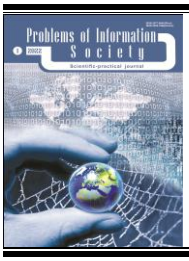

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Assessment of the impact of economic agent vulnerability on economic - financial performance indicators

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ABSTRACT

Crises, whether related to health, finance or the economy, directly affect the lives of each individual and their families. As the inequality gap between rich and poor grew after 2010, many economists predicted a new crisis. But the hypothesis that an economic crisis would stem from a coronavirus outbreak was limited to younger, visionary economists. The current situation is directly related to the impact that this crisis is having on the global economy and, more precisely, the impact of the vulnerability of the economic agent at the local level in terms of economic-financial performance indicators. In this paper, using mathematical modeling we present scientific solutions in regard to the current economic crisis caused by the COVID-19 pandemic. We further consider that at the moment of the crisis, the collaborative economy takes the place of the globalized economy.

1. Introduction

Vulnerability is an indicator of the future state of a system, defining the degree of the ability of the system to cope with expected stress [1]. In general, vulnerability can be understood as the predisposition or susceptibility of an element to being adversely affected by external causes. Emerging evidence on the social epidemiology of COVID-19 suggest that infections and deaths from the disease operate along existing axes of social inequalities [2], and that individuals from ethnic minorities, poorer socioeconomic backgrounds and deprived areas are more likely to suffer [3], and with a direct impact on the social, economic and financial environment. We considered that vulnerability has a profound quantitative character: the level of losses that await an element or group of elements (persons, structures, goods, services, economic capital, or social capital) exposed to a certain risk as the result of a disaster or hazard. Vulnerability is expressed on a scale from 0 to 1, or from 0% to 100%.

The vulnerability of small and medium enterprises (SMEs) needs a lot of attention because they play a key role in economics and particular it is very important for developing countries. These economic agents create a big part of GDP in most countries so it means that in the context of COVID-19 pandemic, this segment of economics needs a lot of support. Tau and Cretoiu (2014) [4] pointed that the vulnerability of SMEs is a lot related with the lack of financial resources. Despite SMEs have different opportunities to attach funds to their activity but in the periods of crisis there are lots of difficulties for getting additional funds.

The vulnerability of a space is based on causes related to the intrinsic characteristics of the

phenomenon; economic causes, such as material well-being and reserves; and socio-psychological causes, from administrative organization to mass psychology. The extent to which these three aspects combine defines the complex vulnerability of a space. However, it is not clear how existing intersecting inequalities at the socio-economic level could influence the short- and long-term consequences of the pandemic. The widespread introduction of physical deterrence measures that keep people in their homes, including blocking households, self-isolating high-risk people, and closing schools and jobs. This situation has led to concerns about financial, physical, and psychological effects, as well as the potential for widening social and health inequalities [5]. Some characteristics of the economic agent have become increasingly important for well-being, such as access to a safe garden or outdoor space, technology and internet connectivity [2], and the lack of congestion of economic agents, especially since, in the given circumstances, these factors are less likely to be mitigated by interactions with school, work, and community contexts [6, 7].

Some social groups are more vulnerable than others, depending on gender, age, physical condition, and other factors. In addition, vulnerability is closely linked to the socio-economic position of an individual or group, with wealthy individuals and groups maintaining access to the reserves needed to cope with disaster, perseverance, and recovery.

2. Literature review

There is no universally accepted formula for the quantitative characterization of vulnerability, much less health, and economic vulnerability. Moreover, its relative character is one of the identifying characteristics of vulnerability. Recently, leading public health experts have argued that vulnerabilities at the individual level could interact to lead to poorer health outcomes during the COVID-19 crisis [8]. We know from the literature on health inequalities that health status is more common among those suffering from other social deprivations, such as poorer housing, overcrowding, financial insecurity, and social exclusion [9, 10]. Therefore, self-isolation can have a negative impact on other dimensions of disadvantage, not only for "extremely vulnerable" people but also for members of the economic operator or their communities. A much larger proportion of the population could be considered "at high risk", suffering from chronic conditions that are likely to cause complications of COVID-19 [2], such as severe respiratory diseases. Intersectionality approaches emphasize how combinations of characteristics can aggravate possible social and health outcomes [11] and that are interdisciplinary connected to the sectoral economic environment, a condition of an employee can have direct implications in the activity of an economic agent, thus creating vulnerabilities. At the economic operator level, some economists do not include economic vulnerability to infectious disease threats in their assessments, and this is due to the lack of easily available and digestible input data to inform this analysis [12]. The infectious nature of COVID-19 has led some to tout the pandemic as a "great equalizer," a systemic disadvantage that limits the economic activity of almost everyone regardless of social locations [5]. Emerging evidence, however, begins to challenge this view.

Different authors point that the COVID-19 pandemic differs a lot, comparing with other crises. Parisi (2020) revealed that despite a strong shock on different sectors, the economy was not attacked so much as in periods of other crises. Gene and Adelson (2020) [8] also pointed that COVID-19 crisis was different if we compare it with 2008-2009 financial crisis. The main reason is that this time we have effect on all the economy with quite different effects in different sectors. During the financial crisis we had different reasons, and the most was affected housing sector and financial institutions.

Given their greater human capital, job stability, and employability, better-educated people tend to exhibit higher economic resilience in the face of a social shock [13, 14].

In this study, using ICT and mathematical modeling, we investigate the financial vulnerability of the economic agent as they are defined by the fact that, in essence, finances are generated entirely at the microeconomic level within the economic agent's relationship with his environment. Our goal is to demonstrate that finance is not a product of the economic agent, but a result of its confrontation with the environment, so a relational essence, implicitly the importance of intersecting vulnerabilities and company structure to mitigate the consequences of the crisis.

3. Methodology

The research methodology in this article consists of two major parts as the whole research is divided into two stages.

First stage

Firstly, at the first stage, in order to substantiate the research method, we use content analysis of literature. Our procedures are based on factual

analysis (intensive documentation at the level of specialized literature existing locally and internationally) and use international databases as well as databases and existing scientific materials in the libraries of specific institutes in Romania. In particular, the methodology draws on scientific articles published by specialized research networks, articles published in various journals and specialized books relevant in the field of reference. The data was processed to provide an overall analytical picture of the most important changes taking place both globally and in the European Union. These changes are considered representative for understanding the phenomena, particularly with regard to this period of health, economic, and financial crises.

The models used in this study are based on the coefficients that express the influence of vulnerability on the company's performance indicators and that are used in simplified models for optimizing vulnerabilities in the context of current and future challenges. For the use of such models, we evaluated performance and vulnerability according to certain criteria, respectively: the size of the companies, the sector of activity, the financial situation of the company, and others.

Second stage

At the second stage, we tried to focus on the credit transmission channel as a support tool for SME. For that purpose, we used pooled time series, cross-section data.

We stated a hypothesis:

H – Commercial banks support economic agent – SME in the period of COVID-19 pandemic through the credit transmission channel.

Firstly, we use analytical graphs, such as boxplot, to identify the main tendencies of loan demand in the euro area SMEs segment. Box and whisker diagram helps to summarize the distribution of data showing the centering and spread of the data set [12]. Boxplot helps to identify third quartile, mean, median, first quartile and outliers.

To check the main hypothesis, we used panel data regression models, cluster analysis, descriptive statistics.

The main equation of panel data regression model is as follows (formula 1):

$$Y_{i,t} = \alpha_i + \beta_1 X_{1i,t} + \beta_2 X_{2,i,t} + ... \beta_k X_{k,i,t} + u_{i,t} \quad (1)$$

where Y – dependent variable, X – independent variable, α, β–coefficients, i, t – indices for individuals and time, k – number of independent variables, u - error term.

In this research, we applied independently pooled ordinary least squares (OLS) regression model and fixed effects model. The OLS variation concludes that every section of data is homogeneous. The latter fact can be explained that every data section is explained in the same manner. So, there is no one-off characteristic in a data set, and there is not found universal effects in time series data. In case of fixed effects model, we try to identify heterogeneity among diverse data series. We made an assumption that each cross section is able to have its own intercept which does not change its value during the moment of analysis. In this case, the error term varies non-stochastically per each set of data and period. At the last step, we had to identify which of the panel regression model is better for our data. For this purpose, we used probability value, decision criterion and tested the hypothesis using Hausman test and Wald test.

In order to check if the fixed effects model is suitable for the data set, we used F test (formula 2).

$$F = \frac{(R^2_{FE} - R^2_{CC})/(N-1)}{(1-R^2_{FE})/(NT-N-k)} \sim F(N-1, NT-N-k) \quad (2)$$

To test our hypothesis, we analyzed euro area banking sector data using European Central Bank quarterly Bank lending survey. For the data consistency, we used the period from 2015 Q2 to 2020 Q4.

All the variables we have chosen for this research are explained in table 1.

4. Results and Discussion

Solutions to reduce the degree of vulnerability in companies' financial policies are currently limited, especially in the current context of the COVID-19 crisis. In our study, we tried to maintain a balance in putting aside a solution that is informed by a perspective growth and consists of choosing a surplus of financial capacity to respond to the increase in the volume of outflows, being a classic process, and responding to vulnerabilities. Another solution presented aims to eliminate the risk (even that posed by the health crisis) and, to a greater or lesser extent, to avoid investments.

The economic agent behaves idly in an inertial environment. In a changing environment the economic agent, through selectivity and adaptability, no longer behaves inertially. The agent may be vulnerable insofar as it is not compatible with the system of relationships in which it must interact. The

process of changing the environment—in this case, the financial environment—has to offer the economic agent another relational field in which the economic agent can perceive and correctly assimilate the change of its financial component. Otherwise, financial inequalities manifested among others will appear through the low quality of financial services and financial blockages as an expression of the economic agent's high vulnerability to change.

The forms under which financial vulnerability manifests inequalities are diverse, with a variety of typological criteria. While some forms are directly determined by the financial environment, others are generated by the perception of the economic agent regarding environmental changes. Some forms of financial vulnerability have a reduced temporality, other forms are manifested over a much longer duration. And while some forms are specific to the financial structure, other forms are confined to financial flows.

This diversity in the forms of financial vulnerability, however, represents hypotheses of the same forms of manifestation of the economic agent through selectivity and adaptability to a changing economic environment. These forms represent ways of participation by the economic agent in both their change and the change of environment.

Additionally, the forms of financial vulnerability can be viewed through the lens of the management system. From this perspective, they are directly related to the behavior or the attitude of the decision maker.

The most significant forms of vulnerability are related to the following types of financial management:

Table 1. Description of variables

Variable	Description
GEA	Impact of general economic activity, Net percentage (frequency of tightened minus that of eased or reverse)
AAMF	Impact of ability to access market financing, Net percentage (frequency of tightened minus that of eased or reverse)
RCD	Impact of risk on the collateral demanded, Net percentage (frequency of tightened minus that of eased or reverse)
BRT	Impact of bank`s risk tolerance, Net percentage (frequency of tightened minus that of eased or reverse)
DBWDI	Backward looking three months, Diffusion index
DBWNP	Backward looking three months, Net percentage (frequency of tightened minus that of eased or reverse)
DFWDI	Forward looking three months, Diffusion index
DFWNP	Forward looking three months, Net percentage (frequency of tightened minus that of eased or reverse)
SBWDI	Supply (credit standards) Backward looking three months, Diffusion index
SBWNP	Supply (credit standards) Backward looking three months, Net percentage (frequency of tightened minus that of eased or reverse)
SFWDI	Supply (credit standards) Forward looking three months, Diffusion index
SFWNP	Supply (credit standards) Forward looking three months, Net percentage (frequency of tightened minus that of eased or reverse)

The causes, effects, and influences of the forms of vulnerability characteristic of financial management are confined to dimensional coordinates by which each form of the vulnerability can be defined, and which are commensurate so that their negative or positive potential can be identified in the change.

a. The structural dimension highlights the financial status of the economic agent faced with one or more forms of vulnerability in the scope of financial management.

Balance structures, corrected and adapted to financial analyses, can provide relevant information in financial vulnerability analysis. The correlated analysis of the various structural modules, as well as the determination of financial vulnerability rates on this basis, can provide an understanding of the mechanisms while allowing the elaboration of any programs to mitigate or absorb the impact of the managerial vulnerability in the process of change. Thus, various macroeconomic and microeconomic models were adopted to study the economic vulnerability [15].

b. The functional dimension highlights the movements, flows, and financial circuits affected or not affected by the vulnerability.

Table 2. Country code

Country	Code
Austria	1
Belgium	2
Cyprus	3
Germany	4
Estonia	5
Spain	6
Finland	7
France	8
Greece	9
Ireland	10
Italy	11
Lithuania	12
Luxembourg	13
Latvia	14
Malta	15
Netherlands	16
Portugal	17
Slovenia	18
Slovakia	19

The economic environment—namely it's normative, institutional, and instrumental components — determines in a decisive way the financial flows and circuits of the economic agent, loading them under the conditions of a nonpermissive environment with new vulnerabilities. The functional dimension allows for the revealing of the restriction of some financial flows and the expansion of others (especially those generated

by the commercial flows); the tightening of some financial circuits in the conditions of the deterioration of the banking circuits; and the financial flows necessary for the functioning of the market economy.

c. The behavioral dimension, directly detectable at the management level, implies the existence of a way of perceiving the change.

The first two dimensions offer a coordination plan for defining and measuring the vulnerability of financial management as an oriented relation of the economic agent with the environment, predetermining the forms of financial vulnerability. The behavioral dimension highlights the process of sedimentation of the vulnerability in the behavior of the economic agent, which can become a carrier and generator of some forms of financial vulnerability.

d. The temporal dimension allows the operationalization of the measure of the duration of the vulnerability and of the discrepancies between the different forms of the financial management vulnerability and the temporal desynchronization. Through this time dimension, speeds (possible rates of change at the microeconomic level) can be appreciated.

Financial costs increase much faster than increasing the volume of activity, compared to a time interval 1.2.

4.1. Economic Agent Vulnerability and Behavior Towards the Financial Crisis

From the manager's point of view, vulnerability is an element that can prevent the company from achieving its institutional objectives, especially in the conditions brought on by globalization.

The weakness of the organization is a negative aspect for itself and for the economic environment in which it operates, and it is necessary to remedy this weakness in the shortest possible time because it can easily degenerate into a threat that subsequently engenders an interruption of activity.

The vulnerability of the company can be temporary or permanent, depending on the degree of difficulty of the problem. It can be at the internal or external level of the organization. But it can be overcome, depending on the factors that determine this vulnerability. The weaknesses of the organization are usually under managerial control, but in the absence of efficient (timely and correct) management, the respective elements are degraded to a status that prevents the company from gaining or maintaining a competitive advantage.

Internal vulnerability is defined as a weakness that blocks the company from obtaining an advantage by exploiting an external opportunity. It should be specified that some vulnerabilities of the company can be ameliorated.

The determinants of a company's weaknesses include:

- The excessive costs necessary for some activities of the company relative to the financial resources held;
- Limits to material resources, which can be an impediment if there is no proper management of the resources;
- Inaccessibility of new technologies;
- Lower service offerings; and
- Lack of experience of business owners with external factors over which they have no control (new competitors, lack of suppliers, or staff turnover).

4.2. Influences of the External Environment on the Vulnerability of the Economic Agent

Vulnerability means that the economic entity cannot withstand a phenomenon or event which has an impact on its financial situation. We believe that because of the difficulties a company faces vulnerability cannot be easily overcome, if at all.

a) Company characteristics

4.2.1. The function of the number of employees and turnover (RSPSME, 2020): [14]

- A microenterprise has up to 9 employees with a net annual turnover or assets up to 2 million euros.
- A small business has between 10 and 49 employees and realizes a net annual turnover or has total assets of up to 10 million euros, equivalent in lei.
- A medium enterprise has between 50 and 249 employees and realizes a net annual turnover of up to 50 million euros, equivalent in lei, or has total assets that do not exceed the equivalent in lei of 43 million euros.

4.2.2. The company's relationship with other companies related to the capital or voting rights held or the right to exercise a dominant influence:

- Autonomous, if it holds less than 25% of the share capital or voting rights (any of which is greater) in one or more companies, or if one or more companies do not own more than 25% of the share capital or the voting rights of the company in question.
- Partner companies, if major financial partnerships are made with other companies without one of the companies having direct or indirect control over the other. Partner companies are enterprises that are not classified as related companies and between which the following relationship exists: the company (upstream) owns, individually or jointly with one or more related companies, 25% or more of the share capital or the rights of the vote of another enterprise.

4.2.3. The fields of activity:

- Agricultural enterprises
- Industrial enterprises
- Commercial enterprises
- Service providers
- Financial, credit, and insurance (organizations that offer these services).

4.2.4. The working time in the calendar year:

- Enterprises that operate throughout the year
- Seasonal enterprises

The company has weaknesses if, despite a large number of employees, the staff is not competent or lacks motivation or teamwork; turnover is below the level forecast; assets are impaired; or other limitations are in place.

b) Health of the economic agent

This is mainly reflected by the levels of the following economic-financial performance indicators: turnover and profit; rates of profitability, liquidity, and solvency; and balance status. These indicators must have positive values that are satisfactory for the management of the company. The degree of indebtedness must be low and there must be positive performance indicators.

The organization is vulnerable if it has debts and is unable to pay them; if liquidities are not enough; if costs related to various processes of production, sale, and delivery are too high; or if resources are limited.

c) Company field of activity

The field of activity is a key factor in the vulnerability of the company because of its location; the involvement of the state through various taxes and duties; the sectors in which a company operates; and unpredictable events such as drought, floods, and natural disasters.

The sectors in which the company operates can include industry, construction, commerce, transport, and services. Vulnerability can be present in any of these economic branches.

The financial structure of an entity, reflected in the balance sheet, varies according to the field of activity in which it operates.

In industry the structure varies depending on the nature and duration of technological processes, with capital as the goal of optimized production flows. The longer the production cycle, the more the entity must have in funds for necessary investments, important storage, and absorption of the important expenses involved in this cycle (especially personnel costs).

In trade and distribution activities the value of total assets at the balance sheet level is less important, but inventories are significant. Supplier credit is frequently used by the company, a particularly easy cash flow option for activities at the company level.

In principle, there is no template structure for the balance of some economic entities. The particularities of the activity of each can be identified at the company level by identifying significant variations in these balances on a case-by-case basis.

Additionally, economic growth or recession may distort how the balance sheet structure reflects objective reality at the level of the analyzed business.

The vulnerability of the organization is an essential factor in the evolution of its performance level. The organization can be highly vulnerable, with its profitability compromised beforehand as well as becoming newly vulnerable in certain sectors of activity. In rare cases, there are strong companies that either do not have weaknesses (in this sense, we consider that there is no company currently on the market that does not have any weaknesses or that cannot maintain or increase their performance despite pre-existing or new weaknesses.

We consider β the coefficient that expresses the influence of vulnerability on the performance indicators of the company, with positive values between 0 and 1 (or 0–100%), β [0; 1].

So:

$\beta = 0$ when the firm is not vulnerable; and

β = x-value when the vulnerability has an impact on the company.

The closer β is to the value 1, the more vulnerable the company is, the market activity is compromised, and the credibility is affected.

For example, note that:

P = level of performance indicator (e.g., economic profitability), and X = vulnerabilities; and

I = P/X and represents a rate or impact ratio as a measure of performance influenced by vulnerabilities.

Thus, for each type of vulnerability, the situation will be assessed and analyzed according to the typology of companies (characteristics, fields of activity, and financial situation of the company).

$\beta \in [0; 1]$, broken down into intervals [0; 0.4]; [0.5; 0.7], [0.8; 1].

This means:

$I \in [0; 0.4]$—performance is not affected by the impact of the respective vulnerability;

$I \in [0.5; 0.7]$—performance is influenced by the vulnerability to an acceptable level; and

$I \in [0.8; 1]$—the impact of vulnerability on performance is strong and negative, the values are negative, and the company is declining.

We are assuming X1 is late in paying bills.

a) ***By characteristics:***

Table 3. Performance and Vulnerability According to Company Characteristics

I = Economic profitability or late payment of bills	[0;0.4]	[0.5; 0.7]	[0.8;1]
Microenterprises	-	-	*
Small enterprises	-	-	*
Medium enterprises	-	*	-

b) ***According to the financial situation of the company:***

Table 4. Performance and Vulnerability According to the Financial Situation of the Company

I = Economic profitability or late payment of bills	[0; 0.4]	[0.5; 0.7]	[0.8; 1]
Poor financial situation	-	-	*
Satisfactory financial situation	-	*	-
Good financial situation	-	*	-

c) ***By field of activity:***

Table 5. Performance and Vulnerability by Field of Activity

I = Economic profitability or late payment of bills	[0; 0.4]	[0.5; 0.7]	[0.8; 1]
Agriculture	-	*	*
Construction	-	*	-
Industry	-	*	-
Trade	-	-	*
Services	-	-	*

If the vulnerability is of type X2 (poor access to credit), then credit lines are granted by banks:

a) By characteristics:

Table 6. Performance and Vulnerability According to the Financial Situation of the Company

I = Economic profitability or poor access to credit	[0;0.4]	[0.5;0.7]	[0.8;1]
Microenterprises	-	-	*
Small enterprises	-	-	*
Medium enterprises	-	*	-

b) According to the financial situation of the company:

Table 7. Performance and Vulnerability According to the Financial Situation of the Company

I = Economic profitability or poor access to credit	[0;0.4]	[0.5;0.7]	[0.8;1]
Microenterprises	-	-	*
Small enterprises	-	*	-
Medium enterprises	-	*	-

c) By field of activity:

Table 8. Performance and Vulnerability According to the Financial Situation of the Company

I = Economic profitability or late payment of bills	[0;0.4]	[0.5;0.7]	[0.8;1]
Agriculture	-	-	*
Construction	-	-	*
Industry	-	-	*
Services	-	-	*

In conclusion, small to midsize enterprises (SMEs) are strongly influenced by vulnerability—especially in crisis conditions—and decreasing values of the economic-financial performance indicators represent an impediment to the development of SMEs.

The determinants of the weaknesses of enterprises are related to the fields of activity of the companies and their financial status, size, and turnover.

Additionally, vulnerability of the company is caused by the obstacles of the current financial crisis, particularly those which cannot be overcome or removed.

The difficulties faced by SMEs can be classified into two categories: those related to production (lack of capital, lack of credit, difficulty of payment, lack of qualified employees, lack of technology, and lack of raw materials) and those related to demand (lack of solvency demand, strong competition, low market prices, lack of notoriety, and lack of ability to use marketing tools).

According to our research, the main obstacles for companies are as follows:

- ✓ Decrease in domestic demand;
- ✓ Excessive taxation and bureaucracy;
- ✓ Delays in payment of invoices from private companies;
- ✓ High cost of loans;
- ✓ Inflation and the relative instability of the national currency;
- ✓ limited access to loans;

Evolution of the legislative framework and political changes.

4.3. Definition of SMEs given by the European Commission

According to Commission Recommendation 2003/3611, SMEs are enterprises "which employ fewer than 250 persons, which have an annual turnover not exceeding EUR 50 million, and/or annual balance sheet total not exceeding EUR 43 million".

Source: EU policy framework on SMEs, state of play and challenges, UE-ECON, 2019 [16].

In 2017, there were approximately 24.5 million SMEs in the EU:

- ✓ Representing 99.8% of enterprises;

Table 9. Classification of Micro-, Small, and Medium Enterprises

Enterprise size	Employees	Turnover (EUR)	Annual balance sheet (EUR)
Micro	≤ 10	≤ 2 m	≤ 2 m
Small	≤ 50	≤ 10 m	≤ 10 m
Medium	≤ 250	≤ 50 m	≤ 43 m

- ✓ Producing 56.8% of the value added;
- ✓ Employing 66.4% of the EU labor force.

In terms of supply, new companies mainly face financial problems because of their lack of resources, limited access to loans, and lack of customers and/or customers with pending payments. In terms of demand, entrepreneurs should consider that their problems depend on the constraints of competition in their markets, the fact that their companies are not as visible on the market and the lack of economic resources of potential customers.

4.4. The Performance of the Economic Agent and State Interventionism

4.4.1. State interventionism

The state is a basic component of the functioning of the economy. It does not replace the market but completes the market and corrects market dysfunctions. Government intervention helps alleviate market failure [18] and ensures the proper functioning of the market through economic and legal instruments. It is also a guarantor of the proper functioning of the market economy.

The market mechanism refers to an abstract framework of a dynamic system in which internal and external factors directly influence the decision of the economic agent, for example prices are a determining factor in the decisions made by agents, which in turn influence prices.

Table 10. Nonfinancial SMEs and Large Enterprises in 2017, Value Added and Employment

	Micro SMEs	Small SMEs	Medium-sized SMEs	All SMEs	Large enterprises	All enterprises
Number (million)%	22,8 93,1%	1,4 5,8%	0,2 0,9%	24,4 99,8%	0,05 0,2%	24,5 100,0%
Value added (€ billion)%	1526 20,8%	1292 17,6%	1343 18,3%	4161 56,8%	3168 43,2%	7328 100,0%
People employed (million) %	42,0 29,4%	28,6 20,0%	24,2 17,0%	94,8 66,4%	47,9 33,6%	142,7 100%

Source: Based on European Commission (2018a), p. 14, and Eurostat, National Statistical Offices, DIW Econ. [17]

The market as an automatic mechanism for regulating the functioning of the economy depends on the exchange instrument (price), as well as on signals received by economic agents. Competitiveness is the current characteristic of the market economy and which expresses a behavioral model of economic agents. Moreover, the economy as a model is currently moving towards the collaborative economic model.

The state represents, through its area, limits, and effects:

a) an autonomous decision center for achieving the objectives of general interest, as the market is insufficient in supplying the company with goods and services such as education, health care, and public services that do not take the form of goods;

b) an independent economic agent and partner of private capital in the form of actions (direct and indirect) as producer-consumer and seller-buyer;

c) a component of the functioning mechanism of the economy, because the state can intervene on the part of either the supply or the demand side to simultaneously complete and ensure the conduct of market operations. The state quantitatively and structurally influences demand and supply by developing economic branches.

4.4.2. State intervention at the level of the business environment

The state must ensure a normal competitive framework. This implies the existence of the following elements:

- ✓ The autonomy of the enterprises;
- ✓ Freedom to establish any type of enterprise;
- ✓ Promotion of the most profitable products based on the interests of each company;
- ✓ Equal economic-financial regulations for all economic agents, regardless of the form of ownership and size (neutral state);
- ✓ Free formation of prices;
- ✓ Stability through budgetary regulations on the external market;
- ✓ Measures to encourage participation in the external market;
- ✓ Clear regulations for the sanctioning, through the courts, of unprofitable enterprises.

State intervention in the development of the sector of SMEs can be summarized through pro and con arguments.

Table 11. The Effect of State Intervention

The Effect of Intervention	Arguments in Support	Arguments in Dissent
From the point of view of economic efficiency	It uses resources more efficiently and grows faster than large companies.	SMEs are not, by definition, more efficient or dynamic. The direct relationship between company size and

		efficiency could not be demonstrated. It has been proven that innovation is the focus of large companies.
From the point of view of job creation	It creates jobs at a faster rate than other types of businesses do and with a lower specific investment.	Destroys jobs in a proportion almost equal to the number of jobs created, and as such the net gain of jobs must be evaluated.
From the point of view of the concept of market economy	Banks do not express a special preference for SMEs, even under higher interest rates, and as such the state must intervene through subsidized loans for SMEs.	SMEs are considered to be at high risk, because 7 out of 10 fail in the US in the first five years after they are established. The failure of state intervention can have far more serious effects than the failure of market mechanisms.

Thus, the main forms of state intervention at the micro level are:

neutral—the intervention affects the whole business environment (for example equal incentives for all economic agents, regardless of the sector of activity, the form of ownership, and the size of the companies);

discretionary—the state intervenes with specific regulations, in certain fields of activity, at certain times;

the intervention of the state as a regulatory agent—the modification of the legal framework determines the modification of the mechanism; and

the intervention of the state as an economic agent—the state can be a producer, consumer, or partner in exchange operations; participate in auctions; and produce for society goods that cannot be realized by another economic agent. It must be specified that the state does not behave like any other agent, because it establishes the rules of the game and participates as a player within its own rules. State bodies are financed by taxes, not by voluntary exchange as in the case of private affairs. This is the reason why, regardless of how intense the competition at the level of economic agents, the state remains a very important actor in supporting the good functioning of the markets.

4.4.3. The quality of state interventionism

State interventionism in the market economy is measured by performance indicators and by quality indicators that reflect whether the state action is effective. We speak in this regard to the indicators of efficiency and effectiveness.

Performance measurement involves taking into account the distinction between the means used (input), the process (throughput), the product (output), and the result or the effect (outcome). From this perspective a connection can be established, on the one hand, between the benefits undertaken and the means used to obtain them and, on the other hand, between the objectives achieved through these benefits.

Means → Products → Effects
Resources Achievements Impacts

Efficiency means maximizing the results of activity concerning the resources used. The measurement is achieved by reporting the outputs (results) to inputs (efforts). Managers consider that the efforts made to meet social needs are measurable and usually quantified (cost of material and both human and informational resources), whereas the social effects are difficult to determine and cannot be fully predicted.

Effectiveness denotes the relationship between the result obtained and the objective to be achieved.

The quality of state intervention in the economy determines the level of performance for the business environment.

We propose in this context that in the economic mechanism, there should be a body that monitors the quality of the intervention that also requires a minimum, permanent channel of regulation and flow in the economic environment.

We consider that the performance of the economic agent is closely related to the involvement of the state in the market, through the policies and the economic environment in which it carries out its activity. Through state interventions we appreciate an increase in the results of SMEs, the activity being more efficient.

The indicators that express the quality of state interventionism depend on how the state is involved in the business environment.

The preferred indicator for measuring efficiency should be the net profit of the company concerning the costs, taking into account in its determination the constant prices and eliminating, as much as possible, the effect of the price variations.

The intervention of the state (fig. 1) at the level of the economic agent is realized mainly through fiscal levers: direct and indirect taxes and contributions.

Therefore, the influence of the state intervention on the performance of the economic agent, commensurate with the economic and financial indicators, can have the following form.

Intervention → Transmission channel →
Performance (Tax) c (indicators)

Where c = the state intervention rate as the indicator level decreases.

4.5. The Impact of State Interventionism on the Performance of the Economic Agent

The intervention of the state, at the level of the economic agent, is carried out by measures

regarding taxation, granting of guarantees, and facilities (sometimes also the suspension of some of these facilities), and through policies.

The performance of the economic agent will always be influenced by the intervention of the state, be it neutral or discretionary and regulating (corrective or compensating).

The affected organizations are mainly the small, young companies (especially those that are just established, such as start-ups) with lower-than-expected financial performance indicators and a high degree of indebtedness; companies operating in various fields of activity (such as companies that provide public services); and companies in fields (such as industry, construction, and services) that are vulnerable to the financial crisis.

State interventionism is reflected in the company's performance through a coefficient α, which shows the share with respect to the profitability as a result of this intervention and with respect to the state-enterprise relations.

α has positive values, $\alpha \in [0.1]$:

$\alpha = 0$, or neutral interventionism—the company is not affected;

$\alpha = k$ discretionary intervention—state measures manifest in the form of vulnerabilities, with negative implications for the firm;

$\alpha = 1$—the state strongly influences the firm, forming an interdependent relationship between the two entities.

The two parties perceive coefficient α differently because the coefficient itself is divided into a potential coefficient (α p-desired, expected) and an effective coefficient (α e-cert, realized), and each is interpreted differently by the firm and by the state.

Note:

α a—modification at the level of the economic agent;

α s—modification at the state level;

α a p—potential change at the level of the economic agent;

α s p—potential change at the state level;

α a e—the effective modification at the agent level; and

α s e—the actual change at the state level.

Additionally, α p at the level of the economic agent is intended to be as low as possible so that the interventionism will be weak, without significant effects, and with as few difficulties and satisfactory taxation as possible so that the performance stays at the expected values.

α p at the state level implies both an intervention through taxes and taxes through which the level of the revenues to the state budget will increase.

Usually, α is realized to the detriment of the agent because of the set of taxes imposed: α ea < α es. However the reverse situation can apply, in which α it > α es because the company avoids payment, because of the underground economy, or because tax evasion is encouraged.

The less the state intervenes, the higher the performance level and the desired results are.

Interventionism is achieved mainly through measures to increase taxation. If the state takes a positive measure (lowering the corporate income tax) simultaneously with a negative measure (increasing Value Added Tax (VAT)), interventionism can cause a lower impact on the firms and a greater impact on the population.

If interventionism is possible—that is, only if a measure is announced without certainty in the future—the implications for the firm will be much smaller than if the measures are certain. Therefore α will be closer to 0 for the potential measures.

However, regardless of the situation, α effectively > α potential and generates either stimulation or inhibition of the business.

The coefficient α is in the range [0; 1], and depending on its value the state-economic relationship is identified. Thus:

$\alpha \in [0; 0.1]$—relationship of state-firm independence and performance level is not affected;

$\alpha \in [0.1; 0.4]$—relative independence, the state intervenes but does not produce significant effects on the firm's finances;

$\alpha \in [0.5; 0.7]$—slight dependence, meaning that the intervention is felt but the impact is bearable; and

$\alpha \in [0.8; 1]$—total dependence, indicating that interventionism has strong effects on performance indicators (turnover, profitability rates, liquidity, and working capital decrease concurrently with the increase of credits).

Table 12. State Interventionist Type

State interventionist type	Modifying the performance from the perspective of the state α s	Change of performance from the perspective of the company's α a
Neutral	α = 0	α = 0
Discretionary	α s α ϵ [0.1; 1] α s > α a	α a α ϵ [0.1; 1] α a > α s

The quality of state interventionism is achieved by the difference:

$[\alpha \text{ p} - \alpha \text{ e}] >> 0 \rightarrow \alpha \text{ p} > \alpha \text{ e}$

The quality of interventionism is positive and beneficial for the company when α p > α e. Otherwise, it is not about quality but about the fact

that it negatively affects the company and the results that define its state of health. In conclusion, the performance level of the company is certainly influenced by the state intervention, the influence being realized by a coefficient $\alpha \in [0; 1]$, which reflects the weight of the state measures vis-à-vis the company in the economic-financial indicators (by increasing or decreasing performance) and, implicitly, the state-organization relationship.

So:

$\alpha = 0$—we have neutral interventionism, and the company is not affected;

α = k discretionary intervention—the state measures manifest in the form of vulnerabilities, with negative implications for the company;

α = 1—the state strongly influences the firm, forming an interdependent relationship between the two entities.

The quality of state interventionism is reflected by the difference $[\alpha p - \alpha e] >> 0 \rightarrow \alpha p > \alpha e$, where αp represents the potential change and αe denotes the effective change. We speak of quality, in this context, as if the state intervenes at the firm level through positive measures (reduction of taxes, granting of various facilities) that will stimulate its activity and as if the performance indicators maintain their values. Conversely when restrictions are imposed, measures are introduced, or certain taxes are raised, then the business is inhibited.

The company's resistance to the negative interventionism of the state depends on several factors that help to bear the tax burden more easily or, on the contrary, determine in the situation whether the company faces difficulties that generate, in the worst case, the cessation of activity:

- ✓ The financial status of the company (before interventionism);
- ✓ The field of activity;
- ✓ The technology used;
- ✓ The management and competencies of staff;
- ✓ The level of competition;
- ✓ The level of demand.

4.6 Credit transmission channel support for economic agent – SME: the case of euro area

Credit transmission channel is very important as external factor for economic agents. SMEs need a strong support in the periods of crisis, so the case of the COVID-19 pandemic is not an exception. COVID-19 pandemic has a very big negative effect on business sector, especially on SMEs. We think that this economic agent needs a lot of attention and support in such difficult time because SMEs take a very important role in the whole economy and creates a big part of GDP.

During the periods of crisis SMEs need funds in order to ensure the continuity of their activity. Commercial banks play an important role through credit transmission channel supporting business entities.

After analyzing Bank lending survey of euro area, we have identified that euro area commercial banks expected an increase in loan demand in SMEs segment while before was identified the decrease in loan demand because of lower amount of fixed investments and uncertainty because of COVID-19 pandemic. But despite the fact that commercial banks expected the increase of demand for loans in SMEs segments that tightened credit standards in most countries and planned to tightened credit standards even more in the nearest future. So, it means that SMEs will not get enough credit support from banking sector. In figure 1 we can see SMEs demand for loans during the period from 2015 Q2 to 2020 Q4 in backward looking approach and in different countries of euro area. A positive number means that demand for loans in SMEs segment increased.

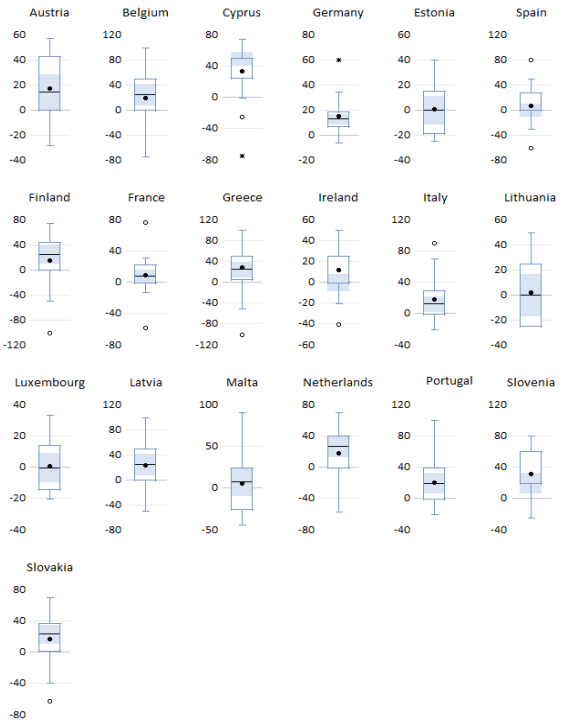

Fig. 1. SMEs demand for loans in a period from 2015Q2 to 2020Q4 (Backward looking three months, Net percentage (frequency of tightened minus that of eased or reverse) [19].

The data above (fig. 1) show that in average in all countries SMEs have quite a strong demand for banking loans so it means that commercial banks play a very important role in funding this segment and

adding value for economic support, especially in periods of crisis.

For better understanding of SMEs demand for loans we group all data into bins (table 11).

Table 13. Tabulation of SMEs demand for loans

Value	Count	Percent	Cumulative Count	Cumulative Percent
[-100, -50)	9	2.06	9	2.06
[-50, 0)	78	17.85	87	19.91
[0, 50)	274	62.70	361	82.61
[50, 100)	72	16.48	433	99.08
[100, 150)	4	0.92	437	100.00
Total	437	100.00	437	100.00

Table 13 shows that in 80,1 percent of all cases SMEs demand for loans increased.

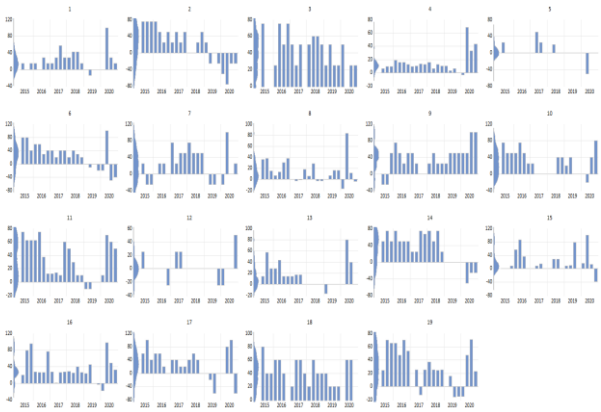

Fig. 2. SMEs demand for loans in a period from 2015Q2 to 2020Q4 with Kernel density function (Forward looking three months, Net percentage (frequency of tightened minus that of eased or reverse). [10].

To identify the main factors which have the strongest influence on the supply of credit from the banking system we used a dependent variable Supply (credit standards) Backward looking three months, Diffusion index and four independence variables: Impact of general economic activity (GEA), Impact of risk on the collateral demanded (RCD), Impact of bank`s risk tolerance (BRT) and Impact of ability to access market financing (AAMF).

From the table 15 we can see that all independent variables are statistically significant. And the most interesting point is that the strongest effect on SMEs credit supply is from bank`s risk tolerance. Less effect we got from general economic activity and risk on the collateral demanded.

Ability to access market financing affect credit supply in opposite way. That means if SMEs have more chances to attract funds from other sources then credit supply increases. So, the main conclusion of this research is that the main factor for credit supply is banks' risk tolerance and it is very hard to manage it.

We think thank even easing monetary policy is not able to control this process. We see different points in this situation: tightening in credit standards for SMEs has positive effect for financial stability but negative effect for SMEs investments and continuity as SMEs cannot get access to funds in difficult periods because at such periods commercial banks have low risk tolerance and use tightening policy for credit standards. So in such critical situations and periods of crisis the role of government is very important.

Table 14. Descriptive statistics of the variables

	GEA	AAMF	RCD	BRT	DBWDI	DBWNP	DFWDI	DFWNP
Mean	2.258032	-0.409588	1.429130	2.432334	8.348558	15.70140	12.71892	23.89941
Median	0.000000	0.000000	0.000000	0.000000	9.340000	16.67000	10.00000	20.00000
Maximum	100.0000	54.58000	75.00000	100.0000	80.00000	100.0000	89.26000	100.0000
Minimum	-54.26000	-50.00000	-40.00000	-40.00000	-63.00000	-100.0000	-63.00000	-75.00000
Std. Dev.	20.70559	8.106524	10.92538	12.74613	17.34454	31.02056	18.00706	30.87749
Skewness	1.342145	1.231039	1.542356	2.194401	0.227468	-0.150082	0.676750	0.221749
Kurtosis	7.248607	21.19144	12.94490	14.45971	5.064117	3.750956	5.441661	2.970731
Jarque-Bera	3678.968	49088.28	15792.67	21935.43	650.7725	95.27079	1135.278	28.77596
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000001
Sum	7894.080	-1431.920	4996.240	8503.440	29186.56	54892.08	44465.36	83552.32
Sum Sq. Dev.	1498381.	229676.5	417176.9	567811.3	1051412.	3363151.	1133269.	3332202.
Observations	3496	3496	3496	3496	3496	3496	3496	3496

Table 15. Pooled Least Squares results

Method: Pooled Least Squares Sample: 2015Q2 2020Q4 Included observations: 437 Cross-sections included: 12 Total pool (balanced) observations: 5244				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.129988	0.097116	-1.338476	0.1808
GEA	0.171098	0.005988	28.57438	0.0000
RCD	0.024371	0.011496	2.120037	0.0340
BRT	0.346063	0.010301	33.59356	0.0000
AAMF	-0.060511	0.012101	-5.000608	0.0000
Root MSE	6.885496	R-squared	0.522330	
Mean dependent var	1.157712	Adjusted R-squared	0.521965	
S.D. dependent var	9.963518	S.E. of regression	6.888781	
Akaike info criterion	6.698618	Sum squared resid	248618.3	
Schwarz criterion	6.704878	Log likelihood	-17558.78	
Hannan-Quinn criter.	6.700807	F-statistic	1432.206	
Durbin-Watson stat	1.583463	Prob(F-statistic)	0.000000	

Fig. 3 shows that in most cases in the euro area region banking credit standards for SMEs were tightened.

We see only some easing credit standard conditions in Finland, Greece, Italy, Latvia, Malta and Slovakia. For further research, having more data in the COVID-19 period, it would be interesting to research SMEs financial results in the mentioned countries which had better credit channel.

All in all, we reject our hypothesis, H – Commercial banks support economic agent – SME in the period of COVID-19 pandemic through the credit transmission channel, because our research revealed that in broad sense lots of commercial banks in euro area countries tightened credit supply and reduced opportunities for SMEs to get funds from the banking sector.

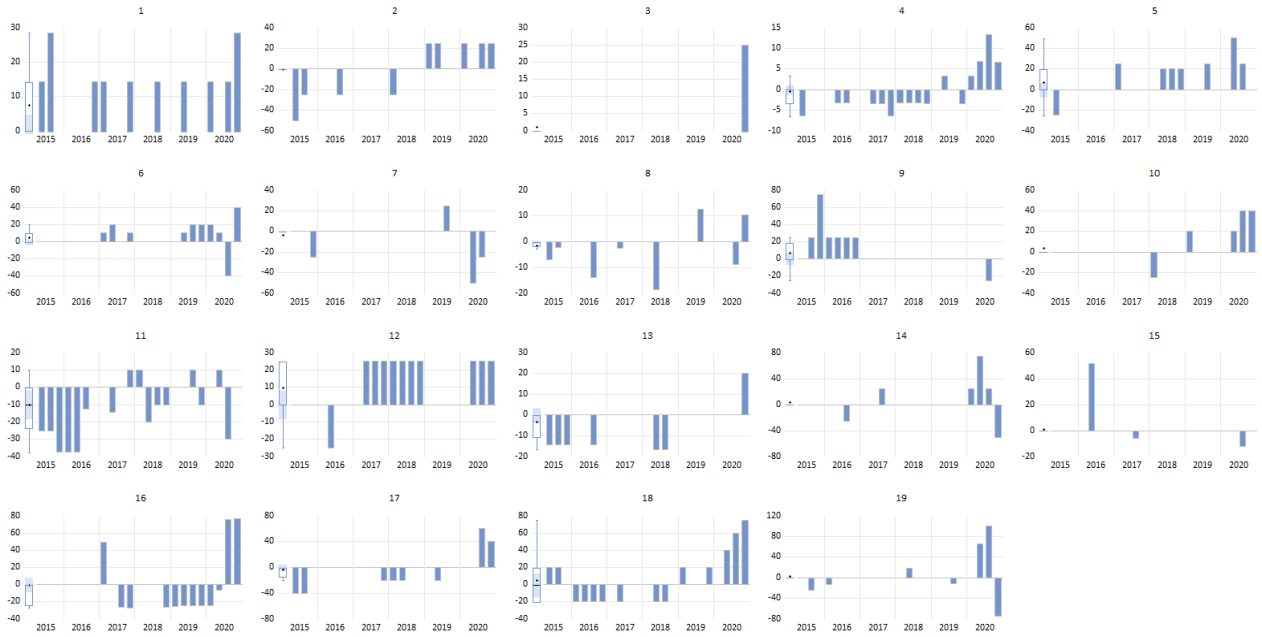

Fig. 3. SMEs supply for loans (credit standards) in a period from 2015Q2 to 2020Q4

Data source: https://sdw.ecb.europa.eu/browse.do?node=9691600

4. Conclusions

Our analysis demonstrates that a company's financial performance is vulnerable to changes in the economic environment. Moreover, financial imbalances or state intervention will affect the performance of the economic agent and implicitly of the employees involved in economic activity. Although in demonstrating our results the health risk elements COVID-19 were limitedly highlighted (due to the fact that this part constitutes our future research, respectively vulnerabilities of the economic agent during the health and post-crisis), we can say that the activity and the financial performance of the economic agent are exposed to multiple, intersecting vulnerabilities (financial insecurities)

The economic downturn for financial agents at a financial pace could worsen physical and social health conditions, making people even more vulnerable to the effects of COVID-19. We can say that even in economic activities where health risks are not as widespread, different dimensions of socio-economic vulnerabilities coexist.

During this period of the COVID crisis 19, the financial and fiscal measures taken by the authorities, determined the state interventions, and according to our results they are intended to be qualitative and positive by taking measures that stimulate the activity, respectively:

- Facilitating, for SMEs, access to European funds, i.e., the facilities offered to SMEs to ensure the necessary co-financing (including guarantees managed through SME guarantee funds); during this period, states intervened through framework measures to restore their economies.
- Subsidized interest loans, especially in conditions of risk/vulnerabilities that affect key sectors of state economies;
- Grants in various fields, for example, vulnerable areas during the COVID 19 pandemic (such as culture and tourism - the introduction of vouchers and grants in the form of grants to support vulnerable activities);
- Tax deductions for investments (in some states, interventionism was by giving tax facilities to the IT and construction fields).

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