BEYOND LINEAR MODELS: FACTORS DRIVING ENVIRONMENTAL ACTION AND CIRCULAR ECONOMY TRANSITION IN WESTERN BALKAN BUSINESSES

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Abstract

This article employs a probit model to analyze the determinants influencing businesses in the Western Balkans to mitigate their environmental impact and assess the feasibility of transitioning to a circular business model. It relies on primary survey data gathered in all Western Balkan countries by professional research agencies in 2022, with a representative sample of approximately 200 businesses per country. The findings reveal that factors such as being an exporting, foreign, innovative, and loan-receiving company increase the likelihood of businesses in the Western Balkans taking measures to reduce their environmental impact. Moreover, being an exporting and loan-receiving company emerges as influential in fostering the belief that a shift to a circular business model is attainable. These insights have profound implications for policymakers and businesses aiming to promote sustainable practices and circular economy initiatives within the Western Balkans. Additionally, this article contributes to policy development and knowledge on environmental and circular practices in developing economies.

Key words: *environmental economics, circular economy, business model, sustainability*

JEL Classification: *F18, F64, O13, P18*

1. Introduction

Circular economy has been gaining traction as a transformative approach to resource utilization, challenging conventional practices marked by excessive resource consumption (Murray, Skene, and Haynes 2017). Recognizing the critical role of resource efficiency in fostering economic growth has propelled a heightened focus on the circular economy concept (Lieder and Rashid 2016). Circular Economy (CE), as reviewed by Julianelli et al. (2020), signifies a substantial departure from traditional linear models of production and consumption. This departure underscores a profound shift towards circular systems, advocating for the elimination of waste and a reduction in material and energy wastage.

The European Green Deal stands as a landmark initiative, setting forth ambitious environmental

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goals and positioning the circular economy as a central tenet of EU environmental policies (European Commission 2023). This strategic emphasis underscores the imperative of integrating circular economy principles into the broader framework of environmental policymaking. Against this backdrop, the Western Balkans countries, each charting diverse trajectories on their journey toward EU membership, face the challenge of aligning their strategies with those outlined in the EU Green Deal.

A report by the Balkan Forum (2021) illuminates critical challenges impeding the Western Balkans' progression towards a circular economy. Despite its potential, the journey faces substantial hurdles, including infrastructure limitations, investment challenges, and outdated production processes. Securing financing for circular business models proves daunting due to a lack of green investment funds and minimal government support. Knowledge gaps hinder shift, with limited understanding across businesses, policymakers, and the public, exacerbated by a scarcity of skilled professionals in eco-design and circular business models. Policy hurdles add complexity, marked by inconsistent national strategies and fragmented waste management regulations causing uncertainty. Inadequate financial incentives and weak tax breaks fail to drive the shift from linear models, while limited collaboration hampers knowledge sharing and coordinated efforts. Cultural resistance to changing consumption habits and potential technological limitations in accessing advanced resource recovery technologies further complicate the transition.

While the Balkan Forum's report illuminates critical challenges impeding the Western Balkans' progression towards a circular economy, it is essential to note that existing research addressing these challenges is noticeably limited. Despite the evident barriers, the scarcity of research examining environmental impact reduction and the shift of circular business models in the Western Balkans is apparent. This research gap emphasizes the necessity for a substantive article to address the existing limitations in our understanding of how businesses in the region navigate the terrain of environmental sustainability and circular economy practices.

In response to this imperative, this article attempts to lay the groundwork for substantive research in the Western Balkans. The core aim is to investigate the complex factors shaping the decisions of businesses in the region concerning the reduction of their environmental impact. Furthermore, the article seeks to unravel the prevailing beliefs among these businesses regarding the feasibility of transitioning to circular business models. Thus, this paper aims to bridge existing gaps in knowledge but also to provide valuable insights that can inform policy decisions, strategic business practices, and contribute to the overarching goal of sustainable development within the Western Balkans.

The subsequent sections of the paper cover a thorough literature review, covering key concepts related to the circular economy and existing research. The core section covers a detailed research methodology, including the definition of hypotheses, sample distribution, as well as model and variable selection. The final section covers discussion of the results and conclusions of the findings, limitations, and implications.

2. Literature Review

This section comprehensively explores the concept of the circular economy (CE) and its profound implications for environmental sustainability and industrial economics. Businesses, as primary drivers of contemporary production across diverse sectors, face a critical responsibility to enhance sustainability. The circular economy emerges within this global context as a pivotal paradigm, offering a pathway to long-term economic growth while addressing the limitations of the linear "take-make-use-dispose" model with its regenerative "take-make-use-reuse" approach (Lieder and Rashid 2016).

While the historical roots of the circular economy lack a clear starting point, its prominence gained momentum in the 1990s, drawing inspiration from seminal works such as Boulding's "The Economics of the Coming Spaceship Earth" (1966) and Stahel and Reday-Mulvey's (1976) reference to a "closed-loop economy". Boulding's conceptualization of "spaceship earth" envisioned a cyclical ecological system, challenging the prevailing "cowboy economy" mindset that prioritizes throughput at the expense of resource depletion and pollution (Murray, Skene, and Haynes 2017). Boulding's. Pearce and Turner (1990) played a pivotal role in shaping the definition of the circular economic model, underscoring the intricate interconnection between the economy and the environment. According to their seminal work, the environment serves three distinct economic functions: providing resources, acting as a disposal location for waste and pollutants, and serving as a system to sustain life. This underscores the growing importance of transitioning to renewable energy sources and enhancing energy efficiency as integral components of the circular economy.

Conceptual discussions on the circular economy trace back to 1966, but a substantial surge in academic interest began post-2003 (Prieto-Sandoval, Jaca, and Ormazabal 2018), highlighting its increasing significance. China's active involvement in circular economy research and the EU's integration of circular economy principles in 2014 further bolstered research efforts. Leading journals focused on prevention, cleaner production, and environmental engineering have spearheaded discussions, emphasizing the global relevance and imperative of advocating sustainable practices (Prieto-Sandoval, Jaca, and Ormazabal 2018).

Ahmad et al. (2023) provide valuable insights by identifying three key streams within the landscape of business management research on the circular economy. These streams encompass organizational and strategic perspectives, business model innovation and value creation, and implementation and shift challenges. While these streams contribute significantly to our understanding, critical knowledge gaps persist, particularly in grasping the nuanced role of leadership, governance, and organizational culture in fostering circular economy shift.

In a comprehensive review of 221 articles, Kirchherr et al. (2023) identify core principles on circular economy. These principles advocate reducing resource consumption, maximizing material reuse, recycling materials for new products, and recovering energy from non-recyclable sources. Crucial for sustainable development, the circular economy offers solutions to mitigate pollution, conserve resources, foster employment, and enhance economic resilience against challenges such as resource scarcity and climate change.

Several studies contribute uniquely to the circular economy discourse from various perspectives. Julianelli et al. (2020) focus on the adverse environmental impacts of traditional production and consumption practices, providing a nuanced taxonomy for critical success factors in reverse logistics. Arruda et al. (2021) complement these insights by exploring the broader environmental challenges emphasizing the pivotal role of private companies and legislative strategies in advancing aspects of the circular economy. Ghisellini, Cialani, and Ulgiati (2016) offer a comprehensive review of circular economy literature, emphasizing its global origins and varied implementation strategies. Pieroni et al. (2019) shift the focus to business models, identifying approaches for circular economy-oriented business model innovation. Murray, Skene, and Haynes (2017) contribute a historical dimension to the literature, addressing tensions and proposing a refined definition aligning with sustainable development goals. Galvao et al. (2018) find that the main barriers to the implementation of the circular economy include technological, policy and regulatory, financial and economic, managerial, performance indicators, customer, and social barriers, based on their review of 195 articles.

Building on these theoretical foundations, empirical studies provide valuable insights into the practical implications of circular economy principles.

2.1. Foreign Company Influence

Dornean, Chiriac, and Rusu (2021) and Marco-Lajara et al. (2023) explore the influence of international activities on environmental practices within firms. They propose that foreign direct investment (FDI) can lead to higher environmental standards. Their reasoning is that companies operating abroad may implement sustainable practices already established in their home countries, or in response to stricter environmental regulations in the host country. Marco-Lajara et al. (2023) further emphasize the connection between international engagement and environmental innovation. They argue that internationalized firms benefit from exposure to stringent environmental regulations and robust financial resources, fostering innovation in environmentally sustainable practices. This suggests that international activities can create a compelling environment for businesses to develop and adopt eco-friendly practices.

2.2. Financial Challenges and SMEs

Kuo and Chang (2021) find that larger firms tend to disclose significantly more circular economy information compared to smaller firms, particularly in environmentally-sensitive industries. Several studies (Demirel and Danisman 2019; de la Cuesta-González and Morales-García 2022; Takacs, Brunner, and Frankenberger 2022) highlight the unique financial challenges faced by SMEs in transitioning to a CE model, including substantial initial investments (Demirel and Danisman, 2019), regulatory risks, and market uncertainties (de la Cuesta-González and Morales-García 2022). These challenges can hinder their ability to secure external funding (Demirel and Danisman, 2019) and necessitate overcoming internal hurdles (Takacs, Brunner, and Frankenberger 2022). Regulatory risks and market uncertainties arise due to the evolving and often ambiguous regulatory landscape surrounding CE models, creating uncertainty for businesses planning long-term investments. Financial institutions may perceive higher risks during this transition due

to the lack of standardized frameworks and proven business models within the circular economy, leading to cautious lending and investment practices. While Aranda-Usón (2019) emphasizes the positive influence of financial resources in CE implementation, Gonçalves, de Carvalho, and Fiorini (2022) acknowledge that financial barriers affect smaller enterprises more significantly.

2.3. Technological Capabilities and Innovation

Internal resources and firm strategies play a crucial role in driving technological progress. Barney (1991) argues that a firm's capability to stand out competitively depends significantly on its efficient utilization of internal resources, including technological capabilities. Triguero, Moreno-Mondéjar, Davia (2013) underscore that financial and technological capabilities are crucial determinants influencing the adoption of environmental innovations across European firms as well as external knowledge networks in driving CE initiatives. The importance of technological capabilities in promoting the adoption of environmental technology-oriented practices is well-documented (Horbach 2008; Rehfeld, Rennings, and Ziegler al. 2007). Research and development activities and the knowledge they generate are crucial for facilitating the adoption of circular economy (CE) initiatives (Triguero, Moreno-Mondéjar, Davia 2013). While incremental technologies dominate environmental innovations, technological limitations have been identified as barriers hindering progress towards circular economy innovations (de Jesus and Mendonça 2018).

2.4. The Role of Industry and Trade Associations

Information and knowledge from industry and trade associations also play essential roles in facilitating CE implementation. These intermediaries contribute to open innovation schemes by fostering connections between producers and users through industrial and trade associations, enabling collaborative schemes (Baldwin and Von Hippel 2011). Particularly beneficial for SMEs, industrial associations help build trust among network actors in the context of open innovation (Lee et al. 2010). Indeed, even though some SMEs primarily focus on basic environmental management practices due to cost-saving and regulatory compliance, effective resource sharing and support from industrial networks, such as industrial associations,

are crucial for promoting industrial symbiosis and facilitating closed-loop material cycles, thereby overcoming barriers to Circular Economy implementation (Ormazabal et al., 2018).

This review has comprehensively examined the circular economy and its implications for businesses. By exploring the core principles, global significance, and practical challenges, this review provides a foundation for developing our research hypotheses.

3. Methodology

Based on theoretical and empirical evidence presented above, the hypotheses below were devised. To test the hypotheses, the article employs a quantitative approach to investigate the factors influencing companies in the Western Balkans to reduce their environmental impact and potential of shifting to a circular business model. A probit regression model is used, a well-established methodology for analyzing the relationship between a binary dependent variable (e.g., indicating a perceived shift towards circularity or not, and having taking environmental impact reduction steps) and independent variables (company characteristics, size, innovation, and financial decisions).

3.1. Hypotheses

Company Size:
H1: Companies with more than 50 employees are more likely to take measures to reduce their negative environmental impacts compared to smaller companies.
H2: Companies with more than 50 employees are more likely to endorse a shift to a circular business model compared to smaller companies.

Company Characteristics:
H3: Exporting companies are more likely to take measures to reduce their negative environmental impacts compared to non-exporting companies.
H4: Exporting companies are more likely to endorse a shift to a circular business model compared to non-exporting companies.
H5: Foreign-owned companies are more likely to take measures to reduce their negative environmental impacts compared to domestically-owned companies.
H6: Foreign-owned companies are more likely to endorse a shift to a circular business model compared to domestically-owned companies.

Innovation:

H7: Companies that introduced new products or services in the past 12 months are more likely to take measures to reduce their negative environmental impacts compared to companies without recent innovation.

H8: Companies that introduced new products or services in the past 12 months are more likely to endorse a shift to a circular business model compared to companies without recent innovation.

Financial Decisions:

H9: Companies that took out a loan in the past 12 months are more likely to take measures to reduce their negative environmental impacts compared to companies without recent loans.

H10: Companies that took out a loan in the past 12 months are more likely to endorse a shift to a circular business model compared to companies without recent loans.

H11: Companies planning to invest in the coming year are more likely to take measures to reduce their negative environmental impacts compared to companies with no planned investments.

H12: Companies planning to invest in the coming year are more likely to endorse a shift to a circular business model compared to companies with no planned investments.

3.2. Sample Distribution

This article uses data from the Regional Cooperation Council's (RCC) Business Balkan Barometer 2022 database, which was created using the Business Opinion Survey questionnaire and included around 200 businesses from each of the Western Balkan economies.

The Balkan Business Opinion Survey 2022 relied on face-to-face interviews to gather data from over 1,203 business leaders across six Western Balkan economies. Trained interviewers utilized a standardized

Figure 1. Conceptual Framework
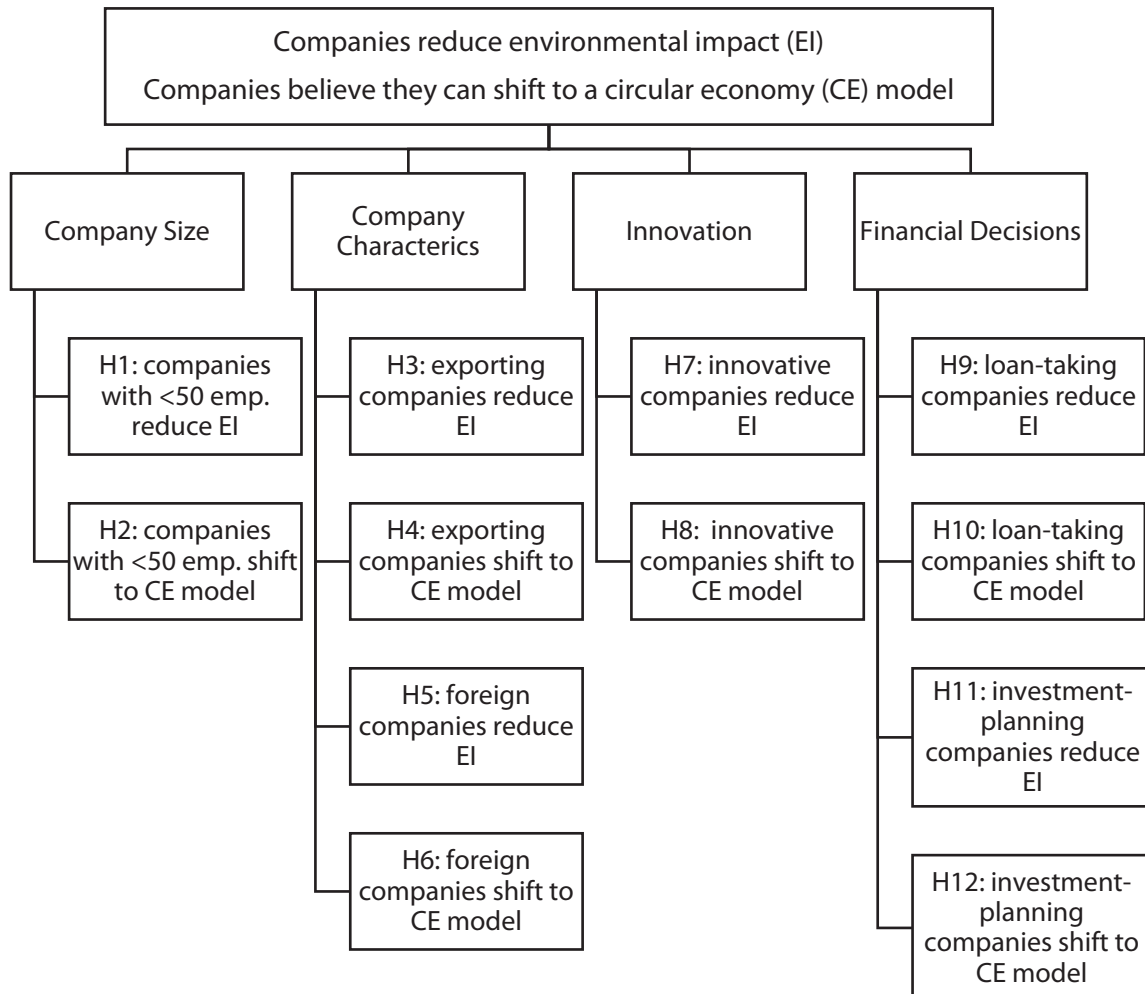
Source: Self-devised

approach, equipped with translated questionnaires and digital platforms for consistent data collection. To ensure a representative sample, rigorous selection methods drew upon official data, targeting companies across various sizes, sectors, regions, and ownerships. Additionally, telephone recruitment focused on reaching key decision-makers, ultimately leading to successful interview scheduling. This comprehensive approach, coupled with stringent quality control measures, generated reliable and accurate data, offering valuable insights into the perspectives and opinions of businesses across the Western Balkans (Zoric 2022).

Table 1 summarizes the sample distribution by economy, where we can see that each economy makes up about 17% of the entire Western Balkans business sample. Specifically: Albania (N=200), North Macedonia (N=202), Kosovo (N=200), Serbia (N=201), Bosnia and Herzegovina (N=200), and Montenegro (N=200), for a total of 1203 businesses in all Western Balkans. In terms of size, there are a total of 44% (N=524) micro businesses, 39% (N=467) small businesses, 15% N=179) medium businesses, and 3% (N=33) of large businesses. While, 64% (N=768) of the businesses operate in Transport, trade, tourism, and catering industry, 26% (N=315) of the businesses operate in Industry, mining, and construction; and 7% (N=87) in Education, science, culture, and information.

3.3. Dependent and Independent variables

In this model, two binary dependent variables are utilized: 'Environmental Impact,' indicating whether companies have taken steps to reduce environmental impact, and 'Circular Economy,' reflecting the belief whether the current business model allows a shift to a circular business model. The specific definitions for these variables are as follows:

– *Environmental Impact* - a dichotomous variable with a value of 1 for a company that has taken steps to reduce environmental impact and a value of 0 for a company that did not take steps to reduce environmental impact
– *Circular Economy* - a dichotomous variable with a value of 1 for a company that perceives their current business model allowing to shift to a circular economy and a value of 0 for a company that does not perceive their current business model allowing to shift to circular economy

Table 1. Sample Distribution by Economy, Industry and Size

Economy	Percentage	Interviews
Albania	17%	200
Bosnia and Herzegovina	17%	200
Kosovo	17%	200
North Macedonia	17%	202
Montenegro	17%	200
Serbia	17%	201
Total	100%	1203
Size	**Percentage**	**Interviews**
Micro (0-9 employees)	44%	524
Small (10-49 employees)	39%	467
Medium (50-249 employees)	15%	179
Large (250+ employees)	3%	33
Total	100%	1203
Industry	**Percentage**	**Interviews**
Agriculture, hunting, fishing and forestry	3%	33
Industry, mining, construction	26%	315
Transport, trade, tourism, catering industry	64%	768
Education, science, culture, information	7%	87
Total	100%	1203

Source: Balkan Business Barometer 2022, Regional Cooperation Council (RCC)

The independent variables, also binary, are employed to test their influence on businesses regarding environmental impact reduction and belief in the potential of transitioning to a circular model. These variables are defined as follows:

– *Exporting company* - a dichotomous variable with a value of 1 for exporting companies and 0 for non-exporting companies
– *Foreign company* - a dichotomous variable with a value of 1 for foreign companies and 0 for domestic companies
– *Size* - a dichotomous variable with a value of 1 for companies that have 50+ employees indicating larger, meaning medium (49-249 employees) and large companies (250+ employees), and 0 for companies that have less than 50 employees indicating small (10-49 employees), and micro companies (0-9 employees)
– *Innovation* - a dichotomous variable with a value of 1 for companies that introduced new products/services in the past 12 months and 0 for companies that did not introduce new products/services in the past 12 months
– *Loan* - a dichotomous variable with a value of 1 for companies that have taken a loan in the past 12 months and 0 for companies that have not taken a loan in the past 12 months
– *Investment* - a dichotomous variable with a value of 1 for companies who have invested abroad or plan to invest in the business in 12 months and 0 for companies who have not invested abroad nor plan to invest in the business in 12 months.

Table 2 provides an overview of both dependent variables (**Environmental Impact** reduction and **Circular Economy** potential shift) and the shared independent variables. The categorical variables underwent transformations to refine their analytical utility. Survey questions designed to capture categorical responses were reorganized into distinct 'yes' or 'no' categories, enhancing clarity and precision in our data analysis. Specifically, for categorical variables such as "Environmental Impact" (used B10), "Circular Economy" (used B11), "Exporting Company" (used UK3), "Foreign Company" (used UK5), "Size" (used UK2),

Table 2. Summarized list of dependent and independent variables

Dependent Variables	Description	Frequency		Percentage	
		Yes	No	Yes	No
Environmental Impact	1=company took steps to reduce environmental impact; 0= company did not take steps to reduce environmental impact	667	503	57%	43%
Circular Economy	1=business model allows shift to circular economy; 0=business model does not allow shift to circular economy	286	917	24%	76%
Independent variables	**Description**	**Frequency**		**Percentage**	
		Yes	No	Yes	No
Exporting company	1=exporting company; 0=non-exporting company	333	870	28%	72%
Foreign company	1=foreign company; 0=domestic company	54	1149	4%	96%
Size	1=company has 50+ employees; 0=company has up to 49 employees	212	991	18%	82%
Innovation	1=company introduced new products/ services in the past 12 months; 0=company did not introduce new products/services in the past 12 months	374	754	33%	67%
Loan	1=company took a loan in the past 12 months; 0=company did not take a loan in the past 12 months	247	857	23%	77%
Investment	1=company invested abroad or plans to invest in the business in 12 months; 0=company that has not invested abroad nor plans to invest in 12 months	84	1119	7%	93%

Source: Authors' own calculations

"Innovation" (used H55), "Loan" (used E31 and E31a), and "Investment" (used G37), responses were consolidated into binary formats to better represent the intended distinctions between positive and negative responses in the article. It shall be noted that due to the prevalence of small and medium-sized enterprises (SMEs) in the region (OECD 2022), this paper focuses on differentiating companies with 50+ or more employees or less than that.

Across all Western Balkan countries, 55% of businesses claim to have taken steps to reduce environmental impact, while 24% believe their business model could shift to a circular economy. Identified factors driving these actions include exporting, foreign ownership, larger size, innovation, loan uptake, and investment. Notably, 28% of companies export, 4% are foreign-owned, and 18% are large-sized. Additionally, 33% are innovative, 23% take out loans, and 7% invest.

4. Empirical Model

A probit model analysis was chosen and applied to answer the question on whether the aforementioned business characteristics increase the probability to reduce environmental impact or shift to a circular model. Probit analysis is a form of regression used to analyze dichotomous response variables. There are several ways to use a probit analysis, however the model in question was examined using the maximum likelihood method. Given the dependent variable is a binary variable as well as six explanatory variables are dichotomous as well, probit is an appropriate method for this analysis. The general analytical form is:

$$Pr\,(Y) = a + bX_i + \varepsilon$$

Where,

– **Pr (Y)** – Probability of the dichotomous binary variable to be '1'
– **X_i** – Independent variable
– **ε** – Error term
– **a** – Constant
– **b** – Coefficient of independent variable X

Model 1

Pr (business taking steps to reduce environmental impact) = f (businesses' characteristics)
≡
Pr (*EnvironmentalImpact*) = F ($\beta0$ + $\beta1ExportingCompany$ + $\beta2ForeignCompany$ + $\beta3Size$ + $\beta4Innovation$ + $\beta5Loan$ + $\beta6Investment$)

Model 2

Pr (business' potential to shift to circular economy) = f (businesses' characteristics)
≡
Pr (*CircularEconomy*) = F (β_0 + $\beta_1ExportingCompany$ + $\beta_2ForeignCompany$ + β_3Size + $\beta_4Innovation$ + β_5Loan + $\beta_6Investment$)

5. Research Results

Table 3 reveals significant variations in the influence of different variables on both environmental impact reduction and the belief in adopting a circular business model.

– **Environmental Impact Reduction:** Companies engaged in exporting are 22.4% more likely to take steps towards reducing their environmental impact, not providing sufficient evidence to reject hypothesis H3.
– Foreign-owned companies demonstrate a 18.5% increased likelihood of implementing environmental reduction measures, not providing sufficient evidence to reject hypothesis H5.
– Companies with recent innovation, through introducing new products or services, are 15.1% more likely to engage in environmental action, not providing sufficient evidence to reject hypothesis H7.
– Taking a loan within the past year is associated with a 15.5% higher probability of implementing environmental impact reduction measures, not providing sufficient evidence to reject hypothesis H9.
– Neither the size of the company (H1) nor recent investments (H11) display statistically significant relationships with environmental action.

Shift to Circular Business Model:

– Exporting companies show a 13.9% increased likelihood of believing their current model facilitates a shift to a circular economy not providing sufficient evidence to reject hypothesis H4.
– Companies that took out loans within the past year are 25.3% more likely to believe they can transition to a circular model, not providing sufficient evidence to reject hypothesis H10.
– Similar to environmental impact reduction, innovation (H8), company size (H2), and recent investments (H12) do not exhibit statistically significant relationships with the belief in transitioning to a circular business model.

Table 3. Probit Model of reduction of environmental impact and shift to circular economy

Variables	Binary Outcome **Environmental impact**	Average marginal effects **Environmental impact**	Binary Outcome **Circular economy**	Average marginal effects **Circular economy**
Exporting company	0.620***	0.224***	0.462***	0.139***
	(0.101)	(0.344)	(0.101)	(0.030)
Foreign company	0.512**	0.185**	0.329	0.099
	(0.246)	(0.088)	(0.213)	(0.064)
Size	-0.034	-0.012	-0.202	-0.061
	(0.118)	(0.043)	(0.129)	(0.039)
Innovation	0.418***	0.151***	0.111	0.033
	(0.0892)	(0.035)	(0.095)	(0.028)
Loan	0.429***	0.155***	0.842***	0.253***
	(0.100)	(0.035)	(0.099)	(0.030)
Investment	-0.132	-0.048	0.126	0.038
	(0.172)	(0.062)	(0.171)	(0.051)
Constant	-0.248***		-1.098***	
	(0.0569)		(0.067)	
Observations	1,036	1,036	1,052	1,052
Mc Fadden R-Squared	7.83%		10.50%	
Percent correctly predicted	63.22%		78.71%	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The findings suggest that exporting status, foreign ownership, innovation, and loan utilization are key factors influencing environmental action and the potential for circular economy adoption among businesses in the Western Balkans. Further research could explore the mediating mechanisms behind these relationships and investigate the role of additional variables not included in this article.

Goodness of fit measurements

Evaluating the goodness-of-fit in probit models is pivotal for reliable conclusions. Two widely used measures, McFadden's pseudo-R-squared and the percentage of correct predictions, offer distinct perspectives on model performance.

The pseudo-R-squared, ranging from 0 to 1, gauges the likelihood of an event occurring by comparing the log-likelihood of the estimated model with that of a restricted model. A value above 0.2 is generally considered indicative of a good model (McFadden 1973).

However, context is crucial, and the pseudo-R-squared alone might be relatively low, particularly in social science research.

In contrast, the percent correctly predicted focuses on the model's ability to accurately classify cases. In our research, the pseudo-R-squared values for both models are modest: 7.83% for the environmental impact model and 10.5% for the circular business model. However, assessing the percent correctly predicted reveals a different picture. Model 1 accurately predicts 63.22% of the data, while model 2 achieves an impressive 78.71% accuracy. Despite the moderate R-squared values, these results indicate the models' effectiveness in correctly classifying the majority of cases.

Both pseudo-R-squared and percent correctly predicted offer valuable insights into model fit, serving as complementary tools for performance evaluation. While the R-squared provides a relative measure of explanatory power, the percent correctly predicted assesses the model's accuracy in real-world application. In our case, despite moderate R-squared values,

the high percentage of correct predictions indicates that both models perform well in accurately classifying cases.

6. Discussion

This article explores the factors influencing decisions by Western Balkan businesses regarding environmental impact reduction and the potential for shifting to circular business models. Analyzing data from 1,203 firms provides valuable insights into this under-researched region, which is undergoing rapid economic integration and aligning with EU environmental goals.

The findings offer some interesting insights, but it's important to acknowledge that several hypothesized relationships were not statistically significant. While exporting status, foreign ownership, innovation, and loan utilization emerged as potential factors influencing environmental action and the potential for circular economy adoption, the hypotheses regarding company size (H1, H2) and recent investments (H11, H12) did not yield conclusive evidence.

Companies engaged in exporting and those with foreign ownership demonstrated a tendency for greater environmental action and belief in the potential for shifting to circular models. This aligns with existing research suggesting that exposure to international markets fosters sustainable practices (Marco-Lajara et al. 2023; Dornean, Chiriac, and Rusu 2021). Facing stricter environmental regulations and cleaner technologies in foreign markets, these firms may be motivated to adopt similar practices to enhance competitiveness. Additionally, foreign-owned companies often bring advanced technologies and sustainability expertise, influencing local firms to follow suit (Dornean, Chiriac, and Rusu 2021). This reinforces the benefits of attracting foreign direct investment with strong sustainability commitments to accelerate the region's circular transition.

A positive relationship was identified between recent innovation activities and both environmental action and the belief in potential circular model shifts. This supports established perspectives on the role of innovation in driving sustainability (Baldwin and Von Hippel 2011; Lee et al. 2010). The article highlights the importance of fostering an innovative culture and supporting research focused on circular solutions within the Western Balkans.

A novel finding is the link between access to finance and environmental action/circularity belief. This suggests potential financial challenges associated with implementing circular economy practicesas well as the importance of financial access, as noted in previous research (Demirel and Danisman 2019; Aranda-Usón 2019; de la Cuesta-González and Morales-García 2022; Takacs, Brunner, and Frankenberger 2022). It underscores the need for tailored financial solutions and targeted incentives to support businesses transitioning to circular economies, aligning with calls for green finance instruments.

Company size and recent investments were not factors that influenced environmental action or the belief in potential for circular economy shifts. This finding warrants further exploration. It could reflect the specific context of the Western Balkans, where the majority of businesses are micro and small, or it may be due to data limitations. Future research could investigate these factors further, potentially disaggregating by industry or firm type.

7. Conclusion

In conclusion, this article identifies exporting status, foreign ownership, innovation, and access to finance as crucial factors influencing environmental action and the belief in potentially adopting circular economy practices among businesses in the Western Balkans. These findings highlight significant pathways for promoting sustainability within the region.

By focusing on the specific context of the Western Balkans, this article contributes into understanding why businesses in developing regions adopt environmentally responsible practices and consider shifting to circular business models. The positive relationship between international exposure (exporting and foreign ownership) and both environmental action and belief in circular economy potential aligns with existing literature. Additionally, the discovery of a link between access to finance and these factors provides a novel contribution to the field.

Despite its contributions, this article acknowledges limitations, including reliance on self-reported data and the potential for unexplored variables such as industry-specific factors, consumer preferences, and regulatory environments. Future research could address these gaps through longitudinal studies to examine the sustained impact of different strategies on environmental outcomes and business performance. By addressing these limitations and continuing to investigate these relationships, researchers can further advance our understanding and support the transition to sustainable practices in the Western Balkans.

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