

Perception regarding European Green Deal challenges: From environment to competition and economic costs

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Abstract: *The objective of sustainable development cannot leave aside the relevance of short-term benefits, long-term negative externalities, and opportunity costs of actions implied by the complex relation economy-society-environment. The transition to a green economy cannot be based exclusively on win-win solutions for all involved parties but requires taking into consideration potential trade-offs between several objectives. The EU strategy for achieving sustainable development and energy security is materialised in the project European Green Deal, which sets courageous goals. Our paper groups the advantages and disadvantages of EGD policies, using exploratory and descriptive research. In this context, we analyse, based on interviews and a questionnaire, the perception of students who have taken Economics courses and are familiar with the topics of externalities and economic policies in relation to the challenges posed by the European Green Deal. While the initiators of this project expect the increase of energy efficiency of the EU states, the encouragement of cleaner industrial activities, the reduction of pollution and of other threats related to global warming, and assuring a more sustainable future for the European economy, the main concerns are related to social costs and loss of European companies' competitiveness. Our findings identified some costs regarding international transactions' financial aspects and competition, while the main benefits were related to environmental protection. Policy implications of this study refer to a more rigorous configuration of policy measures, through expanding the studies regarding the perception of the energy policy, for a wider and better public understanding and acceptance of its benefits and implications.*

Keywords: *European Green Deal, energy efficiency, environment, opportunity costs, competition.*

JEL Classification: Q56, Q58, R11.

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Introduction

Under the umbrella of sustainable development there are many concerns related to finding a balance between immediate benefits, future negative externalities and opportunity costs of actions required by the constraint of the economic-social-environmental trinomial. These concerns have materialised in a rich collection of analyses, debates and political projects. The European Green Deal (EGD) is in line with the logic of the actions proposed by the United Nations in the 2030 Agenda for Sustainable Development with its sustainable goals. Thus, EGD implies “a rethinking of clean energy supply policies in all economic and industrial sectors, along the production and consumption chain, for large-scale infrastructure projects in the transport, food and agriculture, construction, taxation and social benefits” and will require special attention to possible trade-offs between economic, social and environmental objectives (European Commission, 2019). It is believed that green growth, which is a broader objective of the European Union, will lead to harmonised development and cohesion between the old and new Member States (Štreimikienė & Mikalauskienė, 2016).

The transition to green economy cannot be based exclusively on win-win solutions for all involved parties but requires taking into consideration potential trade-offs between several objectives (Filipović et al., 2022). Beyond the certain benefits of a cleaner environment and sustainable growth, there are a number of concerns about the immediate costs of the measures envisaged by the energy transition strategy, which will significantly change the European economy and society. The actions needed in order to achieve the objectives of EGD require a major financial effort. Given the reality of insufficient resources, this will lead to the restriction of other investments. In the short run, EGD policies will contribute to increase the energy expenditure of households and companies, involving significant social costs. Government spending on promoting green jobs can also prejudice the economy. Some green jobs may be created, but many others will be lost or transferred abroad. From an economic point of view, the arguments brought forward by policy makers for the use of government subsidies instead of market prices should also be considered in order to correct the costs of pollution.

Citizens' perceptions and expectations are important issues for decision-makers at

European Union level, as evidenced by the constant concern for conducting surveys on various topics. Between May and June 2022, a survey on “Fairness perceptions of the green transition” was carried out. Its results indicate that, even if over 77% of respondents consider the action to limit climate change a personal responsibility, and over half are optimistic about the new jobs created through climate policies, 93% of respondents showed their concern regarding energy prices (Eurobarometer, 2022). These results suggest that the measures included in the EGD plan seem to be perceived as rather expensive by public opinion. In this context, conducting a survey on the perceptions of a narrower category of respondents, familiar with the notions of economic efficiency, opportunity costs, externalities and the analysis of the effects of public policies can bring additional information related to the benefit-cost ratio of EGD.

Our research groups the advantages and disadvantages of EGD policies, using the exploratory and the descriptive research. In this context, we set out to analyse, based on interviews and a questionnaire, the perception of students who have taken Economics courses and are familiar with the topics of externalities and economic policies in relation to the challenges posed by the European Green Deal. Students were invited to express their agreement/disagreement with a number of statements regarding the effects of the measures envisaged by EGD project. While the initiators of this project expect the increase of energy efficiency of EU states, the encouragement of cleaner industrial activities, the reduction of pollution and of other threats related to global warming and assuring a more sustainable future of the European economy, the main concerns are related to social costs and loss of European companies' competitiveness.

Our research advances knowledge in two directions. First, the research empirically explores, for the first time in Romania, the dimensions explaining the perceived advantages and disadvantages of EGD policies among educated public, young specialists in Economics, capable of carrying out cost-benefit analyses regarding green policies. Second, the article highlights important practical implications, suggesting the need for a clearer and more complete picture regarding the effects of green policies, being able to identify more solutions to reduce costs.

The perception of high economic costs associated with the EGD program can be an impetus for establishing a longer horizon of the green transition, collaborated with incentives for innovation, for the concentration of creative efforts to identify and easily implement substitutes for current resources and alternative production.

The paper is structured in three parts. After the brief presentation of the studies dedicated to the analysis of the effects of the measures assumed by the EGD project, the results obtained from the actual endeavour research and the conclusions and policy implications are presented.

1. Theoretical background

The latest trend of sustainability in the European space, namely the European Green Deal, is seen either as an external policy (Leonard et al., 2021), or as an act of political will (Saikku et al., 2015). Considering the political significance of this new strategy, the opinions related on the Green Deal range from confidence in its success (due to the positive effects for the entire society, from consumers to producers and states) to serious doubts (for various reasons related to competitiveness, efficiency and costs). In any case, this is far from a win-win project, having also some potential negative consequences and challenges for the actors involved, which are impossible to be ignored. The dual effects of Green Deal can also be highlighted by the studies that measure the Green GDP by taking into account both quantitative and qualitative aspects, in the second category being included the opportunity costs of green growth (Stjepanović et al., 2019). Therefore, studies on the impact of the European Green Deal identify consequences on several dimensions, often interconnected: geopolitical, commercial, financial, social and industrial. There is a need to understand all facets of the green economy in the context of circular economy (Stankevičienė et al., 2020).

Since the beginning, the European Commission has recognised that achieving climate neutrality requires a transition process and involves a smart infrastructure. This transition will conduct to geopolitical changes and will create new challenges for the world countries, both for the EU members and partner states. Under these circumstances, the economic and security interests will lean on relations between states.

Different researchers (Leonard et al., 2021) draw attention to the impact that European Green Deal will have on geopolitics, for several reasons. Firstly, the global oil market will be affected, by the reduction in terms of demand, producer prices and revenues. Secondly, EU trade and political relations with oil and gas exporting countries (Russia, Algeria, Norway, Saudi Arabia) will go into a decline. Thirdly, the EU will try to impose its own standards regarding the environmental policy abroad, affecting relations with important states (the USA, China, Russia). Their response can range from cooperation to competition and hostility in implementing Green Deal regulations. Finally, the European energy security will pay from EU dependence on Chinese imports of scarce resources for renewable energy production.

In terms of trade relations, the EU's competitiveness will be affected by the high costs of the new environmental policy (Teevan et al., 2021). The suppliers in developing partner countries, lacking the financial resources to meet the new standards, will also be affected (Lopez, 2021), with consequences for the welfare of European consumers. At the same time, the carbon border adjustment mechanism, introduced by the EU in the implementation of the Green Deal, widely debated in the specialty literature (Eicke et al., 2021; Evans et al., 2021; L'Heudé et al., 2021), will assess new tariffs on carbon-rich imports and will determine repercussions from trading partners (Teevan et al., 2021).

Financially, there is the problem of pressure on the EU budget through the application of environmental policy (Elkerbout et al., 2020), a budget that has already deteriorated by the COVID-19 pandemic expenses. Therefore, there are serious concerns about diminishing funding for other sectors, such as agriculture, research and development, or social cohesion.

The social dimension of the European Green Deal is strongly connected with employment. Going beyond the ambiguity of the term "green jobs" debated in the literature (Furchtgott-Roth, 2012) and the uneven methods for measuring and forecasting the effects of their creation (Sulich & Sołoducho-Pelc, 2022), the creation of green jobs could have a perverse effect, harming the economic system (Borghesi et al., 2022). In other words, it means an increase in public spending, reflected in higher energy prices. In this regard, the consequences will be related to a reduction of production and a rise in unemployment in the affected sectors.

On the other hand, it can lead to unemployment by reducing, disappearing or offshore the transfer of jobs in energy consuming sectors (Mulatu & Wossink, 2014). Moreover, green jobs are seen as the most recent reiteration of a perennial idea: the use of industrial policy to support certain sectors (Furchtgott-Roth, 2012). At the same time, resources are (re)directed to green job-creating industries, without following the criterion of efficiency, thus leading to waste.

From an industrial perspective, the EGD requires significant investment in new technologies. One significant issue is related on the acceleration of the carbon reduction envisaged by the Green Deal. According to the strategy, the carbon emission will be reduced by 55% by 2030. This statement is highly different, if we consider the initial endeavour launched in 1990, when the target was limited to 44%. Considering the aforementioned aspects, the EGD leads to an increase in electricity demand through the coupling of the sector and, as a result, rising short-term energy prices. On the other hand, additional costs with investments in energy distribution and new technologies that replace conventional and renewable energy will rise. In addition to these challenges, there is the issue of the availability of carbon capture, use and/or storage (CCU/CCS) and nuclear technologies and public acceptance of their exploitation (Pietzcker et al., 2021).

The ultimate goal of the European Green Deal is to transform Europe into the first climate-neutral continent by 2050, by decoupling from the use of natural resources (European Commission, 2019). Thus, the European Green Deal is, as the President of the European Commission pointed out, “Europe’s man-on-the-moon moment” (Leyen, 2019) or, in other words, a “once-in-a-generation chance” (Colli, 2020).

Fully agree with the European discourse, numerous studies in the speciality literature have highlighted the potential benefits of the proposed approach through the European Green Deal, considering it a possible response to a future crisis (Gaventa, 2019). Given the multi-dimensional nature of EGD, it was expected that the beneficial effects would be identified in the most diverse spheres, from economy, environment, politics, industry, health, infrastructure, transport, etc. Thus, achieving the set objectives will lead, in the long term, to a significant improvement of living conditions at European level (Mathiesen et al., 2011; Wolf et al., 2022).

The whole greening process proposed by the EGD aims, to a large extent, the development of ecologically sustainable policies, through which efficient management of structural change can be achieved, as well as a guarantee of the equity of economic outcomes between Member States and regions (Pianta & Lucchese, 2020). An important step in this direction is the reform of the industrial sector. Thus, the alignment and adjustment of the industrial strategy aims the EU to become a world leader in the circular economy and clean technologies, trying to reduce pollution in energy-intensive industries (Sikora, 2021). One of the directions promoted is oriented towards the use of renewable energies, the effects that are in accordance with the European Green Deal (Wolf et al., 2022). In this respect, national energy and climate plans, as well as national strategic plans, are key aspects in implementing the EGD. The European Commission has encouraged Member States to develop adaptation strategies in line with national plans to reduce the risk of climate change (Knez et al., 2022).

From an economic perspective, the European Green Deal could be a turning point in overcoming the rigid fiscal constraints that have led to the stagnation of economic growth in recent years (Pianta et al., 2016). Moreover, Ahmed and Streimikiene (2021) consider that green innovation contributes to organisational performance and competitiveness, which could impact economic development. In the same time, EGD plan could be a justification for interventionist policies such as quantitative easing, used to support the real economy.

Socially, the European Green Deal contributes to improving the quality of health, by providing a diet based on less polluted, ecological products, but also by increasing mobility, by consolidating an eco-friendly infrastructure (Haines & Scheelbeek, 2020; Huss et al., 2022).

To sum up, we acknowledge that the speciality literature perspective related to the European Green Deal is heterogeneous, illustrating the disputes over the short- and long-term advantages and disadvantages of implementing this new strategy, both at community and international level. The intensely promoted advantages seem to pass into a shadow of a huge cost, the results of which do nothing to contribute to achieving the objectives, so ambiguously defined. However, the subject actuality makes it necessary to identify how the new path adopted

by the European Union is perceived by the population and, implicitly, by the young generation.

Regarding the perception of different population categories on EGD measures, a cost-benefit analysis of green energy implementation appears in the literature in the form of investigating the consumers' willingness to pay for green energy (Hojnik et al., 2021) or factors influencing consumer decision-making while choosing green products (Maniatis, 2016). A study on EU citizens' perception of some key renewable energy transition factors draws attention to issues related to this transition for the EU, such as resilience, vulnerability, cooperation, competition, sovereignty, security, safety and climate change (Panarello & Gatto, 2023).

A Polish study (Kaczmarczyk & Urych, 2022) analysed the perceptions of secondary school pupils studying in military classes and those of future specialist students in national security regarding their environmental and energy awareness and knowledge of renewable energy sources. The conclusions revealed inadequate levels of knowledge of the necessity of a low-carbon society and of the need to introduce a low-carbon economy in EU countries. Similarly, empirical research performed in five European countries (Austria, Slovenia, Poland, Greece, and Lithuania), highlights the lack of knowledge among the younger generation in terms of identifying opportunities and political issues determined by the European Green Deal. The analysis provides valuable insights into the superficial understanding of the topic of EGD and, consequently, the limited perspective on its effects. In other words, an educational system that provides an interconnected framework, based on knowledge and European transition is required (Krajnc et al., 2022). The perception of the Romanian citizens on implementing different projects for supporting the European Green Deal strategy has been particularly analysed also in the case of nuclear power. For the selected sample, it was stated the necessity of understanding the energy mix for evaluating and accepting nuclear energy, especially taking into account the Russo-Ukrainian conflict. In this regard, the role of the stakeholders is crucial, while public knowledge and trust are key factors for success in nuclear projects (Tantau et al., 2023).

It is recognised that energy policies need to be shaped by citizens' opinions and perspectives (Punzo et al., 2019). At the same time,

the perceptions of EU citizens regarding energy policy have yet to be fully explored (Tosun & Mišić, 2020). In this context, we consider that studies based on the opinion or perception of students on energy policy issues are an important source of information regarding the level of knowledge of the young generation as well as a manner of disseminating knowledge in order to increase the degree of awareness and acceptance of public policy measures adopted by the EU.

Compared to the studies identified in the literature, our research aims to identify the perceptions of an educated public, young specialists in Economics capable of carrying out cost-benefit analyses regarding green policies. The knowledge gained through economic disciplines allows them to identify the costs associated with EGD to a greater extent than the general public, more inclined towards the environmental benefits of these measures. If there is inadequate know-how among young people or other categories of citizens regarding green transition, it does not refer to the benefits of policies, but, rather, to the costs associated with achieving the intended objectives. We believe that our study opens new research directions regarding the perception of the economically educated population for a better understanding of the costs associated with EGD measures. European decision-makers can, thus, have a clearer and more complete picture regarding the effects of green policies, being able to identify more solutions to reduce costs.

2. Research methodology

2.1 Research design

The presents study followed two research objectives: (1) *Identifying the main disadvantages of EGD policies*, and (2) *Identifying the main advantages of EGD policies*.

Given the research goal, which is illustrated by providing an overview of students' perceptions on the European Green strategy, the research methodology was properly designed. To identify the opinions of young specialists about the most significant weaknesses (disadvantages) and benefits (advantages) of EGD strategy, exploratory and descriptive research methods were combined.

Firstly, to provide a systematic spotlight on the topic of the European Green Deal, a rigorous literature review was undertaken.

From the literature, 22 central premises/arguments were identified and extracted and subsequently transformed into items. Aligned with the paper's goal, the experts' perspectives were divided into two main categories. On one hand, debates illustrating the positive effects of EGD policy were summarised. On the other hand, evidence of the negative impact was briefly pointed out and correlated with the survey questions. Based on previous studies (Ahmed & Streimikiene, 2021; Haines & Scheelbeek, 2020; Huss et al., 2022; Sikora, 2021), six items describing the benefits of EGD policy were extracted, related to different aspects, such as reducing pollution through green industries, the potential for decreasing global warming threats, the effects on energetic efficiency or the social impact on the health of individuals. Also, 16 items describing the perception related to the negative aspects of the EGD were built, after the literature review process (Elkerbout et al., 2020; Furchtgott-Roth, 2012; Leonard et al., 2021; Lucchese & Pianta, 2020), such as: the impact of the EGD strategy on the market competitiveness, the higher regulation costs, both at the national and international levels, on the EU's dependence on exporting countries for scarce resources for green energy production or the use of industrial policy to create privileges for certain industries.

The second stage of the research consisted in conducting a quantitative survey based on the questionnaire. The questions aimed to measure the most important factors defining the advantages and the disadvantages of the EGD policies were measured using a 5 points Likert scale (1 – strongly disagree to 5 – strongly agree). Also, to better understand the students' knowledge of the analysed topic, other questions were included, in order to gather general information about the sample, such as their level of education (bachelor or master), the year of study or their involvement in paying the electricity expenses.

The process of analysing the data was facilitated by using statistical software SPSS 22. Methodologically, after reviewing the speciality literature, data analysis and exploratory factor analysis were conducted to group the factors explaining the advantages and the disadvantages of the EGD strategies. Thus, the paper fills a gap in the literature by labelling the advantages and disadvantages of the EGD policies.

2.2 The sample

The questionnaire was addressed to students as citizens of the European Union, future specialists and potential decision-makers in public environmental and energy policies. The sample consists of 206 students of the Alexandru Ioan Cuza University of Iași, Romania, enrolled in International Economics & Business and Economics of Trade, Tourism & Services undergraduate and master study programs. They all studied Microeconomics and Macroeconomics and have basic knowledge about opportunity costs, economic policies aimed at reducing negative externalities, especially pollution, and their implications in terms of the economic efficiency of different measures. Most of the students are bachelors (89.3%), while 10.7% of them are enrolled in a master's program in Economics.

3. Research results

3.1 Identifying the main disadvantages of EGD policies

In order to identify the factors explaining the main perceived disadvantages of the EGD policies, factor analysis was conducted with SPSS 22, grouping the 16 items and investigating different aspects of these disadvantages. After the first run of the factor analysis, three factors were identified, with an eigenvalue greater than one (Costello & Osborne, 2005; Shrestha, 2021), following the Kaiser's criterion (Kaufman & Dunlap, 2000), explaining 52.25% of the total variance. One item was removed from the factor matrix, based on the factor loading which was smaller than 0.4 (Raubenheimer, 2004): EGD has insufficient policy tools to stimulate companies to follow its priorities (companies do not have a clear set of incentives to invest in sustainable production).

The analysis was resumed, and three factors were identified, explaining 53.26% of the total variance (Tab. 1), considered an acceptable value (Beavers et al., 2013; Pett et al., 2003).

The Kaiser-Meyer-Olkin (KMO) test was conducted and the value of 0.903 indicates that the sampling is very adequate and that it is a good grouping solution for the factors. Also, Bartlett's test of Sphericity (Tab. 2) confirms that the exploratory factor analysis is very appropriate for analysing the correlation matrix (Schreiber, 2021).

The three factors explaining the main disadvantages of the EGD policies were labelled, based on the content of the items defining

Tab. 1: Total variance explained – 3 factors

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	5.722	38.144	38.144	5.722	38.144	38.144	2.851	19.007	19.007
2	1.183	7.886	46.030	1.183	7.886	46.030	2.691	17.941	36.948
3	1.084	7.229	53.259	1.084	7.229	53.259	2.447	16.311	53.259
4	0.939	6.257	59.516						
5	0.802	5.349	64.865						
6	0.736	4.904	69.769						
7	0.650	4.335	74.104						
8	0.634	4.229	78.333						
9	0.586	3.905	82.237						
10	0.567	3.780	86.017						
11	0.512	3.412	89.429						
12	0.486	3.241	92.670						
13	0.425	2.836	95.506						
14	0.355	2.368	97.874						
15	0.319	2.126	100.000						

Note: Extraction method – principal component analysis.

Source: own

Tab. 2: KMO and Bartlett's test

Test		Value
Kaiser-Meyer-Olkin measure of sampling adequacy		0.903
Bartlett's test of sphericity	Approx. chi-squared	997.656
	Df	105.000
	Sig.	0.000

Source: own

them and the structure of the factors is presented in Tab. 3.

For the first factor, related to competition, explaining 7.229% of the total variance, the reliability level, measured with the Cronbach alpha coefficient, is 0.71, indicating a good reliability of the scale consisted in three items. This result is convergent with the study conducted by Teevan et al. (2021), which showed that

the EU's competitiveness will be affected by the high costs of the new environmental policy. The EGD strategy will change the direction of economic development into a dimension of environmental prevailing. In other words, there is a new paradigm that aims to provide an ecological dimension by changing the production process, and growth, "but do not question the goals of endless production, consumption

Tab. 3: Three main disadvantages of EGD policies (item loadings, standard deviation, mean)

Factor	Items	Items loading	Standard deviation	Mean
Competition	D1_EGD policies can affect competitiveness	0.735	1.043	3.46
	D2_Faced with the high costs of regulation, which their foreign competitors cannot afford, European firms will become less competitive, domestically	0.607	0.958	3.42
	D3_Faced with the high costs of regulation, which their foreign competitors cannot afford, European companies will become less competitive, externally	0.680	0.949	3.44
International transactions	D4_The adoption of EGD policies will increase the EU's dependence on exporting countries for scarce resources for green energy production	0.590	0.948	3.75
	D5_The reduction in demand, resulting from the EU's shift to renewable energy, will affect the global crude oil market and contribute to the deterioration of oil and gas producing countries' trade relations with the EU, leading to geopolitical imbalances	0.708	0.938	3.66
	D6_Government spending on promoting green jobs can hurt the economy; some green jobs may be created, but many more jobs will be cut or transferred offshore – "Green jobs for EU, green growth for Asia"	0.477	0.979	3.56
	D11_The European Green Deal involves significant investment in new technologies and transport capacity, which will lead to a significant increase in the costs of implementing these measures	0.651	0.877	3.72
	D16_The diversity of Member States' economic interests will be a political obstacle to the common support for EGD policies	0.636	0.972	3.64
Financial	D7_Green jobs are often not economically viable	0.690	0.980	3.44
	D8_There is no argument for using government subsidies instead of market prices to correct the costs of pollution	0.493	0.925	3.50
	D9_Government subsidies are a waste of taxpayer resources	0.665	1.152	3.07
	D10_The Green Deal is a reiteration of a perennial idea: the use of industrial policy to create privileges for certain industries	0.586	0.978	3.42
	D12_EGD policies will increase household energy expenditure, involving significant social costs	0.601	1.006	3.52
	D13_EGD policies will increase companies' energy spending, involving significant social costs	0.591	0.966	3.51
	D15_The EGD has insufficient policy tools to encourage governments to pursue its priorities (Member States have no formal political constraints that could push governments to implement a Green Deal agenda)	0.453	0.875	3.55

Source: own

and growth” (Huber, 2020, p. 4). The second factor explains the impact of EGD policies on the international transactions: geopolitical imbalances, political obstacles, the EU’s dependence on exporting countries or many jobs transferred offshore, as Leonard et al. (2021) stated in their study. The scale measuring this factor has good reliability, indicated by the value of Cronbach alpha coefficient (0.75). This factor explains 38.144% of the total variance, being the most significant in describing the main perceived disadvantages of the EGD policies. The last factor explains 7.886% of the total variance, describing the financial disadvantage of EGS strategy, and the value of 0.81 for the Cronbach alpha coefficient indicates a good reliability level of the seven items scale measuring this construct. Our findings are in accordance with Elkerbout et al. (2020), who drew attention to the pressure that the implementation of environmental policy will have on the EU budget. Similarly, Lucchese and Pianta (2020) highlighted that the increasing ambition of a neutral

climate provided by the European Green Deal is insufficiently justified, especially considering the economic conditions.

We also investigated the perception of each disadvantage for two different categories of specialists, according to their level of involvement in the payment of electricity expenses in the household where they live (low or high level of involvement).

Analysing the data from Tab. 4, presenting the Levene’s test and the *t*-test for equality of means, we conclude that mean differences in competition ($t = 2.897$; $df = 140.003$; $sig = 0.04$) and financial ($t = 3.863$; $df = 123.977$; $sig = 0.000$) are statistically significant. The results indicate that people who are more involved in paying the electricity expenses in their household perceive the competition issues related to EGD policies as representing a stronger disadvantage (mean = 3.52), comparing to the ones who are less involved in this activity (mean = 3.21). Also, the young specialists who are more involved in paying the electricity expenses in their

Tab. 4: Independent samples test – EGD disadvantages factors and the involvement in paying electricity expenses

		Levene's test for equality of variances		t-test for equality of means				
		F	Sig.	t	Df	Sig. (2-tailed)	Mean difference	Std. error difference
DFactor_1 Competition	Equal variances assumed	8.891	0.003	2.546	204.00	0.012	0.30413	0.11944
	Equal variances not assumed			2.897	140.00	0.004	0.30413	0.10498
DFactor_2 International transactions	Equal variances assumed	0.174	0.677	1.713	204.00	0.088	0.17693	0.10327
	Equal variances not assumed			1.741	107.77	0.085	0.17693	0.10163
DFactor_3 Financial	Equal variances assumed	4.706	0.031	3.571	204.00	0.000	0.35944	0.10067
	Equal variances not assumed			3.863	123.97	0.000	0.35944	0.09305
Given the disadvantages of EGD policies, I do not support the implementation of this plan	Equal variances assumed	0.583	0.446	3.725	204.00	0.000	0.70100	0.18800
	Equal variances not assumed			3.977	120.23	0.000	0.70100	0.17600

Source: own

household perceive the financial issues of EGD as a bigger challenge (mean = 3.53), comparing with the other category (mean = 3.17). In the case of international transactions factor, no significant differences were identified regarding the perception of the two categories of people ($t = 1.713$; $df = 204.00$; $sig = 0.088$).

Also, the same Tab. 4 shows that there is a significant statistical difference ($t = 3.725$; $df = 204.00$; $sig = 0.000$), regarding the level of support of the EGD policies between people who are more or less involved in paying electricity bills. In other words, the young specialists who are responsible or contribute to paying these expenses are less motivated to support the EGD project (mean = 2.96), while the other category, less or not financially affected, are more willing to support these measures (mean = 2.26). Therefore, the European Green Deal provides the premises not only for a green transition to a neutral climate continent but to a life transition (Huber, 2020).

3.2 Identifying the main advantages of EGD policies

To investigate the factors explaining the main perceived advantages of the EGD policies, we also used exploratory factor analysis on the six items included in the questionnaire. We followed the Kaiser's criterion (Costello & Osborne, 2005; Kaufman & Dunlap, 2000; Shrestha, 2021) and after the first run of the factor analysis, the items were grouped in one single factor, explaining 51.76% of the total variance. We removed one item with the factor loading smaller than 0.4 (Raubenheimer, 2004) (A1_The actions required to achieve the objectives of the EGD require a significant financial effort which, given the reality of insufficient resources, will restrict other necessary investments) and the factor analysis was resumed. Tab. 5 indicates that the five remaining items were grouped in one single factor, explaining 60% of the total variance.

The Kaiser-Meyer-Olkin (KMO) test (0.847) and Bartlett's test of sphericity confirm that

Tab. 5: Total variance explained

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	3.005	60.091	60.091	3.005	60.091	60.091
2	0.606	12.113	72.205			
3	0.533	10.653	82.858			
4	0.467	9.349	92.207			
5	0.390	7.793	100.000			

Note: Extraction method: principal component analysis.

Source: own

Tab. 6: KMO and Bartlett's test

Test		Value
Kaiser-Meyer-Olkin measure of sampling adequacy		0.847
Bartlett's test of sphericity	Approx. chi-squared	351.160
	Df	10.000
	Sig.	0.000

Source: own

the sampling is very adequate, and the exploratory factor analysis is very appropriate for analysing the correlation matrix (Schreiber, 2021) (Tab. 6).

The extracted factor explaining the main advantage of the EGD policies was labelled according to the item's content (its structure is presented in Tab. 7). The five items from the scale are related to the environmental advantage: reducing pollution, a more sustainable future, reducing global warming, improved health of people and

increasing energy efficiency. The reliability was measured with the Cronbach alpha coefficient (0.83), indicating good reliability of the scale measuring the environmental EGD advantage.

The findings are convergent with the conclusions of the study conducted by Haines and Scheelbeek (2020), who sustained that the EGD policies are an ambitious agenda which would support planetary health.

Investigating the perception of the main advantage of the EGD project of two categories

Tab. 7: Main advantage of EGD policies (item loadings, standard deviation, mean)

Factor	Items	Items loading	Standard deviation	Mean
Environmental	A3_By encouraging clean industrial activities, the EGD project will reduce pollution	0.805	0.806	4.28
	A6_The actions envisaged by the EGD will transform the European economy for a more sustainable future	0.803	0.906	4.09
	A2_The EGD will make a significant contribution to reducing global warming threats	0.781	0.880	4.02
	A4_EGD policies will have important social effects, by improving the health of individuals	0.767	0.900	4.14
	A5_Through the proposed measures, the EGD will contribute to increasing energy efficiency	0.718	0.915	4.08

Source: own

Tab. 8: Independent samples test – EGD advantage factor and the involvement in paying electricity expenses

		Levene's test for equality of variances		t-test for equality of means				
		F	Sig.	t	Df	Sig. (2-tailed)	Mean difference	Std. error difference
AFactor_1 Environmental	Equal variances assumed	0.007	0.933	0.099	204.000	0.921	0.01053	0.10598
	Equal variances not assumed			0.098	102.204	0.922	0.01053	0.10701

Source: own

of specialists, according to their level of involvement in the payment of electricity expenses in the household where they live (low or high level of involvement), we used independent-samples *t*-test, with SPSS 22. The results are presented in Tab. 8 and indicate that there is not a significant statistical difference regarding

the perception of the two categories of people ($t = 0.99$; $df = 204.000$; $sig = 0.921$) on the relevance of the environmental advantage of the EGD policies. Regardless of the involvement level in paying the bills, the young specialist similarly appreciates the importance of this advantage.

3.3 A significant difference between the perceived disadvantages and advantages, depending on education level (bachelor or master degree)

We investigated the young specialists' perception of the advantage and disadvantages of EGD policies, depending on their level of education (bachelor or master studies). The results of the independent samples *t*-test are presented in Tab. 9, showing that there are significant statistical differences in the perception of disadvantages related to the financial aspects of EGD policies ($t = 2.525$; $df = 204.00$; $sig = 0.012$) and the advantages this project brings for the environment ($t = 3.080$; $df = 204.00$; $sig = 0.002$). Master students consider that the financial aspects brought by EGD policies represent a more significant disadvantage (mean = 3.76) compared with the bachelors' perception (mean = 3.39). An explanation might be that these students are more mature, more responsible and more involved in paying their expenses. Most of them have jobs and better understand the responsibility for managing their salary.

There were no significant statistical differences between bachelor and master students' opinions regarding competition ($t = 0.395$; $df = 23.069$; $sig = 0.696$) and international transactions ($t = 1.068$; $df = 204.00$; $sig = 0.287$) factors. Both bachelor and master students share the same opinion regarding the importance of these disadvantages. Also, master students appreciate more the environmental advantage (mean = 4.53) than the bachelors (mean = 4.07). Master students have more economic experience and might better understand environmental issues.

Moreover, we investigated the bachelor students' perception of the advantage and disadvantages of EGD policies, depending on their year of study (students in their first year of university study in comparison to students in 3rd year). The results of the independent samples *t*-test show that there is a significant statistical difference regarding the perception of the disadvantage related to the international transactions aspects of EGD policies ($t = 2.513$; $df = 156$; $sig = 0.013$). The bachelor students in 3rd year consider that the negative impact

Tab. 9: Independent samples test – EGD advantage/disadvantages factors and the level of education

		Levene's test for equality of variances		t-test for equality of means				
		F	Sig.	t	Df	Sig. (2-tailed)	Mean difference	Std. error difference
DFactor_1 Competition	Equal variances assumed	11.092	0.001	0.561	204.000	0.576	0.09898	0.17654
	Equal variances not assumed			0.395	23.069	0.696	0.09898	0.25052
DFactor_2 International transactions	Equal variances assumed	2.878	0.091	-1.068	204.000	0.287	-0.16126	0.15105
	Equal variances not assumed			-0.921	24.577	0.366	-0.16126	0.17503
DFactor_3 Financial	Equal variances assumed	0.383	0.537	-2.525	204.000	0.012	-0.37571	0.14880
	Equal variances not assumed			-2.317	25.206	0.029	-0.37571	0.16216
AFactor_1 Environmental	Equal variances assumed	1.315	0.253	-3.080	204.000	0.002	-0.46462	0.15087
	Equal variances not assumed			-3.386	27.799	0.002	-0.46462	0.13722

Source: own

of EGD policies on international transactions is more significant (mean = 4.05) compared with the first-year bachelors' perception (mean = 3.62). An explanation might be that the 3rd year students seem to be more concerned with the international effects of EGD measures, as their economic education was completed with topics related to the international economy, comparative advantages of nations and competitiveness on global markets.

In order to conclude, we can state that the results of the current empirical research illustrate the perception of students in Economics about the advantages and disadvantages of implementing the new European Green Deal strategy. By processing the collected data, were highlighted significant differences between the ways the European Commission's strategy is perceived. This situation is justified, in the case of this sample, by the level of education (bachelor's or master's degree). Additionally, another explanation is obviously related to an increase in responsibility, depending on the involvement in the payment of household expenses. The following dimensions can summarise the main disadvantages identified: competition, international transactions and financial. In terms of benefits, there is a need for the environmental dimension improvement by implementing measures to reduce pollution costs and support a sustainable economy.

Based on these results, we reckon that public policy makers should better understand how individual decisions are made regarding the transition to the green economy, with immediate personal costs generally weighing much more heavily than future social benefits. Without such an understanding, well-intentioned policies can be ineffective or even counterproductive. The European decision-makers should take into account, to a greater extent, the public opinions of the citizens regarding the proposed green measures, especially starting from the negative perceptions involved in them. The programs regarding sustainable education are sufficiently well implemented, and the young public is constantly exposed to information related to the risks of pollution and the extensive use of resources. Environmental protection measures, however, need coherent industrial policies and economic resources necessary for their implementation. Concerns regarding the economic impact of these green programs should not be neglected, the possibility

of reducing competitiveness being a sensitive aspect, with broad social implications. The perception of high economic costs associated with the EGD program can be an impetus for establishing a longer horizon of the green transition, collaborating with incentives for innovation, and the concentration of creative efforts to identify and easily implement substitutes for current resources and alternative production.

Conclusions

The economic way of thinking is based on actions-interactions-unintentional consequences logic (Heyne et al., 2013). In this respect, referencing the public policy must always include both the immediate temporal plan and the long-term consequences of the measures taken. The current economic and geopolitical context requires a little more caution regarding environmental policies, which, beyond the favourable long-term consequences of the green economy and cleaner production, involve both immediate and long-term economic costs.

Our research captured the perception of 206 young Romanian specialists in Economics towards the European Green Deal project in terms of the advantages and disadvantages of its implementation. The environmental benefits were widely appreciated by the subjects of our study, who agreed with the positive effects expected by the EGD measures, such as the reduction of pollution, the improvement of people's health, the increase of energy efficiency and a more sustainable future. They also expressed concern regarding the expected negative effects of this project on both the loss of European companies' competitiveness, the significant financial costs of government subsidies and rising energy costs, and the deterioration of trade relations with external partners. Among the three main perceived disadvantages of the EGD measures, the most significant one is related to the effects of these measures on international relations, such as the increasing of the EU's dependence on exporting countries for scarce resources for green energy production.

All these expected costs are important elements in the balance that must be taken into account by the decision makers of the European Green Deal project. We appreciate that our study paves the way for broader analyses in European countries regarding the perceptions, expectations and fears of individuals

towards the prospects of implementing ambitious environmental goals. In this respect, we recommend the expansion of studies of this kind at the EU level and their integration into educational and information platforms for all parties interested in energy policy and its economic, environmental and social effects. This recommendation is justified by the fact that the participation of people/company representatives in studies of this kind contributes to increasing the degree of knowledge of various issues involved by energy policies and leads to greater public support. Moreover, the feedback received from different interest groups (private consumers, companies, and policy makers from the lower decision-making levels) could be a valuable starting point for a better configuration of energy and environmental policy measures, whose positive effects outweigh the related costs.

Our study draws attention to the importance of education in terms of understanding the effects of policies in general and energy and environmental ones in particular. At the same time, the study can be a starting point for a more rigorous configuration of energy and environmental policy measures that the EU is considering in order to increase energy security and efficiency and to reduce pollution, and for increasing clarity and transparency regarding the implementation of EGD policies and instruments, as the literature (Smol, 2022) recently pointed out.

The research results offer important insights regarding how EGD policies are perceived by young specialists but the conclusions cannot be generalised due to the size and the structure of the sample. The main research limitations of the study are represented by the relatively small volume of the considered sample and the fact that, for this stage of the research, only students in the Economics field were participants. For a more accurate picture of how the European Green Deal is perceived, in order to obtain representative conclusions, future research directions will extend the analysis to other categories of people, also improving the sample size. The extension of the sample could provide a new perception of the analysed subject. In addition, another limitation is the general approach to the effects of EGD. In this sense, future directions will consider performing specific analyses, such as competitiveness, entrepreneurship, and freedom of decision.

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