion of legitimacy, which was initially used in a sociological context, to the business world and organizational studies (Johnson et al., 2006; Suchman 1995; Rueff and Scott, 1998; del-Castillo-Feito et al., 2022). Legitimacy may be described as “the perceived suitability of an organization to a social system in terms of rules, values, norms, and definition,” according to Deephouse et al., p.9. Legitimate organizations are seen as desirable and suitable because their actions align with the broader values and beliefs of the social system in which they function (Dez Martn et al., 2010). Companies gain legitimacy when stakeholders believe they provide more value than they take away (Miotto et al., 2020). Legitimacy boosts an organization’s chances of success and longevity through increasing stakeholder support (Deephouse et al., 2017; Glozer et al., 2019; Zamparini, Lurati, 2017; Zimmerman, Zeitz, 2002). Legitimacy and organizational success have a good association (Alcantara et al., 2006). Legitimate groups, on the other hand, have greater access to necessary resources and are less likely to be questioned (Salancik, Pfeffer, 1978; Suchman, 1995). “Without stakeholder legitimacy, an organization will not be able to renew its license to function or obtain new domains of authority to develop,” writes Castello and Lozano (2011, p. 12). In terms of legitimacy management, two basic methods have evolved. Companies may only obtain legitimacy by connecting with a particular social system’s general values, beliefs, and norms, according to institutional theory (Dez-Martn et al., 2021; Weber, 1978; Ruef, Scott, 1998; Yang et al., 2020; del-Castillo-Feito et al., 2022).

Authors such as (Scott, 1995) and (Suchman, 1995) believe that organizations may regulate their legitimacy via strategies and activities. Institutions must use this technique to determine the most appropriate methods to increase their legitimacy ratings. Organizations must grasp the importance of acquiring social support while managing legitimacy; as a result, they must identify stakeholders’ expectations and satisfy their requests (Corciolani et al., 2019; Miotto et al., 2020; del-Castillo-Feito et al., 2022). When these groups anticipate that firms will adhere to certain behavioural norms, they give them a favourable legitimacy rating (Kostova, Zaheer, 1999; Yang et al., 2020).

Organizations are part of a larger social system that consumes resources; as a result, their resource consumption must be justified in the eyes of the system in which they function (Kim et al., 2014). Currently, society is preoccupied with sustainability and social well-being, resulting in increased expectations of firms’ ethics and social behaviours (Brnn, Vidaver-Cohen, 2009; Toussaint et al., 2021). Before interacting with a company, stakeholders analyze its actions to verify that it complies with its moral and social standards (Blanco-Gonzalez et al., 2020; Du & Vieira, 2012). Social responsibility policies have become one approach to react to stakeholders’ demands on social concerns. Because corporations develop legitimacy by satisfying stakeholder expectations, implementing social projects will assist businesses in gaining or improving legitimacy (Banerjee, Venaik, 2018; Khan et al., 2015). This approach is evident in today’s marketplaces, where implementing social responsibility standards is one of the most often used tactics for obtaining and sustaining legitimacy

(Palazzo, Richter, 2005; Reast et al., 2013; del-Castillo-Feito et al., 2022). Given the competitive environment, businesses must create social responsibility practices to gain societal support, prestige, and legitimacy (Garriga and Mel, 2004). Blanco Gonzalez et al. (2020) believe that social responsibility policies produce value and that legitimacy assesses the societal support that this value creation implies, emphasizing the significance of merging social responsibility and legitimacy (Lamberti, Lettieri, 2011).

The majority of current research focuses on determining the external effect of CSR, leaving the link between CSR practices and an organization's workers largely unexplored (Bolton et al., 2011; del-Castillo-Feito et al., 2022). Because organizations are linked to many stakeholders, it's crucial to recognize that each has a role to play in the legitimacy evaluation process (Porter and Kramer, 2006). As a result, firms must evaluate their workers' perspectives of social responsibility implementation as a critical factor in gaining legitimacy (Kostova, Zaheer, 1999). When assessing the link between social responsibility and legitimacy, Maignan et al. (2011) emphasize the significance of examining many stakeholders in an organization's CSR policies, including workers and the community. Other scholars, such as Esteban-Lloret et al. (2018) and Subramony (2006), recognize that internal CSR measures, such as staff training, boost a company's legitimacy. This strategy will garner more support from both internal (managers, workers, etc.) and external (public opinion, customers, etc.) sources, resulting in increased overall legitimacy (Certo and Hodge, 2007; Thomas, 2005). Enterprises preserve socially valued behaviours and boost their validity by establishing internal CSR (ICSR) operations (Drori and Honig, 2013). Internal CSR describes the actions that organizations take to meet or exceed employee expectations, actively fulfil and enhance workplace equity toward workers (such as increasing employee happiness and satisfaction with their health), and ensure worker safety and also employees' personal growth (del-Castillo-Feito et al., 2022).

Recent research studies have shown a link between ICSR procedures and employee legitimacy assessments (Blanco-Gonzalez et al., 2020). Many scholars have focused on analyzing external legitimacy granted by external stakeholders such as consumers, suppliers, or governments (DiMaggio, Powell, 1991; Meyer, Scott, 1983); however, to survive and succeed in the long run, additional positive assessments are required; thus, employees' perceptions must be considered critical to organizations' stability and efficiency (Brown, Toyoki, 2013; Drori, Honig, 2013; Esteban-Lloret et al., 2018; del-Castillo-Feito et al., 2022). Furthermore, to develop an understanding of this subject, a deeper investigation of the integration of social responsibility policies in HR management and their influence on intangible assets is required (Barrena-Martinez et al., 2019). Legitimacy has been investigated on many levels.

According to Suchman (1995), legitimacy can be attained through the following dimensions: pragmatic, which is granted when stakeholders believe the organization serves their personal interests; moral, which is related to the institution's ethical behaviour and the fulfilment of social norms and values; and cognitive, which is related to the degree of understandability of the company's activities and objectives. As a result, the goal of this study is to see whether CSR policies in the HR environment impact pragmatic, cognitive, and moral legitimacy to figure out which types of legitimacy are influenced by CSR policies and to what degree by hypothesizing as follows:

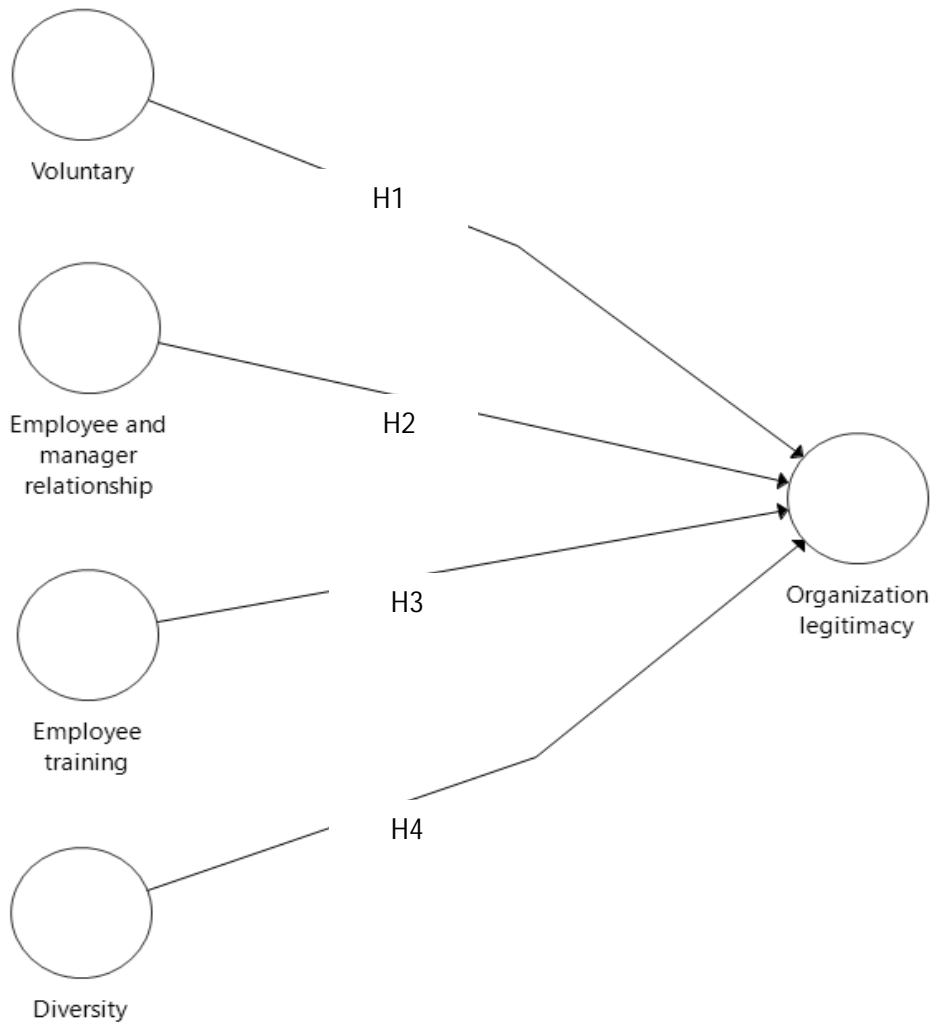
H1: Voluntary positively and significantly affects organization legitimacy.

H2: Employee and manager relationship positively and significantly affects organization's legitimacy.

H3: Employee training positively and significantly affects organization's legitimacy.

H4: Diversity positively and significantly affects organization's legitimacy.

**Figure 1. Hypotheses**



### **3. Methods**

#### *3.1. Conceptual model of the study*

This study was done from January to June 2022; we used a survey for the research approach. Review of prior studies and content validity were two initial processes prior to establishing the survey items. Two approaches within the partial least squares structural equation model (PLS-SEM) were conducted. This predictive-approached study aims at estimating the model for causality because the study is not intervened by data distribution assumption (Hair et al. 2019).

#### *3.2. Data collection*

Many workers refused to fill in the questionnaire. We collected the data for four months and had difficulties collecting the responses. To collect the data, an online questionnaire was distributed. As a result, 46 employees filled in the questionnaire. Thirty respondents are males, and the others (n. 16) are females. Fifteen respondents worked in villages, and 31 of them worked in urban areas or cities. Thirteen workers had working experience of fewer than five years, 21 of them worked for more than ten years, and 12 respondents had an experience of 5 to ten years. From the age criteria, 11 workers were less than 30 years old, 20 were between 30 and 40 years old, and 12 respondents were older than 40 years.

#### *3.3. Instrumentations*

For the development of this research, a specific survey was created considering the existing literature on legitimacy and socially responsible HR management. Each variable is measured along an eleven-point Likert scale, with 1 referring to strongly disagree and 5 referring to strongly agree. Organization legitimacy is considered a multidimensional variable (Deephouse et al., 2017); therefore, for this research, this approach is followed, considering the relevant number of scholars that have measured it through its multiple dimensions (Alexiou, Wiggins, 2019; Díez-Martín, Prado-Roman, Blanco-Gonzalez, 2013).

#### *3.4. Data preparation and analysis*

Data preparation is the process of converting data so that it can be processed by a computer. In this study, the data were prepared to make sure they were accurate, full and that there were no issues with outliers, missing values, non-normal distributions, or data entry errors (Hair et al., 2010). To determine whether the data were normal, skewness and kurtosis measurements were computed, along with a Q-Q plot and histogram. Data are normal based on the values of skewness and kurtosis, ranging from -1 to +1. Q-Q plot and histogram also showed that the data are normal. Main data analyses were computed through two PLS-SEM procedures; measurement model by assessing loading values, convergent and discriminant validities, and reliability (alpha, composite reliability and Rho\_A) and structural model by assessing path coefficient, p values, and t values for significance computations. Due to the



few responses obtained from the data collection, we used PLS-SEM. Strong path coefficients in PLS-SEM tend to require very small sample sizes for successful detection, regardless of whether they are positive or negative. Therefore, if a researcher anticipates that all of a model's path coefficients will be significant before gathering empirical data, resulting in large effect sizes, the researcher may think about employing a small sample size in a PLS-SEM analysis (Hair et al., 2010).

### *3.5. The Differences of our study and previous studies.*

The purpose of this study was to examine the relationship between CSR in human resources and organizational legitimacy in Indonesia. Although we used several previous studies related to our study, what differentiates our study from other studies such as Alcantara, Mitsuhashi, and Hoshino (2006), Alexiou and Wiggins (2019), Barrera-Martinez et al. (2019), Blanco-Gonzalez et al. (2020), Del-Castillo-Feito et al. (2021), Del-Castillo-Feito et al. (2019), and del-Castillo-Feito et al. (2022) is in terms of research subjects. For example, del-Castillo-Feito et al. (2022), in their study, they evaluated the implementation of social responsibility initiatives related to HR management and the legitimacy of 30 multinational enterprises with more than 1000 employees, while in our study, we had 46 employees and of 46 employees, 15 respondents worked in villages, and 31 of them worked in urban areas or cities. Additionally, in terms of variables, del-Castillo-Feito et al. (2022), in their study used a variety of variables, while in our study, we just had five variables, including diversity, employee training, organization legitimacy, employee and manager relationship, and voluntary. These differences led to the different results of our study from other studies, which can be found in our finding section.

## **4. Findings and Discussion**

The first step when analyzing the results of the structural model is to test the reliability and validity of the measurement model, which are presented in Table 3. Regarding the reflective items of all variables, the results show that all Cronbach's alphas surpass the recommended value of 0.70 (Cronbach, 1951; Nunnally and Bernstein, 1994). The values of alpha range between 0.885 (employee and manager relationship) to 0.768 (employee training). The composite reliability results also fulfil the required value of greater than 0.60 (Bagozzi and Yi, 1988); diversity (0.833), employee training (0.768), organization legitimacy (0.835), and employee and manager relationship (0.913), and voluntary (0.863).

The average variance extracted (AVE) values should be greater than 0.50 (Fornell and Larcker, 1981); every item we research exceeds this value; diversity (0.747), employee training (0.628), organization legitimacy (0.505), and employee and manager relationship (0.685), and voluntary (0.863).

Muazza, M., Habibi, A., Mukminin, A. (2023). *The Socially Responsible Human Resources Management and Its Impacts on the Organizational Legitimacy: The Case of Indonesian Employees.*

**Table 1. Loading values, alpha, Rho\_A, CR, and AVE**

Variables	Items	Load	$\alpha$	rho A	CR	AVE
Diversity	D1. The company supports diversity regarding gender, age, and social class	0.928	0.833	0.893	0.898	0.747
	D2. The company accepts flexible working relationships to adapt to the situation of its employees (age, gender, disability)	0.912				
	D3. The company offers job opportunities for youth and/or persons with disabilities	0.741				
Employee training	ET1. The company develops permanent training programs to promote employee knowledge and continuous performance improvement	0.845	0.768	0.768	0.866	0.682
	ET2. The company develops training activities to enable employees to adapt to technological and organizational changes and/or to reduce the risk of workforce exclusion	0.848				
	ET3. The company offers environmental training activities to employees Diversity, opportunity and no discrimination	0.783				
Organization legitimacy	OL1. The company cares about the responsible marketing behavior of distributors	0.742	0.835	0.841	0.876	0.505
	OL2. The company analyzes the social impact of the company's existence on the local community	0.699				
	OL3. The company responds to local requirements (private and public) and holds meetings to resolve issues	0.777				
	OL5. The company sponsors and develops marketing campaigns that address the public interest	0.642				
	OL6. The company promotes respect for and compliance with international standards and treaties (e.g. Universal Declaration of Human Rights)	0.624				
	OL7. Companies seek customer satisfaction and listen to their suggestions and requirements regarding product development or delivery services	0.778				
	OL8. The company develops donations of money or goods, to various organizations to encourage the development of goals for the common good	0.696				
	Employee and manager relationship	REM2. The company establishes a policy to encourage dialogue and the flow of information with employee representatives	0.713	0.885	0.913	0.915
REM3. The company provides transparent information about the remuneration system		0.834				
REM4. The company creates an employment risk prevention program		0.864				
REM5. The company develops regular controls on occupational hygiene and safety conditions and trains employees on these issues		0.826				
REM6. The company develops a health risk and standard training plan or benefit		0.889				
Voluntary		V1. The company supports a voluntary activity program between fellow employees	0.931	0.841	0.841	0.926
	V2. The company encourages employee participation in volunteer programs	0.927				

Discriminant validity is “the extent to which a construct is empirically distinct from other constructs in the structural model” (Hair et al., 2019). The discriminant validity results of the legitimacy reflective items are shown in Table 2. These results were tested through the HTMT ratio, as Henseler et al. (2015) suggested. All values are less than 0.900 (Clark and Watson, 1995); the highest value of HTMT is the relationship between organization legitimacy and employee training (0.889), while the weakest value exists between employee and manager relationship and diversity (0,411). Therefore, no problems appear regarding this issue.

**Table 2. HTMT**

	Diversity	Employee and manager relationship	Employee training	Organization legitimacy
Diversity				
Employee and manager relationship	0.411			
Employee training	0.819	0.796		
Organization legitimacy	0.695	0.755	0.889	
Voluntary	0.919	0.556	0.846	0.832

**Table 3. Cross Loading**

	Diversity	Employee and manager relationship	Employee training	Organization legitimacy	Voluntary
D1	<b>0.928</b>	0.335	0.712	0.556	0.683
D2	<b>0.912</b>	0.487	0.640	0.615	0.672
D3	<b>0.741</b>	0.093	0.382	0.344	0.641
ET1	0.409	0.552	<b>0.845</b>	0.599	0.419
ET2	0.546	0.401	<b>0.848</b>	0.563	0.550
ET3	0.726	0.687	<b>0.783</b>	0.695	0.716
OL1	0.530	0.585	0.506	<b>0.742</b>	0.703
OL2	0.415	0.497	0.728	<b>0.699</b>	0.525
OL3	0.612	0.611	0.645	<b>0.777</b>	0.545
OL5	0.227	0.471	0.417	<b>0.642</b>	0.530
OL6	0.572	0.198	0.490	<b>0.624</b>	0.616
OL7	0.263	0.590	0.412	<b>0.778</b>	0.522
OL8	0.363	0.373	0.556	<b>0.696</b>	0.437
REM2	0.287	<b>0.713</b>	0.542	0.412	0.430
REM3	0.337	<b>0.834</b>	0.633	0.581	0.421
REM4	0.226	<b>0.864</b>	0.464	0.521	0.317
REM5	0.276	<b>0.826</b>	0.504	0.508	0.354
REM6	0.439	<b>0.889</b>	0.637	0.732	0.468
V1	0.734	0.542	0.628	0.738	<b>0.931</b>
V2	0.680	0.352	0.660	0.720	<b>0.927</b>

Discriminant validity presents when a loading value on a construct is greater than that of all of its cross-loadings on the other constructs (Hair et al. 2016). Table 3 exhibits all indicators' outer loadings as well as their cross-loadings for other indicators. The outer loadings (in italics and bold) for every construct were higher than the entire cross-loadings on the other constructs. For instance, the indicator D1 (Diversity) has the highest loading value (0.928) compared to its cross-loading on the other constructs (employee and manager relationship, 0.335; employee training, 0.712; organization legitimacy, 0.556; and voluntary, 0.683) and OL8 (Organization legitimacy) has the greatest loading value of 0.696 compared to the others

values in other constructs (Diversity, 0.363; Employee and manager relationship, 0.335; Employee training, 0.712; and Voluntary, 0.683). According to the results of the cross-loading assessment, it can be said that the evaluation of outer loadings served to establish discriminant validity. “The shared variance for all model constructs should not be bigger than their AVEs,” states the Fornell-Larcker criterion (conventional metric) when applied to data (Fornell & Larcker, 1981). Every construct in this study has an AVE that is greater than its shared variance (Table 4). The discriminant validity for the quantitative data of this investigation was established according to the Fornell-Larcker criterion.

**Table 4 Fornel-Larker Criterion**

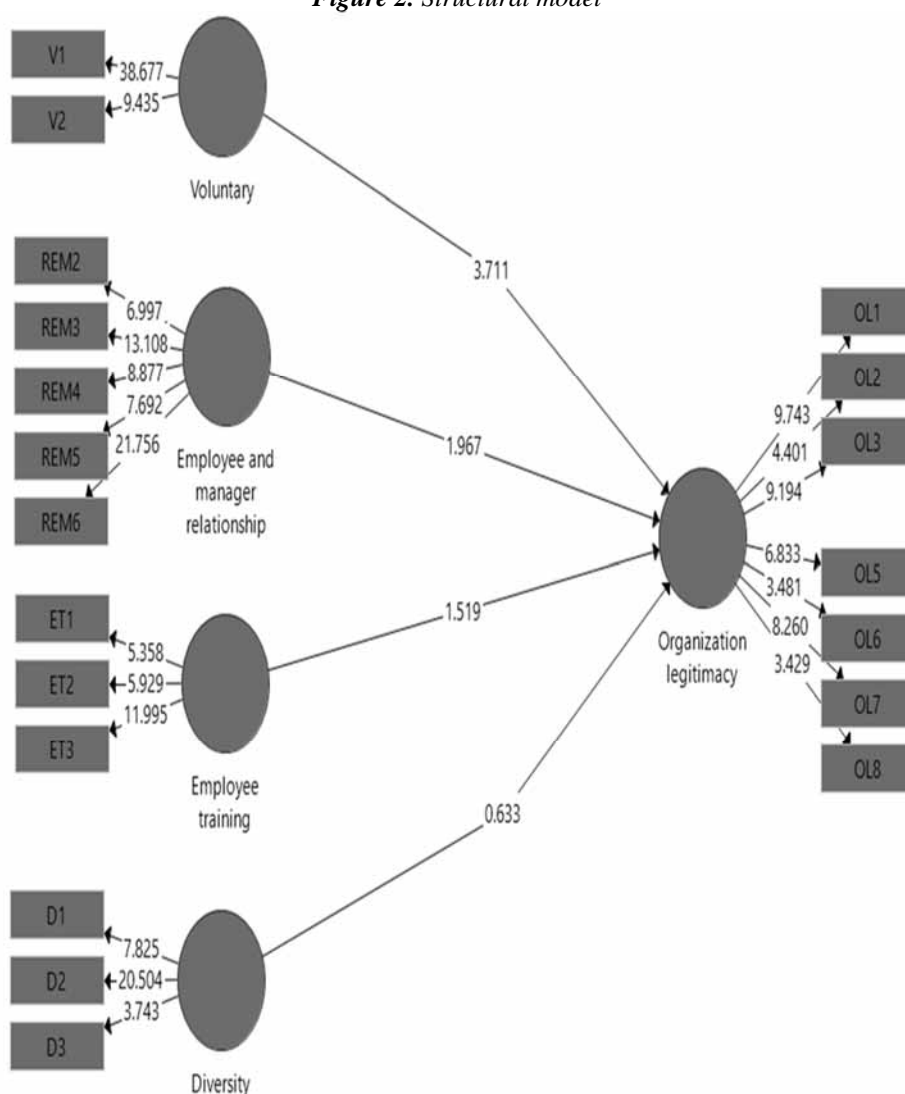
	Diversity	Employee and manager relationship	Employee training	Organization legitimacy	Voluntary
Diversity	0.864				
Employee and manager relationship	0.389	0.827			
Employee training	0.691	0.676	0.826		
Organization legitimacy	0.605	0.684	0.759	0.711	
Voluntary	0.761	0.483	0.693	0.785	0.929

When considering the formative values (global legitimacy and social responsibility policies), the next aspects are analyzed to prove their reliability and validity. First, the collinearity (VIF) results show that every item fulfils the required level of  $VIF < 5$  (Hair et al., 2011). The VIF values (Table 5) show that no values are below 5; Diversity -> Organization legitimacy (2.819), Employee and manager relationship -> Organization legitimacy (1.917), Employee training -> Organization legitimacy (3.219), Voluntary -> Organization legitimacy (2.768). Second, the standardized weights and their significance level show that every item is significantly linked to its respective variable. Two relationships appear nonsignificant; diversity ( $t = 0.633$ ;  $p > .05$ ) and employee training ( $t = 1.519$ ;  $p > .05$ ) are not significant predictors of organization legitimacy. However, the results show the existence of a strong relationship between employee and manager relationship and voluntary and organizational legitimacy ( $t = 1.967$ ;  $p < .05$ ). The strongest correlation appears to be the relationship between voluntary and organizational legitimacy ( $t = 3.711$ ;  $p > .01$ ). Table 3 informs in detail the relationships between hypothetical variables.

In latest years, numerous academics have reasoned that corporate social responsibility and human resources management (HRM) throughout commercial organizations should be integrated so as to better enhance a sustainability schema. Support from any stakeholders has become a significant strength for organizational existence and success in all areas. Nonetheless, stakeholders will only involve in organizations that encounter their social potential and track responsible behavioural values (Fatma & Rahman, 2014; Fatma et al., 2019; del-Castillo-Feito et al., 2022). With an extraordinary level of social support and acceptance, organizations or institutions will be recognized as legitimate and will have access to pertinent resources which are critical to their ongoing performance. Taking into consideration the growing obligations for socially responsible behaviour, the application of CSR practices has been recognized as a basis of legitimacy (Bansal & Clelland, 2004; Campbell, 2007; Del-Castillo-Feito et al., 2019; Palazzo & Scherer, 2006; del-Castillo-Feito et al., 2022). The purpose of this study was to examine the relevance of CSR practices in

employee management and to assess the positive and important influence that these efforts had on the organization’s legitimacy. Our findings indicated that there was a strong and confident link between employee-focused CSR actions and organizational legitimacy. Our findings are in line with what Shen and Benson (2014) claim that SRHRM is a basic action of human resource management divisions used by businesses, companies, or organizations in accomplishing external corporate social responsibility (CSR) agendas which actually intend to persuade employee’s attitudes and behaviours in a constructive track and assist the organizations’ performance such as training, recruitment of socially responsible employee candidates, etc.

**Figure 2.** Structural model



**Table 5. Sturctural model**

	VIF	Path	Mean	SD	T-value	P-values	Sig.
Diversity -> Organization legitimacy	2.819	-0.096	-0.097	0.152	0.633	0.527	No
Employee and manager relationship -> Organization legitimacy	1.917	0.287	0.298	0.146	1.967	0.049	Yes
Employee training -> Organization legitimacy	3.219	0.255	0.251	0.168	1.519	0.129	No
Voluntary -> Organization legitimacy	2.768	0.543	0.540	0.146	3.711	0.000	Yes

## 5. Conclusion

The results of this study illustrate the following conclusions. Based on the results regarding the descriptive analysis of the sample, our findings revealed a robust and positive link between employee-focused CSR actions and organizational legitimacy. Particularly, there was a strong correlation appears between voluntary and organizational legitimacy. In addition, the results showed the existence of a strong relationship between employee and manager relationship and voluntary and organizational legitimacy. However, two relationships appeared nonsignificant, namely diversity and employee training which are not significant predictors of organization legitimacy. In many industries, stakeholder support has emerged as a crucial resource for organizational survival and success. Stakeholders will only interact with organizations that adhere to ethical behavioural standards and meet their social expectations, nevertheless. Organizations are viewed as legitimate and be able to get resources necessary for continued performance if they enjoy a high level of social approval and support. While this study will potentially contribute to the sort of evidence that there is a strong link between employee-focused CSR actions and organizational legitimacy, future research may include a larger sample of Indonesian employees working across companies or organizations so as to achieve maximum results. An in-depth analysis through qualitative studies is also recommended; the interview with the employer and employee is needed to understand the phenomena of the related topic. Future research may be expected to have more different variables, including work productivity, work attitude, and others.

## References

- Alcantara, L., Mitsuhashi, H., Hoshino, Y., 2006. Legitimacy in international joint ventures: it is still needed. *J. Int. Manag.* 12 (4), 389–407. <https://doi.org/10.1016/j.intman.2006.08.002>.
- Alexiou, K., Wiggins, J., 2019. Measuring individual legitimacy perceptions: scale development and validation. *Strateg. Organ.* 17 (4), 470–496. <https://doi.org/10.1177/1476127018772862>.
- Bagozzi, R.P., Yi, Y., 1988. On the evaluation of structural equation models. *J. Acad. Mark. Sci.* 16, 74–94. <https://doi.org/10.1007/BF02723327>.
- Banerjee, S., Venaik, S., 2018. The effect of corporate political activity on MNC subsidiary legitimacy: an institutional perspective. *Manag. Int. Rev.* 58, 813–844. <https://doi.org/10.1007/s11575-017-0324-0>.
- Bansal, P., Clelland, I., 2004. Talking trash: legitimacy, impression management, and unsystematic risk in the context of the natural environment. *Acad. Manag. J.* 47 (1), 93–103. <https://doi.org/10.2307/20159562>.
- Barnett, M.L., Salomon, R.M., 2006. Beyond dichotomy: the curvilinear relationship between social responsibility and financial performance. *Strateg. Manag. J.* 27 (11), 1011–1122. <https://doi.org/10.1002/smj.557>.
- Barrena-Martinez, J., Lopez-Fernández, M., Romero-Fernández, P.M., 2019. The link between socially responsible human resource management and intellectual capital. Fig. 3. Importance-performance map. *C. del-Castillo-Feito et al. Technological Forecasting & Social Change* 174 (2022) 121274 9 Corp. Soc. Responsib. Environ. Manag. 26 (1), 71–81. <https://doi.org/10.1002/csr.1658>.

- Blanco-Gonzalez, A., Díez-Martín, F., Cachon-Rodríguez, G., Prado-Roman, C., 2020. Contribution of social responsibility to the work involvement of employees. *Corp. Soc. Responsib. Environ. Manag.* 27 (6), 2588–2598. <https://doi.org/10.1002/csr.1978>.
- Bolton, S.C., Kim, R.C.H., O’Gorman, K.D., 2011. Corporate social responsibility as a dynamic internal organizational process: a case study. *J. Bus. Ethics* 101, 61–74. <https://doi.org/10.1007/s10551-010-0709-5>.
- Barrena-Martínez, J., López-Fernández, M., Romero-Fernández, P.M. (2019). To-wards a configuration of socially responsible human resource management policies and practices: findings from an academic consensus. *Int J Hum Resour Man*, (30), 2544-2580. DOI: 10.1080/09585192.2017.1332669.
- Brown, A.D., Toyoki, S., 2013. Identity work and legitimacy. *Organ. Stud.* 34 (7), 875–896. <https://doi.org/10.1177/0170840612467158>.
- Campbell, J.L., 2007. Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. *Acad. Manag. Rev.* 32 (3), 946–967. <https://doi.org/10.5465/amr.2007.25275684>.
- Carroll, A.B., 1999. Corporate social responsibility: evolution of a definitional construct. *Bus. Soc.* 38 (3), 268–295. <https://doi.org/10.1177/000765039903800303>.
- Castello, I., Lozano, J.M., 2011. Searching for new forms of legitimacy through corporate responsibility rhetoric. *J. Bus. Ethics* 100, 11–29. <https://doi.org/10.1007/s10551-011-0770-8>.
- Certo, S.T., Hodge, F., 2007. Top management team prestige and organizational legitimacy: an examination of investor perceptions. *J. Manag.* 19 (4), 461–477.
- Clark, L.A., Watson, D., 1995. Constructing validity: basic issues in objective scale development. *Psychol. Assess.* 7 (3), 309–319. <https://doi.org/10.1037/1040-3590.7.3.309>.
- Collier, J., Esteban, R., 2007. Corporate social responsibility and employee commitment. *Bus. Ethics A Eur. Rev.* 16 (1), 19–33. <https://doi.org/10.1111/j.1467-8608.2006.00466.x>.
- Corciolani, M., Gistri, G., Pace, S., 2019. Legitimacy struggles in palm oil controversies: an institutional perspective. *J. Clean. Prod.* 212, 1117–1131. <https://doi.org/10.1016/j.jclepro.2018.12.103>.
- Cronbach, L.J., 1951. Coefficient alpha and the internal structure of tests. *Psychometrika* 16, 297–334. <https://doi.org/10.1007/BF02310555>.
- De Roeck, K., Delobbe, N., 2012. Do environmental CSR initiatives serve organizations’ legitimacy in the oil industry? Exploring employees’ reactions through organizational identification theory. *J. Bus. Ethics* 110, 397–412. <https://doi.org/10.1007/s10551-012-1489-x>.
- Deepphouse, D.L., Bundy, J., Tost, L., Suchman, M., 2017. Organizational legitimacy: six key questions. *SAGE Handb. Organ. Institutionalism* 27–54. <https://doi.org/10.4135/9781446280669.n2>.
- Del-Castillo-Feito, C., Díez-Martín, F., Blanco-González, A., 2021. The effect of implementing environmental policies and employees’ environmental training in multinational companies’ legitimacy level in emerging countries. *J. Clean. Prod.* 312 (20), 127817 <https://doi.org/10.1016/j.jclepro.2021.127817>.
- Del-Castillo-Feito, C., Blanco-González, A., González-Vázquez, E., 2019. The relationship between image and reputation in the Spanish public university. *Eur. Res. Manag. Bus. Econ.* 25 (2), 87–92. <https://doi.org/10.1016/j.iedeen.2019.01.001>.
- del-Castillo-Feito, C., Blanco-González, A., & Hernández-Perlines, F. (2022). The impacts of socially responsible human resources management on organizational legitimacy. *Technological Forecasting and Social Change*, 174, 121-274.
- Díez-Martín, F., Prado-Roman, C., Blanco-Gonzalez, A., 2013. Beyond legitimacy: legitimacy types and organizational success. *Manag. Decis.* 51 (10), 1954–1969. <https://doi.org/10.1108/MD-08-2012-0561>.
- DiMaggio, P.J., Powell, W.W., 1991. Introduction. – In: *The New Institutionalism in Organizational Analysis*. University of Chicago Press, Chicago, pp. 1–38. Dmytriyev, S.D, Freeman, R.E, Horisch, J., 2021. The relationship between stakeholder theory and corporate social responsibility: differences, similarities, and implications for social issues in management. *J. Manag. Stud.* 58 (6), 1441–1470. <https://doi.org/10.1111/joms.12684>.
- Drori, I., Honig, B., 2013. A process model of internal and external legitimacy. *Organ. Stud.* 34 (3), 345–376. <https://doi.org/10.1177/0170840612467153>.
- Du, S., Vieira, E.T., 2012. Striving for legitimacy through corporate social responsibility: insights from oil companies. *J. Bus. Ethics* 110, 413–427. <https://doi.org/10.1007/s10551-012-1490-4>.
- European Commission. (2011). *Renewed EU Strategy 2011–2014 for Corporate Social Responsibility*. Brussels
- Esteban-Lloret, N.N., Aragón-Sánchez, A., Carrasco-Hernandez, A., 2018. Determinants of employee training: impact on organizational legitimacy and organizational performance. *Int. J. Hum. Resour. Manag.* 29 (6), 1208–1229. <https://doi.org/10.1080/09585192.2016.1256337>.
- Fatma, M., Rahman, Z., 2014. Building a

*Muazza, M., Habibi, A., Mukminin, A. (2023). The Socially Responsible Human Resources Management and Its Impacts on the Organizational Legitimacy: The Case of Indonesian Employees.*

---

- corporate identity using corporate social responsibility: a website based study of Indian banks. *Soc. Responsib. J.* 10 (4), 591–601. <https://doi.org/10.1108/SRJ-01-2013-0002>.
- Fatma, M., Khan, I., Rahman, Z., 2019. Striving for legitimacy through CSR: an exploration of employees responses in controversial industry sector. *Soc. Responsib. J.* 15 (7), 924–938. <https://doi.org/10.1108/SRJ-07-2017-0116>.
- Ferrell, O.C., Harrison, D.E., Ferrell, L., Hair, JF, 2019. Business ethics, corporate social responsibility, and brand attitudes: an exploratory study. *J. Bus. Res.* 95, 491–501. <https://doi.org/10.1016/j.jbusres.2018.07.039>.
- Fornell, C., Larcker, D.F., 1981. Structural equation models with unobservable variables and measurement error: algebra and statistics. *J. Mark. Res.* 18 (3), 382–388. <https://doi.org/10.1177/002224378101800313>.
- Freeman, R.E., 1984. *Strategic Management: A Stakeholder Approach*. Pitman Publishing, Marshfield, MA.
- Freudenreich, B., Lüdeke-Freund, F., Schaltegger, S.A., 2020. Stakeholder theory perspective on business models: value creation for sustainability. *J. Bus. Ethics* 166, 3–18. <https://doi.org/10.1007/s10551-019-04112-z>.
- Glozer, S., Caruana, R., Hibbert, S.A., 2019. The never-ending story: discursive legitimation in social media dialogue. *Organ. Stud.* 40 (5), 625–650. <https://doi.org/10.1177/0170840617751006>.
- Hair, J.F., Risher, J.J., Sarstedt, M., Ringle, C.M., 2019. When to use and how to report the results of PLS-SEM. *Eur. Bus. Rev.* 31 (1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>.
- Hair, J.F., Ringle, C.M., Sarstedt, M., 2011. PLS-SEM: indeed a silver bullet. *J. Mark. Theory Pract.* 19 (2), 139–152. <https://doi.org/10.2753/MTP1069-6679190202>.
- Henseler, J., Ringle, C.M., Sarstedt, M., 2015. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *J. Acad. Mark. Sci.* 43, 115–135. <https://doi.org/10.1007/s11747-014-0403-8>.
- Horisch, J., Freeman, R.E., Schaltegger, S., 2014. Applying stakeholder theory in sustainability management: links, similarities, dissimilarities, and a conceptual framework. *Organ. Environ.* 27 (4), 328–346. <https://doi.org/10.1177/1086026614535786>.
- Inyang, B.J., Awa, H.O., & Enuoh, R. (2011). CSR-HRM nexus: Defining the role engagement of the human resource professionals. *IJBSS*, 2, 118–26.
- Jamali, D.R., Dirani, A.M., Harwood, I.A. (2014). Exploring human resource management roles in corporate social responsibility: the CSR-HRM co-creation model. *Bus Ethics: Eur Rev*, 24, 125–43.
- Johnson, C., Dowd, T.J., Ridgeway, C.L., 2006. Legitimacy as a social process. *Annu. Rev. Sociol.* 32, 53–78. <https://doi.org/10.1146/annurev.soc.32.061604.123101>.
- Jones, D.A., 2010. Does serving the community also serve the company? Using organizational identification and social exchange theories to understand employee responses to a volunteerism programme. *J. Occup. Organ. Psychol.* 83 (4), 857–878. <https://doi.org/10.1348/096317909X477495>.
- Khan, Z., Lew, Y.K., Park, B.II, 2015. Institutional legitimacy and norms-based CSR marketing practices: insights from MNCs operating in a developing economy.
- Kim, H.R., Lee, M., Lee, H.T., Kim, N.M., 2010. Corporate social responsibility and employee–company identification. *J. Bus. Ethics*, 95, 557–569. <https://doi.org/10.1007/s10551-010-0440-2>.
- Kim, J., Ha, S., Fong, C., 2014. Retailers' CSR: the effects of legitimacy and social capital. *Int. J. Retail Distrib. Manag.* 42 (2), 131–150. <https://doi.org/10.1108/IJRDM-10-2012-0092>.
- Kostova, T., Zaheer, S., 1999. Organizational legitimacy under conditions of complexity: the case of the multinational enterprise. *Acad. Manag. Rev.* 24 (1), 64–81. <https://doi.org/10.5465/amr.1999.1580441>.
- Lamberti, L., Lettieri, E., 2011. Gaining legitimacy in converging industries: evidence from the emerging market of functional food. *Eur. Manag. J.* 29 (6), 462–475. <https://doi.org/10.1016/j.emj.2011.08.002>.
- Maignan, I., Ferrell, O.C., 2004. Corporate social responsibility and marketing: an integrative framework. *J. Acad. Mark. Sci.* 32, 3–19. <https://doi.org/10.1177/0092070303258971>.
- Maignan, I., Gonzalez-Padron, T.L., Hult, G.T.M., Ferrell, O.C., 2011. Stakeholder orientation: development and testing of a framework for socially responsible marketing. *J. Strateg. Mark.* 19 (4), 313–338. <https://doi.org/10.1080/0965254X.2011.581384>.
- Meyer, J., Scott, R., 1983. Centralization and the legitimacy problems of local government. *Organizational Environments: Ritual and Rationality*. SAGE Publishers, Beverly Hills, CA, pp. 199–215.
- Miotto, G., Del-Castillo-Feito, C., Blanco-Gonzalez, A., 2020. Reputation and legitimacy: key factors for higher education institutions' sustained competitive advantage. *J. Bus. Res.* 112, 342–353. <https://doi.org/10.1016/j.jbusres.2019.11.076>.
- Nunnally, J.C., Bernstein, I.H., 1994. *Psychometric Theory*. McGrall Hill, New York.
- Odrizola, M.D., Baraibar-Diez, E., 2017. Is corporate reputation associated with quality of CSR reporting? Evidence from Spain. *Corp. Soc. Responsib. Environ. Manag.* 24 (2), 121–132. <https://doi.org/10.1002/csr.1399>.



- Orlitzky, M., 2013. Corporate social responsibility, noise, and stock market volatility. *Acad. Manag. Perspect.* 27 (3), 238–254. <https://doi.org/10.5465/amp.2012.0097>. Palazzo, G., Richter, U., 2005. CSR business as usual? The case of the tobacco industry. *J. Bus. Ethics* 61, 387–401. <https://doi.org/10.1007/s10551-005-7444-3>.
- Palazzo, G., Scherer, A.G., 2006. Corporate legitimacy as deliberation: a communicative framework. *J. Bus. Ethics*, 66, 71–88. <https://doi.org/10.1007/s10551-006-9044-2>.
- Pedrini, M., Ferri, L.M., 2011. Implementing corporate social responsibility. An exploratory study of strategy integration and CSR officers' duty. *Econ. Aziend. Online* 2, 175–187.
- Pfajfar, G., Shoham, A., Malecka, A., & Zalaznik, M. (2022). Value of corporate social responsibility for multiple stakeholders and social impact—Relationship marketing perspective. *J. Bus. Res.*, 143, 46-61.
- Porter, M.E., Kramer, M.R., 2006. Strategy and society: the link between competitive advantage and corporate social responsibility. *Harv. Bus. Rev.* 78–92. Reast, J., Maon, F., Lindgreen, A., Vanhamme, J., 2013. Legitimacy-seeking organizational strategies in controversial industries: a case study analysis and a bidimensional model. *J. Bus. Ethics*, 118, 139–153. <https://doi.org/10.1007/s10551-012-1571-4>.
- Ruef, M., Scott, W.R., 1998. A multidimensional model of organizational legitimacy: hospital survival in changing institutional environments. *Adm. Sci. Q.* 43 (4), 877–904. <https://doi.org/10.2307/2393619>.
- Salancik, G., Pfeffer, J., 1978. A social information processing approach to job attitudes and task design. *Adm. Sci. Q.* 224–253. <https://doi.org/10.2307/2392563>.
- Scherer, A.G., Palazzo, G., Seidl, D., 2013. Managing legitimacy in complex and heterogeneous environments: sustainable development in a globalized world. *J. Manag. Stud.* 50 (2), 259–284. <https://doi.org/10.1111/joms.12014>.
- Scott, W.R., 1995. *Institutions and Organizations*. Sage, Thousand Oaks, CA.
- Silva, S., Nuzum, A., Schaltegger, S., 2019. Stakeholder expectations on sustainability performance measurement and assessment. A systematic literature review. *J. Clean. Prod.* 217 (20), 204–215. <https://doi.org/10.1016/j.jclepro.2019.01.203>.
- Subramony, M., 2006. Why organizations adopt some human resource management practices and reject others: an exploration of rationales. *Hum. Resour. Manage.* 45 (2), 195–210. <https://doi.org/10.1002/hrm.20104>.
- Suchman, M., 1995. Managing legitimacy: strategic and institutional approaches. *Acad. Manag. Rev.* 20 (3), 571–610. <https://doi.org/10.5465/amr.1995.9508080331>.
- Surroca, J., Tribo, J.A., Waddock, S., 2010. Corporate responsibility and financial performance: the role of intangible resources. *Strateg. Manag. J.* 31 (5), 463–490. <https://doi.org/10.1002/smj.820>.
- Thomas, T.E., 2005. Are business students buying it? A theoretical framework for measuring attitudes toward the legitimacy of environmental sustainability. *Bus. Strateg. Environ.* 14 (3), 186–197. <https://doi.org/10.1002/bse.446>.
- Toussaint, M., Cabanelas, P., Blanco-Gonzalez, A., 2021. Social sustainability in the food value chain: an integrative approach beyond corporate social responsibility. *Soc. Responsib. Environ. Manag.* 28 (2), 103–115. <https://doi.org/10.1002/csr.2035>.
- Ulmer, R.R., Sellnow, T.L., 2000. Consistent questions of ambiguity in organizational crisis communication: jack in the Box as a case study. *J. Bus. Ethics* 25, 143–155. <https://doi.org/10.1023/A:1006183805499>.
- Wang, Q., Dou, J., Jia, S., 2016. A meta-analytic review of corporate social responsibility and corporate financial performance: the moderating effect of contextual factors. *Bus. Soc.* 55 (8), 1088–1121. <https://doi.org/10.1177/0007650315584317>.
- Weber, M., 1978. *Economy and Society: An outline of Interpretive Sociology* (Vol. 1). Univ of California Press.
- Wyrod-Wróbel, J., Biesok, G., 2017. Decision-making on various approaches to importance-performance analysis (IPA). *Eur. J. Bus. Sci. Technol.* 3 (2), 123–131. <https://doi.org/10.11118/ejobsat.v3i2.82>.
- Yang, K., Kim, J., Min, J., Hernandez-Calderon, A., 2020. Effects of retailers' service quality and legitimacy on behavioral intention: the role of emotions during COVID-19. *Serv. Ind. J.* 41 (1/2), 1–23. <https://doi.org/10.1080/02642069.2020.1863373>.
- Zamparini, A., Lurati, F., 2017. Being different and being the same: multimodal image projection strategies for a legitimate distinctive identity. *Strateg. Organ.* 15 (1), 6–39. <https://doi.org/10.1177/1476127016638811>.
- Zhang, Y., Li, J., Jiang, W., Zhang, H., Hu, Y., Liu, M., 2018. Organizational structure, slack resources and sustainable corporate socially responsible performance. *Corp. Soc. Responsib. Environ. Manag.* 25, 1099–1107. <https://doi.org/10.1002/csr.1524>.
- Zimmerman, M.A., Zeitz, G.J., 2002. Beyond survival: achieving new venture growth by building legitimacy. *Acad. Manag. Rev.* 27, 414–431. <https://doi.org/10.2307/4134387>.

Saransh Royal<sup>1</sup>  
Namarta Kaushik<sup>2</sup>  
Ramesh Chander<sup>3</sup>  
Nirmala Chaudhary<sup>4</sup>

## A NEXUS BETWEEN SUSTAINABILITY, OPENNESS, DEVELOPMENT, AND URBANISATION: PANEL DATA EVIDENCE FROM QUAD NATIONS<sup>5</sup>

*The paper explores the relationship between economic openness, development and urbanisation in sustainable ecosystems. The investigation is based on the balanced panel data for QUAD countries from 1991 to 2019. By using PMG-ARDL, this paper follows affiliation amid sustainability and openness. The results reported indicate the existence of an encouraging association between sustainability and urbanisation both in the case of Australia and India. The ECT value for all the panels is negative and noteworthy, confirming the existence of short-term affiliation too. The granger causality analysis also reveals that in the case of the US and India, there existed bi-directional causation amid sustainability and urbanisation. Knowing well that the countries are party to the “Kyoto Protocol and Paris agreement”, but there is still a necessity to preserve and promote the impetus concerning sustainability in arousing inclusive awareness concerning the realisation of sustainable ecosystems. More so, subsidising schemes and promoting awareness programmes are recommended, such as incentivising sustainable urban planning and green power purchase agreement and adoption of green bonds for energy infrastructure needs.*

*Keywords: Environmental Sustainability; Urban Growth; Foreign Investment; ARDL and Sustainable Ecosystems*

*JEL: C23; C33; F15; R11; Q56*

<sup>1</sup> Saransh Royal, Research Scholar, University School of Management Kurukshetra University Kurukshetra, +919643663337, e-mail: saransh.usm@kuk.ac.in.

<sup>2</sup> Namarta Kaushik, Research Scholar, University School of Management Kurukshetra University Kurukshetra, +919034962508, e-mail: namarta.usm@kuk.ac.in.

<sup>3</sup> Ramesh Chander, Professor, University School of Management Kurukshetra University Kurukshetra, +919466535510, e-mail: dalal.kuk@gmail.com.

<sup>4</sup> Nirmala Chaudhary, Professor, University School of Management Kurukshetra University Kurukshetra, +919896436069, e-mail: nchaudhary@kuk.ac.in.

<sup>5</sup> This paper should be cited as: Royal, S., Kaushik, N., Chander, R., Chaudhary, N. (2023). A Nexus between Sustainability, Openness, Development, and Urbanization: Panel Data Evidence from QUAD Nations. – *Economic Studies (Ikonomicheski Izsledvania)*, 32(3), pp. 178-196.

## 1. Introduction

It is ubiquitous that an economy needs to be as resource-efficient and environmentally benign as possible for subsequent growth to be both rapid and sustainable. Although the researches concerning these issues have been progressively expanding in recent years, some other aspects are still untapped in these areas that have the potential for research. These untapped aspects provided us with some thoughtful research questions on the grounds of this study has been conducted with chosen variables in the QUAD context. “Quadrilateral Security Dialogue” popularly known as “QUAD”, the four-nation grouping of the US, India, Australia, and Japan, is emerging as conceivably the most prominent new entente & benefactor to the stability in “Indo-Pacific region” in the global world order (Mehra, 2020). QUAD has the potential to shape geopolitical scenarios of the world and its commitment to the global pillar of the sustainability framework continually challenges its affiliate to discover novel ways to conserve raw materials, minimise waste, recycle and reuse to reduce their environmental impact.

In recent times, the world’s economies have been striving with the dual challenges of realising higher economic growth while ensuring the environmental sustainability of the planet for future generations (Adedoyin et al., 2020). The overarching concern of modern society is that with the ongoing conception of economic development, the forthcoming generations may be at the extreme of facing up to scarcity of natural resources (World Economic Forum, 2021). The comprehensiveness of the mitigating environmental strategy depends on various areas such as businesses, homes, industrial production, electricity generation and transport (Adedoyin et al., 2020); therefore, one solution for all approach is not sufficient and it becomes an obligation of all the stakeholders including government to keep the planet in a self-sustaining state by carrying out comprehensive environmental sustainability targets, without disrupting the course of development as a whole (Anbu, 2020).

The pandemic of “SARS Cov-2” is another instance where anthropogenic forces have disrupted the equilibrium of ecology, society, and economics (Vitenu-Sackey & Barfi, 2021). In a world post-COVID 19 it is of the essence that all efforts are directed towards maintaining this equilibrium. With global value chains bringing a new paradigm in production and consumption, international trade has emerged as the drivers of the new world economic order (Pahl & Timmer, 2020). In all, it is expected to take into consideration the path to global sustainability with resolving the development–environment dilemma (Combes Motel et al., 2014; Piddington, 1990; Staniškis, 2020). Similarly, the studies (Anser et al., 2020; Behera & Dash, 2017; Iheonu et al., 2021; Nketiah et al., 2020) have considered additional variables like urbanisation, foreign direct investment in order to remove the biases in the skewed development. Urbanisation has been viewed as a prerequisite for growth as it leads to an increase in the urban population & causes an upsurge in energy consumption which plays relevant and must role in the advancement of an economy. But with this, urbanisation leads the way to bring social, economic, and sustainability into increasingly challenged surroundings (Bai et al., 2012; Douglas, 2012; Macomber, 2013) as it has manifold implications for the environment and human health; especially energy based on fossil fuel degrades the environment, and negatively affects the human health. So, to avoid these negative ramifications of climate change, emissions need to be curbed, which indicates a necessity to end our reliance on fossil fuels and invest in alternate energy sources that are clean, accessible,

economical, sustainable, and relevant. The only choice seems to be non-conventional. Renewables offer a pathway out of import dependency and provide energy security for sustainable growth, employment opportunities, and a way out of a vicious cycle of poverty. Correspondingly, the International Renewable Energy Agency (IRENA) estimates that ninety per cent of the world's electricity will come from renewable energy by 2050. In the prior studies, total energy systems (including conventional and non-conventional energy sources) have been included, but very few have attempted to analyse it from the renewable energy perspective. So, there is a need for stringent environmental policies which could shift consumption from conventional to non-conventional energy sources and enlarge the scope for renewable energy markets as investors always look for an investible pipeline of green projects, which turns out to be supportive for accelerating growth of the non-conventional energy sources. Therefore it is important to revisit trade openness in consonance with the development with the purpose of understanding the sustainability of the ensuing outcomes. The study has preferred FDI flows over exports as it better explains the perspectives of both developed as well as emerging economies. Later the developed country perspective of FDI is to exploit the opportunities arising out of robust demand in emerging economies and the latter perspective, i.e. developing economies, is to seek investment for the import substitution, particularly in India.

All this necessitates the researchers to find the intertwined statistical relationship of urbanisation, openness and sustainability to further magnify sustainability orientations. Therefore, the present study endeavours to examine the association amid four multifaceted dimensions named development, openness, urbanisation, and sustainability by utilising the “PMG-ARDL model” for the QUAD countries over the period of 1991 to 2019 to investigate the said phenomenon with a view to achieve these study objectives: Firstly to analyse the influence of Trade Openness, GDP growth and urbanisation on the environmental sustainability in QUAD countries and secondly to put in perspective the underlying causal relationship between the Openness, GDP, Urbanization, and sustainability in QUAD countries for progressive policy reforms and sustainable development.

It is worth noting that a few studies have investigated the linkage of these variables altogether in the context of the QUAD countries and the QUAD countries have achieved development milestones over time. A study of this kind is expected to help guide the policy disposition of the nation-states striving for development in a net zero era. The paper has been organised into the following sections: The details of the literature review have been elucidated in section 2. The econometric methodology has been highlighted in section 3. The study's empirical findings are discussed in section 4. Further, section 5 brings the study to a close by providing the concluding remarks in a most comprehensive way.

## **2. Literature Review**

In this section, an attempt has been made to précis all the previous studies associated with the subject matter. Table I reviews all the related studies. The literature has been scrutinised on the basis of a time period, sample, the methodology adopted for the study, and the findings. Further, the study tries to institute the trends among different variables based on the preceding literature.

Table 1 summarises the findings of the preceding literature.

**Table 1. Reported summary of the literature analysed**

Authors	Time period	Tools and Technique	Findings
Yang et al.,(2021)	1990-2017	Panel co-integration, pair-wise non-causality test, and FMOLS.	This study investigates the impact of globalisation, financial development, and energy utilisation on environmental sustainability in the GCC countries, where results define bidirectional causality between Urbanization & GDP growth.
Murshed et al., (2021)	1972-2015	ARDL approach.	The study indicates that attracting the FDIs, having the potential of making use of knowledge spillover effects to facilitate the country's renewable power generation, helps in achieving the goals of security of energy and environmental sustainability.
Han et al., (2021)	1990-2018	Quantile Regression	The government needs to increase the share of renewable energy in the industrial production and export sector, which could have a good impact on country trade, and further account for a friendly environment along with sustainable performance.
Baloch et al., (2021)	1990-2017	PMG-ARDL	The paper investigated and revalidated the relevance of the EKC hypothesis for OECD countries in the context of development, globalisation, and energy innovation. Globalisation has a prolonged relationship with energy innovation which further reduces GHG emissions.
Gyamfi et al., (2021)	2000-2018	PMG-ARDL, OLS, DOLS and FMOLS	The study reported a pivotal role of bio-energy consumption in creating a green and sustainable environment, thus signifying the relevance of renewable energy sources in environmental well-being.
Adewale Alola et al., (2021)	2000-2016	ARDL estimate	The paper reasserts the relationship between sustainability Goal 7(Access to green energy) & Goal 12 and economic growth. The investigation exhibits a long-term equilibrium betwixt economic expansion, renewable accessibility, and innovation capacity leading to better development indices.
Adebayo et al., (2021)	1965-2019	ARDL, FMOLS and DOLS	This study found uni-directional causality running from urbanisation to economic growth and a significant association between economic growth and trade openness.
Zhang et al., (2021)	1990-2017	AMG estimator, Panel bootstrap Granger causality	This study contributes to the existing literature by suggesting policy implications for a sustainable environment explaining that an increase in the share of urban investment is highly momentous for environmental sustainability.
Arif et al., (2020)	1980-2018	ARDL approach.	<ol style="list-style-type: none"> <li>1. In the long run, financial development and trade have major effects on economic growth in selected sample economies.</li> <li>2. 'Complementarity hypothesis' is also supported regarding the above variables.</li> </ol>
Le & Bao, (2020)	1990-2014	Westerlund co-integration test and AMG estimator	This study investigates the role of non-renewable and renewable energy consumption in sustainable development in 16 Latin America and Caribbean Emerging Markets and Developing Economies. The study concludes that economic growth is influenced positively and considerably by renewable energy consumption and trade openness.

Royal, S., Kaushik, N., Chander, R., Chaudhary, N. (2023). *A Nexus between Sustainability, Openness, Development, and Urbanization: Panel Data Evidence from QUAD Nations.*

Authors	Time period	Tools and Technique	Findings
Sheikh et al., (2020)	1995-2018	ARDL approach of co-integration	This study is an attempt to empirically examine the implications of trade openness on sustainable development in India since the liberalisation policy in 1991. These findings back up environmentalists and social critics who claim that advanced economic activity and trade openness is linked to increased welfare expenses in India.
Olorogun et al., (2020)	1970-2018	ARDL, Toda-Yamamoto Granger Causality Test	The current study focuses on the FDI-led economic growth hypothesis if it holds or not and concludes that FDI impacts Economic Growth. Foreign investment and Financial development are good predictors for sustainable economic growth.
Tecel et al., (2020)	1995-2016	PMG-ARDL	This study has tried to explore the impact of FDI on economic growth as a control variable and it concluded that there is a uni-directional causality between foreign investment and economic growth.
Udi et al., (2020)	1970-2018	ARDL, Bayer-Hanck Co-integration approach	There is a one-way causal link running from FDI to industrialisation. Also, industrialisation validates a significant impact on economic growth both in the short and long run.
Belloumi & Alshehry, (2020)	1971-2016	ARDL co-integration approach	This study examines the impact trade openness has on sustainable development in Saudi Arabia and the key findings are. 1. Financial development-favourable impact on environmental sustainability 2. Foreign direct investment (FDI) is a good driver of economic growth.
Manta et al., (2020)	2000–2017	FMOLS, VECM, and Pair-wise Granger causality test	The aim and novelty of this study consist of estimating the nexus between energy and economic growth and the major findings are- 1. Betwixt economic growth proxied as GDP and financial development variables, there is bidirectional causality. 2. In the short term, increased economic growth and energy consumption encourage a rise in financial development.
Basu et al., (2020)	1990–2015	VECM, FMOLS, DOLS, and Granger causality	In this study, a causal relationship among economic growth, urbanisation, energy consumption, renewable energy share, trade openness and carbon emissions in the context of a large developing economy of India has been and the outcome establishes Bidirectional causality 1. Betwixt trade openness & economic growth, 2. Betwixt urbanisation & economic growth 3. Betwixt trade & renewable energy 4. There is a one-way connection from growth to renewable energy,
Ali et al., (2020)	1971-2014	FMOLS, DOLS, CCR Estimation	This paper revealed the existence of a Uni-directional relationship from Urbanization to Electricity Consumption leading to Economic Growth, but in the long term, urbanisation impedes growth.
Nathaniel & Bekun, (2020)	1971-2015	VECM, Pesaran's autoregressiv distributive lag cointegration	This study tries to model urbanisation, trade flow and energy consumption with regard to the environment and it was concluded that Economic Growth, Energy consumption and urbanisation has a negative impact on environmental quality.

Authors	Time period	Tools and Technique	Findings
Gyamfi et al., (2020)	1980-2018	PMG-ARDL	The study reported a uni-directional casual association betwixt trade and CO <sub>2</sub> emissions. The study further established the significance of emission reduction targets and the adoption of greener technology for a better tomorrow.
Intisar et al., (2020)	1985-2017	Panel co-integration tests, FMOLS and DOLS.	This study was aimed at analysing the impact of trade openness on economic growth and the bidirectional causality between Trade openness and Economic growth was reported in it.
Fan et al., (2018)	1992-2012	SEM	This study investigates whether large cities are in sync with the region in terms of population dynamics, urbanisation, and sustainability and it was found that economic development has a stronger impact on urbanisation as per the selected sample.
Faisal et al., (2018)	1965-2013	ARDL, VECM, and Granger causality	The outcome reveals that economic growth, urbanisation, and trade have a positive and significant long-term and short-term impact on electricity consumption for the selected sample.
Haseeb et al., (2018)	1995-2014	Dumitrescu-Hurlin Granger causality test and FMOLS.	This study established the relationship between energy consumption, financial development, globalisation, economic growth, and urbanisation and the findings suggest that there is a two-way causality betwixt growth, GDP, and financial development.
Rafiq et al., (2016)	1980-2010 2001-2010	Panel Unit root, panel regression, co-integration test, FMOLS, and DOLS.	This paper analyses the impact of urbanisation and trade openness on emissions and energy intensity in twenty-two increasingly urbanised emerging economies. The findings show that openness reduces both emissions and energy intensity; urbanisation, on the other hand, greatly increases energy intensity.
Asumadu-Sarkodie & Owusu, (2016)	1971-2012	ARDL regression, Granger causality test	The study examines the causal relationship between energy use, carbon dioxide emissions, GDP, industrialisation, financial development and establishes a long-run equilibrium causality amongst GDP, population, financial development, and energy use.
Asif et al., (2015)	1980-2011	Panel Unit root and co-integration tests, Panel causality tests, FMOLS and DOLS,	This study addresses the problem of environmental degradation due to the faster-growing energy consumption and urbanisation for supporting economic growth and the research unfolds that urbanisation has a favourable impact on economic growth and that urban planning contributes to long-term sustainability for specified countries.
Were, (2015)	1991-2015	Panel Regression analysis	This study has focused on the relationship between trade openness and economic growth, and it was found after analysis that economic growth is influenced positively and significantly by trade.

*Note: "OLS= Ordinary least square, FMOLS= Fully modified ordinary least square, ARDL= Autoregressive distributive lag, ECM=Error correction model, DOLS= Dynamic ordinary least square, AMG=Augmented mean group, PMG= pooled mean group."*

*Source: Author Compilation.*

Capitalising on the academic context, an empirical feature of previous writings intended to appraise the association amid economic progress and environmental milieu, neither of the

studies has taken all the variables together which have been considered in our study, nor does any study cover the time frame as we have taken from 1991 to 2019. Therefore, this paper is an improvement over the previous inquiries and a justified effort to look into it the interrelationship between GDP, Openness, Urbanisation, and Sustainability in the case of the QUAD region.

Previous studies have reported that trade openness has a noteworthy relationship with GDP (Belloumi & Alshehry, 2020b; Chang et al., 2009; Dollar & Kraay, 2004; Frankel & Romer, 1999; Freund & Bolaky, 2008; Were, 2015b) and the same has been reported by the Keho (Keho, 2017) in a study by using the “ARDL” and “Toda & Yamamoto Granger causality” tests. Moreover, the study done by (Ali et al., 2020; Asif et al., 2015; Baloch et al., 2021; Basu et al., 2020; Faisal et al., 2018; Gyamfi et al., 2020; Nathaniel & Bekun, 2020; Rafiq et al., 2016) has reported a positive and considerable influence of FDI (openness), and urbanisation on sustainability.

The uniqueness of this study is reflected in its approach to examine the above-reported notion amongst QUAD countries by using moderately advanced & robust econometric approaches for empirical analysis where the exploration comprises the data suitability and availability of the reported examined variables since liberalisation policy 1991. To the best of our knowledge, there is no such collaboration which quantifies the effect of Urbanization, Openness, GDP and Sustainability in the context of QUAD countries. The aforementioned conflicting results reported in the literature review can be attributed to the varying econometric methodology adopted, sample size taken, and the variables considered as a proxy for openness, development, and sustainability.

## 1. Data and Model Estimation

The balanced panel for QUAD countries (the strategic group including four nations, i.e., US, Japan, Australia and India) from 1991 to 2019 has been utilised for this study. Four variables, viz. GDP, Openness (which is proxied by FDI influx), Sustainability (proxied by total renewable energy generation per year), and Urbanization (indicated by the size of the population living in urban areas). The World Bank (2019) Development Indicator(Banco Mundial, 2019) and Our World in Data(Ritchie et al., 2021) is the primary source of data for the reported study. Further, the data has been described in table 2 presented below.

**Table 2. Variables**

Variable Narrative	Representation	Dimension	Data-Source
Gross Domestic Product	GDP	Million US\$	WDI
Openness	OPEN	Million US\$	WDI
Sustainability	REN	GWH (Gigawatt hour)	Ourworldindata.org
Urbanisation	URB	Million persons	Ourworldindata.org

*Note: WDI= world development indicator retrieved from World Bank repository +*

*Source: Author compilation*



### 3.1. Model Estimation

Though there were multiple studies that have jointly perceived the interconnection of Conventional and non-conventional sources of energy with carbon-di-oxide emanations (Inglesi-Lotz & Dogan, 2018; Nguyen & Kakinaka, 2019; Shakouri & Khoshnevis Yazdi, 2017), the reported study have practically implemented the notion concisely for the QUAD-countries. Moreover, our investigation distinctively integrated sustainability to replace resource-rent in the study conducted by Festus Victor Bekun (Bekun et al., 2019) such that:

$$\mathbf{REN}(\mathbf{x}) = f_x(\text{OPEN}, \text{GDP}, \text{URB}) \quad (1)$$

$$\ln \mathbf{REN}(\mathbf{x})_{i,t} = \alpha_{x1} + \beta_{x,11} \ln \text{OPEN}_{x,i,t} + \beta_{x,12} \ln \text{GDP}_{x,i,t} + \beta_{x,13} \ln \text{URB}_{x,i,t} + \varepsilon_{1x,i,t} \quad (2)$$

The current time-series utilises a logarithmic transformation to have a constant variance. In the estimated equation, Sustainability (REN) is the output variable. Here, x represents the country (x= USA, Australia, Japan, India). Also,  $\ln \mathbf{REN}_{x,i,t}$  against  $\ln \text{OPEN}_{x,i,t}$ ,  $\ln \text{GDP}_{x,i,t}$ , and  $\ln \text{URB}_{x,i,t}$  signify the logarithmically modified dependent variable vs the independent one,  $\alpha_{x1}$  denotes the intercept value,  $\beta_{x,i}(i= 1,2,3)$  is the slope measurement, and  $\varepsilon_{1x,i,t}$  is the white-noise error term.

Because of the prejudices generated by the association amid the mean-differenced self-explaining variables and the white-noise term, the typical “ARDL model” is unqualified for adjusting biases specifically in panel-data studies with singular repercussions. Therefore, a blend of PMG-estimator advanced by Hashem Pesaran and others (Pesaran et al., 1999) and ARDL-approach deliver a correcting brace to the challenges divergent to the inapt “dynamic-panel generalised method of moments” estimators (Sarkodie & Strezov, 2019). Also, to avoid the problem of endogeneity and homogeneity, this approach is very much relevant, because simple ARDL is inefficient to do so.

Conflicting to prevailing techniques presented (Destek & Sarkodie, 2019; Sarkodie, 2018; Sarkodie & Strezov, 2019), the investigation utilises “PMG-ARDL<sup>6</sup>” conduit exploited in an investigation conducted by Sarkodie and Strezov (Sarkodie & Strezov, 2018), expressed as:

$$\Delta \ln y_{x,i,t} = \phi_{x,i} \text{ECT}_{x,i,t} + \sum_{j=0}^{q-1} \Delta \ln Z_{x,i,t-j} + \sum_{j=1}^{p-1} \phi_{i,j} \Delta \ln y_{x,i,t-j} + \varepsilon_{x,i,t} \quad (3)$$

$$\text{ECT}_{x,i,t} = y_{x,i,t-1} - Z_{x,i,t} \theta \quad (4)$$

Where, x represents the country (x= USA, Australia, Japan, India) and y represent the dependent variable (REN), Z denotes the regressors (GDP, OPEN, URB) with equivalent lags across specific cross-sectional units i in time t,  $\Delta$  indicates the difference operator,  $\phi$  denotes the correction quantity,  $\theta$  signifies the associated long-run coefficient that generates two estimates i.e.  $\beta$  and  $\phi$  after realising the convergence, and  $\varepsilon$  signifies the associated error quantum.

<sup>6</sup> Pooled Mean Group Autoregressive Distributed Lag

The present investigation embodies a three-phase approach for its empirical investigation. Starting with testing the stationarity of the distinct time-series, for robustness, two tests were utilised, i.e., “augmented Dickey-Fuller” and “Phillips-Perron” test. (ii) The Co-integration amid the reported variables is investigated to ascertain the prolonged association, popularised by Hashem Pesaran (Pesaran et al., 1999). (iii) Finally, causativeness among the variable has been analysed using pair-wise Granger-causality testing.

#### 4. Results and Discussion

The maiden investigation of data has been done by utilising the descriptive statistics technique, the fallouts have been presented in Table 2.

The preliminary investigation validated that the average GDP value for the USA is the highest; also, the USA bears the highest deviation value in terms of GDP; for openness, the average value for the USA is the highest, and also, the same bears the maximum deviation from the mean. Similarly, in the case of sustainability, which is represented by renewable potential again, the US stood tall both in terms of mean value and deviation from the mean. But the story is altogether different for urbanisation, where India exceeds all both in terms of mean and deviation. All the series are positively skewed except for the urbanisation in the case of Japan. The empirical investigation is performed on a panel of 464 observations.

**Table 3. Descriptive Statistics**

	Mean	Maximum	Minimum	St. Dev	Skewness	Kurtosis	JB
<i>Variable: GDP</i>							
USA	12939023	21433226	6158129	4525445	0.18404	-1.07073	3.135933
Japan	4795388	6203213	3584420	594878.2	0.529353	0.805085	1.595327
Australia	816101.1	1576184	311549.3	464609.1	0.362352	1.482275	3.417993
India	1150803	2868929	270105.3	846114.1	0.677728	-0.92438	1.486067
<i>Variable: Openness</i>							
USA	224839.1	511434	30310	129541	0.264398	2.346654	0.85367
Japan	10168.16	40954.18	2396.91	11218.77	1.201554	3.755322	7.6674
Australia	47366.68	651526.7	-25093.1	118378.9	4.805115	25.10692	70.1293
India	18660.47	50610.65	73.53764	17708.61	0.392038	1.518105	3.39637
<i>Variable: Renewable Energy</i>							
USA	443.812	760.9588	284.4502	131.395	1.181069	3.315838	6.862673
Japan	115.2779	195.0887	77.96449	26.89069	1.517807	4.695101	14.60672
Australia	24.72605	55.34499	16.37845	10.87116	1.393209	3.899023	10.35827
India	131.824	296.7803	70.26861	64.92055	0.914111	2.848789	4.066359
<i>Variable: Urbanisation</i>							
USA	234.7923	270.663	191.5091	24.00761	24.00761	1.867846	1.73918
Australia	17.68268	21.84476	14.76106	2.196339	0.414229	1.890219	2.317532
Japan	107.7524	116.4162	96.00532	8.178042	-0.21817	1.305682	3.698835
India	339.8807	471.0315	228.9228	74.2184	0.18165	1.80077	1.89725

Note: Time-Period For The Study Is From 1991 To 2019. “St. Dev = Standard Deviation”; “J.B= Jarque-Bera Test”

Source: Author Compilation.

Supplementary, we utilise a correlation investigation to inspect the affiliation amid the variables that are to be appraised. The results are presented in table 4.

**Table 4. Analysing the association between variables**

		“lnGDP”	“lnOPEN”	“lnREN”	“lnURB”
USA	lnGDP	1			
	lnOPEN	0.8433	1		
	lnREN	0.7644	0.5627	1	
	lnURB	0.9979	0.8457	0.7656	1
Australia	lnGDP	1			
	lnOPEN	0.8597	1		
	lnREN	0.8559	0.757	1	
	lnURB	0.9518	0.8476	0.9392	1
Japan	lnGDP	1			
	lnOPEN	-0.0668	1		
	lnREN	0.1698	0.5222	1	
	lnURB	0.5713	0.5903	0.6622	1
India	lnGDP	1			
	lnOPEN	0.9209	1		
	lnREN	0.9671	0.838	1	
	lnURB	0.9905	0.9338	0.9476	1

*Source: Authors Compilation*

It is quite evident from the aforementioned table 4 that there exists a significant positive correlation among variables in most of the cases. But a few variables also show an inverse correlation, as presented by openness and GDP in the case of Japan. It is worth mentioning that the correlation estimates are not alone adequate to validate any ramifications. So, the econometric analysis has been employed, as the econometric techniques are more consistent in authenticating or contradicting the objects of the investigation.

To avoid the spurious regression trap, it is obligatory to perform a stationarity analysis. The unit-root statistics have been conveyed in Table 5; we noticed that all of the required variables are first-difference stationery barring urbanisation in the case of Japan. Thus, the broad conclusion can be devised that all the series are of mixed-order integration barring urbanisation in Japan, as reported in table 4.

So, as the “rule of thumb” says, either we should drop the country or the variable from the subsequent analysis to get relevant regression results. There we should drop Japan from the co-integration analysis. The subsequent step after testing the “stationarity” is to proceed with investigating the magnitude of co-integration, as stated in Table 6, through the “PMG-ARDL” model. The model is applied separately for each of the sample country panels.

**Table 5. Unit-root statistics for data stationarity**

		“ADF statistics”		“PP statistics”	
		L <sub>0</sub>	D <sub>1</sub>	L <sub>0</sub>	D <sub>1</sub>
USA					
GDP	t-value	-1.424	-2.933*	-2.381	-2.995**
OPEN	t-value	-2.207	-5.4635***	-2.5063	-5.461***
REN	t-value	0.342	-5.647***	0.4815	-5.647***
URB	t-value	-2.696*	-1.322	13.550***	-1.322
Australia					
GDP	t-value	-0.558	-3.866***	-0.606	-3.870***
OPEN	t-value	-0.972	-6.589***	-2.451	-29.463***
REN	t-value	1.512	-5.465***	3.568	-5.460***
URB	t-value	-1.536	-4.401***	-1.536	-4.376***
Japan					
GDP	t-value	-2.863*	-3.954***	-2.840*	0.007***
OPEN	t-value	-2.226	-6.939***	-2.149	-6.933***
REN	t-value	-0.0734	-8.339***	0.724	-8.211***
URB	t-value	-1.918	-1.11	-1.145	-1.302
India					
GDP	t-value	-0.041	-4.725***	-0.0452	-0.0452***
OPEN	t-value	-3.888***	-4.6296***	-3.888***	-4.666***
REN	t-value	0.724	-5.261***	1.639	-5.275***
URB	t-value	0.213	-1.652*	26.514	-1.652*

Note: \*= significant at 10%, \*\*= significant at 5%, \*\*\*= significant at 1%

L<sub>0</sub> and D<sub>1</sub> represent the statistics at the level and first difference, respectively

**Table 6. PMG- ARDL estimates**

Model: lnREN= F(OPEN, GDP, URB)				
Variable	Coefficient	Std. Error	t- Statistics	Probability
USA: Model PMG-ARDL(2, 1, 0, 1)				
“Long-run”				
lnOPEN	-1.44127	1.164	-1.237	0.231
lnGDP	-3.37386	5.9823	-0.563	0.5793
lnURB	32.903	30.43108	1.08125	0.2931
“Short-run”				
ECT	-0.1316***	0.02765	-4.7613	0
lnOPEN	-0.1126*	0.0574	-1.9622	0.0645
lnGDP	-0.4442	0.67	-0.662	0.5157
lnURB	37.577*	18.53	2.027	0.056
Constant	13.673***	4.435	-3.082	0.006
AUSTRALIA: Model PMG-ARDL(3,4,2,2)				
“Long-run”				
lnOPEN	-0.81402***	0.2183	-3.72887	0.003
lnGDP	0.87321	0.30806	2.83445	0.017
lnURB	7.43143***	1.1128	6.6776	0
“Short-run”				
ECT	-0.2419***	0.0985	-7.53274	0
lnOPEN	-0.0856***	0.02721	-3.14738	0.01
lnGDP	0.6323***	0.19448	3.2517	0.008
lnURB	-18.3644***	5.17114	-3.551	0.005
Constant	-15.8863***	2.70483	-5.87331	0
INDIA: Model PMG-ARDL(3, 4, 0, 3)				
“Long-run”				
lnOPEN	-0.071***	0.0168	-4.2288	0.001
lnGDP	0.093	0.061	1.531	0.1539

lnURB	1.8314***	0.224	8.1522	0
“Short-run”				
ECT <sup>2</sup>	-0.2019***	0.365	-8.755	0
lnOPEN	0	0.0525	-0.004	0.996
lnGDP	0.299	0.2	1.495	0.162
lnURB	-135.296***	41.261	-3.2789	0.007
Constant	-14.365***	2.309	-6.22	0

Note: Number of Observation= 348. Information Criteria- “Akaike Information Criterion (AIC)”

\*\*\*\* denotes the 1% significance level.

\*\* denotes the 5% significance level.

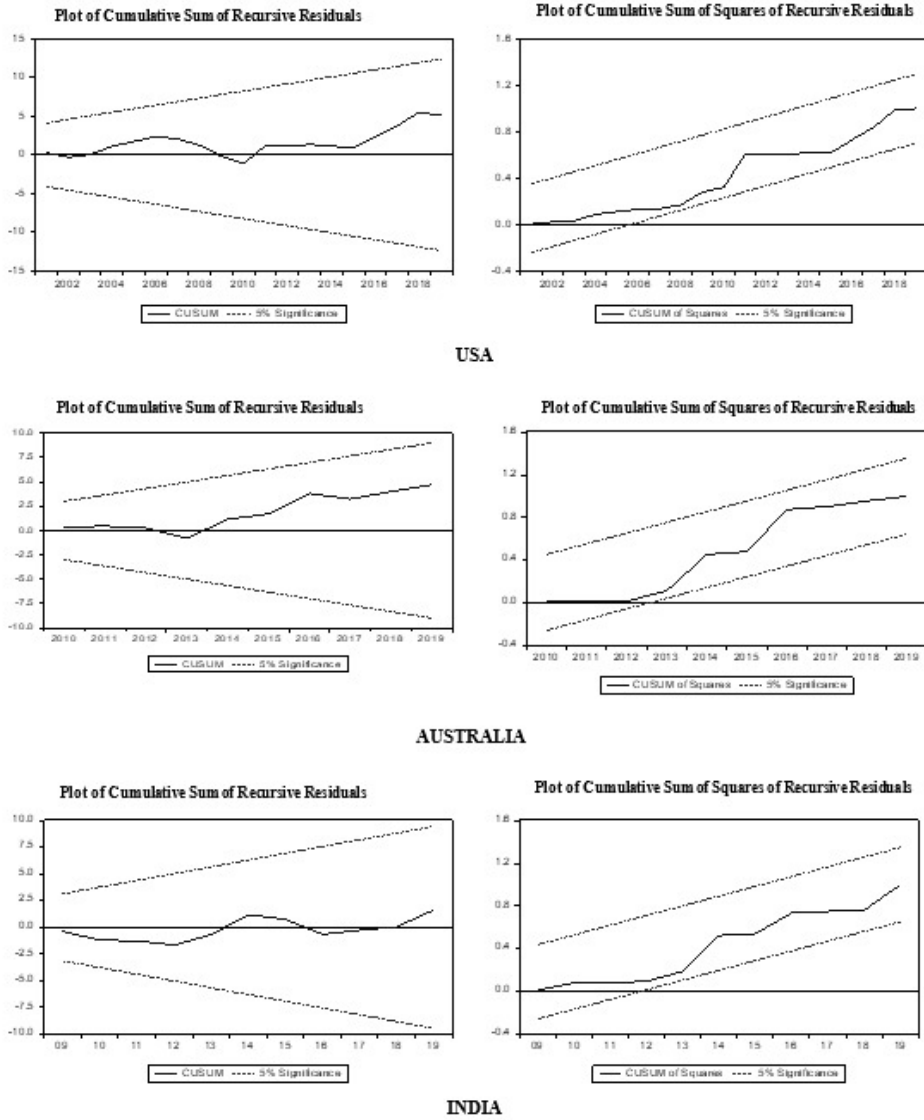
\* denotes the 10% significance level”

The outcomes demonstrate a vigorous appraisal with a convergence speed of 13%, 24%, and 20% for the USA, Australia, and India with the assistance of additional regressors toward their stability path, respectively. In the case of the USA, there is no long-term association amid sustainability and other variables. But in the case of both Australia and India, the study perceives a destructive affiliation amid sustainability and openness. As a 1% proliferation in investment gives birth to a matching 0.81% decrease in sustainability in Australia and 0.07% in India, which means that in the prolonged period, openness will deteriorate the environment quality, as companies will utilise the conventional sources of energy, which are cheap, rather than the greener one which is expensive, thus negatively impacting the sustainability. Also, the study witnesses a constructive association between sustainability and urbanisation both in the case of Australia and India. As a 1% increase in urbanisation corresponds to a 7.4 % and 1.83% increase in sustainability for Australia and India, respectively. The reason being the sustainability is imperative to healthy living in order to make cities better for living; the urban areas will promote sustainable sources of energy, which in turn leads to sustainability. In the immediate run, openness has an adverse effect in all three sample countries, though it is statistically insignificant for India. There is a positive relationship between GDP and sustainability in the case of Australia which means the country supports sustainable development even in the short run. Nonetheless, in the case of the USA, the relationship is inverse, though it is statistically insignificant. Both India and Australia show a negative relationship between urbanisation and sustainability, which means that the rapid urbanisation in the immediate run could lead to adverse environmental conditions, as we saw in the case of Delhi and Gurugram (Liang & Yang, 2019).<sup>7</sup>

In order to examine the robustness of the given model, we conducted a “CUSUM and CUSUMQ test”, the assessment is centred on the “cumulative sum of recursive residuals” and “cumulative sum of squares of recursive residuals”. Rendering to the below-mentioned figure, there are not any kind of instability issues in the case of the USA, Australia, and India.

<sup>7</sup> “Error Correction Term”

**Figure 1. Plots of CUSUM and CUSUMQ tests for the USA, Australia, and India.**



Source: Author Compilation

Table 7 represents the pair-wise granger-causality examination. The panel-causality investigation allows for the examination of the causality direction amid variables in a heterogeneous panel. It is to be noted that in all three countries, there is no Granger causality

between openness and sustainability. Further, in the case of the US and India, both present a bidirectional causality between sustainability and urbanisation. Similarly, in the case of Australia, there is bidirectional causality between GDP (i.e. development and openness) and in the case of India, this relation is bidirectional.

**Table 7. Pair-wise Granger Causality Analysis**

<b>H<sub>0</sub></b>	<b>F-Statistic</b>	<b>Prob.</b>	<b>Causality</b>
<b>USA</b>			
lnOPEN doesn't cause lnREN	0.00	0.98	OPEN≠REN
lnREN doesn't cause lnOPEN	2.23	0.14	
lnGDP doesn't cause lnREN	2.59	0.12	
lnREN doesn't cause lnGDP	4.15**	0.05	REN→GDP
lnURB doesn't cause lnREN	2.76*	0.10	REN↔URB
lnREN doesn't cause lnURB	8.81*	0.07	
lnGDP doesn't cause lnOPEN	3.48*	0.10	GDP→OPEN
lnOPEN doesn't cause lnGDP	0.81	0.37	
lnURB doesn't cause lnOPEN	3.00*	0.09	URB→OPEN
lnOPEN doesn't cause lnURB	0.81	0.37	
lnURB doesn't cause lnGDP	1.87	0.18	URB≠GDP
lnGDP doesn't cause lnURB	0.13	0.71	
<b>AUSTRALIA</b>			
lnOPEN doesn't cause lnREN	0.41	0.6658	OPEN≠REN
lnREN doesn't cause lnOPEN	1.64	0.2151	
lnGDP doesn't cause lnREN	1.26	0.3021	GDP≠REN
lnREN doesn't cause lnGDP	0.49	0.6174	
lnURB doesn't cause lnREN	2.22	0.1316	
lnREN doesn't cause lnURB	3.35**	0.0533	REN→URB
lnGDP doesn't cause lnOPEN	4.26**	0.0272	GDP↔OPEN
lnOPEN doesn't cause lnGDP	2.97*	0.0720	
lnURB doesn't cause lnOPEN	4.04**	0.0320	URB→OPEN
lnOPEN doesn't cause lnURB	2.32	0.1214	
lnURB doesn't cause lnGDP	0.71	0.5006	
lnGDP doesn't cause lnURB	2.64*	0.0937	GDP→URB
<b>INDIA</b>			
lnOPEN doesn't cause lnREN	1.39	0.2677	OPEN≠REN
lnREN doesn't cause lnOPEN	1.86	0.1792	
lnGDP doesn't cause lnREN	3.05*	0.0673	GDP→REN
lnREN doesn't cause lnGDP	1.04	0.3678	
lnURB doesn't cause lnREN	2.79*	0.0827	URB↔REN
lnREN doesn't cause lnURB	3.19*	0.0606	
lnGDP doesn't cause lnOPEN	6.66***	0.0055	GDP→OPEN
lnOPEN doesn't cause lnGDP	1.56	0.2324	
lnURB doesn't cause lnOPEN	2.14	0.1413	URB≠OPEN
lnOPEN doesn't cause lnURB	0.20	0.8194	
lnURB doesn't cause lnGDP	6.24***	0.0071	URB↔GDP
lnGDP doesn't cause lnURB	6.12***	0.0077	

*Note: "The direction of the arrows represents the trend of the causativeness." ≠ represents no relationship, "\*\*\*, \*\*, \* denotes the statistical significance at the 1%, 5% and 10% level."*

## 5. Conclusion and Policy Recommendations

The sustainability literature has well-documented the relationship between capital flows, urbanisation and sustained development in previous researches. With increasing global

warming-induced environmental concerns, energy consumption patterns is receiving wider global attention both in the developed and the large-sized emerging economies, more so carbon emission and renewable energy consumption. But no such investigation has focused particularly on sustainability which is proxied in our result through renewable energy production output. The study lengthens the literature via incorporating the urbanisation represented by the total urban population for the selected QUAD countries (USA, Japan, Australia, and India) over the period 1991–2019, which is also unique as, to my knowledge, no such study has been conducted on QUAD countries; also the previous studies were restricted to the time period of only up to 2014.

In the long run, the findings are pretty much curious. For the USA, there is no long-term association amid sustainability and other variables (Basu et al., 2020; Faisal et al., 2018; Le & Bao, 2020). But in the case of both Australia and India, the study presented a destructive association amid sustainability and openness, which are in line with the findings of Rafiq, Baloch & Bekun; Gyanfi (Baloch et al., 2021; Gyamfi et al., 2020; Rafiq et al., 2016) Also, there is a presence of a positive association between sustainability and urbanisation, which has also been seen true in the previous studies (Ali et al., 2020; Asif et al., 2015) both in the case of Australia and India.

The causativeness between the reported variables has been verified by utilising the pair-wise granger causality test. It is to be eminent that in the USA, Australia and India, there is no Granger causality between openness and sustainability. Further, in the case of the US and India, there is a presence of bi-directional causality between sustainability and urbanisation. Similarly, in the case of Australia, there is bidirectional causality between GDP and openness which is in line with Belloumi & Alshehry, Gries, Manta and Were (Belloumi & Alshehry, 2020; Gries et al., 2012; Manta et al., 2020; Were, 2015), implying that the higher growth rates lead to more open and free trade regimes and in the case of India, this relation is uni-directional (Belloumi & Alshehry, 2020; Were, 2015). In the short run, results are pretty mixed. The acceptable elucidation to this is attributed, that there may be other factors working and the heterogeneity between the sample countries.

For an economy in order to be resource-efficient and environmentally benign, economic growth should be both rapid and sustainable, so it is the responsibility of policymakers to take appropriate steps to cope with the problems related to environmental sustainability as the environment and trade policy in the economies are intertwined in a similar way.

The nations should come up with a policy prioritising both foreign direct investment as well as environmental sustainability. The policy should be formed in such a way that it encourages foreign investment in green innovations.

India and Australia should learn from Japan as well as other developed economies where FDI are bringing in technologies which are less deteriorating and more energy efficient. For this, there needs to be a presence of stricter environmental protocols along with eased investment avenues. Thus the FDI should be promoted without compromising the environmental protection needs, which leads to sustainable development in the long run. Further, the techno policy innovative imports to reduce environmental degradation should also be promoted and MNCs should be encouraged to set up interpersonal green energy grids, so that it may benefit



both the host as well as home countries and act as an instrument of development at both regional as well as global level.

As in India and US, there is a presence of bi-directional causality between sustainability and urbanisation; here, the government should give priority to urban planning as it increases the livability of the cities and keep the avenues open for novel ideas and technologies. There is a need to put in place an urban development policy that will accommodate the rate of urbanisation and an energy policy that will ensure the sustainability of energy consumption in the long run. The initiatives like Power purchase agreement and the adoption of green bonds for energy infrastructure such as transport network, waste management system and water supply needs to be taken on a priority basis at a local level, which further reduces energy-related imports and transforms the economy into a green economy, which is the best way to combat the environmental challenges emanating from economic growth.

Also, with increasing energy demand in urban areas, it becomes a necessity rather than a compulsion to provide affordable energy sources. In order to do so, people are shifting towards personal rooftop power grids based on solar energy. The efforts at a popular level in the form of subsidisation schemes should be promoted to provide affordable renewable energy.

Awareness also plays an important part in non-conventional energy choices, so the government should come up with a sustainable development-centric awareness programme with due consideration to the environment and encourages the adoptability of greener as well as efficient energy choices.

Consequently, all the QUAD member states included in the investigation are party to the “Kyoto Protocol and Paris agreement”. Even so, there subsists a necessity to preserve the impetus concerning sustainability in the grace of arousing inclusive awareness concerning the realisation of a sustainable setting. In light of this, an auxiliary investigation of the scope of the present study should embrace additional republics to capture a better contextual outlook of the topic. Moreover, further researches may also take into consideration other drivers of sustainable development such as human development, technological attainment and advancement, domestic savings and investments, as well as the contract enforcement efficiency of legal systems, which are not examined in this research in addition to the extended time horizon of the study to capture the better outlook of the aforementioned idea of sustainable ecosystems.

## References

- Adebayo, T. S., Awosusi, A. A., Odugbesan, J. A., Akinsola, G. D., Wong, W. K., & Rjoub, H. (2021). Sustainability of energy-induced growth nexus in brazil: Do carbon emissions and urbanisation matter? *Sustainability (Switzerland)*, 13(8). <https://doi.org/10.3390/su13084371>
- Adedoyin, F. F., Alola, A. A., & Bekun, F. V. (2020). An assessment of environmental sustainability corridor: The role of economic expansion and research and development in EU countries. *Science of the Total Environment*, 713. <https://doi.org/10.1016/j.scitotenv.2020.136726>
- Adedoyin, F., Ozturk, I., Abubakar, I., Kumeka, T., Folarin, O., & Bekun, F. V. (2020). Structural breaks in CO2 emissions: Are they caused by climate change protests or other factors? *Journal of Environmental Management*, 266(December 2019), 110628. <https://doi.org/10.1016/j.jenvman.2020.110628>

- Adewale Alola, A., Ozturk, I., & Bekun, F. V. (2021). Is clean energy prosperity and technological innovation rapidly mitigating sustainable energy-development deficit in selected sub-Saharan Africa? A myth or reality. *Energy Policy*, 158(May), 112520. <https://doi.org/10.1016/j.enpol.2021.112520>
- Ali, H. S., Nathaniel, S. P., Uzuner, G., Bekun, F. V., & Sarkodie, S. A. (2020). Trivariate modelling of the nexus between electricity consumption, urbanisation and economic growth in Nigeria: fresh insights from Maki Co-integration and causality tests. *Heliyon*, 6(2), e03400. <https://doi.org/10.1016/j.heliyon.2020.e03400>
- Ali, S., Yusop, Z., Kaliappan, S. R., & Chin, L. (2020). Dynamic common correlated effects of trade openness, FDI, and institutional performance on environmental quality: evidence from OIC countries. *Environmental Science and Pollution Research*, 27(11), 11671–11682. <https://doi.org/10.1007/s11356-020-07768-7>
- Anbu, S. (2020). Sustainable Development : The Balance between Conserving Environmental Resources and Economic Development.
- Anser, M. K., Alharthi, M., Aziz, B., & Wasim, S. (2020). Impact of urbanisation, economic growth, and population size on residential carbon emissions in the SAARC countries. *Clean Technologies and Environmental Policy*, 22, 923–936.
- Arif, A., Sadiq, M., Shabbir, M. S., Yahya, G., Zamir, A., & Bares Lopez, L. (2020). The role of globalisation in financial development, trade openness and sustainable environmental -economic growth: evidence from selected South Asian economies. *Journal of Sustainable Finance and Investment*, 0(0), 1–18. <https://doi.org/10.1080/20430795.2020.1861865>
- Asif, M., Sharma, R. B., & Adow, A. H. E. (2015). An empirical investigation of the relationship between economic growth, urbanisation, energy consumption, and CO2 emission in GCC countries: A panel data analysis. *Asian Social Science*, 11(21), 270–284. <https://doi.org/10.5539/ass.v11n21p270>
- Asumadu-Sarkodie, S., & Owusu, P. A. (2016). Energy use, carbon dioxide emissions, GDP, industrialisation, financial development, and population, a causal nexus in Sri Lanka: With a subsequent prediction of energy use using neural network. *Energy Sources, Part B: Economics, Planning and Policy*, 11(9), 889–899. <https://doi.org/10.1080/15567249.2016.1217285>
- Bai, X., Chen, J., & Shi, P. (2012). Landscape urbanisation and economic growth in China: Positive feedbacks and sustainability dilemmas. *Environmental Science and Technology*, 46(1), 132–139. <https://doi.org/10.1021/es202329f>
- Baloch, M. A., Ozturk, I., Bekun, F. V., & Khan, D. (2021). Modeling the dynamic linkage between financial development, energy innovation, and environmental quality: Does globalisation matter? *Business Strategy and the Environment*, 30(1), 176–184. <https://doi.org/10.1002/bse.2615>
- Basu, S., Roy, M., & Pal, P. (2020). Exploring the impact of economic growth, trade openness and urbanisation with evidence from a large developing economy of India towards a sustainable and practical energy policy. *Clean Technologies and Environmental Policy*, 22(4), 877–891. <https://doi.org/10.1007/s10098-020-01828-9>
- Behera, S. R., & Dash, D. P. (2017). The effect of urbanisation, energy consumption, and foreign direct investment on the carbon dioxide emission in the SSEA (South and Southeast Asian) region. In *Renewable and Sustainable Energy Reviews* (Vol. 70, pp. 96–106). Elsevier Ltd. <https://doi.org/10.1016/j.rser.2016.11.201>
- Bekun, F. V., Alola, A. A., & Sarkodie, S. A. (2019). Toward a sustainable environment: Nexus between CO2 emissions, resource rent, renewable and non-renewable energy in 16-EU countries. *Science of the Total Environment*, 657, 1023–1029. <https://doi.org/10.1016/j.scitotenv.2018.12.104>
- Belloumi, M., & Alshehry, A. (2020). The impact of international trade on sustainable development in Saudi Arabia. *Sustainability (Switzerland)*, 12(13). <https://doi.org/10.3390/su12135421>
- Chang, R., Kaltani, L., & Loayza, N. V. (2009). Openness can be good for growth: The role of policy complementarities. *Journal of Development Economics*, 90(1), 33–49. <https://doi.org/10.1016/j.jdeveco.2008.06.011>
- Combes Motel, P., Choumert, J., Minea, A., & Sterner, T. (2014). Explorations in the Environment-Development Dilemma. *Environmental and Resource Economics*, 57(4), 479–485. <https://doi.org/10.1007/s10640-013-9745-9>
- Destek, M. A., & Sarkodie, S. A. (2019). Investigation of environmental Kuznets curve for ecological footprint: The role of energy and financial development. *Science of the Total Environment*, 650, 2483–2489. <https://doi.org/10.1016/j.scitotenv.2018.10.017>
- Dollar, D., & Kraay, A. (2004). TRADE, GROWTH, AND POVERTY\*.
- Douglas, I. (2012). Urban ecology and urban ecosystems: Understanding the links to human health and well-being. *Current Opinion in Environmental Sustainability*, 4(4), 385–392. <https://doi.org/10.1016/j.cosust.2012.07.005>

- Faisal, F., Tursoy, T., Günsel Resatoglu, N., & Berk, N. (2018). Electricity consumption, economic growth, urbanisation and trade nexus: empirical evidence from Iceland. *Economic Research-Ekonomiska Istrazivanja*, 31(1), 664–680. <https://doi.org/10.1080/1331677X.2018.1438907>
- Fan, P., Chen, J., Ouyang, Z., Groisman, P., Loboda, T., Gutman, G., Prishchepov, A. V., Kvashnina, A., Messina, J., Moore, N., Myint, S. W., & Qi, J. (2018). Urbanisation and sustainability under transitional economies: A synthesis for Asian Russia. *Environmental Research Letters*, 13(9). <https://doi.org/10.1088/1748-9326/aadbf8>
- Frankel, J. A., & Romer, D. (1999). Does Trade Cause Growth?
- Freund, C., & Bolaky, B. (2008). Trade, regulations, and income. *Journal of Development Economics*, 87(2), 309–321. <https://doi.org/10.1016/j.jdeveco.2007.11.003>
- Gries, T., Redlin, M., Gries, T., & Redlin, M. (n.d.). Trade Openness and Economic Growth: A Panel Causality Analysis. [www.C-I-E.org](http://www.C-I-E.org)
- Gyamfi, B. A., Bein, M. A., Ozturk, I., & Bekun, F. V. (2020). The Moderating Role of Employment in an Environmental Kuznets Curve Framework Revisited in G7 Countries. *Indonesian Journal of Sustainability Accounting and Management*, 4(2), 241. <https://doi.org/10.28992/ijSAM.v4i2.283>
- Gyamfi, B. A., Ozturk, I., Bein, M. A., & Bekun, F. V. (2021). An investigation into the anthropogenic effect of biomass energy utilisation and economic sustainability on environmental degradation in E7 economies. *Biofuels, Bioproducts and Biorefining*, 15(3), 840–851. <https://doi.org/10.1002/bbb.2206>
- han, J., Zeeshan, M., Ullah, I., Rehman, A., & Alam Afridi, F. E. (2021). Trade Openness and Urbanization impact on Renewable and Non-Renewable Energy Consumption in China. <https://doi.org/10.21203/rs.3.rs-1000201/v1>
- Haseeb, A., Xia, E., Danish, Baloch, M. A., & Abbas, K. (2018). Financial development, globalisation, and CO2 emission in the presence of EKC: evidence from BRICS countries. *Environmental Science and Pollution Research*, 25(31), 31283–31296. <https://doi.org/10.1007/s11356-018-3034-7>
- Iheonu, C. O., Anyanwu, O. C., Odo, O. K., & Nathaniel, S. P. (2021). Does Economic Growth, International Trade and Urbanization uphold Environmental Sustainability in sub-Saharan Africa? Insights from Quantile and Causality Procedures. *Environmental Science and Pollution Research*, 70234, 1–24. [http://clock.uclan.ac.uk/25161/1/25161\\_Education-in-the-Diffusion-of-Knowledge-with-Mobile-for-Inclusive-dev.pdf](http://clock.uclan.ac.uk/25161/1/25161_Education-in-the-Diffusion-of-Knowledge-with-Mobile-for-Inclusive-dev.pdf)
- Inglesi-Lotz, R., & Dogan, E. (2018). The role of renewable versus non-renewable energy to the level of CO2 emissions a panel analysis of sub-Saharan Africa's Big 10 electricity generators. *Renewable Energy*, 123, 36–43. <https://doi.org/10.1016/j.renene.2018.02.041>
- Intisar, R. A., Yaseen, M. R., Kousar, R., Usman, M., & Amjad Makhdom, M. S. (2020). Impact of trade openness and human capital on economic growth: A comparative investigation of Asian countries. *Sustainability (Switzerland)*, 12(7). <https://doi.org/10.3390/su12072930>
- Keho, Y. (2017). The impact of trade openness on economic growth: The case of Cote d'Ivoire. *Cogent Economics and Finance*, 5(1). <https://doi.org/10.1080/23322039.2017.1332820>
- Le, H. P., & Bao, H. H. G. (2020). Renewable and non-renewable energy consumption, government expenditure, institution quality, financial development, trade openness, and sustainable development in Latin America and the Caribbean emerging market and developing economies. *International Journal of Energy Economics and Policy*, 10(1), 242–248. <https://doi.org/10.32479/ijEEP.8506>
- Liang, W., & Yang, M. (2019). Urbanisation, economic growth and environmental pollution: Evidence from China. *Sustainable Computing: Informatics and Systems*, 21, 1–9. <https://doi.org/10.1016/j.suscom.2018.11.007>
- Macomber, J. D. (2013). Building sustainable cities. *Harvard Business Review*, 91(7–8), 2013.
- Manta, A. G., Florea, N. M., Badircea, R. M., Popescu, J., Cîrciumaru, D., & Doran, M. D. (2020). The nexus between carbon emissions, energy use, economic growth and financial development: Evidence from central and eastern European countries. *Sustainability (Switzerland)*, 12(18). <https://doi.org/10.3390/SU12187747>
- Mehra, J. (2020). The Australia-India-Japan-US Quadrilateral: Dissecting the China Factor. ORF Occasional Paper No. 264, Observer Research Foundation.
- Murshed, M., Elheddad, M., Ahmed, R., Bassim, M., & Than, E. T. (2021). Foreign Direct Investments, Renewable Electricity Output, and Ecological Footprints: Do Financial Globalization Facilitate Renewable Energy Transition and Environmental Welfare in Bangladesh? *Asia-Pacific Financial Markets*. <https://doi.org/10.1007/s10690-021-09335-7>
- Nathaniel, S. P., & Bekun, F. V. (2020). Environmental management amidst energy use, urbanisation, trade openness, and deforestation: The Nigerian experience. *Journal of Public Affairs*, 20(2). <https://doi.org/10.1002/pa.2037>

- Nguyen, K. H., & Kakinaka, M. (2019). Renewable energy consumption, carbon emissions, and development stages: Some evidence from panel co-integration analysis. *Renewable Energy*, 132, 1049–1057. <https://doi.org/10.1016/j.renene.2018.08.069>
- Nketiah, E., Cai, X., Adjei, M., & Boamah, B. B. (2020). Foreign Direct Investment, Trade Openness and Economic Growth: Evidence from Ghana. *Open Journal of Business and Management*, 08(01), 39–55. <https://doi.org/10.4236/ojbm.2020.81003>
- Olorogun, L. A., Salami, M. A., & Bekun, F. V. (2020). Revisiting the Nexus between FDI, financial development and economic growth: Empirical evidence from Nigeria. *Journal of Public Affairs*. <https://doi.org/10.1002/pa.2561>
- Pahl, S., & Timmer, M. P. (2020). Do Global Value Chains Enhance Economic Upgrading? A Long View. *Journal of Development Studies*, 56(9), 1683–1705. <https://doi.org/10.1080/00220388.2019.1702159>
- Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled Mean Group Estimation of Dynamic Heterogeneous Panels. *Journal of the American Statistical Association*, 94(446), 621. <https://doi.org/10.2307/2670182>
- Piddington, K. W. (1990). Third World dilemma: development, environment. *Forum for Applied Research & Public Policy*, 5(3), 26–29.
- Rafiq, S., Salim, R., & Nielsen, I. (2016). Urbanisation, openness, emissions, and energy intensity: A study of increasingly urbanised emerging economies. *Energy Economics*, 56, 20–28. <https://doi.org/10.1016/j.eneco.2016.02.007>
- Sarkodie, S. A. (2018). The invisible hand and EKC hypothesis: what are the drivers of environmental degradation and pollution in Africa? *Environmental Science and Pollution Research*, 25(22), 21993–22022. <https://doi.org/10.1007/s11356-018-2347-x>
- Sarkodie, S. A., & Strezov, V. (2018). Empirical study of the Environmental Kuznets curve and Environmental Sustainability curve hypothesis for Australia, China, Ghana and USA. *Journal of Cleaner Production*, 201, 98–110. <https://doi.org/10.1016/j.jclepro.2018.08.039>
- Sarkodie, S. A., & Strezov, V. (2019). Effect of foreign direct investments, economic development and energy consumption on greenhouse gas emissions in developing countries. *Science of the Total Environment*, 646, 862–871. <https://doi.org/10.1016/j.scitotenv.2018.07.365>
- Shakouri, B., & Khoshnevis Yazdi, S. (2017). Causality between renewable energy, energy consumption, and economic growth. *Energy Sources, Part B: Economics, Planning and Policy*, 12(9), 838–845. <https://doi.org/10.1080/15567249.2017.1312640>
- Sheikh, M. A., Malik, M. A., & Masood, R. Z. (2020). Assessing the effects of trade openness on sustainable development: evidence from India. *Asian Journal of Sustainability and Social Responsibility*, 5(1). <https://doi.org/10.1186/s41180-019-0030-x>
- Staniškis, J. K. (2020). Future is now: science for achieving sustainable development– the global sustainable development report 2019. In G. Zilahy (Ed.), *sustainability in transforming societies: proceedings of the 26th annual conference of the international sustainable development research society (ISDRS 2020)* (pp. 831–839). Budapest University of Technology and Economics.
- Tecel, A., Katircioğlu, S., Taheri, E., & Victor Bekun, F. (2020). Causal interactions among tourism, foreign direct investment, domestic credits, and economic growth: evidence from selected Mediterranean countries. *Portuguese Economic Journal*, 19(3), 195–212. <https://doi.org/10.1007/s10258-020-00181-5>
- Udi, J., Bekun, F. V., & Adedoyin, F. F. (2020). Modeling the nexus between coal consumption, FDI inflow and economic expansion: does industrialisation matter in South Africa? *Environmental Science and Pollution Research*, 27(10), 10553–10564. <https://doi.org/10.1007/s11356-020-07691-x>
- Vitenu-Sackey, P. A., & Barfi, R. (2021). The Impact of Covid-19 Pandemic on the Global Economy: Emphasis on Poverty Alleviation and Economic Growth. *The Economics and Finance Letters*, 8(1), 32–43. <https://doi.org/10.18488/journal.29.2021.81.32.43>
- Were, M. (2015). Differential effects of trade on economic growth and investment: A cross-country empirical investigation☆. *Journal of African Trade*, 2(1–2), 71. <https://doi.org/10.1016/j.joat.2015.08.002>
- World Economic Forum. (2021). *The Global Risks Report 2021: 16th Edition*. In Weforum.Org. [http://www3.weforum.org/docs/WEF\\_The\\_Global\\_Risks\\_Report\\_2021.pdf](http://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2021.pdf)
- Yang, B., Jahanger, A., Usman, M., & Khan, M. A. (2021). The dynamic linkage between globalisation, financial development, energy utilisation, and environmental sustainability in GCC countries. *Environmental Science and Pollution Research*, 28(13), 16568–16588. <https://doi.org/10.1007/s11356-020-11576-4>
- Zhang, Q., Naqvi, S. A. A., & Shah, S. A. R. (2021). The contribution of outward foreign direct investment, human well-being, and technology toward a sustainable environment. *Sustainability (Switzerland)*, 13(20). <https://doi.org/10.3390/su132011430>

## **SUMMARIES**

*Victor Yotzov*

### **THE EURO AND BULGARIA – FEARS AND HOPES**

The political passions of the last three years have prevented the general public from appreciating the long-awaited event – the accession to ERM II, which is undoubtedly an important achievement and the last step towards full membership of the Eurozone. In a broader sense, the monetary union can be considered as a preparatory stage for the transition of the European Union to the next form – Political Union. In practice, however, this does not happen, and the eurozone expansion process is currently slowing down. The main goal of the proposed article is to dispel some of the fears that have been instilled in recent months, related to the upcoming accession of Bulgaria to the Eurozone. The main theoretical concepts regarding the benefits and disadvantages of joining a monetary union are examined. The initial prerequisites, the structure and functioning of the modern monetary regime, as well as some of the peculiarities in the development of the Bulgarian economy, are analysed.

Keywords: Euro; Optimum Currency Areas; Integration

JEL: E58; F36

*Stoyan Tanchev, Naftaly Mose*

### **FISCAL POLICY AND ECONOMIC GROWTH: EVIDENCE FROM EUROPEAN UNION COUNTRIES**

This article empirically examines the fiscal policy elements affecting economic growth in 27 European countries and Switzerland (Without the United Kingdom). The research objective is to estimate the impact of macroeconomic variables such as tax revenue, government expenditure and public debt on the economic development of 28 European countries. The study employs a panel ordinary least squares (POLS) technique with a fixed effect estimation method. The Hausman test was applied to support the validity of the fixed effect over the random effect estimation model. Annual secondary data for the period 1995-2020 were used, including 728 observations. Based on the results, it may be inferred that the increase in government expenditure and tax revenue leads to an increase in economic growth in 28 EU countries. However, the higher rates of public debt lead to a decrease in economic growth. From the standpoint of fiscal policy, we conclude that Keynesian theory in the 28 EU countries was present. The study has empirically established the importance of fiscal policy tools in European countries. The study calls for the establishment of moderate fiscal policy strategies that would help ensure solvency and stimulate economic growth.

Keywords: fiscal policy; budget deficit; economic growth; Keynesian theory

JEL: E62; H62; E12; E13

*Ignat Ignatov*

### **CONVERGENCE DETERMINANTS AND CLUB FORMATION IN THE EU OVER 1999-2021**

Within the EU, the applied decomposition of the GDP per capita over 1999-2021 reveals that labour productivity is a dominant contributor to economic growth, followed by employment, though the impact of each factor is largely non-uniform among countries. Although the fast-converging economies benefit from productivity gains, the core EA countries have lost some of their long-term growth capacity. Despite the implemented measures, almost all EU countries experience an

aggravating age structure. In 2020, digitalization was evidenced to have mitigated the negative effects of COVID-19 on productivity and employment. The estimated panel model accounts for these developments by including other relevant convergence factors such as human capital, regulatory quality and debt. The investments are empirically inferred to be a transmission channel of the positive impact of higher institutional quality and the adverse influence of higher debt stock on economic growth. While in times of high indebtedness, the expenditures on education are found to be crowded out by interests, the low debt is not necessarily associated with greater spending on education. Eventually, these inferences are graphically supported by the three-club formation derived through the K-means clustering algorithm. Although such distribution is generally in line with the neoclassical growth theory, it also reveals disturbing EU heterogeneity due to worsening demographic dynamics, rising indebtedness and insufficient regulatory quality. The derived club formation is not tightly related to EMU membership. Overall, to enhance the speed and quality of the convergence, the EU countries have to strengthen their institutional and fiscal framework.

Keywords: convergence; clubs; COVID-19; institutions; debt; clustering

JEL: O43; O47; C38

*Stefan Petranov, Milena Angelova, Lillyana Georgieva, Radostina Ivcheva, Nino Avreyski*

### **IS TAX MORALE HOMOGENEOUS IN BULGARIA?**

The article argues that tax morale is an essential component of social capital with a significant impact on tax compliance and tax collection. Against this backdrop, the results of the study are based on a questionnaire survey in Bulgaria, conducted among 1280 employed individuals. They work in enterprises that are representative of the country's economy in terms of economic activity, size, and geographical location. We design an index to assess the tax morale of the respondents and use it to address a series of questions. What is the tax morale of the Bulgarian population currently? What factors possibly influence it? Are there any differences between various population groups, based on socio-demographic or socio-economic characteristics? The results show that tax morale in Bulgaria is heterogeneous. Such findings lead to certain conclusions about economic policy reforms. By influencing the tax morale of the population, policymakers can improve tax collection. Our estimations show that a relatively large share of the population in Bulgaria has average or low tax morale. We point out that one of the most effective ways to increase tax revenues is through targeted measures to improve the tax morale of specific groups of people with a high inclination to participate in the shadow economy and evade taxes. Using statistical tests and ordinal regression models, this article provides empirical evidence that the profile of these individuals includes low income, living in regional cities, younger age and poor education.

Keywords: tax morale; tax collection; shadow economy; economic policy; ordinal regression model; Bulgaria

JEL: H26; H30; K42; O17

*Vasyl Demianyshyn, Bohdana Shuliuk*

### **FORMATION AND USE OF THE SYSTEM OF FINANCIAL INCENTIVES FOR THE DEVELOPMENT OF PARTNERSHIP BETWEEN THE STATE AND BUSINESS**

The article reveals the domestic and foreign practices of using the main types of financial incentives for public-private partnership: direct financial support, subsidies, guarantees and insurance and government benefits. It was found that concessional lending, provided mainly by international development banks, plays an important role in direct financial support. Such support is especially

relevant in the initial stages of project implementation due to the lack of skills and financial resources to achieve effective results. Emphasis is placed on the active participation of public authorities in the lending process, which involves the signing of international agreements and the provision of state or local credit guarantees. Given the low level of development of the financial market in Ukraine, the expediency of using interest rate subsidies is justified, which compensates for the difference between market and preferential rates. It is proved that in the process of state incentives in the form of tax benefits, preferential tariffs for private partners, lease or leasing benefits, public authorities must take into account the annual losses of the state budget from the provision of such benefits. In this regard, to minimize the negative consequences, it is necessary to apply financial incentives, taking into account the impact on the budget and financial and economic activities of economic entities, to introduce an effective system of control over their use. Carrying out a comprehensive analysis of the use of financial incentives in domestic and international practice made it possible to identify problems that hindered their successful implementation in Ukraine.

Keywords: financial incentives; public-private partnership; soft loans; guarantees and insurance; subsidies; tax benefits

JEL: G32; G38; H54

*Petar Peshev*

### **ESTIMATION OF THE VALUE, DISTRIBUTION AND CONCENTRATION OF WEALTH IN BULGARIA, 1995-2020**

This paper estimates private wealth in Bulgaria using different official sources of macroeconomic and survey data. Due data availability reasons, the 1995-2020 period is analysed. Net wealth is calculated by capitalising incorporated and non-incorporated entrepreneurs' income, combining it with administrative and survey sources of data on real and financial wealth and liabilities. The net wealth of Bulgarian households is rising in nominal EUR and PPP terms, so is inequality. From the end of 1995 until the end of 2020 net wealth of Bulgarian households (individuals) has grown eightfold, from EUR 41.7 bln to EUR 381.8 bln, while per adult and per capita measures have grown tenfold, from 8.5 thousand euro to 92.2 thousand euro and from 4.9 to 55.2 thousand euro respectively. The geometric average rate of growth (CAGR) amounts to 9.3% yearly for the net wealth, 10% for the net wealth per adult and 10.1% for the net wealth per capita. For the period under review, the bottom half of individuals own less than 5.1% of net wealth on average, while the top decile and percentile own 65.3% and 10.6% of total net wealth on average, respectively, while the Gini coefficient grows to 0.75 at the end of the period but accepting values between 0.63 and 0.81 over the analysed period.

Keywords: wealth; inequality; wealth distribution; wealth concentration; income capitalisation; GINI

JEL: D31; E01; G51; D63

*Maria Blikhar, Valerii Syrovatskyi, Ulyana Bek, Maria Vinichuk, Lesia Kucher, Maryana Kashchuk*

### **SHADOW ECONOMY VS ECONOMIC SECURITY: TRENDS, CHALLENGES, PROSPECTS**

The purpose of the article is to highlight the results of the study of counteracting the shadow economy in the system of ensuring the economic security of the agricultural sector and its impact on the poverty level of the population. The relationship between the shadowing of the economy and the growth of the poverty level in Ukraine is substantiated, which is confirmed by the results of cluster and regression analysis. A study of the dynamics of the integral indicator of the level of the shadow economy and changes in the volume of real GDP in Ukraine is conducted and the volume of official GDP created by shadow wages is estimated. Predictive assessments of the level of the shadow

economy and poverty in the coming years have been made, and growth trends have been established. It has been found that the growth of the level of the shadow economy has a significant impact on the population poverty indicator. The regional features of the spread of the shadow economy and population poverty are analyzed, as a result of which it has been proved that a higher standard of living of the population and a lower level of poverty are observed in the border and industrially developed regions.

Keywords: shadow economy; economic security; legal relations; agricultural sector; economic security of agriculture; Ukraine

JEL: O17; Q10; Q14

*Reni Pantcheva*

### **CIRCULAR USE OF MATERIALS: DRIVERS OF THE CIRCULARITY RATE IN THE EUROPEAN UNION**

In the transition to a greener economy, countries need suitable indicators to follow progress on sustainability. One such metric, the ‘circularity rate’, indicates the share of recovered resources used in the economy which substitute for primary raw materials. The current paper analyses 27 European Union member countries to study the effects of selected waste management and resource efficiency indicators as well as several socio-economic determinants on the circularity rate. Results indicate that four factors emerge as equally important – GDP per capita, research and development expenditure, resource productivity and environmental tax revenues, where past values of R&D expenditure and resource productivity are especially useful in predicting the circularity rate. The research findings also emphasise the importance of adequate environmental taxation policy and its role in driving circularity. Finally, suggestions for future research on the topic are made to expand the model and allow for comparisons with other countries on their path to a circular economy.

Keywords: Circularity rate; Circular economy; Resource efficiency; Recyclable materials; Environmental taxation

JEL: H23; O13; Q53; Q56

*Muazza Muazza, Akhmad Habibi, Amirul Mukminin*

### **THE SOCIALLY RESPONSIBLE HUMAN RESOURCES MANAGEMENT AND ITS IMPACTS ON THE ORGANIZATIONAL LEGITIMACY: THE CASE OF INDONESIAN EMPLOYEES**

Socially responsible human resource management (SRHRM) is a basic action of human resource management (HRM) divisions used by businesses, companies, or organizations in accomplishing external corporate social responsibility (CSR) agendas. The purpose of this study is to examine the relationship between the CSR in human resources and organizational legitimacy in Indonesia. . Also, in our study, PLS-SEM was used to assess the relevance and effectiveness of various CSR strategies. The evaluations of 46 employees in Jambi, Sumatra, Indonesia, were used for this purpose. The data were analyzed by using PLS-SEM, which revealed a robust and positive link between employee-focused CSR actions and organizational legitimacy. The findings provide useful information for companies looking to improve their resource optimization and internal stakeholder management by implementing CSR policies correctly and efficiently.

Keywords: Human resources; management; organizational legitimacy

JEL: G4; H3; J24; L2; L3; O15



*Saransh Royal, Namarta Kaushik, Ramesh Chander, Nirmala Chaudhary*

**A NEXUS BETWEEN SUSTAINABILITY, OPENNESS, DEVELOPMENT,  
AND URBANIZATION: PANEL DATA EVIDENCE FROM QUAD  
NATIONS**

The paper explores the relationship between economic openness, development and urbanisation in sustainable ecosystems. The investigation is based on the balanced panel data for QUAD countries from 1991 to 2019. By using PMG-ARDL, this paper follows affiliation amid sustainability and openness. The results reported indicate the existence of an encouraging association between sustainability and urbanisation both in the case of Australia and India. The ECT value for all the panels is negative and noteworthy, confirming the existence of short-term affiliation too. The granger causality analysis also reveals that in the case of the US and India, there existed bi-directional causation amid sustainability and urbanisation. Knowing well that the countries are party to the “Kyoto Protocol and Paris agreement”, but there is still a necessity to preserve and promote the impetus concerning sustainability in arousing inclusive awareness concerning the realisation of sustainable ecosystems. More so, subsidising schemes and promoting awareness programmes are recommended, such as incentivising sustainable urban planning and green power purchase agreement and adoption of green bonds for energy infrastructure needs.

Keywords: Environmental Sustainability, Urban Growth, Foreign Investment, ARDL and Sustainable Ecosystems

JEL: C23, C33, F15, R11, Q56