

The Impact of Pandemic and Energy Crisis on the Financial Performance of Small and Medium-Sized Enterprises in European Countries

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Abstract: In an effort to mitigate the effects of the pandemic and the recent energy price shock, the world economies initiated recovery packages to support economic growth as part of their recovery plans. SMEs have the potential to be a vital part supporting the given process. Through their entrepreneurial innovativeness, SMEs are the carriers of innovations that can stimulate economic growth. For this reason, it is necessary that the efforts of national economies to support economic recovery take into account the potential and simultaneously the vulnerability of SMEs in times of crisis. By creating suitable conditions for the revitalization of financial resources, in order to improve the financial health of SMEs, national economies can achieve their use as a catalyst for economic recovery. An essential part of maximizing the obtained effect will be an understanding of the impact of both crises on the financial health and performance of SMEs, which can be insightful in the case of setting up business support as a part of national recovery plans or as the preparation of entrepreneurs to reduce the impact of the crisis to their businesses.

Keywords: small and medium-sized enterprises; SMEs; covid-19; energy crisis; financial health; performance

JEL Classification: M19; M20; M29

1. Introduction

The constant need to adapt the business model to better reflect the current situation was the mandatory rule of success for SMEs in the past as it is today. Technological progress has seen a great leap towards digitalization and digitization over the past decade. For most of the companies, today's communication with clients and business partners is easier, faster and more transparent. Business models are also highly affected by this phenomenon, focusing mainly on the goal to communicate, manufacture, store and distribute with cost minimization. There are SMEs that have their product fully produced at one business partner, have it stored at another and then use the third one for distribution, or use their own capabilities and resources. At the same time, they do not have to meet with their partners in person on a regular basis, but solve the vast majority of tasks and orders online through business platforms or other internet-based interactive technologies (Neghina et al., 2019). Such a high level of networking between companies was established long before the outbreak of covid-19. SMEs have already proven their high level of adaptability due to scientific and technological progress. With the ongoing

pandemic, this ability has been fully tested again. SMEs are forced to search for new survival strategies to overcome against the negative impacts of the pandemic on their financial health (Belas et al., 2022).

Covid-19 has been hitting the entire business activity for several years. The post-pandemic world would witness the large enterprises use any means necessary to reclaim their margins and profit. Such an effort can threaten SMEs in losing their profitability and market share. In order to reclaim their space in the market, SMEs will have to rediscover their entrepreneurial innovativeness. By finding new ways of business solutions with the aim of expanding beyond the already existing added value to goods and services, they can ensure sufficient demand for the financing needs of their business model (Zutshi et al., 2021).

Despite the fact that the negative effects caused by the covid-19 pandemic are undeniable, there are various aspects of business where SMEs have already been able to adapt to such an extent of effectiveness that they have stabilized their financial situation and even strengthened their position in the market (Huang et al., 2022). Therefore, this study is aimed to examine not only the negative aspects of the pandemic, but the positive outcomes as well.

The second negative, unforeseeable phenomenon affecting SMEs in Slovakia and abroad is the Russian-Ukrainian war, causing a problematic economic situation for the EU27 countries and the United Kingdom. The current situation has led to the interruption of gas supply from Russia, which has caused a large-scale increase in energy costs (Roeger & Welfens, 2022). In our research, we will look at the energy crisis in the same aspect as the covid-19 pandemic, with both positive and negative effects for SMEs. Based on the background, the aim of this study is to provide a deeper insight into the impact of the pandemic and the energy crisis on the financial health and performance of SMEs.

Since the beginning of the COVID-19 pandemic, there have been a number of different studies that have examined the impact of the adverse situation on different sectors of the economy. International institutions and scientific teams produce economic and statistical reports for the governments of individual states in order to ensure support for the development of adequate measures to mitigate the consequences of the crisis (Espitia et al., 2020; UNCTAD, 2020; WTO, 2020). Many countries despite achieving significant losses, decline of the national economy and deficits in the state budget, avoided possible bankruptcy thanks to appropriately adopted political measures (Alves et al., 2020; Virglerová et al., 2020; Wójcik & Loannou, 2020). After several waves of covid-19 and a significant number of measures taken, the effectiveness of which we will only be able to observe in the following years of the post-pandemic period, the world economies are facing a new crisis. The Russian-Ukrainian conflict, starting in October 2022, represents another event that will significantly change the economies of individual states at both the macroeconomic and microeconomic levels (Siddiqui, 2022).

One of the most significant consequences of the currently ongoing conflict in the context of economic impacts is the interruption of Russian gas supplies to the EU. The stoppage of supplies caused an enormous increase in gas prices starting around the summer of 2022 (Roeger & Welfens, 2022). In the countries of EU, the electricity market is dominated by the merit-order approach, affecting the price of electricity, based on the merit principle, in which

dispatchable power plants enter the market in the order of their marginal costs to cover the residual load, i.e. the difference of load and renewable generation (Trebbien et al., 2022). Using this approach caused an excessively high increase in electricity prices (Roeger & Welfens, 2022).

Due to their key influence on the national economy, SMEs are the area most affected by the consequences of both pandemic and energy crisis. Most national economies are fully aware of the vulnerability of SMEs and for this reason have included direct support for the sector in their national recovery plans. The budget of the recovery plans of most European countries is mainly financed by the funds of the NextGenerationEU initiative, which is focused mainly on green recovery, associated with the application of digitalization and digitization to the public and business sectors as a response to the pandemic crisis (OECD, 2022). Slovakia, as an EU member country, uses the NextGenerationEU funds to meet the set goals. The national recovery plan of Slovakia uses a certain part of the funds for direct and indirect support of SMEs. As an example, we can use one of the plan's components, including business support through directly allocated financial resources for SMEs. An example of indirect financial support is the targeted reduction of costs for entrepreneurs using the application of digitalization in the public sector (Plán obnovy, 2021). Within the countries of the European Union, we can notice similar trends in the content of recovery plans. However, the share of funds devoted to direct or indirect support of SMEs is worrying (OECD, 2022). Holienka et al. (2022) focused in their research on the positive effect of sufficient funds as one of the main factors increasing entrepreneurial self-confidence and willingness to take risks, which ultimately motivate new entrepreneurs in establishing their business.

To better understand the impact of both covid-19 pandemic and recently started Russian-Ukrainian war, which led to the energy crisis, we will investigate how these events contributed and will contribute to the development of the financial health of SMEs. This study includes views, perspectives and strategies from different countries. As part of the investigation of the impact of covid-19 on the stock market, (Ashraf, 2021) used Pearson's correlation in his research using equivalent variables defined as stock market returns and the development of countries' covid-19 confirmed cases. Research observed strong negative correlation between the variables. We consider the correlation evaluation using the number of confirmed positive cases as a potentially interesting variable that can also be used to assess the impact of covid in other areas of the economy. For this reason, our research addresses this research gap and uses the calculation of the correlation with the number of new confirmed cases in connection with the use of the Value added metric as a variable determining the assessment of the performance development of SMEs in the countries of the European Union.

2. Methodology

In the context of assessing and understanding the impact of covid-19 and the enormous increase in energy prices caused by the Russian-Ukrainian war, we conducted a large-scale investigation based on the research objective to determine how these events contributed to the development of the financial health of SMEs in different countries. In order to obtain the necessary data for the implementation of the research, we used both qualitative and quantitative methods based on the knowledge resulted from the broader context of the given

topic and also from the financial results of selected international companies. By using the both approaches to data acquisition, we were able to gain a broader view of the research topic and at the same time offer a basis for expanding research in the future. For the most reliable information, we compared the opinions of several foreign experts and obtained data sources at the international level.

In the empirical part of the research, we focused more closely on evaluating the impact of the covid-19 pandemic on the performance of SMEs by calculating the correlation through the Pearson coefficient. This method of determining intercorrelation is most commonly used for numerical variables and does not take into account the dependence of the variables, but treats them as equivalent (Muhaidat et al., 2022).

3. Results

In this research chapter, we will focus more on the application of theoretical knowledge to specific statistical and research data.

3.1. The Impact of Covid and Energy Price Shock to SMEs Performance

In the following chart, we can see the development of the added value of SMEs in the countries of the European Union (EU27) over the last 10 years, covering the time span before and after the covid-19 outbreak. In the monitored period, micro, small and medium-sized enterprises have approximately the same share in the distribution of added value for the entire SME sector

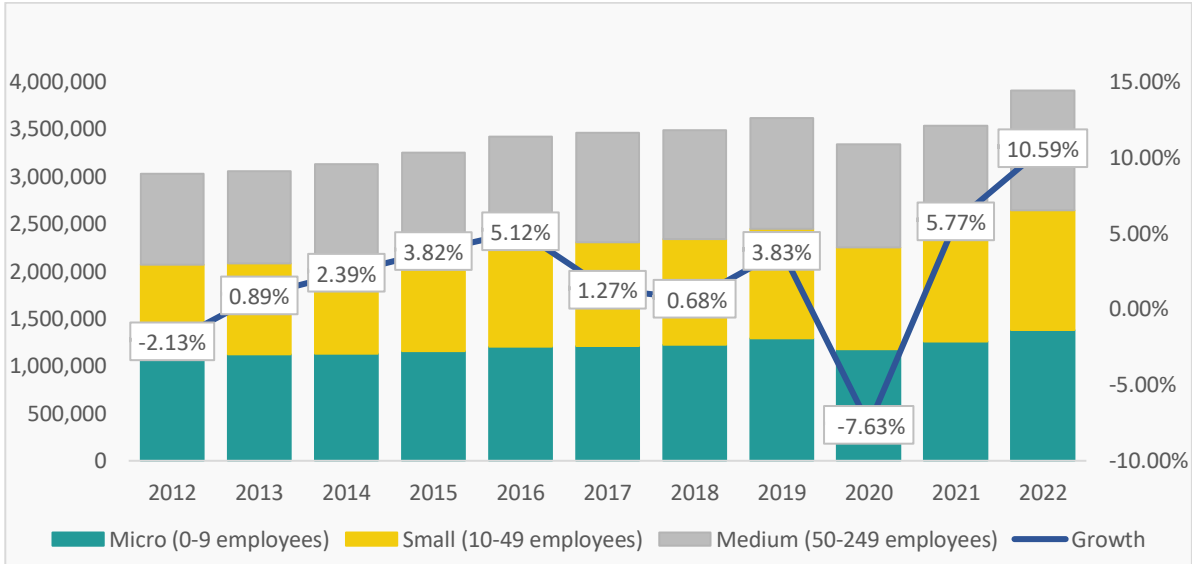


Figure 1. Value added by SMEs in EU27 countries from 2012 to 2022 [M€] (Statista, 2022)

As we can notice, continuous growth of value added in EU27 countries occurs in the pre-covid period in seven consecutive years. In 2020, after the outbreak of covid-19, SMEs in EU27 experienced a sharp decline. In the following year, the value added by SMEs again achieved growth, which was supported in 2022 by a noticeable 10.59%.

For a deeper assessment of the impact of the covid-19 pandemic on the SMEs performance in European countries, we decided to assess the occurrence of a correlation between the covid-19 pandemic and the development of the added value of SMEs. For the given calculation, the variable y represents the added value in selected 19 European countries for the period 2020-2022. The variables x are represented by the annual development of the number of new covid-19 cases in individual countries. The following table shows the values of added value achieved in successive years in the countries included in the study.

It should be noted that the study is not based on the full number of EU27 countries. Due to the unavailability of the dataset for some of the countries, our research includes an extensive grouping of selected EU countries, depicted in Table 1.

Table 1. Value added by SMEs in selected European Union countries from 2020 to 2022 [M€] (Statista, 2022)

Country	2020	2021	2022	Avg. YoY growth [%]
Austria	109,697	116,912	125,500	6.96
Belgium	135,306	156,082	164,040	10.20
Bulgaria	20,173	21,668	23,984	9.01
Croatia	15,176	17,148	18,400	10.10
Cyprus	7,210	7,947	8,599	9.20
Czechia	63,138	68,339	74,044	8.29
Estonia	10,963	12,395	13,211	9.79
Finland	62,716	65,177	67,141	3.47
Germany	875,951	923,983	1,007,518	7.26
Greece	27,893	33,612	36,716	14.87
Ireland	87,401	91,792	99,241	6.57
Latvia	9,268	10,391	11,325	10.54
Lithuania	16,538	18,388	20,154	10.35
Malta	4,610	5,216	6,255	16.50
Netherlands	252,219	272,011	284,369	6.19
Portugal	57,571	61,155	67,007	7.89
Romania	45,870	52,000	57,130	11.58
Slovakia	23,668	24,531	27,542	7.92
Slovenia	16,870	18,608	19,690	8.06

The development of Value added reached a constant increase for selected European countries during the observed period. Despite the crisis caused by the covid-19 pandemic and later the energy price shock, the SMEs managed to increase Value added in 2021. This trend continued in 2022. The average year-on-year increase for all selected countries in the monitored period amounts to 9.20%. Malta recorded the largest average YoY increase by a wide margin. The largest average year-on-year increase in monetary units was achieved by Germany, which increased the produced Value added by an average of 65,784 million euros. The Slovak Republic managed to achieve an average YoY increase just below the average of selected European countries with a value of 7.92%. The Czech Republic, which is a neighboring country of Slovakia and also a member of the V4, achieved a slightly better performance with 8.29%.

Table 2. Annual balance of new covid-19 cases in selected European Union countries from 2020 to 2022 (ECDC, 2022)

Country	2020	2021	2022	Avg. YoY growth [%]
Austria	357,410	914,787	4,129,965	253.70
Belgium	650,040	1,475,862	2,481,394	97.59
Bulgaria	202,266	544,842	528,373	83.17
Croatia	210,837	504,408	529,447	72.10
Cyprus	22,651	144,176	429,470	367.19
Czechia	733,479	1,752,631	1,666,887	67.02
Estonia	28,393	213,738	364,137	361.57
Finland	36,681	241,354	1,057,283	448.02
Germany	1,754,432	5,440,699	28,092,559	313.23
Greece	138,850	1,072,003	3,924,347	469.06
Ireland	91,779	696,780	881,818	342.87
Latvia	40,904	235,770	672,578	330.83
Lithuania	147,861	378,766	739,358	125.68
Malta	12,774	39,696	62,773	134.44
Netherlands	795,538	2,336,036	5,363,131	161.61
Portugal	400,606	1,013,820	4,100,056	228.74
Romania	632,431	1,176,628	1,437,521	54.11
Slovakia	184,508	1,090,159	1,260,887	253.25
Slovenia	124,034	341,757	762,426	149.31

The number of new cases of covid-19 reached a significant year-on-year increase in 2020-2022. As we can see in Table 2, in 2020 there were the fewest confirmed new cases of the entire monitored period. It remains interesting that the year 2020 is generally considered to be the period when the anti-epidemic measures among the states were the strictest and the public was the most concerned. The average year-on-year increase for all selected countries in the monitored period is 227.03%. Greece achieved the largest average annual increase with 448.02%. The largest average year-on-year increase expressed in the number of infected people was achieved by Germany with more than 13 million cases. Slovakia achieved a slightly higher YoY increase compared to the average value of selected European countries. Compared to the Czech Republic, Slovakia performed worse year-on-year. However, at the beginning of the pandemic, there were significantly fewer new cases. We can observe a rapid increase in the number of new cases of the covid-19 pandemic in Slovakia starting in year 2021.

It should be noted that the analysis is limited by the downloadable data provided from ecdc.europa.eu, which contains the number of new cases of covid-19 infection only up to October 2022. We decided to consider this data limitation for the year 2022 as a full period due to a significant year-on-year increase in the number of new cases and a low impact on the overall result of the calculation. The data used in table 1 and table 2 represent the input values for the correlation, aimed at assessing the interrelationship of the impact of the covid-19 pandemic on the performance of SMEs in the countries of the European Union. We use the Pearson Correlation Coefficient for our calculation. In the following picture we can see the details of the correlation calculation with the selected data.

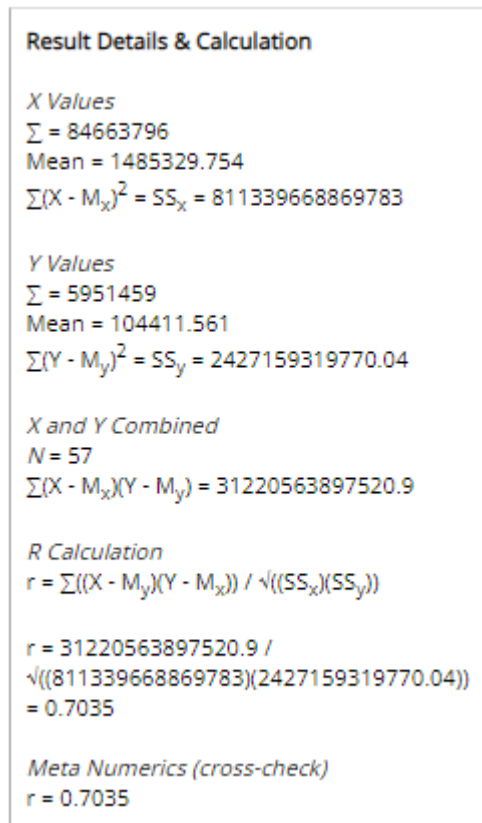


Figure 2. Calculation of Pearson correlation with selected x and y variables

The resulting R score reaches a value of 0.7035, which represents a moderate positive correlation. That means there is a tendency for x variables to achieve high scores with y variables. The value of R², the coefficient of determination, is 0.4949. To test the significance of our results, we proceeded to test the p-value with a significance level of 0.05. With the resulting R score of 0.7035 and sample size (n) of 57, the p-value reaches the value < 0.00001. Since the p-value < α , H₀ is rejected. To better summarize the results, Table 3 follows.

Table 3. Correlation results summary

R score	R ² score	P-value	Sample size
0.7035	0.4949	0.00001	57

Interesting aspects of the correlation of covid with SME performance is the development of the disease during the monitored years. The number of new confirmed cases has increased annually in most countries. One of the reasons is the different variants of covid-19 during the course of the disease. In October 2020, we reported the first cases of the delta variant, also referred to as B.1.617. The delta variant of covid-19 was significantly more infectious than previous versions. The assumption of being infected with the virus has subsequently increased, especially for people under the age of 50 (WHO, 2022). In February 2021, a new variant was discovered, named by WHO as "Omicron variant". This new version of covid includes increased transmissibility, infectiousness and immune escape. It has been observed that the reinfection risk from the Omicron variant of the SARS-CoV-2 virus is substantially higher than from the previously identified variants. Based on the mentioned facts, most of

the countries of the European Union recorded a record number of new cases of covid-19, as it follows from the data we used to calculate the correlation. Despite the high infectivity, the delta and omicron variants are described as less severe with a milder and shorter course (Khajotia, 2022).

We are aware of the fact that, despite the high number of new confirmed cases of covid-19, value added metric for selected 19 countries of the European Union recorded a significant year-on-year increase. Based on the input data for our research, we consider the year 2020, which was at the very beginning of the pandemic, as the period when the crisis affected the performance of SMEs the most. In 2021 and 2022, value added started to grow again despite the increasing number of confirmed positive cases. One of the reasons may be the relaxation of restrictions, the consequence of which in previous years was a significant limitation of business. At the same time, as a response to the pandemic, the states developed national recovery plans, some components of which in 2022 gradually began to fulfill their function of business support by providing financial resources for SMEs. The initiative of the European Union, NextGenerationEU, also played its role with the aim of supporting entrepreneurship and economic recovery through sustainability and digitalization. Last but not least, through their entrepreneurial innovativeness, SMEs explored new possibilities for carrying out their business activities. As an example, the significant expansion of working from home, known as home-office, increased the adaptability of SMEs in the context of the modification of the business model as an answer to the crisis.

3.2. The Impact of Covid and Energy Price Shock to SMEs Financial Health

The outbreak of the covid-19 pandemic has had a profound impact on the financial health of SMEs. As a result of the sudden drop in revenues, the liquidity of the affected companies gradually decreased. The research published under the responsibility of the Secretary-General of the OECD, indicated that in the absence of government intervention, 20% of firms during crisis are vulnerable to exhaust their liquidity after one month, 30% after two months and close to 40% after three months (OECD, 2020). Kalemli-Ozcan et al. (2020) estimated that SME failure rates due to the Covid-19 pandemic will increase by 60-130% depending on the countries selected. The study also examines the specific SME sectors most affected by the crisis. Among the most vulnerable sectors are Accom. & Food service, Arts, Ent., & Recreation and Mining. Kamaldeep (2021) investigated the expectations of SMEs to effectively manage the ongoing pandemic. From the examined sample, 29% of SMEs willingly try to enter new markets or develop new products and services, and more than 44% are looking for a new way of financing in order to revitalize their financial resources with the application of innovative financial management strategy.

The search for new innovative business opportunities and access to new markets have reduced the negative impact of the pandemic on many SMEs. Some businesses have been able to use the restrictions associated with trying to limit the spread of the infection to their advantage. Social distancing measures have led many SMEs to accelerate the transition to digital platforms as a new way to reach customers. SMEs that were able to effectively use the advantages offered by digital platforms could expand their market share thanks to this

competitive advantage. Di Maria et al. (2023) investigated how Italian fashion brands were able to use the impact of covid-19 to strengthen their relationship with customers. Using the advantages that e-commerce provides to entrepreneurs, they filled their websites with the promotion of new innovative protective masks. Thanks to the refined content, the company was able to present its customers with the offered quality and possibilities associated with the new product. They supplemented the sales support with the initiative of communication via Whatsapp, during which the seller in the store can present the offered products through an activated video call. Another example of positive adaptation is the food industry, on which covid-19 had a devastating impact. Social distancing has led to the expansion of online food deliveries, which in the conditions of the risk of infection brought a relatively safe possibility of using the restaurant offer without the need to visit the establishment. Due to the covid pandemic, many restaurants that did not use digital services until then have reached out to the possibilities of online ordering of their meals for customers (Li et al., 2022).

4. Discussion

While some SMEs have been able to adapt and survive, many others have had to close their doors or reduce their operations significantly. Determining the exact values of the number of SMEs that were forced to cease their activities due to the consequences of covid-19 is prevented by the fact that different countries of the world do not provide comprehensive statistics of the impact of the pandemic on their business sector in precise numbers that would be measurable and at the same time internationally comparable. The study Gourinchas et al. (2020) prepared the comparison of aggregate SME failure rate during the non-covid period and after the impact of the pandemic for selected countries of the European Union. From the original value of 9%, the SME failure rate would increase to approximately double the value of 18% in 2020 if the government did not take measures. However, in reality, many governments have provided quite significant support to the business sector. Measures representing less significant business support include, for example, deferral of taxes, rent and interest reduction. On the contrary, cash grants can significantly reduce the rate of failure of SMEs. According to estimates, a grant equivalent to 15 percent of a firm's annual wages in the current year would reduce business failure to 12.40% from a projected 18% without government intervention.

The impact on the financial health of SMEs can also be observed in the case of the second current crisis, caused by a sudden energy price shock. The increase in energy prices affects SMEs in several ways. In general, we can say that an increase in operational costs reduces the achieved profitability. Paying a higher bills for energy can severely disrupt liquidity of many businesses due to the necessity of paying costs earlier than received payment from the customers (Bongalonta & Bongalonta, 2022). Businesses that are able to deal with an increased operating cost, reduced liquidity and negatively impacted Cash flow, can gain a significant competitive advantage. SMEs unable to effectively adapt to enormously increased energy prices can also lose the ability to effectively invest in business opportunities (Hussain et al., 2022). This fact results primarily from the need to spend financial resources to compensate for increased electricity prices or to mitigate the effect of price shock with an

investment in energy-efficient technology with potential savings in the long term. One of the effective ways to cope with the increased operating costs caused by the energy crisis is to save funds through minimizing power losses and voltage deviation in the distribution network (Mubarak et al., 2022).

Despite the mentioned negative aspects of the energy crisis, we can find several positive effects in the given event that can help SMEs in their business and improve the overall level of financial health and performance. The need to adapt to excessively increased energy prices will force some SMEs to diversify energy sources so that they are not forced to rely on only one specific energy source. The second possibility is an investment in new energy equipment with renewable energy. A good example of fulfilling the diversification of energy sources while supporting the sustainability, is the installation of photovoltaics. In fact, as one of the main advantages of the energy crisis, we can consider the need for SMEs to look for different ways of reducing electricity consumption and saving financial resources.. By improving the processes associated with the transformation cycle, companies can identify the sources of energy waste and make corrections. Such an action will require a large investment of time and possibly a certain amount of resources to achieve any significant savings for SMEs from which they could benefit in the long term.

Conflict of interest: none.

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