



## Article

# Energy and Environmental Challenges in the European Union and Green Bonds

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**Abstract:** Could the European Union mitigate the negative effects of economic, pandemic and environmental crises using only one tool? The answer is positive, by implementing “green” fiscal expansion financed by “green” common debt, such as issuing green bonds. In this paper, we connect the independent responses to different crises into a single response that could end them. The European Union’s theoretical background is based on new-classical models, but current research findings doubt new-classical orthodoxy, underling the importance of economic federalism for sustainable economic and green growth. We argue that the Economic and Monetary Union has to speed up fiscal federalism by establishing a powerful European Union common budget using green Eurobonds and implementing fiscal transfers as a mechanism to address the consequences of the triple crisis.

**Keywords:** green bonds; European Union Green Deal; fiscal federalism; Eurobonds



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## 1. Introduction

This paper examines the effectiveness of EU common debt (Eurobonds) as a tool to handle economic, pandemic, and environmental crisis consequences in parallel. The EU, by using green bonds and green fiscal budgeting reforms, aims to achieve the goals of the EU’s Green Deal (Maris and Flouros 2021). More specially, the EU Green Deal will lead to sustainable economic green growth, transforming the European Union economy into a new generation growth model without emissions of greenhouse gases in 2050 (Rivas et al. 2021). Furthermore, the European Green Deal aims for higher funding for green and sustainable investments, as green bonds could increase sustainable economic long-term growth, while there is a strong positive correlation between growth and the positive spillover effect of green bonds (Bhutta et al. 2022). Moreover, the EU Green Deal strategy is implemented through green fiscal budgeting reforms, such as Ecological Tax Reform (ETR) (Schlegelmilch 1999), to achieve an inclusive green economy post COVID-19. Furthermore, the EU Green Deal underlines the key role of green bonds in common debt, as well as of green banking and green investments in mitigating market failures, such as negative externalities, and protecting the common resources.

Due to recent international developments, for example, the COVID-19 pandemic, the Russia–Ukraine war and the Israel–Gaza war, the cost of oil and natural gas has increased. This has had an impact on the EU member states’ economies, as the cost of energy production has risen. In the previous decade, the member states faced a severe economic crisis which affected not only their economic sustainability but also the future of the eurozone. In previous years, the EU’s energy import dependency led to a trade deficit in 2022 for the first time in EU history. In this regard, investments in renewable energy sources are a tool that will lead the EU to higher international competitiveness and energy self-sufficiency (ECB 2022b). Finally, energy dependency during times of war leads to the depreciation of the Euro against other currencies, resulting in lower purchasing power for households. Therefore, green investments leading to energy autonomy not only have

environmental benefits but also economic advantages for EU member states (ECB 2022a). The research methodology of this study implemented descriptive statistics, secondary data analysis from official databases (OECD, Worlds Bank) and a literature review to answer the research questions.

## 2. EMU Theoretical Background

### 2.1. Lender of Last Resort and No Bailout Clause

Since 19th Century authors underlined that a Central Bank could be a lender of last resort as a mechanism that could address not only bank runs but also financial panic. The eurozone is based on the absence of a lender of last resort (Howarth and Quaglia 2016), which means that a “no bailout clause” could defuse (freeze) the moral hazard effect (Menguy 2010) and prevent a sovereign debt crisis (Maris and Sklias 2016, 2020). A strict fiscal framework aiming at economic stability without deficits and, at the same time, the absence of a LORL, could lead to full employment and stable economic growth according to monetarist theory (Friedman 1948). It is noted that the mechanism of a LOLR could lead to an inflation tax, which means that debt repudiation is possible through monetary expansion, but its effectiveness depends on the consumer’s expectations about inflation (Calvo 1988), and the effectiveness of inflation in the short term only (Kohn 1984).

Wyplosz (2005) underlined that the effectiveness of national or transnational independent and accountable fiscal policy committees, such as the European Fiscal Board, as a tool to achieve debt targets, is not verified. Since then, the experience of the EMU has been different, as many countries have current accounts and sovereign debt imbalances (De Ferra 2021), while independent fiscal councils have not succeeded in stabilizing government budgets (Raudla and Douglas 2020). According to economists, a global LOLR can stabilize the global financial markets (Fischer 1999).

During the economic crisis, the EMU implemented fiscal and monetary reforms, as IMF financial support was not enough to stabilize eurozone sovereign debt countries. The EMU established the ESM to stabilize government debt in EMU countries, and the ECB implemented non-standard monetary measures which led to a rethink of the neoclassical macroeconomic model of the absence of a lender of last resort (De Grauwe 2013). For this reason, there was great conflict between the member states in order to decide the appropriate economic measures for indebted member states such as Greece, Spain, Portugal and Cyprus. It is widely accepted that including green bonds from the private market in quantitative easing programs could mitigate climate-induced financial instability and achieve environmental sustainability (Dafermos et al. 2018).

Recently, during the Greek sovereign debt crisis, the EU developed stronger policies and institutions, such as the banking union, to enhance an extreme existential challenge (Pagoulatos 2020), while the sovereignty of the national economic landscape increased due to the PSI and haircut of the Greek sovereign debt (Reinhart and Trebesch 2016). Before a payment default, sovereign debt haircuts can be implemented preemptively extracting lower output losses for the debt holders (Asonuma and Trebesch 2016). Lastly, the ESM can stabilize the financial sector and sovereign liquidity, which leads to investment increases without moral hazard effects (Nijskens and Eijffinger 2011).

### 2.2. OCA and Fiscal Integration

The EMU is based on an optimum currency area (OCA), which holds that a group of countries could adopt the same currency if they share high labor and capital mobility, price and wage flexibility, and if they have symmetric economic cycles (Mundell 1961). One more argument for an OCA is the need for fiscal federalism, as a large “federal” part of spending at the national or regional level, which could significantly help in coping with non-symmetric shocks (Kenen et al. 1969). The growing economic divergence in the eurozone has led to a growing debate among economists as to whether the eurozone meets the endogeneity criteria of an OCA (Matthes 2009). As to the effectiveness of the EMU, Frankel and Rose (1997) argued that the criteria could be satisfied if a common currency

was adopted after implementing steps toward economic convergence, while it would be necessary to achieve fiscal integration using fiscal transfers to achieve the OCA criteria. Incomplete fiscal integration can lead to macroeconomic imbalances, while the creation of the Euro involved a decision to ignore what Kenen underlined about the effectiveness of OCAs (Krugman 2012). According to some economists, fiscal transfers could eliminate poor equilibria, the cause of which is capital mobility (Fornaro 2021), while fiscal integration is vital to mitigate national fiscal policies. Additionally, the adoption of a common fiscal budget, financed by EU taxation (Bordo et al. 2011) could lead to macroeconomic stability in the eurozone (Sklias and Maris 2012). In the same way, fiscal transfers within the eurozone could result in increased social welfare, but the eurozone would need to manage the moral hazard behavior that is an outcome of one-sided fiscal transfers, while independent monetary policies by contrast would not have welfare implications (Sklias and Maris 2012; Economides et al. 2016).

### 2.3. Economic Integration and Fiscal Consolidation

While fiscal policy integration is a vital component of an EMU Delors's report recommended upper limits on fiscal deficits (Delors 1989). EMU fiscal policy rules are based on fiscal consolidation (Balassone and Franco 2004) as well as fiscal stimulation (Buiter et al. 1993) and fiscal reduction. Fiscal policy in a monetary union aims at sovereign finance sustainability, gives space for anti-cyclic economic policy at the national level, and implements reforms (Coeure and Pisani-Ferry 2005). On the one hand, according to the "Ricardo-Barro effect," governments should not increase public lending because it crowds out private investment (Buiter 1977), and fiscal expansion may not lead to economic growth (Buchanan 1976). On the other hand, EU fiscal integration could handle the "crowding-out effect" when governments have access to foreign finance (Solocho and Bundt 1990). Of course, neoclassical economists underline the rationalism of consumers, which means that nominal sizes such as the quantity of money and aggregate demand though government spending expansions could not affect the actual sizes, like production or unemployment, in the long term (Lucas 1986). Strict fiscal framework and supervision mechanisms, such as the European Semester and the SGP, are trying to decrease government deficits and sovereign debt as an answer to the need to contain potentially "irresponsible" governments and moral hazard behavior (Allsopp and Vines 1996; Maris et al. 2022). Furthermore, fiscal integration could drive economic stabilization in case of asymmetric shocks (Beetsma et al. 2001).

The previous aspect is not commonly accepted because other economists support the roles of public spending, fiscal expansion, and money supply measures, accepting the business cycle theory (White 1999). Moreover, fiscal spillovers are positive among the larger Euro area countries (Beetsma et al. 2006), while positive cross-country fiscal spillovers led to speeding up the GDP recovery from the global financial crisis (IMF 2017), (Alloza et al. 2019). This view underlines the effectiveness of recent fiscal expansion as a tool to mitigate pandemic crisis consequences (Baldwin and Mauro 2020).

### 2.4. Market Failures

Adam Smith argued that the "invisible hand" and the price mechanism of a free market are successful in allocating resources efficiently (Bishop 1995). The previous argument is not always true, as sometimes the market fails, leading to the optimum use of scarce resources (Tirole 2015). Many times, markets have led to various levels of success, as well as market failures (Roth 2018). Public goods, externalities, incomplete competitiveness, and common resources are only some forms of microeconomic market failures (Morrissey et al. 2002). According to many economists, asymmetric information leads to market failure and requires the role of the government (Löfgren et al. 2002). Moreover, developed economies are richer than other countries, while the level of income and growth rate differs between developed and less-developed economies due to market failures (Stiglitz 1989). As market failures have not only national-level effects but EU-level effects too, international cooperation is vital and serves a host of geo-political interests. International public goods

(IPGs) are achieved mainly with the UN Development Programme's implementation of Global Public Goods (Kaul et al. 2003). So, the European Union implemented policies to help countries produce public goods (Tiebout 1956). It is very important to underline that climate change (Nordhaus and Yang 1996) and technological innovations (Romer 1990), as public goods and goods with externalities, integrate into long-run macroeconomic analysis, which means that the role of the EU is vital in long-term economic growth. According to welfare economics, governments and international originations should implement policies such as public spending to promote social welfare and reduce poverty (Deaton 2016), and the effectiveness of government spending is essential as productive government spending leads to higher social surpluses (Atkinson 1999). Finally, many economists underline the effectiveness of fiscal expansion and public spending in capital goods and public investment programs (PIPs), as the government could increase public goods production (Samuelson 1954) and regulate governance of the collective goods and common pool research systems such as environmental resources (Ostrom 1990).

Note also that the government intervenes in the economy both on a microeconomic and a macroeconomic level. According to the theoretical framework of welfare economics, market failures occur both in the case of externalities and common-pool resources. Climate change is an example of international market failure that also affects the natural environment on a global level. Hence, green investments are a tool that addresses the negative externalities of pollution while protecting the global natural capital (Agarwal 2023).

Furthermore, global peace and security are international pure public goods, but unfortunately, international organizations have failed to provide adequate conditions for global peace and security. If one pools the international market failures due to negative externalities (e.g., pollution), common-pool resources (natural capital—ozone), and pure public goods (e.g., peace and security), it becomes evident that the EU must intervene to address market failures (Meyer 2020).

However, alongside microeconomic market failures, there are also macroeconomic imbalances that make government intervention necessary. One such macroeconomic imbalance is the inability to achieve satisfactory growth rates. The government seeks to achieve satisfactory growth rates by boosting public and private investments (Fang and Chang 2022). Issuing EU common debt is a tool aimed at achieving satisfactory growth rates, especially during periods of imbalances, such as the pandemic crisis, but also the energy crisis due to armed conflicts.

### 3. Theoretical Background versus Current Challenges

#### 3.1. Are Green Bonds Part of the Solution?

Green bonds focus on green and sustainable growth and represent a financial tool that can be used to increase green investments (Bagnoli and Watts 2020). They benefit the utility of not only their existing shareholders (Tang and Zhang 2020) but also the utility of companies' utility and society as they contribute to a decrease in carbon production. It is important to note that the banking sector is critical for green and sustainable growth (Louche et al. 2019), as using green bonds from international organizations could lead to a decrease in lending costs for green investments financing a low-carbon transition (Fatica et al. 2021). Surveys not only show that green bonds have lower interest costs than regular bonds, which means lower lending costs for the borrower and lower profits for the investor (Li et al. 2020), but also show that the stock market responds to green bonds, which leads to an increase in environmental performance and a reduction in the environmental footprint (Flammer 2020).

#### 3.2. Fiscal Reforms: Tight or More Flexible Rules?

After the public debt relief, EU countries established many fiscal measures and regulatory reforms to ensure the safety, soundness, and sovereignty of fiscal sustainability (Meier et al. 2021). Some of the reforms that led to enhanced fiscal and macroeconomic surveillance were the tightening of SGP, which aims to tackle sovereign debt expansion



(Rommerskirchen 2019), and tight fiscal measure requirements. In other words, after the eurozone mitigated the economic crisis, the EU reinforced the pre-existing fiscal rules with the European Semesters and the MIP, boosting the preventing part of fiscal supervision, which led euro-member countries to implement fiscal reforms (Mariotto 2022).

Contrary to the theoretical model of the eurozone, which focuses on monetary policy as the dominant policy, the eurozone and governments have recently given a more active role to fiscal policy and fiscal expansion (Constâncio 2020), as well as transitional periods allowing national governments to deviate from the EU's SGP (Dabbicco 2018), such as an escape clause. Many economists underline that the EU should shift its fiscal rules into common government debt as a tool to lead to positive growth rates (Hauptmeier and Leiner-Killinger 2020). Not only in the recent pandemic crisis, but also in economic crises, fiscal policy could decrease negative economic shocks, but its use is limited due to the high sovereign debt, especially in southern eurozone countries (Matthes 2009).

On the other hand, EU fiscal rules have been frozen, as an "escape clause" drives fiscal expansion to tackle pandemic crisis consequences (Truger 2020). It is certain that tightened measures such as SGP will need to be transformed due to the high levels of sovereign debt. For example, the gross financing needs would be an innovative index for sovereign debt borrowing sustainability, as reforms in GFNs lead to positive effects on borrowing costs when sovereign debt is high (Blanchard et al. 2021).

It is noted that the current fiscal debate is focused on the one hand on the genuine budget for the eurozone by creating Eurobonds and common debt, but on the other hand on the SGP (Schoeller 2021). BICC aims at structural reforms and public investments to increase the growth of euro-area countries and the resilience of the eurozone economy against pandemic shock, but as it will be disbursed via grants, it is far from a common budgetary tool which drives differentiated budgetary integration (Jones et al. 2021).

### 3.3. Eurobonds: If Not Now, Then When?

Not even the establishment of the ESM as the eurozone lender of last resort due to the EMU government debt crisis (Howarth and Quaglia 2016), nor the NGEU as a temporary recovery instrument, are enough for complete fiscal integration. EU politicians established new tools focusing on the stabilization of the business cycle, as it is known far and wide that the eurozone needs fiscal federation (Fatás 1998), and may be able to succeed with Eurobonds, as all EMU members could gain from common debt issues. Furthermore, some economists argue about the issuing of common debt to achieve fiscal and economic integration (Boscheck 2021). Furthermore, current research shows that the lack of an official fiscal bailout drives deeper economic recession (Economides et al. 2021). On the same side, some economists underline that debt reduction could lead to lower GDP growth rates, as well as fiscal expansion driving lower productivity in the market (Badarau et al. 2021).

Currently, the pandemic crisis has led to fiscal deficits and increased sovereign debt to all eurozone member countries. As the ECB's non-standard monetary measures are not effective in Zero Lower Bound due to a liquidity trap (Sau 2018), Eurobonds could solve this problem by using mutual insurance (or risk sharing) between eurozone countries (Bilbiie et al. 2020) as the eurozone needs fiscal solidarity, particularly in recessions such as the pandemic crisis which caused negative snowball effects on the stability of the EU.

### 3.4. EU Green Bond Establishment

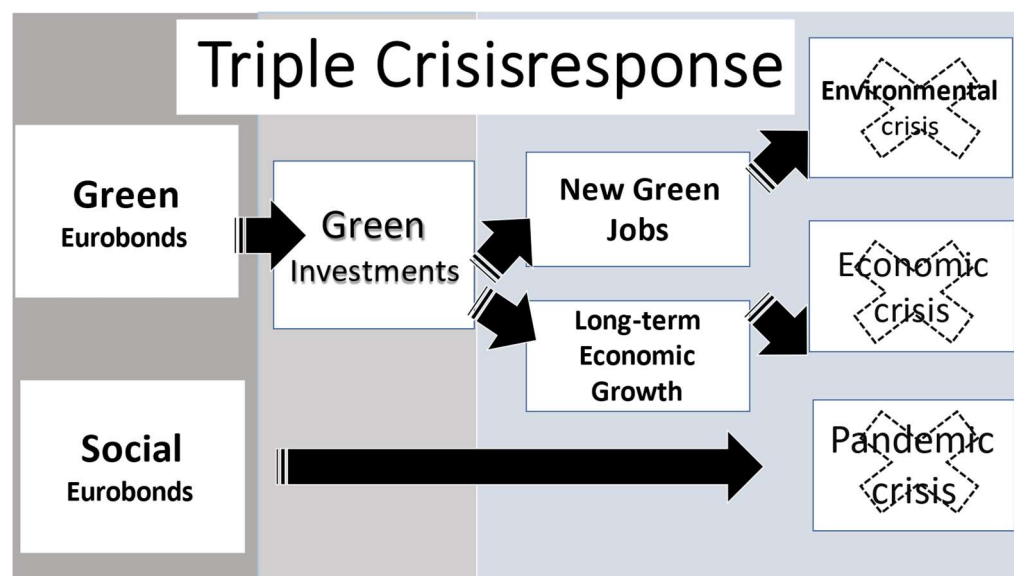
EU green bonds are not only a response to climate change, but they also implement European Green Deal policies and NGEU fiscal expansion, which could address the consequences of the economic and pandemic crises (Bongardt and Torres 2021). The EU published the path that leads to sustainable economic growth as well as the financial mechanisms that the EU will use, such as green bonds. Lastly, the EU established green bonds in 2020 as a tool to increase public and private finance for sustainable investments (European Commission 2021). It is important to mention that the effectiveness of public spending multipliers grows when international government lending faces the crowding-out effect

(Broner et al. 2022). According to the European Commission (2019a, 2019b), to make the EU climate-neutral by 2050, the EU needs more than EUR 200 billion in additional investments till 2050. Current findings ensure that green bonds could lead to lower carbon production, while a decrease in carbon production could lead to higher GDP growth rates (Fatica and Panzica 2020; Maris and Flouros 2021).

The EU responded to the COVID-19 crisis by using Next Generation EU not only as a temporary instrument designed to increase private and public investments, but also to mitigate the environmental crisis. The Next Generation EU recovery instrument includes a financial capacity of up to EUR 800 billion, or in other words 5% of the European Union GDP (European Commission 2021), focusing on the green agenda and Just Transition implementation (Colli 2020).

#### 4. Sustainable Economic Green Growth in EU during Great Challenges

The EU is called upon to address both endogenous and exogenous crises (Figure 1). The economic crisis of 2008 was an endogenous crisis for some EU member states, as structural weaknesses led certain member states to fiscal, economic, and financial crises. In contrast, the pandemic crisis was exogenous. The energy crisis could be seen as mixed, as it exhibits features of both exogenous and endogenous crises. On the one hand, the energy crisis is exogenous because the EU's economy is not responsible for the rise in the prices of natural gas and oil. On the other hand, the EU's energy dependency on natural gas and oil makes its economy vulnerable, revealing its structural weaknesses.



**Figure 1.** Green and social bond bazooka spillover effects in triple crisis. Source: authors' copyright.

Achieving satisfactory growth rates is no longer the sole criterion for social welfare. The EU is called upon to address both endogenous and exogenous crises, as well as achieve satisfactory rates of sustainable economic development. Sustainable economic development is achieved through circular economy policies and green investments. Sustainable economic development requires economic growth without compromising future growth rates. Therefore, it is necessary to reduce the consumption of scarce resources, such as fossil fuels and oil. At the same time, it is necessary to make green investments in all sectors, including construction, transportation, and manufacturing.

The Russia–Ukraine and Israel–Gaza wars destabilize the global economy, lead to cost inflation, and also increase EU state expenditures on humanitarian aid and refugee protection, on top of other negative economic impacts. Considering these wars, the EU must expedite the implementation of the Green Deal to limit the impacts of energy dependency

on third countries. Additionally, the implementation of the REPowerEU plan seeks to address the consequences of these wars (Vezzoni 2023).

## 5. Conclusions

The theoretical framework of the EU is based on new-classical economic models, the lack of a LOLR, the absence of fiscal federation through budgetary transfers, and the absence of common debt issuing, such as Eurobonds. All of the above new-classical theoretical models try to mitigate moral hazard effect behavior, such as irresponsible fiscal policy and sovereign debt increases, as well as to ensure the economic rationalism and the power of the free market which allocates rare productive factors efficiently. The economic reality frequently drives new theories, transforming economic orthodoxy. Adam Smith criticized the mercantilist role of the state in the economy, J. M. Keynes criticized the power of the invisible hand, arguing for effective demand and demand-side measures, A. C. Pigou criticized the power of the market, explaining its failures, and M. Friedman criticized the effectiveness of public regulation, underling the importance of independent central banks. Now it is time to criticize the orthodox new-classical models, showing that the EU needs a new, more federalist theoretical model to mitigate the ongoing triple crisis. The existing new-classical economic theories cannot respond to economic imbalances, business cycles, pandemic and health crises and environmental crises in parallel. We argue that the eurozone immediately needs to establish permanent mechanisms such as fiscal budgetary transfers to achieve fiscal expansion in specific targeted green investments. The fiscal expansion will be funded by common debt issues, such as green euro bonds, which would decrease lending costs. Using these tools, the EMU could succeed in green and sustainable economic growth, minimizing the effects of the pandemic crisis. Of course, the ECB's non-standard monetary policy (QE), ESM, and NGEU establishment is a step toward monetary and fiscal federalism, but it is not enough. The EU must speed up fiscal integration by moving on a real (actual) optimum currency area, adopting economic policies from the federalist model of the USA, which is much closer to the OCA theory.

In conclusion, each crisis creates a window of opportunity for implementing reforms. Historically, the EU has evolved by successfully tackling both exogenous and endogenous crises. During the Cold War era, the tension between two global powers led EU member states to converge and achieve economies of scale. The establishment of the ECU addressed the collapse of the dollar and the Bretton Woods system of fixed exchange rates in the medium term. The fiscal crisis of 2010 was addressed through reforms and the introduction of new fiscal rules and mechanisms, such as the European Semester and the ESM mechanism. The pandemic crisis was addressed through investments in the digital market and the issuance of common debt as a financing tool for Next Generation EU (NGEU). Based on the above, it becomes evident that it is necessary to create common green debt by issuing green bonds to enable investments in renewable energy sources and the implementation of the Green Deal goals. In this way, the energy crisis can also be tackled. Finally, future research should correlate green growth with technological progress, as high-tech development is vital for sustainable economic growth, as well as the energy and environmental gaps among the EU countries, as their performance differs. Lastly, in future research, the authors underline the need for comparative analysis of EU green economic growth and other economies such as the USA.

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