GREEN BONDS, BORROWING AND OTHER IMPORTANT (REVOLUTIONARY) NOVELTIES OF THE EUROPEAN UNION BUDGET FOR THE PERIOD FROM 2021 TILL 2027

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Abstract

The EU budget 2021 - 2027 stands at 1,824.3 billion euros. It has two parts: Next Generation EU (750 billion euros) and Multiannual Financial Framework (1,074.3 billion euros). The EU already issues different debt instruments to finance more than 40% of its budget (750 billion euros). One-third of this borrowing (250 billion euros) will be funded through the EU's Next Generation Green Bonds. We prove that issuing new short- and long-term EU debt instruments has become an important source and novelty for the EU budget. We also demonstrate that many other important, even 'revolutionary' novelties are connected to the EU budget 2021 – 2027. We explore all these novelties in a very systematic way that represents original contributions to financial research. We systematically researched the EU green bonds for the first time. We also explore some green bonds' characteristics and requirements to prove that the EU green bonds are a very financially and strategically important novelty for the EU 2021 - 2027 budget.

Key Words

EU budget; EU bonds; green bonds.

INTRODUCTION AND LITERATURE REVIEW

We analyse borrowing of the European Union (in fact, the European Commission on its behalf) in the context of the European bond program (from now on referred to as the "Next Generation EU Bonds"); however, we want to emphasise the green bonds within the whole European Union borrowing, within the European Union bonds issuing, and within the European Bond Program. The green bonds make the European Union one of the largest global single issuers and are essential at the forefront of this paper and its central thesis. If the next EU budget from 2028 to 2034 continues with the existing pace of issuing green bonds, the EU might become, by far, the world's largest green bond issuer.

Most of the European Union member states have already received many tranches of the EU budget, mainly within the framework of the Recovery Resilience Facility (RRF); however, although the budget of the European Union for the period 2021 - 2027 is already underway, it is still important to emphasise that its spending has not yet fully started owing to delays in member state regional smart specialization strategies and consequently their operating programmes. The European Commission must approve both before tenders/calls can be published and money used according to the European Union priorities. This national, regional spending of the EU budget (the EU Cohesion Policy: European Structural and Investment Funds supported SMEs, employment of millions of people and clean energy production) goes through the European Cohesion and Investment Funds (ECIF) which consist of the European Regional Development Fund (ERDF), the European Social Fund (ESF), the Cohesion Fund (CF), the Agricultural Fund for Rural Development (AFRD) and the European Maritime and Fisheries Fund (EMFF). According to its size, the most crucial part is the Cohesion Fund. Practically, all the EU countries or their regions/provinces, where they are the carriers of drawing structural funds, still take advantage of the possibility of using them from the previous financial perspective of 2014 –2020. This possibility remains within three years after its calendar expiration – by the end of 2023.

These procedures of adopting smart specialisation strategies and operational programmes based on them have taken much time in some countries/regions. The so-called centralised European tenders (that is, those that the European Commission directly carries out entirely in Brussels) according to the EU priorities have already been taking place (see, for example, Veselinovič, Will The EU Budget 2021 - 27 Cause Some Financial Deepening Of The European Union and The European Monetary Union?!), and yet, since the new European Union seven-year budget period 2021 – 2027 has already begun, its consumption because of the delays in structural funds programming and spending has not fully started yet. Regardless of everything analysed, the European Union or the European Commission, on its behalf, has already begun borrowing from the financial markets with many revolutionary innovations. Therefore, the first thesis of the paper is that the European Union's borrowing through international financial markets represents a significant, even revolutionary, novelty of the European budget

2021 – 2027. Additionally, issuing green bonds means a vital novelty and an essential source for the European programmes covering and financing necessary climate changes that the European Union is systematically heading as the first globally.

The primary purpose of the article is to analyse the borrowing of the European Union with a particular emphasis on the EU green bonds and to test the central thesis of the paper whether the outlined EU borrowing, and within it, green bonds issuing, represents a significant global and especially the European Union novelty in terms of the size and form. We will also touch on the taxonomy of green bonds to test the central thesis.

However, along the way, proving the central thesis, we will also test whether the European Union budget for 2021 – 2027 has some essential systemic and other important and even revolutionary novelties never used before.

This paper initially researches in a very systematic way all (revolutionary) novelties of the European Union budget for 2021 – 2027 with a particular emphasis on the 'revolutionary' EU borrowing for the first time in EU history and, within this, on green bonds issuing. The way this article is structured and this theme has been researched and put forward represents a unique contribution to business and business-related science and practice.

Since not much has been explicitly published about this subject, checking with Scopus, Web of Science, Google Scholar, and some other bases like Econlit, many references are based on the primary source of a public budget or the adapted European Union budget and new own resources' decisions by the European Council as Matthijs (2022) stated, as well. The same author published an article about the European Union budget from 2021 to 2027, describing how it was formed and put together. He additionally researched quite in detail what this budget means for Belgium. He correctly points out that the EU has already started borrowing on financial markets for its budget through social bond issuing (100 billion euros) for the European Union SURE (2022) program (short-term employment schemes across the European Union). However, he has not gone into any detail regarding the EU budget novelties.

Schout, Luuk, and Saskia (2023) wrote an interesting article about the EU budget 2021 – 2017 but focused more on the money and program efficiency of this new European Union budget and some previous ones. They elaborated quite precisely on problematic convergence, coherence, and budget flexibility. The EU has a historically record budget, but this is still insufficient for its better results and positive economic consequences, especially in the direction of better convergence. They also mention three new characteristics in the EU budget 2021 – 2023 (size, new revenue sources, borrowing).

In another article, Schout and Riel (2022) again focus on convergence, which is not happening at all. Surprisingly, they found that countries that reduced their debts reached higher GDP growth than countries that had not. They claim that Ireland and Eastern European countries are doing much better than South European countries regarding economic results and convergence with the developed part of the EU. Even with the new budget, the EU has limited fiscal space, which would change only if the EU took over national budgets.

Kölling (2022) discusses the new EU budget but from the point of view of its conditionality, which causes the so-called stressed EU budget. Countries not respecting the EU rules and laws will be prevented from getting particular European Union money, which will highlight the EU budget.

Vitola, Aleksejeva and Ostrovska (2021) study the new European Union budget from the point of view of its effects on green goals ('Green Deal' and other global and especially the European Union climate goals). Some older scientific articles discuss different issues about the EU's fiscal and budget problems, but then again, nothing in the context of this paper.

Andersen et al. (2018) claim that crises even help the EU in some results regarding its mobilisation, while divergence has prevailed most of the time. Comparing this to Schout, Luuk and Saskia (2023), it is interesting because they claim that divergence exists even with the new historically highest European Union budget. They claim that more than the highest budget is needed. More long-term-oriented research (Sapir et al., 2008) about the European Union budgets claims that the European Union budget (they refer at that time only to Multiannual Financial Facility) has yet to be consistent with the present and future of the European Union integration. That is synchronised with the opinion of Schout and others (2023), who claim that even for the record-high European Union budget 2021 – 2027.

RESEARCH METHODOLOGY

The theme of this paper is a quite specific one. Therefore, I had to adopt such research methodologies to achieve the goal of this article to test all theses: borrowing of the EU budget is an essential revolutionary historical novelty, green bonds represent a vital part of this borrowing, and there are many other novelties of the EU budget 2021 – 2027. Studying a budget means using descriptive methods, analysing, using the first deduction and then synthesis, and comparing different segments and structures of the EU budget 2021 – 2027 and comparing them to the previous budget (2014 – 2020). We use simple statistical methods comparing different budget categories and segments and one budget (2021 – 2027) to another (2014 – 2020) to see and comment on comparisons/differences and to find out specifics about the budgets and their categories/segments. We did not compare only budget figures but also how they were put together. We also researched the concept and methods of how the EU budget 2021-2027 was 'assembled' – if the European Commission used any other methods and financial instruments in 2021 – 2027 compared to the budget 2014 – 2020 and other previous budgets. The quantitative approach in the paper is mixed with the qualitative one. In the last chapter, we synthesise everything together, make a summary, and explain some of the limitations of this research. In the end, we make many suggestions for future research possibilities.

THE EUROPEAN UNION BUDGET PRIORITIES FOR THE PERIOD 2021 - 2027

The so-called 'EU twins,' green transition/climate change (also called Green Deal) and digitisation with targeted spending through various European Union funding programs (calls) are critical spending on the European Union budget. The first represents 37% and the second 20% of total budget consumption. Initially, the percentage of the former was set at 30%, but due to the persistence of the new European Commission, it was further increased to make the EU the most advanced in this field in the world (The Next Generation EU, 2021). Within the Next Generation EU (€ 750 billion), the Recovery Resilience Facility (RRF) program has a massive share of € 672.5 billion.

At the same time, we must remember the unique EU funding instrument - the so-called missions; four out of five represent the green program/transition climate change themes. These are Climate-Neutral and Smart Cities, Adaption to Climate Change, A Soil Deal for Europe, Restore our Ocean and Waters (EU et al. Europe, 2020), and are expected to account for an additional 10% of the total Horizon Europe program, with just over € 81 billion in 2018 prices and just over € 90 billion in current prices (The EU long-term 2021-2027 Budget and Next Generation, 2021). That means the total spending for European Union twins will eventually be even higher than the projected absolute and relative figures above. The fact that almost 60% of the EU budget will be used for only two purposes, which has not been the case ever before, is the first important novelty of the EU budget.

The size and composition of the European Union budget

In many aspects, the seven-year European Union budget for 2021 - 2027 should be viewed differently than in the past. The current EU budget has a new dimension in the form of the Next Generation EU programme, which represents 750 billion euros, and the Recovery and Resilience Facility has a substantial share of 672.5 billion euros. This part arose mainly because of the COVID crisis and was finally unanimously supported by the member states after lengthy negotiations. For this part of the European Union budget, for these 750 billion euros, the European Commission will be using borrowing on the international financial markets for the first time in its history. This is the second (revolutionary!) novelty about the current European Union budget. This borrowing will be done mainly by issuing different short- and long-term debt instruments, including green bonds, in the amount of 250 billion euros altogether. The traditional, ‘classic’ EU budget as we know it from the past, or the Multiannual Financial Framework, represents (MFF) 1,074.3 billion euros. Together, with the Recovery Resilience Facility, both items represent the record European Union budget of 1,824.3 billion euros (all in 2018 prices, The EU long-term 2021 –2027 Budget and Next Generation, Facts and Figures in Infographic – Multiannual financial framework 2021 –2027 and Next Generation EU).

If we compare these numbers of the new overall EU budget (2021 - 2027) with the previous one for the period 2014 – 2020, we can first note that the overall budget has increased substantially (almost doubled from its predecessor – there is an increase of almost 70%). This is the third revolutionary novelty of the current EU budget. The total EU budget for 2014 - 2020 stood at 959.5 billion euros. Also, as already mentioned, there is now its credit component on the side of its revenues for 750 billion euros (41 % of the total EU budget) and on the expenditure side for 360 billion euros (around 20% of the total EU budget or a good half of the Recovery Resilience Facility). Credit part of the EU budget on both the revenues and expenditures side has never been the case in EU history, and this represents the fourth revolutionary novelty for the EU and its budget. You must understand this 'revolution' with the eyes of some of the European countries that never wanted the European Union to borrow for its spending - by definition, these were the most developed EU member states, Germany being a typical example.

Analysing what the record 2020 - 2027 European Union budget will be spent on and comparing it with the different EU scenarios and the European Union 2014 - 2020 budget, we can see then that the total European Union budget is 1,824.3 billion euros, with the Next Generation EU amounting to € 750 billion and the Multiannual Financial Facility 2021 - 2027 of 1.074.3 billion euros (all figures in constant 2018 prices). Breaking down these big numbers tells us that most of the funds are for cohesion, resilience, and European values in the amount of 1,099.7 billion euros (of which, for example, 330.2 billion euros for "classic" cohesion, as we know it from the past); 672.5 billion euros for recovery and resilience, with more than half of it (53.5%) coming from the European Commission's borrowing from the financial markets (ibid). Additionally, 373.9 billion euros represent spending for natural resources and the environment (of which 336.4 billion euros for the standard agricultural policy); 143.4 billion euros for the single market, innovation and digitalisation; 98.4 billion euros for the neighbourhood and the world; 73.1 billion euros for the entire European administration; 7.5 billion euros for employment regulation, sustainable regional development regarding crisis times, 22.7 billion euros for migration and border control, and 13.2 billion euros for security and defence. Finally, Horizon Europe (Science et al. Program), totalling 81.4 billion euros, and Erasmus 21.7 billion euros are interesting and vital sub-priorities. This spending represents an important EU novelty. Until the 2021 – 2017 EU budget, all these individual priorities had so much money for spending through different EU programmes. As a result, we are also recording specific increased spending for agreed EU priorities based on the new EU budget. We can consider this as the fifth important novelty of the EU budget.

The total EU budget for the period 2014 - 2020 was € 959.5 billion, with some crucial categories not directly comparable to the new EU budget: 325 billion euros in economic, social, and territorial cohesion; sustainable development with natural resources, 373 billion euros including agriculture; competitiveness for growth and jobs 126 billion euros; global Europe 59 billion euros; 16 billion euros for security and citizens, and the European administration almost 62 billion euros.

Table 1: The total European Union budget with its structure for the period 2021 - 2027 and the period 2014 - 2020 in billions of euros

Categories for:	2021 - 2027	Categories for:	2014 - 2020
Single Market	144	Competitiveness for growth and jobs	125,6
Cohesion and resilience	1,100	Economic & Territorial Cohesion	324,9
Natural resources and the environment	374	Sustainable growth: natural resources	372,9
Migrations and borders	23		
Security and defence	13	Security and citizens	15,7
Neighbourhood and world	98	Global Europe	58,7
EU administration	73	EU administration	61,7
TOTAL	**1,824**	**TOTAL**	**959,5**

Source: Infographic – Multiannual financial framework 2021-2027, retrieved from: https://www.consilium.europa.eu/en/infographics/mff2021-2027-ngeu-final/ and Next Generation EU, retrieved from: https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3014 and Long-term EU budget 2014-2020, retrieved from: https://www.consilium.europa.eu/en/policies/the-eu-budget/long-term-eu-budget-2014-2020/

Individual categories of the total European Union budget from 2014 – 2020 (old budget) are mainly incomparable with the categories from 2021 – 2027 (new budget); therefore, it is difficult for us to make and qualitatively analyse a direct comparison. The purest and the most comparable item is Erasmus, which jumped from around 15 billion euros in the previous budget to almost 22 billion euros (idem), an increase of almost 50%. We can also directly compare the cost of the European administration, which jumped from 62 billion euros in the 2014 - 2020 European Union budget to 73 billion euros in the 2021-27 budget, an 18% increase. Cohesion in the strict sense of the word remained at about the same level: 330.2 billion euros versus 324.9 billion euros budget-on-budget. The same goes for agriculture: 374 billion euros versus 372.9 billion euros budget-on-budget. Although both items include some other ingredients, they are pretty comparable. However, the new budget includes additional financial sources for cohesion within the next generation EU part of the total European Union budget (besides grants and some soft loan possibilities). The overall cohesion and resilience financial capacity stands in the 2021 – 2027 European Union budget at 1,100 billion euros, compared to 343,9 billion euros in the previous budget, but as said, not wholly comparable owing to the additional COVID package called next generation EU and soft loans for members states. Maybe we can compare category competitiveness for growth and jobs (new budget) with the category single market (old budget) and register an almost 15% growth in comparable prices. In the new budget, the defence received its item, the European Defence Fund (EDF) of 8.5 billion euros, as it previously had no meaning and form. However, generally, security issues registered altogether in the new budget high growth compared to the previous one when we put together some categories (46 billion euros vs 16 billion euros). Additionally, the category neighbourhood and world in the new budget increased significantly compared to the old category global Europe owing to 'taking care' of migrations already on 'their' territories. In any case, we can immediately see that the European Union budget 2021 - 2027 represents, in terms of quantity and quality, an essential step toward the European Union's and the European Monetary Union's financial deepening. However, some individual categories and items are not directly comparable as they were designed, combined, and assembled differently in the new budget compared to the previous one.

In the new overall EU budget, individual categories are different for several reasons, from the fact that the new budget is quite different in content, more complex, and broader; it consists of two distinctly different parts, while the old one consisted of only one; it also contains a vital credit component that the previous one did not. Furthermore, the negotiation process was completely different between the two. Nevertheless, the fact is that the new budget is almost 70% bigger than the old one and that this means a significantly more important role and power for the EU. This also strengthens its fiscal function in both directions (revenues and expenditures). We already noted this as a third revolutionary novelty of the EU budget 2021 – 2027.

It is also worth noting that the European Union, through the European Commission, is becoming an essential global player in financial markets. Markets have been waiting for the real European bonds for a long time, and some are already out there, including the green ones. In this way, the euro can get an accurate market reference for long-term and short-term interest rates, as the EU will issue short-term monetary instruments with a maturity of up to one year and long-term bonds, including green bonds. Euro reference interest rates already exist (see, for example, the European long-term interest rate, 2021); however, they are based on the issuance of debt instruments by the EU member states and their various entities. Now, the euro has a reference interest rate based on the debt instruments of the issuer, the European Commission itself - that is, the European Union itself! This is the sixth important (revolutionary) novelty about the European Union budget from 2021 to 2027.

The European Union Budget Revenues

The classic European Union direct revenues are contributions by member states of up to a maximum of 1.2% of their gross national income (GNP), whereby only these can increase by up to 0.2% due to the loss of Great Britain's (net) participation (Brexit). Member states' contributions represent 70% of all revenues of the EU's multiannual financial framework or, as I call it, the classic part of the overall European Union budget. It is also worth noting that the gross domestic income of the member countries may be additionally burdened by 0.6% to finance EU borrowing (essentially to finance the Next Generation EU) until all the European Union credit sources are repaid but by the end of 2058 at the latest. In addition, the European Union budget revenues are specific customs duties (against third countries), sugar duties, and 0.3% of revenues collected from member states from value-added tax.

Revenues in the European Union budget for the period 2021 - 2027 receive new additional sources, in addition to the already mentioned permanent ones, from charging pollution with non-recycled plastic (0.8 euros per kilogram), and potentially with some other similar instruments in connection with decarbonisation and climate change and digitisation. Revenues from the emission trading system (ETS), the carbon border adjustment mechanism (CBAM) and revenues are based on a levy on the world's largest multinationals. We count this as the seventh revolutionary and, at the same time, also a significant novelty for the European Union and its budget.

The European Union borrowing

With the European Union budget 2021 – 2027, the European Commission has started to borrow from the financial markets – this will be taking place throughout the entire budget period. It has already started through the issuance of various bonds. Financial markets have been waiting for this for a long time because one thing is the borrowing of the individual European Union member states in euros, and something else is additional high-quality and homogeneous borrowing of the European Union by itself as one entity. All the European Union debt issues have the highest credit rating. Of all the bonds that have been and will be issued by the European Union, the most exciting and innovative bonds that support various positive climate changes, including the green economy (all in all, the so-called EU "Green Deal"), are green bonds. According to the title of this paper and theses that we set, they represent the eighth revolutionary novelty of the EU budget 2021 – 2027.

Although it has been recently emphasised that the European Union also issues 'conventional' bonds, social bonds (e.g., to maintain employment or employment in emergencies and coming from Temporary Support to Mitigate Unemployment Risks in an Emergency, the so-called SURE programme) and short-term treasury bills ("the EU-Bills") the EU green bonds in such dimension are the novelty for the EU and one of the research targets of this paper, bonds are issued through auctions and syndication, while T-bills for maintaining liquidity of the European Union budget are issued primarily through auctions.

The European Union borrowing through the financial markets applies to the Next Generation EU for 750 billion euros. As a result, part of the spending of the European Union budget – namely the part of the Recovery Resilience Facility for 360 billion euros - will be passed on to the member states under credit conditions. In comparison, the other part, for 390 billion euros, will be passed on to the member states through grants. For the first time in the history of the European Union, the European Commission is borrowing through financial markets for the realisation of its spending and for the spending of its member states in line with the EU priorities and with the EU (the European Commission) coordinated national priorities. For the first time in the history of the European Union, creditors of the European Union have in their assets a claim towards the European connection, which is not a classical legal state entity as we know it in the case of national states but an extraordinary legal entity as a contractual union between the European Union member states (a very specific legal "sui generis"). For the first time in the history of the European Union, member states will receive credits from the European Union for implementing their projects (within the Recovery Resilience Facility programme). In the negotiations and coordination for the record budget, the four countries, namely Austria, Denmark, the Netherlands, and Sweden, insisted on this option. They achieved it in the negotiations, while on the other hand, Germany, which was also not the most enthusiastic about it, did not block the negotiations because of it. However, Germany initiated the post-festum appeal at its constitutional court to assess its constitutionality (The German Constitutional Court has blocked the EU's recovery fund. What happens now?), as this European Union borrowing is supposed to represent the so-called Hamilton effect. The case ended positively for the European Union; all the European Union member states ratified the EU budget with all its borrowing through the financial markets, but it raised many controversial issues and debates (ibid).

The European Union as a whole, through its European Commission, has been becoming an important player in global financial markets, as the markets with all their financial institutions have been hardly waiting for actual European bonds for a long time; now, they have already received the first ones. In this way, the euro is also finally getting the right market references through its true long-term and short-term interest rates because, in addition to long-term bonds, the European Union is also issuing short-term monetary instruments with a maturity of up to one year. Of course, euro reference interest rates already exist (e.g., European Long Term Interest Rate, 2021 or Euribor, 2022). However, they are based on credit instruments of the national EU member states and their various entities (mainly banks). EURIBOR, as the most critical indicator of the price of short-term money, represents an introductory short-term interest rate (up to 1 year) and is the internationally recognised reference for interbank-offered interest rates for euro borrowing and lending.

On the other hand, we know that, e.g., the Greek government's long-term euro bond has a much different interest rate and thus yield than, e.g., a comparable German one. The same applies to commercial debtors from both countries. The new EU borrowing, as such, gives us the reference interest rates for the EU as a whole! We can consider this, as already mentioned, the eighth (revolutionary) novelty.

In 2022, the European Union planned to borrow 80 billion euros, with an additional 35 billion euros (Next Generation EU Borrowing: Updates on the European Union's Funding Strategy and Program), but this is only a part of the whole story, as we clearly explained, since the European Union should borrow for its record budget 2021 – 2027 for 750 billion euros (i.e. for the entire Next Generation EU, of which 360 billion euros will go to the states in the form of credits and 390 billion euros in the form of various subsidies' tendered instruments), of which even EUR 250 billion (at 2018 prices) through green bond issues only.

GREEN BONDS

A green bond is a fixed-income instrument designed to raise money for climate and environmental projects. Although known as a fixed income instrument, it can be issued either with a fixed or floating interest rate. These bonds are asset-linked and backed by the issuing entity's balance sheet, so they usually have the same credit rating as other issuers' debt instruments. Green bonds are also called climate bonds, but the two terms are not always synonymous. Climate bonds specifically finance projects that reduce carbon emissions or alleviate the effects of climate change, while green bonds represent a broader category of instruments related to projects with a positive environmental impact (Troy et al.: Green Bond: Types, How to Buy, and FAQs (Bonds, Fixed Income), September 21, 2022). Green bonds are sometimes also called sustainable bonds. Green bonds may have specific tax incentives to enhance their attractiveness to investors. Green bonds are becoming increasingly important within a significant environmental, social, and governance (ESG) investing trend.

Green bonds are intended to encourage sustainability through financially supporting climate-related and other environmental-related projects. Green bonds finance projects like energy efficiency, pollution prevention, sustainable agriculture, fishery and forestry, aquatic and terrestrial ecosystems protection, clean transportation, clean water, and sustainable water management. They would also finance cultivating environmentally friendly technologies and climate change mitigation.

Tax incentives such as tax exemption and tax credits might be used with the green bonds, making them a more attractive investment. Tax advantages provide a concrete financial incentive to tackle climate change and a movement toward renewable energy sources. To qualify for green bond status, they are often verified by a third party, such as the Climate Bond Standard Board (CBSB) and eminent auditors, which control and hopefully certify that the bond will fund projects that include environmental benefits.

The third most important European Union budget's revenues item (250 billion euros) represents one-third of the whole Next Generation EU programme (750 billion euros) will be realised by the European Commission through the issuance of green bonds of the European Union ("Next Generation EU Green Bonds") through the international financial markets, what we already named as a significant revolutionary novelty. There is no single country in the world where green bonds would represent such an essential part of its budget. Let us remind you that the whole EU budget stands at 1,824,3 billion euros; therefore, green bonds will represent almost 14% of it, but as said, only in the Next Generation part of the EU budget/programme, even one-third – that is 33%. This represents the ninth important novelty. Development of the EU green bonds taxonomy, which we address later, is considered the tenth important novelty.

Countries/governments' treasuries and various entities from the European Union, especially the European Investment Bank (EIB), are world leaders in issuing green bonds. The first in the world was the EIB in 2007, which, with its Climate Awareness Bond (CAB), later successively reached the altogether issued amount of over 52 billion euros (CAB et al. and internal EIB materials). The World Bank followed in 2008 with its green bond issues. The European Commission issues and will issue green bonds within the framework of the Next Generation EU Green Bond program. Thus, in October 2021, the European Commission issued the first such 15-year green bond from the mentioned program for 12 billion euros, which it supplemented with another 2.5 billion euros in January 2022 (Next Generation EU Bonds, European Commission, 2020, 2021 and some internal materials of the European Commission and Next Generation EU Green Bond Dashboard, 2023). Until now (Next Generation Green Bond Dashboard, August 2023), the European Commission, on behalf of the EU, issued 44,220 billion euros of green bonds through auctions and syndications. Through the European Union, the world will thus get one of the largest single issuers of green bonds.

Nevertheless, let us go into some more details. All issued amounts of green bonds worldwide between 2014 and 2022 have been rising all the time apart from 2022. In 2014, there were 37 billion USD in green bonds issued worldwide, while in 2021, already 582 billion USD and in 2022, 487 billion USD. Europe was the most significant issue region, with 229 billion USD, followed by the Asia-Pacific region, with 133 billion USD. The largest issuers worldwide in 2022 were China with 85 billion USD, followed by the USA with 64 billion USD and Germany with 61 billion USD. Between 2014 and 2022, the largest green bond issuer was the USA with 380 billion USD, followed by China, Germany and France (Statista: Statistic, Green Bonds, April 1, 2023). As explained above, the European Union is becoming a significant world issuer of green bonds through its Next Generation Green Bond framework; however, its activities started not earlier than in late 2021. According to all approved green bonds' issuing figures, the European Union, with its Next Generation Green Bond program, will become the world's largest single issuer of green bonds in forthcoming years. The European Union budget was approved for 2021 – 2027 and includes 250 billion euros in green bond issues.

Next Generation EU Green Bonds

At least 37% of the Recovery Resilience Facility is dedicated to the green transition. This means that investing in green bonds will bring investors safe yields on the one hand and the more sustainable, green, and resilient European Union on the other hand. The European Union will issue them up to 250 billion euros (Next Generation EU Bonds and Next Generation EU

Green Bonds). This is the most extensive systematic green bond scheme in the world and represents the eleventh important novelty that means, on the one hand, additional investors in the European Union green programmes and, on the other hand additional opportunities for their investments and additional impetus for sustainable finance and development of euro-zone and the European Monetary Union (EMU) in general. These green bond issues also mean the financial deepening of the EU budget and the European Monetary Union with its currency, the euro. This is the twelfth important novelty for the European Union, the European Monetary Union and its euro. Let us recall that the European Green Deal (A European Green Deal. Striving to be the first climate-neutral continent) means achieving climate neutrality by 2050, while by 2030, reducing carbon emissions by at least 55% compared to 1990 (‘Fit for 55,’ ibid).

The European green bond program complies with the Green Bond Principles (GBP) of the International Capital Market Association (ICMA). The proceeds from this indebtedness will be used for nine (9) categories of purposes, and independent external experts will measure effects. The second opinion regarding the application of the principles of the ICMA green bonds principles and compliance with the European environmental, social and management strategy (Environment, Social and Governance Criteria, from now on ESG; Overview of sustainable finance) will be handled by Vigeo Eiris, a member of Moody's Group (Vigeo Eiris, 2020). United Nations ESG principles as such and among others amended by OECD are also an excellent reference when studying, analysing, and comparing these issues with what is the European Union doing (UN, 17 Goals To Transform Our World; OECD, The UN Principles For Responsible Investment And The OECD Guidelines For Multinational Enterprises: Complementarities And Distinctive Contributions).

Use of proceeds from the European Green Bond program

According to the ESG criteria (for comparison, see also, e.g., Huber, Comstock, Smith), which are based on the methodology of the United Nations on sustainable development (Sustainable Development Goals), the European programme of green bonds (Next Generation EU Green Bonds) has defined nine categories of purposes for the usage of these collected funds:

- Research and innovation supporting the green transition,
- Digital technologies supporting the green transition,
- Energy efficiency,
- Pure energy,
- Implementation of positive climate changes,
- Adequate "green" water and waste management,
- Clean transport and infrastructure,
- Protection of nature, its rehabilitation and biodiversity,
- Other in the context of sustainable development and green transition.

The European Commission is committed to strict reporting on using money from issued green bonds. There will be reporting of allocations and their effects -impacts of these funds will be strictly followed. The countries will follow the allocation of funds for specific uses and report on this to the European Commission. This will also be subject to an independent external audit. Reporting on the impact/effect of funds, or instead on their effectiveness, will be reviewed by independent external experts for individual areas of sustainable development. In December 2020, the European Commission also stepped towards using the European taxonomy in this area and overtook its official introduction.

Some more details below about the selection of spending purposes and their evaluation.

Table 2: A selection of purposes for the use of the European green bond revenues and their valuation in percentages

	Climate Coefficient	**Environmental Coefficient**	**Eligibility of Green Bonds**
Solar Energy	100%	40%	100%
Digitisation of hospital infrastructures	0%	0%	0%
Railway manage. system (ERTMS)	40%	40%	40%
Limitation of risks of non-climate risky natural programs	0%	100%	0%
Household recycling	100%	40%	100%

Source: Next Generation EU Bonds and Next Generation EU and European Rail Traffic Management System.

The table can be a simple explanation because the examples show how certain forms of project spending of money collected through the European green bonds will be measured. The eligibility of green bonds is a combination of achieving the climate and environmental coefficient (much more details about the indicators, e.g., in the IMF, Climate Change Indicators Dashboard or Coefficients of Determination for the Climate Characteristics). The precise processing of environmental and climate indicators and the analysis, testing and discovery of the (most) suitable ones would go beyond the scope of this paper. However, the topic is still relevant, given that we are entering the era of issuing European green bonds and their quality monitoring and consumption. Nevertheless, this subject gives much potential for further future exploration and research.

CONCLUSIONS

We discovered that issuing new short- and long-term debt instruments through financial markets will become an essential source for the European Union budget. Green bonds will represent a vital novelty not only in the European Union budgeting 2021 - 2027, together with the EU taxonomy and all the independent external reporting connected to them, but also a sizable part of the Next Generation EU part of the total European Union budget. The article also explores some green bond characteristics and requirements to prove that the EU Green Bonds programme is financially and strategically crucial for the European Union 2021-2027 budget. The first and second theses were, therefore, proved.

The entire European Union budget for the period 2021 –2027 amounts to 1,824.3 billion euros, of which the Next Generation EU (NGEU) €750 billion, for which the European Union will borrow on financial markets, and the Multiannual Financial Framework (MFF) 2021-2027 of €1,074.3 billion (all in 2018 prices). We discovered that twelve crucial, even revolutionary novelties about the EU budget 2021 – 2027 were recognised and analysed more precisely in the paper. Therefore, the third thesis of the paper is proved too.

Multiannual Financial Facility will be subject to some classic European Union budget revenues like member state contributions, customs duties from third countries, and revenues from value-added tax of member states while the Next Generation EU to some new European Union revenues like direct taxation of users of non-recycled plastics and potentially some other tax instruments in connection with the EU decarbonisation and digitalisation. The critical form of the European Union budget borrowing for 750 billion euros will occur through the Next Generation Green Bonds program for 250 billion euros, which makes the European Union already in 2023 one of the world's largest single issuers of green bonds. Just the European Union green bonds will represent one-third of the Next Generation EU program and almost 15% of the overall EU budget when realised by 2027.

There has yet to be any single issuer in the world with such importance of green financing by issuing green bonds through financial markets auctions. Also, this caused the European Union to borrow from the financial markets for its programmes for the first time in its history. We must also mention the historical record of the EU budget by its size and the quality of its financing programmes. The green bonds' issuance considers the starting points of the United Nations ESG rules and the EU taxonomy, and above all, thorough reporting on spending allocations and their effects/influences, impacts or, in a word, efficiency. External neutral auditors and experts will be reviewing and checking all these. The central thesis of the paper, that EU borrowing to implement the record EU budget is also carried out through the sizable issuance of green bonds, and that this is a significant European and global revolutionary innovation, was confirmed. Seemingly, it also confirmed other theses of the paper that the EU 2021 – 2027 budget brings many important, and even revolutionary, novelties – twelve altogether into the EU (see their transparent summary below).

The EU budget 2021 -2027 novelties introduced for the first time in the history of the European Union (including its predecessors) – qualitative approach:

1. An essential part of the EU budget (60%) goes for just two purposes (the EU twins – green and digitisation);
2. The EU borrows for its budget on the financial markets (750 billion euros);
3. The EU budget 2021-2027, compared to all the previous ones, is substantially increased (70%);
4. The credit part of the EU budget is on both (revenues 750 billion and expenditures 360 billion euros) sides;
5. Substantially increased spending for the anonymously agreed EU priorities;
6. The Euro gets its (own) actual short- and long-term reference interest rates through the EU debt instruments (treasury bills, bonds) issues;
7. The EU is introducing and getting its own original budget revenues besides member countries' grants;
8. Green bonds as a new borrowing source for the EU budget;
9. Green bonds represent a very sizable part of the overall EU budget (almost 15% and even 33% of the Recovery and Resilience Facility part of the EU budget);
10. The green bonds taxonomy started its development;
11. There is the Next Generation EU bonds scheme, which systematically sets the path and is the world's largest green bonds scheme for investors;
12. The EU borrowing through EU short- and long-term debt instruments on the financial markets positively influences the deepening of the EMU (and its euro).

There are some limitations to this study. First of all, we researched the specifics of the budget, which has yet to be realised. There are many risks that the EU budget, borrowing, and other specifics will not be realised as planned and envisaged. Consequently, some calculations and comparisons need to be corrected during this budget period. The same goes for some EU budget effects like green bond financing efficiency, correct usage of collected funds, including the green ones, and similar. Owing to some unplanned global and very influential issues like the war in Ukraine, the Israeli-Palestinian conflict, and some others, many Green Deal targets of the EU might be doubtful. Many items in the EU budget might be replaced with others, like the ones for improving energy issues and security. One thing that will stay in the EU budget no matter the other circumstances is all twelve novelties systematically and in detail analysed in this paper.

How this article is structured and how this theme has been researched and put forward represents a unique contribution to business and business-related science and practice. On the other hand, since an overview of the literature shows that more systematic research on this subject is needed, there are many opportunities and challenges for further research in this specific research area. After 2027, when the EU Multiannual Financial Facility 2020 – 2027 will be over and statistical data will be available, a thorough study of how the Next Generation Green Bonds Program will be able to be realised. It would be exciting to analyse its effects on the EU programmes related to the Green Deal in general and especially on the nine specific individual categories of purposes we analysed in this paper when using green bond financing. Such a follow-up would also be an essential contribution to the science. Some more years later, a study of how the European Union is repaying all this debt accumulated within the budget period 2021 – 2027 would be an additional significant contribution to the science and how the EU member countries used the credit part of the EU budget for its national purposes.

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