

Greenwashing Awareness and Consumer Behavior among Economics Students



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Abstract: In the context of increasing global concerns for sustainability and the proliferation of unfounded environmental claims in commercial communication, greenwashing represents an increasingly relevant challenge for consumers and regulatory institutions. This study analyzes the level of awareness of greenwashing practices in the agri-food sector among economics students in the Republic of Moldova, assessing the extent to which current economics education prepares them to identify deceptive commercial tactics and adopt responsible consumption behaviors. Through a structured questionnaire administered to a sample of 235 students aged 18-25 from economics faculties, the study measures greenwashing awareness, consumer confusion and purchase intention for organic products, using multiple regression techniques and mediation models. The results indicate that 92% of respondents correctly identify greenwashing practices, but the correlation between confidence in one's own abilities and actual performance is insignificant ($r = 0.074$), suggesting a Dunning-Kruger effect specific to this field. The perception of the benefits of organic products is the strongest predictor of purchase intention ($r = 0.59$), and awareness of greenwashing amplifies, not diminishes, the motivation to purchase authentic green products. Gender differences reveal significantly higher scores in women regarding the perception of ecological benefits, with no differences in detection ability. 63.8% of students support the introduction of courses dedicated to responsible marketing in the university curriculum. The study contributes to the specialized literature by highlighting a metacognitive paradox in economic education in emerging economies: the deficit of students is not cognitive, but resides in the lack of confidence in the skills already formed, providing empirical arguments for the curricular reform in economic education in the Republic of Moldova.

Keywords: greenwashing; economics education; economics students; consumer behavior; Republic of Moldova; curriculum reform.

JEL Classification: Q56; M31; I23; D83; P46; A20.

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Introduction

In the last decade, the phenomenon of greenwashing has become increasingly widespread globally, as people become more interested in living a healthy and environmentally friendly lifestyle. Companies tend to exploit this trend for their own interests, without implementing genuine sustainability practices, relying on misleading claims, labels or practices that create the illusion of environmentally responsible activity (European Commission, 2023). The situation is particularly pronounced in the agri-food sector, where the impact extends to food safety and public health (Arayess & de Boer, 2022; Palenychak *et al.*, 2024). Although the phenomenon is the subject of increasingly significant regulatory initiatives at the European level, countries in Central and Eastern Europe, including the Republic of Moldova, face institutional vulnerabilities and gaps in the application of standards (European Union

Agency for Fundamental Rights, 2024; Timofei *et al.*, 2025). In such a context, formal education becomes the main defense mechanism against misleading commercial practices for young consumers. This research examines the impact of greenwashing awareness on the purchase intention of organic agri-food products among economics students in the Republic of Moldova, analyzing the mediating role of green consumer confusion and the effect of perceived benefits, in order to argue for the need for curricular reform in economics education. By combining behavioral and educational perspectives, the research contributes both to the literature on greenwashing and to the debate on economics education reform in emerging economies.

1. Literature Review

The term "greenwashing" was introduced in 1986 by the American ecologist Jay Westerveld, derived from the concept of "whitewashing" with the meaning of masking reality (Lyon & Montgomery, 2015). Academic interest in this phenomenon has grown exponentially in recent years, a trend extensively documented through systematic database searches across multiple platforms (Montgomery *et al.*, 2024). Astuti *et al.* (2025) identify 674 peer-reviewed articles published in Scopus in the last 25 years, of which 289 in 2024 alone, with 18,973 total citations. A search conducted by the authors, updated on May 15, 2026 in the same database reveals 976 articles and 30,346 citations for the same period, an increase of 302 documents and 11,373 citations confirming that greenwashing has become a central theme in corporate sustainability research.

The specialized literature identifies multiple typologies of the phenomenon, demonstrating its multidisciplinary nature, which crosses fields such as business, communication, economics, social sciences and environmental management (Vollero, 2022). This complexity complicates the clear delimitation and definition of the concept. Delmas and Burbano (2011) situate greenwashing at the intersection of poor environmental performance and positive communication about it, while Baum (2012) defines it more broadly as the act of disseminating misinformation to consumers regarding a company's environmental practices. More recent approaches emphasize the discrepancy between communications and actions: Gatti *et al.* (2019) characterize it as a symbolic communication strategy without substantiation by concrete measures, and Huang *et al.* (2024) expand the perspective, highlighting that the phenomenon operates on multiple levels and involves a perceptual dimension with an impact on stakeholder trust. The conceptual diversity has generated calls in the recent literature for greater paradigmatic clarity, with authors arguing that the lack of a consensual definition hinders the development of effective tools to measure and combat the phenomenon (Bernini & La Rosa, 2024).

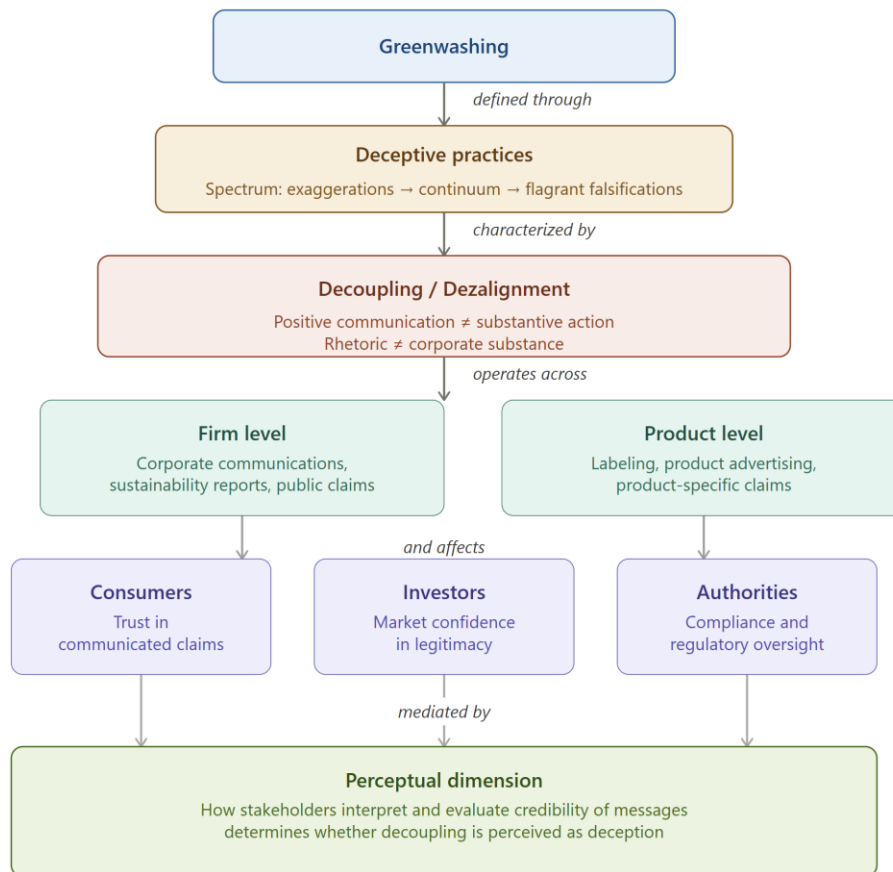
An overview of these approaches allows the conclusion that greenwashing manifests itself through deceptive practices ranging from minor exaggerations to flagrant falsifications of environmental performance, characterized by a systematic decoupling between positive communication and substantive actions, which affects the trust of consumers, investors and regulators alike (Delmas & Burbano, 2011; Gatti *et al.*, 2019; Huang *et al.*, 2024). This interpretation and assessment also depend on how stakeholders perceive the credibility of the messages communicated (Seele & Gatti, 2017; Verleye *et al.*, 2023) (Figure 1).

Research has also expanded the analysis to include consumer behavior. Fella and Bausa (2024), in a study of approximately 700 German participants, demonstrate that they can identify greenwashing when systematically stimulated to do so, but fail to do so under normal product evaluation circumstances. This finding aligns with the observations of Verleye *et al.* (2023), who identify six elements of green advertising credibility - honesty, clarity, detail, commitment, urgency, and shared value - the absence of any of which compromises the perception of authenticity. Wang *et al.* (2019) additionally highlight a contagion effect through which the perception of greenwashing in a brand negatively affects attitudes towards the entire category of green products, creating a vicious circle in which the deceptive practices of some companies undermine trust in all green claims, including genuine ones.

Consumer behavior in the context of greenwashing can be explained by several complementary theoretical frameworks. Cognitive dissonance theory (Festinger, 1957) suggests that discovering discrepancies between a company's environmental claims and its actual performance generates psychological discomfort that leads consumers to avoid the products in question or to minimize the importance of environmental aspects (de Jong *et al.*, 2020; Verleye *et al.*, 2023). The Knowledge Persuasion Theory (Friestad & Wright, 1994) and the Theory of Planned Behavior (Ajzen, 1991) explain how consumers develop resistance to deceptive marketing tactics: in quick purchases they rely on intuition and heuristics, which makes them vulnerable to unverified positive claims, but with repeated exposure to contradictions they resort to deliberate and critical thinking, a process consistent with the dual processing model (Kahneman, 2011). Higher education acts as a significant moderator of these processes - higher-educated consumers have more sophisticated mental schemas that allow them to more effectively detect discrepancies between green communication and actual corporate actions (Kahneman, 2011). Margariti *et al.*

(2024) confirm that repeated exposure to greenwashing increases green skepticism, with the effect being more pronounced in higher-educated consumers, who more frequently engage in deliberate critical thinking. The contagion effect documented by Wang *et al.* (2019), whereby greenwashing affects the perception of an entire category of similar products, remains active, but more educated consumers show more resistance to negative generalization, differentiating between specific brands and practices.

Figure 1. The structure and conceptual evolution of greenwashing



Source: Developed by the authors based on the synthesized literature (Delmas & Burbano, 2011; Gatti *et al.*, 2019; Seele & Gatti, 2017; Verleye *et al.*, 2023; Huang *et al.*, 2024).

These findings highlight the need for continued development of skills to recognize greenwashing practices in society, and formal university education plays a key role in this process. The literature argues that systematic teaching approaches that integrate theory, practice, and critical evaluation are needed to close the gap between knowledge and competence in the field of sustainability (Álvarez-García & Sureda-Negre, 2023; Gianfrate, 2023). Álvarez-García and Sureda-Negre (2023), reviewing 20 academic papers, demonstrate that current education is insufficiently equipped to prepare students to navigate the complexity of contemporary environmental claims and recommends the systematic integration of greenwashing identification skills into business and economics curricula. In the same vein, Gianfrate (2023) argues that current economic education fails to prepare students for the complex realities of corporate greenwashing, proposing the integration of modules on critical sustainability analysis in all university business and economics programs. The relationship between academic knowledge and the ability to identify greenwashing thus constitutes an emerging field with direct implications for the reform of university curricula, especially in the context of European transition economies where regulatory mechanisms remain insufficiently developed (Irawati *et al.*, 2023).

This educational insufficiency is particularly relevant in the agri-food sector, which exhibits specific vulnerabilities to greenwashing practices. Nugraha *et al.* (2024) identify a significant research shortage in this area - only 16 studies out of 711 articles analyzed meet the inclusion criteria for greenwashing in the food industry - and emphasize that the key factors that amplify consumer vulnerability are access to information, transparency, specific knowledge about sustainable labels, and trust in the certification process. The specificity of agri-food greenwashing is manifested by the frequent use of vague terms such as "natural," "traditional," "organic," or "green" without

concrete or verifiable substantiation, exploiting the absence of standardized definitions (Khan *et al.*, 2024). The vulnerability of the sector becomes even more problematic in post-Soviet and European integration countries, where the literature remains extremely limited, with most studies focusing on developed economies in Western Europe or emerging economies in Asia. Given that transition countries present specific institutional vulnerabilities that can facilitate the proliferation of greenwashing (Singh & Singh, 2025), the context of the Republic of Moldova, characterized by a developing legal framework and monitoring mechanisms under consolidation, creates enabling conditions that require dedicated investigations (Irawati *et al.*, 2023).

The analysis of the literature highlights several gaps that this research directly addresses. It is noteworthy that there is no research dedicated exclusively to economics students as a distinct group: although there is research on marketing students (Brouwer, 2015) or on young people in general (Promalessy & Handriana, 2024), no studies dedicated to future economists and their role in identifying and combating greenwashing have been identified. Also, the educational dimension is poorly integrated in the literature devoted to the phenomenon, with most works strictly approaching the perspective of consumer behavior, leaving in the shade the implications for economic education and the formation of critical skills. The agri-food sector in post-Soviet economies is, in turn, covered to a limited extent in research, although it requires targeted investigations to understand the specific manifestations of greenwashing in this vulnerable institutional context.

Based on these identified gaps, the present research formulates the following hypotheses:

H1: Awareness of greenwashing negatively influences the intention to purchase organic agri-food products among economics students.

H2: Green consumer confusion mediates the negative relationship between greenwashing awareness and purchase intention.

H3: Perceived benefits of green products positively influence purchase intention.

At the same time, the research aims to assess the level of awareness and the need for anti-greenwashing education in university economics programs.

2. Materials and Methods

To achieve the objectives of the study and verify the research hypotheses, a quantitative approach was adopted. For this purpose, a structured questionnaire was developed, in accordance with the methodological recommendations for consumer behavior research (Hair *et al.*, 2019). This choice is justified by the need to obtain quantifiable and generalizable data on greenwashing awareness among a specific sample, as well as by the advantages of the cross-sectional design in capturing a snapshot of the investigated attitudes and behaviors. The sample targets students at the faculties of economics aged 18–25 from the Republic of Moldova, the selection of this group being justified by the human capital theory (Becker, 1964) and the high theoretical relevance of the group for the investigated phenomenon, due to their training in market mechanisms and future role in economic strategies. According to the National Bureau of Statistics of the Republic of Moldova (2025), this age group numbers approximately 174,000 persons, representing 7.2% of the total population, underlining the societal relevance of investigating this demographic in the context of an insufficient regulatory framework.

The minimum required sample size was determined by applying Green's (1991) formula for multiple regression analysis, which assumes $N \geq 50 + 8m$, where N represents the minimum number of participants required and m represents the number of predictors included in the model. The regression model of our research includes seven predictors: three demographic control variables (gender, age, education level) and four main constructs (greenwashing awareness (GWA), net objective knowledge score (F1_net_score), perceived benefits of green products (GPB), and green consumer confusion (GCC). Applying the formula: $N \geq 50 + 8 \times 7 = 106$, a minimum threshold of 106 respondents results in order to ensure adequate statistical power to detect medium-sized effects. The actual sample collected of 235 valid respondents exceeds this threshold by 2.2 times, providing additional robustness to all statistical analyses performed.

In addition to the self-report scales, the instrument included an objective knowledge question (F1) in which respondents were asked to identify, from a list of ten commercial labels on the Moldovan agri-food market, those considered environmentally misleading. The list included six greenwashing labels and four legitimate certifications, presented in Table 1. This approach responds to the methodological criticism formulated by Fella and Bausa (2024), who demonstrate that self-assessment of the ability to detect greenwashing systematically differs from real performance.

Based on the responses to the F1 item, four numerical indicators were constructed: F1_hits - the number of greenwashing labels correctly identified (range 0–6); F1_false_pos - the number of legitimate labels erroneously marked as misleading (range 0–4); F1_net_score - the net knowledge score, calculated as F1_hits – F1_false_pos

(range -4 to +6); and F1_all_correct - a binary variable assigned to respondents who identified all 6 greenwashing labels without any classification errors for legitimate labels.

Table 1. Labels Included in Item F1 and Their Classification

Commercial Label	Classification	Justification
"Green Production"	MISLEADING ✓	Vague, unverifiable term
"Environmentally Friendly"	MISLEADING ✓	Generic claim without standard
"Zero Emissions"	MISLEADING ✓	Frequently unsubstantiated claim
"Grown the Old-Fashioned Way"	MISLEADING ✓	Nostalgic appeal without verification
"100% Natural"	MISLEADING ✓	Does not imply safety or eco-certification
"Locally Produced"	MISLEADING ✓	Origin ≠ sustainability
EU Organic (EU logo)	LEGITIMATE X	Third-party verified certification
Fairtrade Certified	LEGITIMATE X	Internationally accredited standard
Rainforest Alliance	LEGITIMATE X	Globally recognized certification scheme
"Packaging made from 80% recycled plastic"	LEGITIMATE X	Concrete, numerically verifiable claim

Source: Elaborated by authors based on synthesized literature.

The research instrument integrates internationally validated scales, adapted to the Moldovan context and the specifics of the agri-food sector: Greenwashing Awareness Scale (5 items, adapted from Chen & Chang, 2013), Green Consumer Confusion Scale (3 items, Braga Junior *et al.*, 2019), Green Perceived Benefits Scale (4 items, Braga Junior *et al.*, 2019) and Green Purchase Intention Scale (5 items, adapted from Chen & Chang, 2013). All items are measured on a 5-point Likert scale (1 = completely disagree → 5 = completely agree). Open-ended and semi-structured questions were added to identify greenwashing practices in agri-food products on the Moldovan market, as well as demographic questions for stratified analysis of the results.

Data collection was carried out through an online questionnaire distributed on the Google Forms platform over a period of 4–6 weeks, with an average completion time of 12–15 minutes. Distribution was carried out through official channels of higher education institutions and university networks.

The statistical analysis was performed in the R environment (R Core Team, 2024), chosen for its transparency and replicability. The internal consistency of the scales was assessed by the Cronbach Alpha coefficient using the psych package (Revelle, 2024): GWA $\alpha = 0.727$, GPB $\alpha = 0.709$ and GPI $\alpha = 0.835$ exceed the conventional threshold $\alpha > 0.70$, confirming the acceptable reliability of the instrument. The GCC scale records $\alpha = 0.677$, slightly below the threshold, which can be explained by the low number of items ($k = 3$), a situation methodologically recognized by Cortina (1993), the related results being interpreted with caution. Pearson correlations between constructs were calculated to examine bivariate relationships, using the psych package. Hierarchical multiple regression for testing direct effects was performed with basic functions in R, and multicollinearity was diagnosed by manual calculation of VIF. Mediation analysis was performed using the Baron and Kenny (1986) method, with bootstrapped estimates implemented using the boot package (Canty & Ripley, 2024), generating 95% confidence intervals for the indirect effect. Graphical visualizations were produced using the ggplot2 package (Wickham, 2016). Gender differences were tested using independent t-tests. Limitations of the research include the cross-sectional nature of the design, which does not allow for definitive causal inferences, the use of non-probability sampling, which limits generalizability to the general population of Moldovan youth, and the potential for social desirability bias in responses related to environmental behavior.

3. Research Results

The questionnaire was administered to 235 students from the faculties of economics in the Republic of Moldova, of whom 61.3% were women and 38.7% were men. The predominant age group was 20–21 years (47.7%), followed by 18–19 years (27.2%), over 23 years (13.2%) and 22–23 years (11.9%). From the perspective of educational level, most respondents were enrolled in bachelor's degrees I–II (57.9%), followed by bachelor's degrees III–IV (28.1%), master's degrees (11.5%) and doctorate degrees (2.5%). The descriptive statistics of the scales and the internal consistency of the instrument are presented in Table 2. The values of asymmetry and excess kurtosis fall within the thresholds recommended by West *et al.* (1995), justifying the use of parametric methods. Reliability is confirmed for three scales, with the GCC being slightly below the conventional threshold $\alpha > 0.70$, the related results being interpreted with caution (Cortina, 1993).

Tabel 2. Descriptive Statistics and Internal Consistency of Research Scales

Scale	Items	M	SD	Skewness	Kurtosis	α
GWA	5	3.822	0.637	-0.415	0.294	0.727
GCC	3	3.096	0.848	-0.187	0.244	0.677
GPB	4	3.486	0.762	-0.441	0.520	0.709
GPI	5	3.158	0.833	-0.241	-0.210	0.835

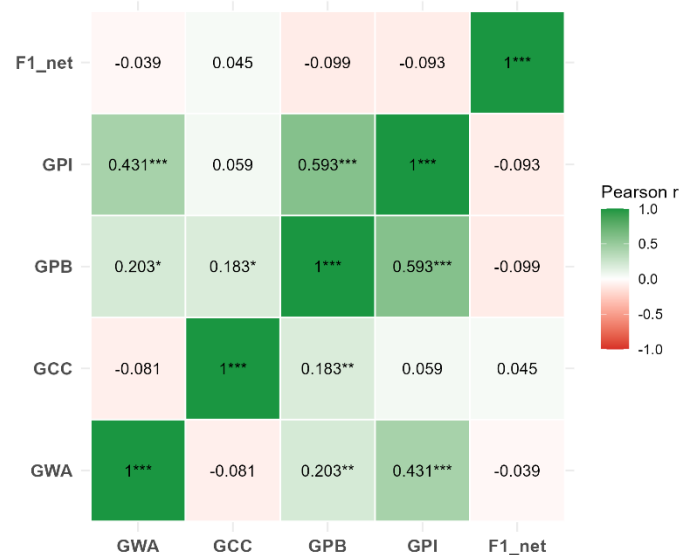
Source: Authors' own calculations based on collected data (n = 235)

Note: GWA = Greenwashing Awareness; GCC = Green Consumer Confusion; GPB = Green Perceived Benefits; GPI = Green Purchase Intention.

Prior to testing the hypotheses by regression, the structure of bivariate relationships between constructs was examined by Pearson correlations. The critical value for statistical significance at $n = 235$ is $r = 0.128$ at $p < 0.05$. The results, presented in Figure 2, show that GPB records the strongest association with GPI ($r = 0.593$, $p < 0.001$), followed by GWA ($r = 0.431$, $p < 0.001$). GCC does not significantly correlate with GPI ($r = 0.059$, $p = 0.372$), and F1_net_score does not show significant associations with any construct (r between -0.099 and 0.045 , $p > 0.05$). The low correlations between predictors ($r < 0.25$) confirm the absence of multicollinearity and validate their simultaneous inclusion in the regression models.

For the preliminary assessment of the relationships between the research constructs and verification of the assumption of absence of multicollinearity, Pearson correlations were calculated between all variables included in the models. The critical value for statistical significance at $n = 235$ is $r = 0.128$ at $p < 0.05$. The results, presented in Figure 2, show that GPB records the strongest association with GPI ($r = 0.593$, $p < 0.001$), followed by GWA ($r = 0.431$, $p < 0.001$). GCC does not significantly correlate with GPI ($r = 0.059$, $p = 0.372$), and F1_net_score does not show significant associations with any construct (r between -0.099 and 0.045 , $p > 0.05$). The low correlations between predictors ($r < 0.25$) confirm the absence of multicollinearity and validate their simultaneous inclusion in the regression models.

Figure 2. Pearson Correlation Matrix between Research Constructs (GWA, GCC, GPB, GPI, F1_net)



Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

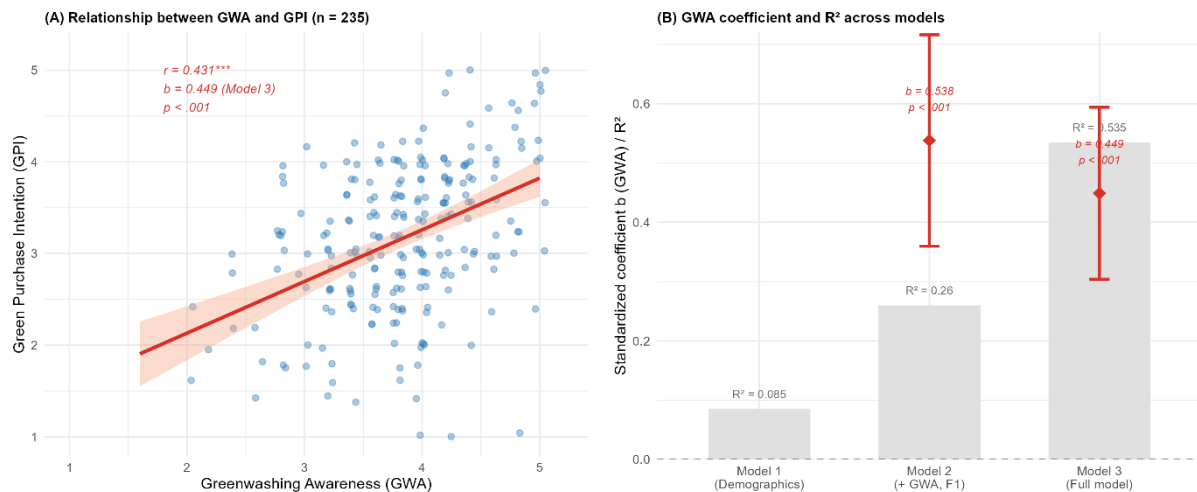
Source: Authors' own calculations based on collected data (n = 235)

The first hypothesis (H1) started from the premise that students who are more aware of greenwashing practices develop a generalized skepticism towards ecological products, which would lead to a reduction in purchase intention (Wang *et al.*, 2019; Festinger, 1957). Testing this hypothesis was carried out through hierarchical multiple regression, a method that introduces predictors in successive steps to isolate the contribution of each variable after controlling for the others (Model 1 includes exclusively demographic variables, Model 2 adds GWA and F1_net_score, and Model 3 is the complete model with all predictors).

The results, presented in Figure 3 in two distinct panels, contradict the anticipated direction. Panel A illustrates the bivariate relationship between GWA and GPI for the 235 respondents. Each point represents a

student, and the regression line with 95% confidence interval indicates a clear positive trend. Panel B shows the stability of the GWA coefficient across hierarchical models. The explanatory power increases progressively from $R^2 = 0.085$ in Model 1 to $R^2 = 0.260$ in Model 2 and $R^2 = 0.535$ in Model 3. This positive direction is explainable by the nature of the GWA scale items, which measure the perceived competence of detecting greenwashing ("I can understand", "I know how to recognize", "I notice", "I can see", "I check") and not passive exposure to deceptive practices or generalized distrust. A student with a high GWA perceives himself as being able to differentiate authentic products from greenwashed ones, which gives him confidence in his own purchasing decisions and increases, not reduces, the intention to purchase green products. *H1 is therefore refuted in its original form: awareness of greenwashing does not reduce, but increases the intention to purchase green products ($r = 0.431$, $p < 0.001$).*

Figure 3. Testing Hypothesis H1: Greenwashing Awareness and Green Purchase Intention



Source: Authors' own calculations based on collected data ($n = 235$).

The second hypothesis (H2) was formulated based on the literature documenting green consumer confusion as a mechanism through which greenwashing exerts its negative effect on purchasing behavior (Chen & Chang, 2013; Braga Junior *et al.*, 2019). The GCC scale used in the questionnaire aimed to measure three dimensions of this confusion: difficulty in distinguishing organic from conventional products (I do not see the difference between normal and organic products), oversaturation with green messages (I think there are too many products that say they are green and I get confused), and doubt about the authenticity of green claims (I often have doubts whether green products are truly green). The hypothesis assumed that students with higher greenwashing awareness (GWA) would experience higher levels of green market confusion (GCC), which in turn would reduce purchase intention (GPI).

The results of the Baron and Kenny (1986) procedure, presented in Table 3, show that the mediation chain is broken at the first link. The first condition is met - GWA significantly influences GPI ($b = 0.564$, $SE = 0.077$, $t = 7.298$, $p < .001$). However, the second condition is not met: GWA does not significantly influence GCC ($b = -0.108$, $SE = 0.087$, $t = -1.247$, $p = .214$), which means that students who are more aware of greenwashing do not report a higher level of confusion towards ecological products.

Table 3. Mediation Analysis Results: GCC as Mediator between GWA and GPI (Baron & Kenny, 1986)

Step	Path	b	SE	t	p
Step 1	GWA → GPI (total effect c)	0.564	0.077	7.298	<.001
Step 2	GWA → GCC (path a)	-0.108	0.087	-1.247	.214
Step 3	GWA → GPI (direct effect c')	0.574	0.077	7.427	<.001
Step 3	GCC → GPI (path b)	0.093	0.058	1.595	.112
—	Indirect effect ($a \times b$) bootstrap	-0.010	—	—	95% CI [-0.043; 0.020]

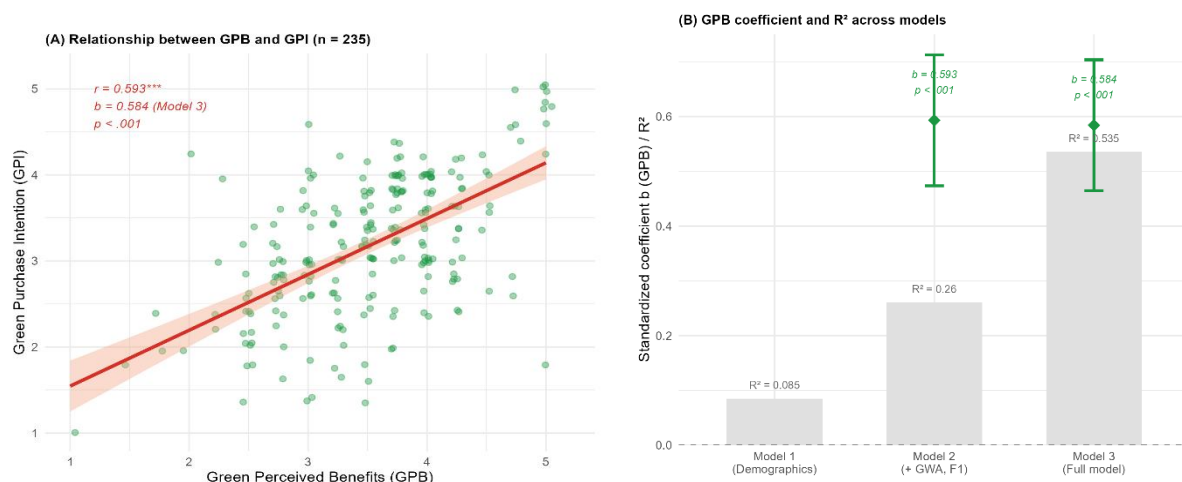
Note: H2 not supported. The 95% bootstrap confidence interval for the indirect effect includes zero, indicating no significant mediation.

Source: Authors' own calculations based on collected data ($n = 235$).

The negative direction of the coefficient suggests that, in the studied sample, perceived competence in detecting greenwashing tends to slightly reduce confusion, not to amplify it. Consequently, GCC does not significantly influence GPI after controlling for GWA ($b = 0.093$, $SE = 0.058$, $t = 1.595$, $p = .112$), and the direct effect of GWA remains robust ($b = 0.574$, $SE = 0.077$, $t = 7.427$, $p < .001$). Bootstrapped estimation of the indirect effect ($a \times b = -0.010$) with 5,000 iterations yields a 95% confidence interval that includes zero $[-0.043; 0.020]$, confirming the absence of significant mediation. *H2 is rejected: green consumer confusion does not mediate the relationship between greenwashing awareness and purchase intention among economics students in the Republic of Moldova.*

The third hypothesis (H3) proposed that perceived benefits of organic products positively influence purchase intention. The GPB scale measures four dimensions of these benefits: reduced content of harmful chemicals, superior nutritional quality, support for nature-respecting farms, and absence of negative environmental impacts. The relationship between GPB and GPI, illustrated in Figure 4, is the strongest in the entire model - the bivariate correlation reaches $r = 0.593$ ($p < .001$), and the standardized regression coefficient in the full Model 3 is $\beta = 0.584$ ($SE = 0.061$, $p < .001$), exceeding the contribution of all other predictors included in the analysis.

Figure 4. Green Perceived Benefits and Green Purchase Intention relationship ($n = 235$).



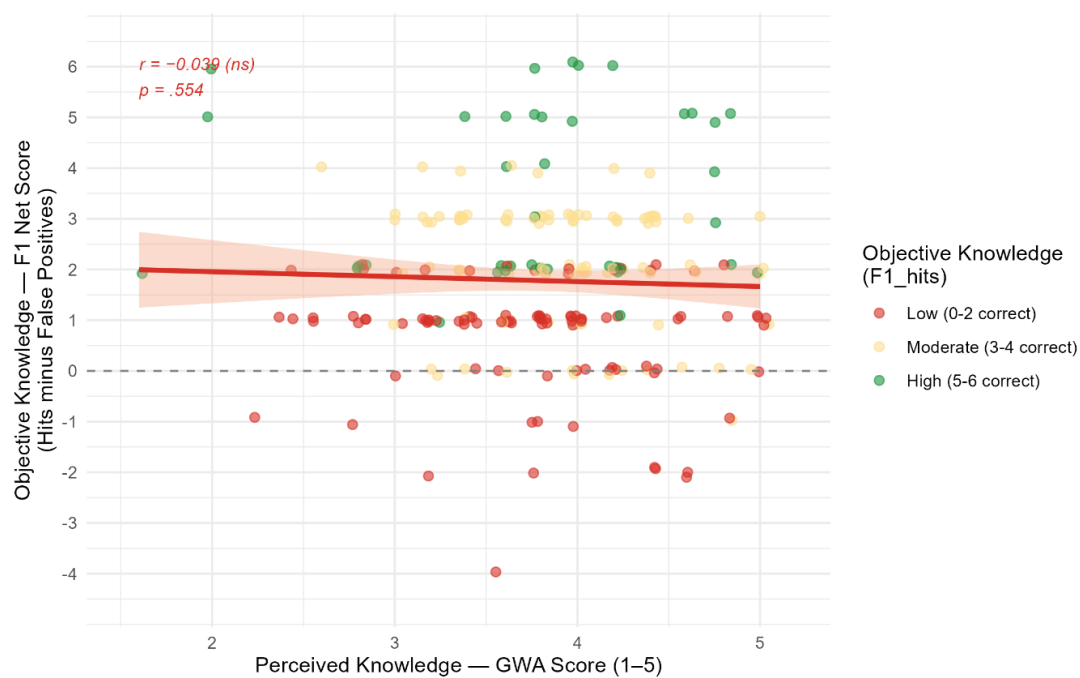
Source: Authors' own calculations based on collected data ($n = 235$).

Each unit increase in perceived benefits is associated with a proportional increase in purchase intention, independent of the level of greenwashing awareness, consumer confusion, or demographic variables. The introduction of GPB in Model 3 contributes with $\Delta R^2 = 0.275$ ($p < .001$) compared to Model 2, explaining together with GWA 53.5% of the total variance of GPI. *H3 is confirmed: the perception of the benefits of organic products is the strongest predictor of purchase intention among economics students in the Republic of Moldova.*

Beyond hypothesis testing, a distinct and relevant aspect of the research was the assessment of students' objective knowledge of greenwashing practices. If the B1–B5 (GWA) scales measured students' perceptions of their knowledge, that is, what students think they know, then F1 aimed to allow them to demonstrate what they know concretely, asking them to identify from a list of ten commercial labels the truly misleading ones.

Figure 5 illustrates the relationship between subjective and objective knowledge, with the dots colored according to the level of objective knowledge: red for low knowledge (0–2 correct labels), yellow for moderate (3–4), and green for high (5–6). The random distribution of green dots along the entire GWA axis, present at both low and high values of perceived competence, visually demonstrates the absence of any systematic association between the two types of knowledge ($r = -0.039$, $p = .554$). In other words, students who consider themselves very competent in detecting greenwashing do not demonstrate a higher objective performance than those who are more modest in self-assessment. This discrepancy is consistent with the Dunning-Kruger effect (1999) by which people with limited competence in a domain overestimate their own ability, while those with high competence tend to underestimate it. In the studied sample, the mean of the GWA scale reaches 3.82 out of 5, reflecting a high self-assessment, while only 2.1% of respondents achieve a complete and error-free classification of all labels, a significant gap between perception and reality, with direct implications for the design of economic education programs.

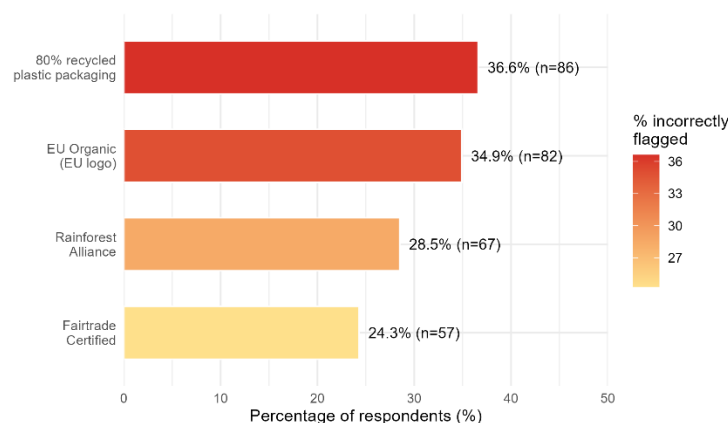
Figure 5. Perceived versus objective greenwashing knowledge: GWA score and F1 Net Score (n = 235).



Source: Authors' own calculations based on collected data (n = 235).

A distinct and complementary phenomenon to the metacognitive paradox is ecological over-skepticism, illustrated in Figure 6. If the main cognitive deficit consists in the inability to identify some deceptive practices, the data simultaneously reveal an opposite problem: 61.7% of respondents mark at least one legitimate certification as deceptive. Figure 6 shows the distribution of this phenomenon across the four legitimate certifications included in item F1. The certification "Packaging made of 80% recycled plastic", a concrete and numerically verifiable statement, is erroneously rejected by 36.6% of students (n = 86), followed by EU Organic (34.9%, n = 82), Rainforest Alliance (28.5%, n = 67) and Fairtrade Certified (24.3%, n = 57). These results indicate that the problem of greenwashing awareness among economics students in the Republic of Moldova is not unidirectional, it is not only a problem of insufficient identification of deceptive practices, but also a problem of over-distrust of authentic certifications, which risks undermining sustainable consumption behavior by rejecting truly ecological products.

Figure 6. Legitimate certifications incorrectly flagged as misleading by respondents (n = 235).

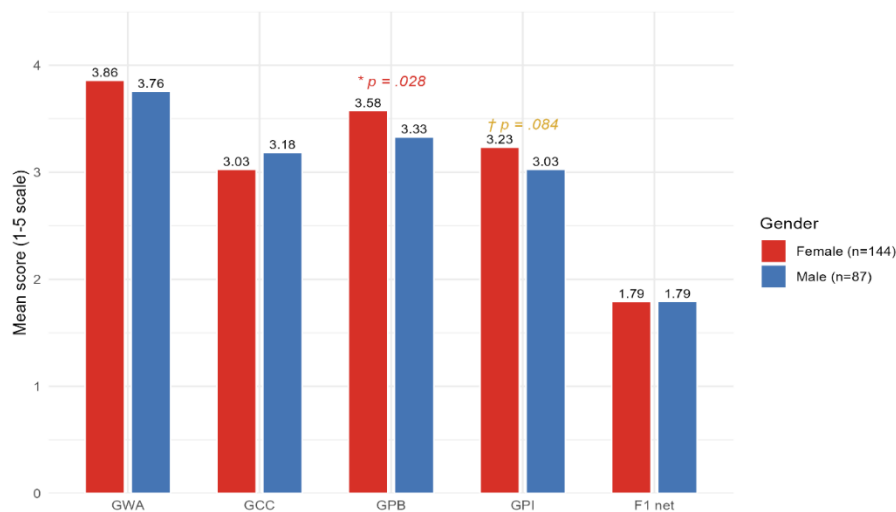


Source: Authors' own calculations based on collected data (n = 235).

The analysis of gender differences, presented in Figure 7, reveals an asymmetric pattern: women score significantly higher on the perception of the benefits of organic products than men ($M = 3.575$ vs. $M = 3.330$, $t = -2.219$, $p = .028$), with a marginal trend also for purchase intention ($M = 3.235$ vs. $M = 3.028$, $t = -1.740$, $p = .084$). However, the ability to objectively identify greenwashing is similar in both genders ($F1_net_score$: $t = 0.007$, $p =$

.995), indicating that gender differences manifest themselves at the level of consumption motivation, not detection competence.

Figure 7. Gender differences in green consumer behavior scales: mean scores by gender (n = 231).



Source: Authors' own calculations based on collected data (n = 231, excluding 4 respondents who preferred not to disclose gender).

Regarding the need for anti-greenwashing education in university programs, 63.8% of respondents consider it necessary or very necessary, 14.5% declare themselves neutral, and 21.7% do not support this initiative. This distribution, corroborated with the demonstrated gap between perceived and objective knowledge, provides empirical arguments for the integration of modules dedicated to sustainable marketing and the identification of deceptive practices in the curricula of economics faculties in the Republic of Moldova.

4. Discussions

This research started from a seemingly simple premise: economics students, due to their specialized training in market mechanisms, should be better equipped than the general population to identify deceptive commercial practices such as greenwashing. The results obtained partially confirm this premise, but significantly nuance it, generating a more complex picture than anticipated in the specialized literature.

The most significant findings of the study concern the testing of hypotheses H1 and H3, which, although they started from different premises, converge towards the same explanatory picture. H1 predicted that awareness of greenwashing reduces purchase intention - a defensive mechanism based on generalized distrust of the green market. H3 predicted that perceived benefits of green products amplify purchase intention, a positive mechanism based on perceived value. The results confirm H3 and refute H1 in direction, but not in significance: both constructs significantly and positively influence purchase intention, suggesting that the mechanism governing green consumption behavior in economics students is predominantly positive in both cases. Awareness of greenwashing does not function as a deterrent factor, but, similar to perceived benefits, as a factor of cognitive confidence in one's own consumption judgment. Together, the two predictors explain 53.5% of the GPI variance, a result consistent with Apostolopoulos *et al.* (2025), Margariti *et al.* (2024) and Khan *et al.* (2024), which confirm that more educated consumers differentiate between deceptive practices and genuine products, instead of generalizing distrust to the entire category of green products. This dynamic has direct practical implications: university curricula should combine critical education about greenwashing with highlighting the concrete benefits of green products, since a positive approach focused on the authentic value of sustainability seems more effective than an exclusively negative one focused on debunking.

Another result that provides important clarification compared to previous studies conducted in other cultural contexts concerns the Rejection of hypothesis H2 brings. Chen and Chang (2013) and Braga Junior *et al.* (2019) had documented green consumer confusion as a significant mediator in the relationship between greenwashing awareness and purchasing behavior. In the studied sample, this mechanism does not operate, GWA does not significantly influence GCC, suggesting that economics students process information about greenwashing differently than general consumers in the cited studies. A plausible explanation lies in their training in the economic theory of asymmetric information, which provides them with a conceptual framework to understand why companies

communicate selectively, thus reducing the likelihood that exposure to greenwashing will generate generalized confusion. This finding extends the literature by identifying a segment of consumers for whom the mediation mechanism through confusion does not activate.

The metacognitive paradox identified by the GWA vs. F1_net_score comparative analysis is perhaps the most original contribution of the study. The discrepancy between high self-assessment and low objective performance is consistent with the Dunning-Kruger effect (Kruger & Dunning, 1999) and empirically confirms Fella and Bausa's (2024) warning that self-assessment of detection ability systematically differs from actual performance. This finding has direct implications for the design of educational programs: it is not enough to raise awareness of greenwashing, it is also necessary to develop metacognitive skills, that is, the ability of students to correctly assess their own limits of knowledge. Álvarez-García and Sureda-Negre (2023) and Gianfrate (2023) argue in the same vein, recommending the systematic integration of critical skills in business and economics curricula.

At the same time, the fact that 61.7% of respondents rejected at least one legitimate certification adds an additional dimension to this picture. The problem is not only that students do not sufficiently identify greenwashing, but that their detection system is imprecise in both directions: it under-detects some deceptive practices and over-detects genuine certifications. This result is particularly worrying in the context of the European integration of the Republic of Moldova: as products with EU Organic, Fairtrade or Rainforest Alliance certifications will penetrate the Moldovan market more massively, an uncorrected educational over-skepticism risks discouraging the consumption of truly sustainable products.

Regarding the identified gender differences, women reporting significantly higher perceived benefits and a tendency towards higher purchase intention, in the absence of differences in objective competence, are consistent with the literature documenting a more pronounced orientation of women towards sustainable consumption (Margariti *et al.*, 2024). The absence of gender differences in the ability to detect greenwashing suggests that the educational intervention should be uniform in content.

The research presents several limitations that must be considered when interpreting the results. The cross-sectional design does not allow for definitive causal inferences, and the non-probability sampling limits generalizability to the general population of Moldovan youth. The potential social desirability bias in responses related to ecological behavior cannot be excluded. At the same time, the F1 item, although methodologically innovative, represents a point measure of objective knowledge, limited to ten labels specific to the Moldovan agri-food market, and does not cover the entire complexity of the greenwashing phenomenon.

Overall, the results of this study contribute to the literature in three distinct directions. First, it demonstrates that the relationship between greenwashing awareness and consumption behavior is more nuanced than existing theoretical models suggest, with the direction of the effect depending on the educational characteristics of the study population. Second, it identifies a specific metacognitive deficit among economics students in the Republic of Moldova, not a lack of knowledge, but a lack of calibration between perceived and demonstrated knowledge, with direct implications for the design of educational interventions. Third, it provides the first set of empirical data on greenwashing in the context of a post-Soviet economy in European transition, helping to fill the geographical gap reported in the literature (Singh & Singh, 2025; Irawati *et al.*, 2023). These contributions are developed in the next section by formulating some practical conclusions and recommendations.

Conclusions and Further Research

In the research we conducted, we managed to highlight the increased interest of the scientific community towards the phenomenon of greenwashing in recent years, confirming that the phenomenon is gaining increasing importance in the corporate sustainability literature. However, the implications for economic education and for the specific segment of future professionals from European transition economies is a segment that has remained insufficiently explored. The present study directly addresses this gap, providing a set of empirical data on the perception and identification of greenwashing among economics students from the Republic of Moldova and generating conclusions with relevance both for the specialized literature and for educational and consumer protection policies.

The main conclusion of the study is that economic education generates a paradoxical and unexpected effect: *awareness of greenwashing does not discourage green consumption* but stimulates it. Students who perceive themselves as competent in identifying deceptive practices are more motivated to buy ecological products, not more reluctant. This result contradicts the defense mechanisms documented in the general literature and suggests that economic preparation activates a process of differentiation, not generalization of distrust. Perceived benefits of organic products constitute the strongest predictor of purchase intention, confirming that positive motivation (health, nutrition, supporting responsible agriculture) is more influential than awareness of fraud risks.

Another relevant conclusion from the perspective of educational policies concerns the discrepancy between self-assessment and the identified objective performance: students overestimate their ability to detect greenwashing, while the objective performance remains modest. Only 2.1% achieve a complete and error-free classification, and 61.7% reject at least one legitimate certification as misleading. This result indicates an overestimation of one's own competence that cannot be solved by simply increasing awareness of greenwashing, but requires educational interventions, focused on developing critical thinking and familiarizing with certification systems verified by independent third parties. The massive support of students for the integration of such modules into university curricula (63.8%) provides an additional empirical argument for curricular reform in economic education in the Republic of Moldova.

At the same time, the results provide empirical arguments for two categories of practical interventions. For economics universities, it is recommended to integrate greenwashing identification skills as cross-curricular components in existing marketing, business ethics and consumer behavior courses, combining critical education about misleading practices with the presentation of the benefits of certified organic products. For regulatory authorities, the over-skepticism towards EU Organic and Fairtrade certifications suggests the need for campaigns dedicated to increasing consumer trust in verified certification systems, in the context of harmonization with the *Acquis Communautaire*.

The research results, although limited to a specific sample and a particular geographical context, open valuable directions for future investigations. Comparative studies between economics students and other educational profiles would allow quantifying the specific effect of economics training on the ability to detect greenwashing and would clarify whether the metacognitive paradox identified is specific to this group or more widespread among young consumers. Longitudinal research, conducted before and after the introduction of dedicated modules in university curricula, could measure the effective impact of the educational intervention on metacognitive calibration and on the relationship between perceived and demonstrated knowledge. Finally, replicating the study in other EU accession candidate countries in Central and Eastern Europe, where the institutional context and regulatory vulnerabilities are similar, would allow verification of whether the gap between perceived and actual knowledge, as well as the absence of the mediation effect through consumer confusion, are phenomena specific to the Republic of Moldova or more broadly characteristic of post-Soviet economies in the process of European integration.

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Credit Authorship Contribution Statement

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