UNCERTAINTY IN SMES' ASSESSMENT OF CORONAVIRUS PANDEMIC RISK IMPACT ON AGRI-FOOD SECTOR IN WESTERN BALKANS

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ABSTRACT

The subject of the research is to explore the operational risks - the risk of emergencies and specific Coronavirus pandemic risk that are SMEs from agribusiness sector, from Western Balkan countries exposed to, and the significances of their effect as independent variables to the sustainability of revenues in 2020. For that purpose, a survey of 102 SMEs from Agri-food and farms from the agribusiness sector from Serbia, Montenegro, Bosnia and Herzegovina, Albania and Montenegro were provided at the end of March 2020. Methods used are: descriptive statistical analysis, correlation and regression analysis, ANOVA test, Person's correlation and multiple linear correlations. The results confirmed the hypothesis of the research - which the Sustainability risk of SMEs and farms in Western Balkan countries is significantly influenced by operational risk of emergencies and, ongoing Coronavirus pandemic) risk level in 2020. The contribution could to the sector actors' exposure to these risks for efficient managing future uncertainties.

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Introduction

The world has seen an explosive growth of infections with the deadly novel virus in the first half of 2020. Most of the countries have been forced to shut down large areas of social and economic life to slow contagion, the Western Balkans have not been spared. Serbia, Montenegro, Bosnia and Herzegovina, Albania and North Macedonia, have been forced also to impose tight restrictions on economic life to contain the Coronavirus pandemic.

It has to be said that the Western Balkan growth model was vulnerable before the crisis. In the region, consumption accounted for more than 60 per cent of the growth in recent years. Consumption growth in some countries has been fuelled by higher public spending and buy one-off wage policies and near double-digit growth in household lending, raising questions about the sustainability of the consumption-driven growth in the region. The contribution of investment was about 47 per cent in 2019 while net exports subtracted from growth. In Albania and Bosnia and Herzegovina, growth of investment in 2019 has been limited while consumption grew strongly driven by remittance inflows and higher consumer lending.

Across the region, net exports in 2019 were a drag on growth: on average, in 2012-18 they subtracted from growth because of the high level of imports, there are few competitive exporters, and the region's main trading partners, in particular EU members, were weakening. Productivity, including the growth of advanced manufacturing and services, has lagged behind what is necessary for the region to catch up with incomes in the advanced EU.

Going into the Coronavirus crisis, Western Balkan countries had different economic strengths and weaknesses. At 2019, Western Balkan trade deficits reached 13.8 per cent of Gross domestic product. The resilience of Western Balkan economies will be tested as the Coronavirus crisis unfolds. The economic freeze will put pressure on both government budgets and private sector balance sheets. Households will lose jobs, and some once-viable businesses will close. Throughout the economy's liquidity will need to be carefully managed to avoid escalating the crisis. There are many institutions in the Republic of Serbia and region in charge to realise integral disaster risk management measures in emergencies, such is Coronavirus, and therefore agricultural protection, but despite all efforts their work is sometimes very questionable (Radovic et al., 2015). Hence, not only government restrictions, but also the responses of households and businesses to the crisis are putting unprecedented strain on the economies in the region. Declining economic activity is also complicating public finances and expanding the financing needs of governments. Aggregate demand is collapsing, and aggregate supply is also contracting, with the collapse in orders, and the food supply chain problems. Disruptions in global and domestic supply chains hurt agribusiness very much, especially small household farming. Liquidity constraints might cause further disruptions in Agri-food production. So the risk which is an important aspect of the farming business, with the uncertainties inherent in weather, yields, prices, government

policies, global markets, and other factors that impact farming can cause wide swings in farm income, got a new dimension in corona pandemic risk. Risk management, which involves choosing among alternatives that reduce the financial effects that can result from such uncertainties, is at the base of the motivation for the research of this paper, to explore the impact of the Coronavirus pandemic on the Agri-food sector in Western Balkan countries (Jevtic et al., 2013).

The paper is structured to present main data on the agribusiness sector in the Western Balkans, after the introduction, literature overview of the organisational risk of unexpected events and Coronavirus pandemic, and to present main findings of the field research provided in the March of 2020, on the impact of Coronavirus on the sector by surveying the attitudes and estimations of 102 SMEs from agriculture production, Farm households, and services. Discussion and Conclusions, as well as references in the Harvard style, are given at the end of the paper.

Agri-food sector in the Western Balkan countries

Agri-food sector in Western Balkan countries (Grozdanic, 2013) use to be, and still is one of the main sources of production, employment and growth in these countries (T.1)

Table 1. The importance of agriculture in the WB countries, 2013, 2017, 2019.

Indicator	Albania			Bosnia & Herzegovina			Montenegro			North Macedonia			Serbia		
	2013	2017	2019	2013	2017	2019	2013	2017	2019	2013	2017	2019	2013	2017	2019
Gross added value (GAV) for agriculture (% of total GVA)	22.4	22.7	22.0	8.3	7.1	7.0	11.4	10.9	9.2	9.8	9.6	8.2	9.4	7.3	6.0
Employment in agriculture (% of total employment)	52.5	38.2	43	18.9	18.9	17.1	18.7	16.2	7.8	18.2	17.4	16.0	21.3	17.2	16.9

Source: EU Commission Directorate-General for Agriculture and Rural Development Unit, data.

The situation in Western Balkan country's agriculture in 2019 recorded positive economic developments, indicating continuing economic recovery from the severe economic crisis, which started in 2009 and in most countries bottomed out in 2012 (T. 2).

Table 2. The situation in the Western Balkan country's agriculture in 2019.

Indicator	Albania	Bosnia and Herzegovina	Montenegro	North Macedonia	Serbia
Total area (km^2)	28 750	51 209	13 812	25 713	88 407
Utilised Agricultural Area (% of total land area)	1.18 mil.ha (40.5% of total)	1.6 mil.ha	0, 9 mil.ha (38% of total)	0,509 mil.ha (40% of total)	3.44 mil. ha (43% of total)
Population (mil.)	2.8	3.8	0.6	2.1	7.2
Rural population (% of total)	39,7%	53.2%	33,2%	42.0%	43,9%

Indicator	Albania	Bosnia and Herzegovina	Montenegro	North Macedonia	Serbia
Population density (km^2)	97	75.1	45.0	83.5	81.9
GDP (USD billion)	13.2	17.3	4.8	10.9	42.5
GDP per capita (USD)	4 320	5 093	7 782	5 311	5 900
Share of agriculture in GDP	22.9%	3.3%	8, 2 %	10%	7.5%
Employment in agriculture (% of total)	43%	17.1%	7,8%	16,0%	16.9%

Source: Authors, based on EU data

The total UAA for Albania, Bosnia and Herzegovina and North Macedonia was estimated by reducing the total agricultural land area by the recorded unused arable land and by 50 % of the land under permanent grassland. The accession of WB countries to the EU has gained new momentum in 2018, with the EU Council concluding that North Macedonia and Albania, opened accession talks in 2019. These two countries, thus follow in the footsteps of Montenegro and Serbia, where accession negotiations are already underway, while potential candidate, Bosnia and Herzegovina are lagging behind in the accession process (Volk, 2010; Rednak et al. 2013).

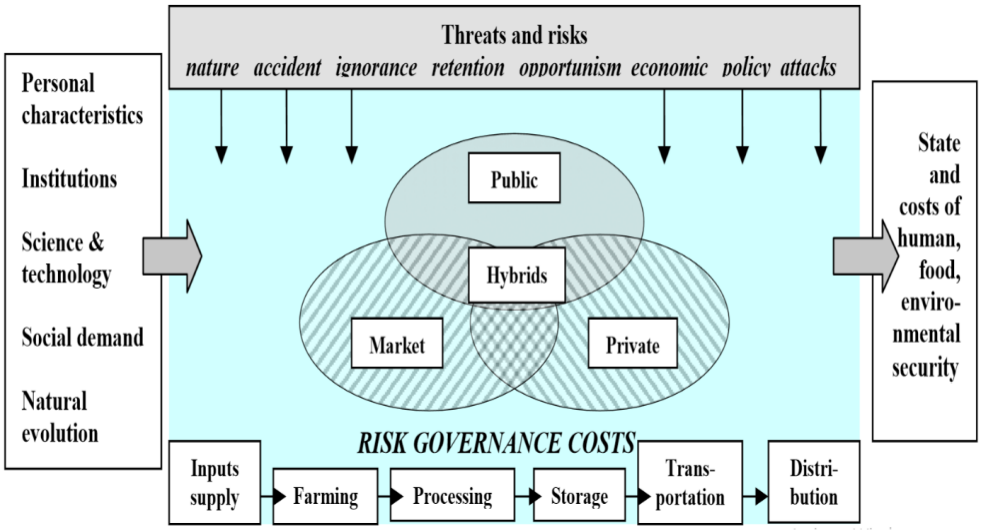
Literature review

Modern Agri-food chains involve a lot of actors with different interests, multiple stages, and diverse risks requiring complex, multilateral, and multilevel governance on a large scale. The variety of existing and emerging threats and risks (natural, technological, behavioural, Coronavirus pandemic) in the modern agri-food chains are identified in the literature (DTRA & IIBR, 2011; Humphrey and Memedovic, 2006; OECD, 2011). Diverse market and private modes evolved to address specific risks driven by ethics, competition, health threats, consumer demand, business initiatives, trade opportunities such as direct marketing, volunteering and industry standards, insurance schemes, guarantees, fair-trade, trade with brands, origins, and organic and quality products.

The globalization of exchange and threats/risks increasingly requires setting transnational public order (ISO, WHO, FAO, WTO). There are a number of opportunities for risk governance in the Agri-food chain (Figure 3): advances and dissemination of technical food chain, training and risk management methods (microbiological, genetic, electrical, laser, robotic, immunological, chemical, nanotechnology, ICT etc.), integral and food chain approaches, and research, monitoring, testing, decision making, and forecasting capabilities for risk-detection, assessment, prevention, and mitigation (Trench at al., 2011; Luning et al., 2006; Sarkar et al., 2012).Trying to define the risk, it can be said that risk is any current or future hazard (event) with a significant negative impact(s). It is either idiosyncratic (accidental, low probability, unpredictable events) or systematic (high probability, predictable events).

The Agri-food sector, which is in the focus of the research in this paper, can face risks associated with each component or it could cause risks: risk of from farming, from food processing, from food-distribution, from diseases as Coronavirus pandemic, is. Risk can be internal to agri-food chains such as hazards caused by one element affecting another within the sector. Risk can be external and associated with external factors (natural environment, government policy, international trade) and/or effecting external components (consumers, residents, industries, nature). Risk can be private when it is assumed by individuals, collectives, entities, or industries, or it can be public when it affects large groups, communities, consumers, or future generations. In a narrow (technical) sense, risk management comprises individual, collective and public action(s) for reducing/eliminating risk and its consequences. In a broader sense, risk management is the specific system of social order (governance) that is responsible for the particular behaviour (s) of agents and determining way(s) to assign, protect, exchange, coordinate, stimulate, and dispute risks, rights, resources, and activities (Bachev & Nanseki, 2008; Beslac & Coric, 2019). In a particular, social-economic, technological, natural environment, the specific system of risk governance that is in place is intimately responsible for the efficiency of the detection, prevention, mitigation, and reduction of threats/risks and their consequences (Miskic et al., 2017). According to Bachev, 2013, generic forms and mechanisms of risk governance are as follows (Figure 1):

Figure 1. Risk Management in the Agri-food Sector



Source: According to Bachev, 2013.

In the agrarian and food sectors the management of natural, market, criminal, policy diverse risks are issues with particular topical interest (Babcock, 2004; CIPS, 2012; Deep & Dani, 2009; EU, 2011; Notarnicolaa et al., 2012; OECD, 2008; Olsson & Skjöldebrand, 2008; Ramaswami et al., 2008; RPDRM, 2012; Schaffnit-Chatterjee, 2010; Shepherd et al., 2006; Tummala & Schoenherr, 2011; Weaver & Kim, 2000;

Domazet et al., 2016). Evolving uncertainty, risks and crises associated with the progression of natural environments, products, and technologies, social demands, policies, and globalization present new challenges to the current systems of risk management. The literature on the Agri-food sector focuses predominately on technical methods and capabilities to perceive, prevent, mitigate, and recover from diverse threats and risks (Barker, 2005; Beni et al., 2012; Hefnawy, 2011; Jaffee et al., 2008; Zhang & Li, 2012).

Consequently, a complete range of risks is left not managed, which has adverse effects on the size and sustainability of Agri-food enterprises, market development, the evolution of production and consumption, the state of the environment, and social welfare (Curcic et al., 2017; Zakic et al., 2019). Depending on the costs and the efficiency of the specific system of governance in a particular (sub) sector, region, country, supply chain, etc., there will be unlike outcomes in terms of "residual" risks and dissimilar states and costs of human, food, environment, etc., security in different regions and periods of time. For instance, when there is inefficient public enforcement of food, labour, and eco-safety standards (lack of political will, administrative capability), then grey agrarian and food sectors develop with inferior, hazardous, and counterfeit components.

Methods and materials

Research description

The aim of the research is, based on the literature on operational risk and statistical properties of operational losses, to explore the operational risks - the risk of the risk of emergencies and specific Coronavirus pandemic risk that are SMEs from Agri-food sector, from Western Balkan countries exposed to, and the For To that purpose, a survey of 102 SMEs from the Agri-food sector and farms from Western Balkan countries: Serbia, Montenegro, Bosnia and Herzegovina, Albania and Montenegro were provided in March 2020.

The hypothesis of the research is:

H= The risk of emergencies and Coronavirus risk that are SMEs from the Agri-food sector from Western Balkan countries exposed to, significantly affect their sustainability in 2020.

There are 2 independent variables in the research; two operational risks- of emergencies (ORE), and the Coronavirus risk, and one independent variable- sustainability risk (SR).

Methods of descriptive statistics used in the elaboration of the research data and findings are correlation and regression analysis, ANOVA test, Person's correlation and multiple linear correlations.

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Sampling

Table 3 presents the main activity of the surveyed farm households and SMEs from Agri-food sector production; where SMEs from Agri-food production make 51 (50.00%) of the total sample, Farm households, 33 (32.35%), and services in agribusiness, 18 (17.64%).

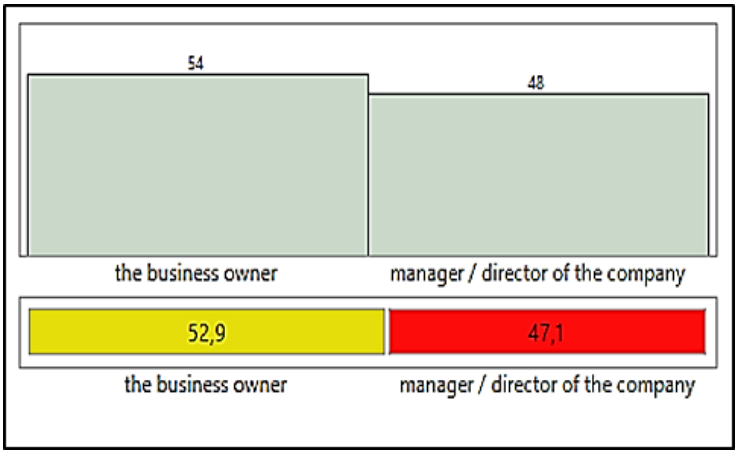
Table 3. The main activity of firms

The main activity of firms	Count	Prob
Agri-food production	51	0.50000
Farm households	33	0.32353
Services in agribusiness	18	0.17647
Total	102	1.00000

Source: Authors

All SMEs are private-owned companies/farms, and rural entrepreneurs (from 1-9 employees), and service companies from the sector. Respondents were mostly business owners 52, 9%, and managers 47, 1% (F. 2).

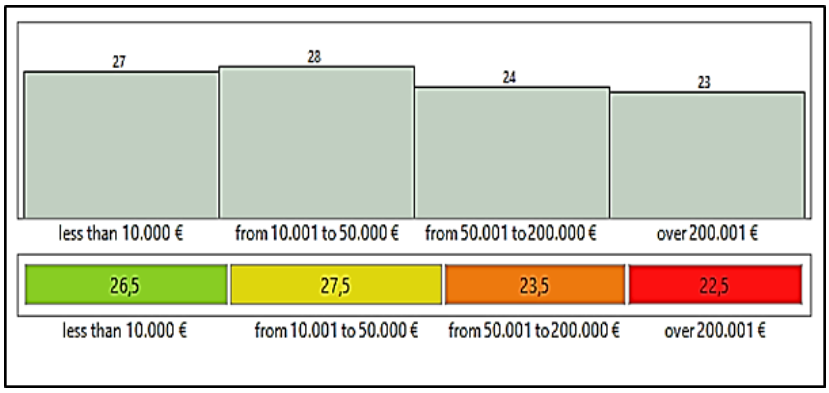
Figure 2. The position of the respondents



Source: Authors

According to the revenues of the firms in 2019 (given in Figure 3), there are: 27 companies and farms with the revenue < of 10.000€, (26.47%), from 10.001 to 50.000€ – 28, (27.45%), from 50.001 to 200.000€ - 24 or 23.52%, and from 200.001€ - 23 or 22.54% (F. 3)

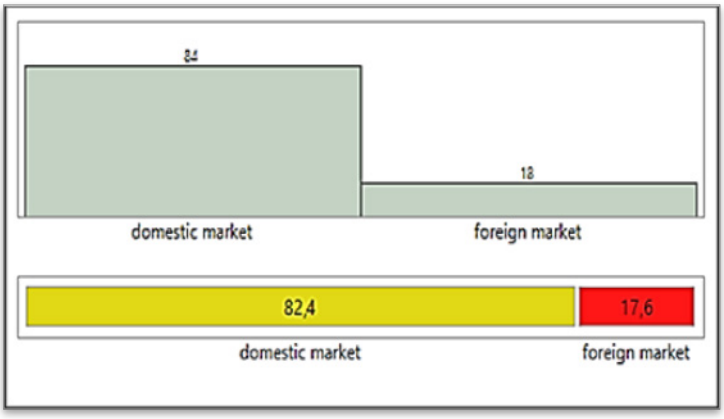
Figure 3. The company's revenue in 2019



Source: Authors

The origin of the *company's revenue in 2019 was a predominantly* domestic market - 81 (82.35%), and the foreign market for 18 firms (17.64%), what was illustrated in Figure 4.

Figure 4. The origin of the company's revenue in 2019



Source: Authors

Key findings

The cross-tabulated values for the main agribusiness activity of the company and the company's revenue in 2019 are presented in Table 4. It can be seen that the highest number of companies were operating in the Agri-food production, these with the revenue in 2019 from € 10,001 to € 50,000, and small agricultural householders with the revenue less than 10.000 € in 2019, as well as the service companies in agriculture in that category of revenues.

Table 4. The main activity of the company and revenue in 2019, cross-tabulated values

The main activity of the company and revenue in 2019	Agri-food production				Farm household				services in agribusinesS				All	
	N	Column %	Row %	% of Total	N	Column %	Row %	% of Total	N	Column %	Row %	% of Total	N	% of Total
less than 10.000 €	7	13.73%	25.93%	6.86%	10	30.30%	37.04%	9.80%	10	55.56%	37.04%	9.80%	27	26.47%
from 10.001 to 50.000 €	18	35.29%	64.29%	17.65%	8	24.24%	28.57%	7.84%	2	11.11%	7.14%	1.96%	28	27.45%
from 50.001 to 200.000 €	11	21.57%	45.83%	10.78%	8	24.24%	33.33%	7.84%	5	27.78%	20.83%	4.90%	24	23.53%
over 200.001 €	15	29.41%	65.22%	14.71%	7	21.21%	30.43%	6.86%	1	5.56%	4.35%	0.98%	23	22.55%
All	51	100.00%	50.00%	50.00%	33	100.00%	32.35%	32.35%	18	100.00%	17.65%	17.65%	102	100.00%

Source: Authors

In table 5 are given the cross-tabulated values for the origin of the company*'s revenue* where it is evident that most of the companies, 82.35% earned their revenues in 2019, on the domestic market.

Table 5. The main agribusiness activity of an SME/farm and the origin of the revenue in 2019, cross-tabulated values

The main activity of the SME/farm origin of income	Agri-food production				Farm household				Services in agribusiness				All	
	N	Column %	Row %	% of Total	N	Column %	Row %	% of Total	N	Column %	Row %	% of Total	N	% of Total
Domestic market	43	84.31%	51.19%	42.16%	25	75.76%	29.76%	24.51%	16	88.89%	19.05%	15.69%	84	82.35%
Foreign market	8	15.69%	44.44%	7.84%	8	24.24%	44.44%	7.84%	2	11.11%	11.11%	1.96%	18	17.65%
All	51	100.00%	50.00%	50.00%	33	100.00%	32.35%	32.35%	18	100.00%	17.65%	17.65%	102	100.00%

Source: Authors

In Table 6 are given the cross-tabulated values for the main activity of the SME/farm household and the impact of Coronavirus on income sustainability in 2020. Companies from agri-food production assessed that the highest impact Coronavirus risk would have on their liquidity, farms assessed that main negative impact would be on revenue decrease, as well as service companies. All together see revenue decreases in 2020. Production companies think that the high impact could be on the amount of employee reduction. All think that Bankruptcy & Termination could happen with only 8.82%.

Table 6. The main activity of the SME/farm and expected impact of Coronavirus on income sustainability in 2020

The main activity of the SME/farm and the Impact of Coronavirus on the income sustainability	Agri-food production				Farm household				Services in agribusiness				All	
	N	Column %	Row %	% of Total	N	Column %	Row %	% of Total	N	Column %	Row %	% of Total	N	% of Total
The number of employees' reduction	12	23.53%	60.00%	11.76%	7	21.21%	35.00%	6.86%	1	5.56%	5.00%	0.98%	20	19.61%
The loss of the market	10	19.61%	62.50%	9.80%	4	12.12%	25.00%	3.92%	2	11.11%	12.50%	1.96%	16	15.69%
Liquidity reduction	15	29.41%	62.50%	14.71%	7	21.21%	29.17%	6.86%	2	11.11%	8.33%	1.96%	24	23.53%
Revenue decrease	9	17.65%	27.27%	8.82%	14	42.42%	42.42%	13.73%	10	55.56%	30.30%	9.80%	33	32.35%
Bankruptcy & Termination	5	9.80%	55.56%	4.90%	1	3.03%	11.11%	0.98%	3	16.67%	33.33%	2.94%	9	8.82%
All	51	100.00%	50.00%	50.00%	33	100.00%	32.35%	32.35%	18	100.00%	17.65%	17.65%	102	100.00%

Source: Authors

In the further tables are given statistical values for independent and dependent variables.

The statistical values for the operational risk of of emergencies (ORE) with its variables: external theft, natural disasters, lows and suppliers are given in Table 7.

Table 7. Statistics for the operational risk of of emergencies (ORE)

The operational risk of of emergencies (ORE), variables	Mean	Std Dev	Std Err Mean
External theft	3.5392157	1.2560473	0.1243672
Natural disasters	3.7843137	1.2791353	0.1266533
Laws	1.8235294	1.2381059	0.1225908
Suppliers	2.9803922	0.8557365	0.0847305
All variables	3.0318627	1.0540302	0.1043645

Source: Authors

The statistical values for the operational risk of Coronavirus with its variables: unprecedented health, social and economic challenges, the immediate pressure experienced by SMEs, self-employed people in the Agri-food and the need for the direct legislative power over Coronavirus matters are given in Table 8.

Table 8. Statistics for Coronavirus risk

Coronavirus risk variables	Mean	Std Dev	Std Err Mean
Unprecedented health, social and economic challenges	3.872549	1.2560473	0.1243672
The immediate pressure experienced by SMEs, self-employed people, specific sectors	3.872549	1.2560473	0.1243672
The need for the direct legislative power over Coronavirus matters	3.0686275	0.9038948	0.0894989
All variables	3.5163399	1.0794892	0.1068854

Source: Authors

The statistical values for the Sustainability risk (SR) with its variables: The number of employees' reduction, the loss of the market, Revenue decrease and Bankruptcy & termination is given in Table 9.

Table 9. Statistics for the Sustainability risk (SR)

Sustainability risk (SR), variables	Mean	Std Dev	Std Err Mean
The number of employee reduction	3.5882353	1.2456096	0.1233337
The loss of the market	2.9705882	0.9795522	0.0969901
Liquidity reduction	3.4117647	1.0374468	0.1027225
Revenue decrease	4.1372549	1.2667821	0.1254301
Bankruptcy & termination	2.5980392	1.2288593	0.1216752
All variables	3.3411765	1.081835	0.1071176

Source: Authors

The correlation of the presented model is given in Table 10, by Pearson correlation values.

Table 10. The correlation of the formed model

Risks	The operational risk of emergencies (ORE)	Coronavirus risk (C19)	Sustainability risk (SR)
The operational risk of emergencies (ORE)	1.0000	0.9709	0.9754
Coronavirus risk (C19)	0.9709	1.0000	0.9860
Sustainability risk (SR)	0.9754	0.9860	1.0000

Source: Authors

Between the independent variable Coronavirus risk and the dependent variable Sustainability risk (SR) is the highest correlation coefficient, 0.9860, and it is strong. The coefficient of Determination is 0.972196, which means how accurately can be predicted the dependent variable Sustainability risk (SR) relative to the independent variable Coronavirus risk, that is worth 97.21%.

In Table 11 the evaluation of the model is given. The total coefficient of determination is 0.977929, with 97.79% can be explained the variability of the dependent variable Sustainability risk (SR) by the 2 independent variables. The correlation between the variables is strong.

Table 11. Evaluation of the model

RSquare	0.977929
RSquare Adj	0.977483
Root Mean Square Error	0.162337
Mean of Response	3.341176
Observations (or Sum Wgts)	102

Source: Authors

The statistical significance score is given in (Table 12) and sums it up [F (2. 99) =2193.242, p<0. 0001].

Table 12. ANOVA

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	115.59809	57.7990	2193.242
Error	99	2.60897	0.0264	Prob > F
C . Total	101	118.20706		<.0001*

Source: Authors

The largest single contribution makes the independent variable Coronavirus riks, 67.85%, while the independent variable, the operational risk of emergencies (ORE) affects 31.66% the dependent variable, Sustainability risk (SR). Based on these data, it can be confirmed that hypothesis H_0 holds that: The operational emergencies risk (ORE) level risk and the Coronavirus risk (C-19) level significantly influence the Sustainability risk (SR) level. The contribution of independent variables to the dependent variable Sustainability risk (SR) is determined in Table 13.

Table 13. Coefficients' contribution

Term	Estimate	Std Error	t Ratio	Prob>|t|	Std Beta	VIF
Intercept	-0.035425	0.0583	-0.61	0.5448	0	.
The operational risk of emergencies (ORE)	0.3250059	0.063962	5.08	<.0001*	0.316653	17.419449
Coronavirus risk (C19)	0.6800334	0.062453	10.89	<.0001*	0.678559	17.419449

Source: Authors

Based on the data in Table 13, Formulas 1 and 2 of multiple regression linear equations were formed, which read:

$$y = -0.035425 + 0.3250059 \cdot x_1 + 0.6800334 \cdot x_2 \quad (1)$$

or

$$\text{Sustainability risk } (SR) = -0,035425 + 0,3250059 \cdot \text{The operational risk of emergencies } (ORE) + 0,6800334 \cdot \text{Coronavirus risk } (C19) \quad (2)$$

Discussion and Conclusions

The key findings of the research in the paper have demonstrated that the Agri-food sector in Western Balkan countries deserves so special attention at the time of Coronavirus pandemic risk threatens. The Agri-food sector is, according to the information given in the paper very important sector of activities, employment and entrepreneurship, and would have to be subject of government financial and other support to overcome the expected problems.

The findings of the research in the paper confirm the hypothesis that the risk of unpredictable events and Coronavirus risk could affect the sustainability of SMEs from the Agri-food sector and farm households from Western Balkan countries in 2020.

Looking further, it can be concluded that governance, along with technical, information and other issues, play a central role in risk management analysis and design. Moreover, the system of risk management is to adapt/improve by taking advantage of the summarized new opportunities and overcoming/defending against evolving new challenges.

Often, the introduction and enforcement of new obligations in the food secure, risk-management responsibility, and supporting private and collective initiatives in informing, training, assisting, funding, could be of more efficiency. In order to provide effective support of national policies, the design of modes for public interventions, and individual, collective and business actions, the greater support would have to be given to multi and interdisciplinary research on factors, modes, impacts of risk governance in the Agri-food chain.

Conflict of interests

The authors declare no conflict of interest.

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