Jan Musil, MSc

Doctoral Student
Brno University of Technology, Czech Republic
Faculty of Business and Management
E-mail: Jan.Musil2@vut.cz
Orcid: https://orcid.org/0000-0002-7249-7701

Alena Kocmanova, PhD

Professor
Brno University of Technology, Czech Republic
Faculty of Business and Management
E-mail: kocmanova@vut.cz
Orcid: https://orcid.org/0000-0002-9518-1179

STICKY COSTS IN RELATION TO GEOGRAPHICAL, SECTORAL AND PANDEMIC FACTORS IN SMES IN CENTRAL EUROPEAN COUNTRIES

UDC / UDK: 657.471:334.012.63/64]:616-036.21(4-191.2)
JEL classification / JEL klasifikacija: L11, D22, D24
DOI: 10.17818/EMIP/2025/4
Preliminary communication / Prethodno priopćenje
Received / Primljeno: May 28, 2024 / 28. svibnja 2024.
Accepted / Prihvaćeno: October 1, 2024 / 1. listopada 2024.

Abstract

This study investigates the phenomenon of cost stickiness among SMEs in the Czech Republic, Poland, and Slovakia, analyzing the period 2018-2022, pre- and post-COVID-19 pandemic. It aims to assess the influence of geographical location, industry sector, and business size on cost stickiness. Data sourced from the Orbis Europe database is subjected to univariate statistical analysis to explore these relationships. Findings indicate significant effects of business size and industry sector on cost stickiness across the observed years. While enterprise size consistently impacts cost stickiness, industry sectors showed variation, with certain sectors demonstrating stable stickiness pre-pandemic and deviation during the pandemic. Post-pandemic, there was an overall increase in cost stickiness, with the pandemic factor proving statistically significant. Geographic location also exhibited a consistent impact on cost stickiness. These insights contribute to understanding cost behavior in SMEs across diverse contexts and offer practical implications for cost management strategies, potentially informing policy adjustments at governmental levels. This research enhances knowledge regarding cost dynamics in SMEs, particularly relevant amidst economic disruptions such as the COVID-19 pandemic.

Keywords: sticky costs, cost-stickiness, factor, SMEs, Central European countries

1. INTRODUCTION

The beginning of the 21st century in the corporate sphere (including SMEs) is characterized by themes of competitiveness, efficiency, stability, and growth, which have come to the forefront (Talíř & Straková, 2023; Milanovic Glavan, 2022). These themes have recently been influenced by an exogenous shock - the covid-19 pandemic, which has affected business operations (Kuckertz et al., 2020). In connection with this exogenous shock and cost management, several studies describe the impact of the pandemic in individual regions - for example, Nguyen et al. (2021) - Vietnam, or studies focusing on employee layoffs in Indian SMEs, which mention the difficulties faced by entrepreneurs (information asymmetry, financial crisis, loan burdens) (Pathak et al. 2022). In the context of these studies, cost reduction is mentioned, which must be perceived from a strategic perspective - that is, it involves long-term planned actions, although on the other hand, in the real economic environment, companies often approach cost reduction reactively, only when they encounter difficulties (Bragg, 2010). To properly set up the cost-cutting process, it is necessary to understand the current and largely individual development of costs in each company (Anderson et al., 2003). According to traditional cost behaviour, costs are considered either variable or fixed (about production activity volume). However, the behaviour of some items does not adhere to this traditional pattern, and these costs then react asymmetrically to changes in activity volume - in this case, they are referred to as sticky costs, or costs with a sticky effect (Cannon, 2014).

The article deals with cost stickiness in small and medium-sized enterprises in Central European countries (specifically in Poland, the Czech Republic, and Slovakia). Cost stickiness in manufacturing industry enterprises is examined in terms of the impact of selected factors - geographic factor, enterprise size factor, impact of the Covid-19 pandemic factor, and manufacturing industry sector factor in the period 2018-2022 using one-dimensional statistical methods based on data obtained from the Orbis Europe database.

Before the statistical analysis is conducted, a literature review on sticky costs is performed. Subsequently, this part is followed by a section devoted to the methodology used in this research. The methodological framework includes hypotheses based on the defined research questions, which are the subject of subsequent statistical analysis. Statistical analysis through one-dimensional methods consisting of testing using non-parametric tests and then comparing the medians of stickiness coefficients is used to draw conclusions, which are discussed at the end of the article, including the identification of limitations and references to areas of possible future research.

2. LITERATURE REVIEW

The concept of asymmetric cost behaviour, or cost stickiness, has been known to the academic community for over 30 years. Ibrahim et al. (2022)

recapitulates in their review the gradual development of knowledge in this area of Business Economics. Non-linear cost behaviour is further described by Malcom (1991), who examines the issue of costs and non-linear behaviour through overhead costs. This thesis on cost behaviour is expanded by Banker & Byzalov (2014), who argue that the real world is not linear, and neither are cost functions. These findings lead to a new perspective on cost functions and models, which are contradictory to traditional, linear cost models.

In the context of , the study by Anderson et al. (2003) is often cited, as they developed a model to measure the reaction of costs to changes in performance to evaluate cost asymmetry. Anderson et al. (2003) found that sales, general, and administrative (SG&A) costs in a sample from the USA increased by 0.55 pp for every 1 pp increase in demand but decreased by only 0.35 pp for every 1 pp decrease in demand. Several other models by different authors corroborate these results (Ibrahim et al., 2022). For example, Weidenmier and Subramaniam (2003) identified similar sticky cost behavior. Chen et al. (2012) also confirmed the presence of asymmetrical behavior in selling, general, and administrative (SG&A) costs. The behaviour of these costs is then referred to as "cost stickiness."

Authors in the current literature designate several reasons for the sticky nature of costs. Anderson et al. (2003) attribute revenue declines as temporary, and this temporality leads to management's reluctance to eliminate certain cost items. This reluctance is also associated with managers' perception that maintaining current cost consumption is cheaper than adjusting them, leading to sticky cost behaviour. Guenther et al. (2014) provide further reasons for cost stickiness, categorizing them into legal, social and personnel policy, corporate and operational policy, and psychological reasons. All these reasons or causes of cost stickiness influence the cost reduction process (Musil, 2024). According to the adjusted cost reduction framework, originally authored by Himme (2012), one of the elements motivating a successful cost reduction process is cost culture. Other elements include turbulent behaviour in economies.

Numerous studies examining the issue of sticky costs have been published. Their focus is divided into three categories: (i) Empirical evidence of the existence of sticky costs, (ii) Determinants of sticky costs, and (iii) Subsequent consequences related to sticky costs (Ibrahim et al., 2022).

Determinants of cost stickiness in the context of strategy are examined, for example, by Ballas et al. (2020), who investigate the role of corporate strategy on the intensity and direction of cost asymmetry in the case of sales, general, and administrative costs. Some studies examine situations in specific regions – for example, Via & Perego (2014) regarding the situation in Italy and using the approach by Anderson et al. (2003) and Weiss (2010) provide interesting evidence on the stickiness of operating and wage costs and the anti-stickiness of SG&A and COGS. Cohen et al. (2017) present evidence of anti-sticky cost behaviour in municipalities, showing that administrative and public relations costs in Greek local governments exhibit anti-sticky behaviour, while service costs show sticky

cost behaviour. Dierynck et al. (2012) mention firm size as one of the factors influencing cost stickiness. Their study on employee costs shows that in large profitable firms, differences in severance costs have no impact on managers' decisions, but in small profitable firms, managers focus on employees who can be laid off most cheaply. CEOs with narcissistic traits mitigate the negative impact of revenue declines on the cost-revenue relationship – these CEOs excessively reduce slack resources when revenues decrease, which has a positive effect on cost stickiness (Jeon, 2024). Other determinants are addressed by studies such as Balakrishnan et al. (2014), which include the influence of fixed costs on stickiness and also provide evidence that logarithmic specification and the influence of fixed costs lead to biased results. Sales, general, and administrative costs increase by 0.6608 pp if revenue increases by 1 pp. Sales, general, and administrative costs decrease by 0.1476 pp if revenue decreases by 1 pp. The Covid-19 pandemic can also be considered a shock (Slišković et al., 2021) - turbulence, to which companies had to react (Zhang et al., 2022). Stock market volatility is sensitive to pandemic news, with both positive and negative news being significant, but negative news has a greater impact (Baek et al., 2020). A way to control cost stickiness in the corporate environment is to increase the quality of internal control and motivate employees through remuneration. These steps provide support for cost stickiness control (Sun & Gong, 2023). The influence of cultural factors, which statistically significantly affects the level of cost stickiness, is found in Confucian culture - it reduces cost stickiness (Pan et al., 2024).

In recent years, new studies have provided significant insights into cost stickiness, which refers to the asymmetrical behavior of costs in response to changes in revenues—costs increase more rapidly when sales grow but decrease more slowly when sales decline. Lefebvre (2024) analyzes the impact of cost stickiness on the relationship between sales growth and profitability. Cost stickiness can also be seen as a strategic disadvantage for companies, negatively affecting profitability by contributing to organizational rigidity and resulting in missed opportunities (Lefebvre, 2024).

Further research has focused on the role of internal control mechanisms in managing cost stickiness. Zhang et al. (2023) demonstrate that firms with better internal governance are more capable of managing cost stickiness effectively, leading to more stable cost management and a reduction in agency problems (Zhang et al., 2023).

Significant progress has also been made in the study of labor costs. Kong, Liu, and Shen (2023) examined the stickiness of labor costs and found that companies that strategically adjust the quality of their workforce during economic downturns achieve better performance in subsequent periods. Their study highlights the importance of human capital management in the context of labor cost stickiness (Kong et al., 2023).

These new findings expand the understanding of cost stickiness and suggest that effective management not only mitigates its negative impacts but can also enhance the long-term profitability of firms.

Based on these studies, the following hypotheses are proposed:

H1: "There is a statistically significant relationship between cost stickiness coefficients and enterprise size factor." Based on Cheng et al. (2016), the authors assume that enterprise size affects stickiness. Cheng et al. (2016) demonstrated in their study that large enterprises exhibit sticky behaviour in SG&A costs, while SMEs exhibit anti-sticky behaviour.

H2: "There is a statistically significant relationship between cost stickiness coefficients and geographic factor." Authors consider the geographic factor as a determinant of the cost reduction framework element "cost culture" according to Himme (2012).

H3: "There is a statistically significant difference in cost stickiness among individual Industry Groups within the manufacturing industry sector." Authors assume, based on Subramaniam & Watson (2016), that cost stickiness behaviour varies across different industry sectors.

H4: "There is a statistically significant difference in the cost stickiness of individual companies during the covid-19 pandemic years." In this case, the authors assume that the exogenous shock of the Covid-19 pandemic also influenced cost stickiness coefficients in selected companies. This assumption is supported by Habib & Huang (2019) and Han et al. (2019), who included the factor of financial crisis (an exogenous shock) in their cost stickiness research.

3. RESEARCH METHODOLOGY

3.1. The data sample

In the first phase, data were collected from the Orbis Europe database. When determining the research sample, the following filters were used: (i) geographical filter - the countries Poland, Czech Republic, and Slovak Republic were selected, (ii) categorization of activities according to NACE-Rev2 - only the manufacturing industry with all subcategories was selected, (iii) available economic data for the years 2018-2022, including Turnover in individual years, EBIT in individual years.

The data sample is composed as follows for the years 2018-2022:

- Company ID
- Company Name
- Country of operation
- Size of the company
- Industry group according to the NACE Rev2 methodology.
- Turnover (revenue)
- EBIT

3.2. Calculation of indicators for determining cost stickiness

For the investigation of cost stickiness, the costliness at individual companies is first quantified using the "Total operating costs" indicator, calculated according to (Eq. 1), where the variables "Turnover" and "EBIT" from the data sample are utilized.

$$\mathrm{TOC_n} = \mathrm{TURNOVER_n} - \mathrm{EBIT_n} \quad (1)$$

where

- TOCn is the Total operating costs of the nth year.
- EBITn is the EBIT of the nth year.
- TURNOVERn is the Turnover of the nth year.

When researching cost stickiness, interannual changes in company revenues and costs are monitored and further utilized through the variables Growth rate of TOC and Growth rate of Turnover.

(i) Calculation of the growth rate of costs according to (Eq. 2)

$$\mathrm{Growth\_rate\_of\_TOC}_{(n,n-1)} = \frac{\mathrm{TOC_n} - \mathrm{TOC_{n-1}}}{\mathrm{TOC_{n-1}}} \quad (2)$$

where

- $\mathrm{Growth\_rate\_of\_TOC}_{(n,n-1)}$ is the growth rate of total operating costs in year n compared to year n-1.
- TOC_{n-1} is the total operating costs of the (n-1)th year.
- TOC_n is the total operating costs of the nth year.

(ii) Calculation of the growth rate of turnover according to (Eq. 3)

$$\mathrm{Growth\_rate\_of\_TURNOVER}_{(n,n-1)} = \frac{\mathrm{Turnover_n} - \mathrm{Turnover_{n-1}}}{\mathrm{Turnover_{n-1}}} \quad (3)$$

where

- $\mathrm{Growth\_rate\_of\_Turnover}_{(n,n-1)}$ is the growth rate of turnover in year n compared to year n-1.
- $\mathrm{Turnover}_{n-1}$ is the turnover of the (n-1)th year.
- $\mathrm{Turnover}_n$ is the turnover of the nth year.

Subsequently, a dummy variable is introduced, which takes a value of "0" in cases where the "Growth_rate_of_Turnover (n,n-1)" assumes a positive value, corresponding to the scenario where the turnover of the enterprise increases year-on-year, or a value of "1" assigned in instances where the turnover declines year-on-year. This variable enables filtering to discern cases of declining and growing turnovers. Such segmentation is essential for concluding methodological procedures, such as those outlined by Anderson et al. (2003).

The quantification of cost stickiness in a given period for a specific enterprise is facilitated through the variable Sticky_coefn, where "n" denotes the year, and the computation is conducted according to (Eq. 4):

$$Sticky\_coef_n = \frac{Growth\_rate\_of\_TOC_{n,n-1}}{Growth\_rate\_of\_Turnover_{n,n-1}} \quad (4)$$

where

- Sticky_coef$_n$ is the Cost Stickiness Coefficient for year n.
- Growth_rate_of_Turnover(n,n-1) is the Growth Rate of Turnover in year n compared to year n-1.
- Growth_rate_of_TOC(n,n-1) is the Growth Rate of Total Operating Costs in year n compared to year n-1.

The variable "Sticky_coef$_n$" s utilized in the research to conclude cost stickiness for specific observations within a given period (yearly). This variable expresses, in percentage points (hereinafter "pp"), how many percentage points costs increase or decrease relative to a 1 pp increase or decrease in turnover. The factors influencing the variable "Sticky_coef$_n$" along with their impact and statistical significance, are the subject of this research.

3.3. Cost Stickiness Factors

In the preceding methodological step, the dataset is augmented with the computation of variables that, in the final step, serve to quantify cost stickiness for individual observations. Included in the dataset are variables representing factors whose influence on the resulting cost stickiness is examined.

- **Industry Group Factor**

The variable "Industry Group according to NACE Rev2 methodology" is classified based on higher-level categories of the manufacturing industry to achieve a smaller number of groups while ensuring a higher number of observations within each group, as shown in table 1, compared to a more detailed breakdown.

Table 1 Super group of industry

Group	1	2	3	4	5	6
Title	Food Industry	Textile and Clothing Industry	Manufacture of Leather and Footwear	Manufacture of Wood and Cork Products, Excluding Furniture; Manufacture of Straw and Plaiting	Materials Printing and Reproduction of Recorded Media	Manufacture of Chemicals and Chemical Products
N	1873	925	101	1946	638	1626
%	11,50%	5,70%	0,60%	12,00%	3,90%	10,00%

Group	7	8	9	10	11	Total
Title	Manufacture of Other Non-metallic Mineral Products and Metals	Manufacture of Machinery and Equipment	Manufacture of Vehicles and Transport Equipment	Manufacture of Furniture	Manufacture of Health Products	Total
N	5160	2503	351	559	553	16235
%	31,80%	15,40%	2,20%	3,40%	3,40%	99,90%

Source: Own data processing, based on Orbis Europe database, [2024]

The uneven representation of distinct groups within the manufacturing sector dataset is corroborated by table 1. Predominating this categorization are the productions of metallic and non-metallic goods, alongside the manufacturing of machinery and equipment. These are succeeded by the wood processing industry and the food sector, which emerge as substantial components within the dataset.

- **Factor of Enterprise Size**

Research data from the Orbis database were categorized into small and medium-sized enterprises (hereinafter "SME") and large enterprises (hereinafter "LE"). The representation of each group is depicted in table 2. For categorization into two groups, coding was introduced, wherein this variable was transformed into a dummy variable taking the value "0" for SMEs and "1" for LEs.

Table 2 Company category

COMPANY CATEGORY	SMEs	LEs
N	16235	4592
%	78,00%	22,00%

Source: Own data processing, based on Orbis Europe database, [2024]

The results indicate that the representation of small and medium-sized enterprises in the dataset is 78%, while large enterprises comprise only 22%. In terms of the impact of enterprise size on cost stickiness, the research employs the categorization into SMEs and LEs. Further investigation focuses solely on SMEs due to their greater representation in the dataset.

- **Geographic Factor**

Research data of enterprises were classified in a matrix according to geographical factors. For the variable "Country," coding was introduced with a numeric variable taking the values "0" for Czechia (hereinafter "CZ"), "1" for Slovakia (hereinafter "SK"), and "2" for Poland (hereinafter "PL"), as shown in table 3.

Table 3 Country code

COUNTRY_CODE	CZ	SK	PL
N	3528	6136	6571
%	22%	38%	40,50%

Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024]

From the perspective of the geographic factor, according to table 3, the dataset is composed primarily of Polish enterprises, representing more than 40% of the sample, followed by Slovak enterprises with a 38% share and Czech enterprises with a 22% share.

3.4. Impact of Industry, Size, Geography, and the Covid-19 Pandemic Factors

The research on the impact of various factors on cost stickiness was conducted using univariate statistical methods, specifically the non-parametric Kruskal-Wallis test, denoted as the "K-W test," to assess the sensitivity of a specific factor (the factor Group variable). Statistically significant differences within the sample (among different groups of the factor variable) were compared using median values for scenarios where enterprise turnovers increase or decrease. Based on these results, conclusions regarding cost stickiness or cost anti-stickiness were established. These results were further supported by pairwise comparisons, where the concept of "effect" was utilized, indicating whether the criterion being tested in the aforementioned K-W test exhibited positive or negative values, enabling inference about the positive or negative impact on the tested variable (in this case, cost stickiness).

4. RESEARCH RESULTS

The research findings are organized into subsections named after factors and their relation to cost stickiness.

4.1. Factor of enterprise´s size and its Impact on Cost Stickiness

Hypothesis H1 addresses the impact of the factor representing the size of the enterprise:

H1: *"There is a statistically significant relationship between cost stickiness coefficients and enterprise size factor."*

The statistical significance of the enterprise size factor, represented by the variable "COMPANY_CATEGORY_CODE," is assessed using a non-parametric median test, specifically the Kruskal-Wallis test (hereinafter referred to as "K-W

test"), as shown in table 4. The null hypothesis (H0) posits that the population medians are equal, while the alternative hypothesis (H1) states that the population medians are not equal, or that the population median differs from the population median of one of the other groups. In the case of the Median test, the null hypothesis is that the groups are drawn from populations with the same median. The alternative hypothesis can be either that the two medians are different (two-tailed test) or that one median is greater than the other (one-tailed test).

Table 4 Testing the impact of the enterprise size factor using the K-W test and Median test

Sticky_coef Year		2018	2019	2020	2021	2022
Sig. (a)	K-W test	0,008	0,001	0,017	0	0
	Median test	0,17	0,001	0,001	0,001	0,001
a. The significance level is,050.						

Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024]

The test result (Table 4) indicates the rejection of H0 at a significance level of 0.05. Since the outcome of these tests suggests a statistically significant difference between the groups representing "SME" and "LE," providing only information on significance, it is supplemented by a comparison of medians between the groups (Table 5).

Table 5 Medians by Enterprise Size Groups

Turnover	Size of Company	Sticky coef									
		2018		2019		2020		2021		2022	
		Median	N	Median	N	Median	N	Median	N	Median	N
Increase	SME	1,0168	10450	1,0146	9352	0,1288	5969	0,9476	11234	0,9706	10681
	LE	1,0001	3340	0,9968	3151	0,1963	1498	0,9839	3972	1,0014	3977
Decrease	SME	0,9957	5785	0,9929	6883	-0,3303	10263	0,8864	4998	0,8836	5554
	LE	1,0013	1252	0,9839	1441	-0,3937	3094	0,8438	620	0,7052	615

Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024]

The results of the median comparisons indicate that in 2018, the enterprise size factor significantly influenced the entire dataset. Specifically, when company revenues increase annually, costs for SMEs rise faster than for large enterprises (hereafter referred to as "LE") by 0.01 pp. Similarly, when annual revenues decline, costs for SMEs decrease slower than for LE, as evidenced by the median value corresponding to non-sticky cost behaviour. In 2019, the interpretational results remain consistent, with SMEs exhibiting very similar values. However, in 2020,

with the full impact of the COVID-19 pandemic on business operations, the development of cost stickiness coefficients underwent significant changes. In the case of a 1 pp increase in revenue, SME costs increase by approximately 0.13 pp, while for LE, it's 0.19 pp, indicating a tendency towards anti-stickiness. However, in the event of a 1 pp decrease in revenue, the cost stickiness coefficient corresponds to negative values, signifying that despite the revenue decline, costs increase by 0.33 pp for SMEs and 0.39 pp for LE. Only this part of the results deals with LE-type enterprises; subsequent analyses focus solely on SMEs, by the research focus.

This partial conclusion can be contrasted with the findings of a study focusing on Chinese private firms, which observed that from 1999 to 2007, costs were non-sticky for small firms and sticky for large firms, exhibiting an overall non-sticky behaviour (Cheng et al., 2016).

4.2. Geographic Factor and its Impact on Cost Stickiness

The geographic factor is represented by the three aforementioned countries – the Czech Republic, Poland, and Slovakia.

The impact of the geographic factor has been the subject of several studies, each focusing on a specific region, sometimes comparing it with other regions. In this case, Hypothesis H2 is related to the geographic factor:

H2: *"There is a statistically significant relationship between cost stickiness coefficients and geographic factor."*

In the case of the geographic factor, the statistical analysis examines the influence of the geographic factor – represented by the country in which the enterprise is located – on the cost stickiness of SMEs. Initially, the hypothesis about the equality of medians is tested using the K-W test (Table 6), where H0 asserts that the medians of the cost stickiness coefficients are the same across the three country groups. In contrast, H1 suggests that there are statistically significant differences between the medians of the cost stickiness coefficients.

Table 6 Testing the impact of the geographic factor using the K-W test

Sticky_coef Year		2018	2019	2020	2021	2022
Sig. (a)	K-W test	0	0	0	0	0,019
a. The significance level is ,050.						

Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024]

The outcome of the test in table 6 suggests the rejection of H0 at a significance level of 0.05. Since the result of these tests, indicating a statistically significant difference among groups representing individual states, only provides information regarding significance, it is supplemented initially by pairwise comparisons (Table 7) and subsequently by comparing medians between groups (Table 8).

Table 7 Pairwise comparison of observation groups - segmented by geographical factor

Country Sample1–Sample2	Pairwise Comparisons				
	2018	2019	2020	2021	2022
	Adj. Sig.[(a)]	Adj. Sig.[(a)]	Adj. Sig.[(a)]	Adj. Sig.[(a)]	Adj. Sig.[(a)]
PL-CZ	1,000	0,444	1,000	0,000	0,240
PL-SK	0,000	0,000	0,001	0,004	0,020
CZ-SK	0,000	0,027	0,001	0,052	0,672
The significance level is ,050. , a. Significance values have been adjusted by the Bonferroni correction					

Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024]

Pairwise comparison allows for a closer description of differences in the dataset. The differences between "PL" and "CZ" are statistically insignificant in all observed years except for 2021, thus the statistical significance in terms of differences in stickiness coefficients concerns "PL" and "SK", as well as "CZ" and "SK". Regarding the latter pair, there are two exceptions, which occur in the years following the COVID-19 pandemic (2021 and 2022). A more detailed exploration of differences between groups, or their quantification, is facilitated by the table of medians (Table 8).

Table 8 Medians by geographical factor groups

Turnover	Country	Sticky coef									
		2018		2019		2020		2021		2022	
		Median	N	Median	N	Median	N	Median	N	Median	N
Increase	CZ	1,0108	2196	1,0174	2022	0,1408	1201	0,9671	2588	0,964	2527
	SK	1,04	4236	1,0252	3370	0,0974	2527	0,9653	3870	0,9779	3948
	PL	0,9989	4018	1,0028	3960	0,1426	2241	0,9224	4776	0,9693	4206
	Total	1,0168	10450	1,0146	9352	0,1288	5969	0,9476	11234	0,9706	10681
Decrease	CZ	0,9901	1332	0,9896	1506	-0,3746	2327	0,901	940	0,9204	1001
	SK	0,9898	1900	0,9985	2766	-0,2463	3606	0,9201	2263	0,9206	2188
	PL	1	2553	0,9868	2611	-0,3727	4330	0,8349	1795	0,8234	2365
	Total	0,9957	5785	0,9929	6883	-0,3303	10263	0,8864	4998	0,8836	5554

Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024]

The results of the median comparison presented in table 8 indicate that in the years prior to the outbreak of the COVID-19 pandemic, very similar median values are recorded, with costs increasing by 0.01-0.04 percentage points (pp) faster than revenues when revenues increase by 1 pp in most cases. However, when revenues decrease by 1 pp, costs decrease by a maximum of 0.02 pp. A significant difference in this behaviour occurred in the year 2020, when the COVID-19

pandemic erupted, affecting all three countries. Here, the results can be interpreted such that during revenue growth, which was observed unlike in previous years in significantly fewer companies (in 2018 – 10450 companies, 2019 – 9352 companies, 2020 – 5969 companies), costs increase much more slowly. In the case of a revenue increase of 1 pp, costs increase by a maximum of 0.14 pp for CZ and PL. On the other hand, in the case of revenue decline, negative values are generated, indicating that despite a 1 pp decrease in revenue, costs increase by an average of 0.33 pp. Among these three countries, "SK" performs the best, with costs rising the least in median values despite revenue declines.

In the years following the COVID-19 pandemic, namely 2021 and 2022, a return to the original trend occurs, but the pandemic leaves a significant mark in this area as well – in the case of a revenue increase of 1 pp, costs increase more slowly by 0.05 pp, indicating better results than before the COVID-19 pandemic. However, in the case of a 1 pp decrease in revenues, costs decrease more slowly – in total, by 0.88 pp. In comparison with other authors, as in the previous section of the results, the study by Cheng et al. (2016) is mentioned again, which focused on companies in China, which were divided by size but also by region, with results showing that regions with lower levels of financial development (with limited access to external capital) exhibited a higher level of cost stickiness. The study by Bugeja et al. (2015) compares cost stickiness in companies in the USA and Australia. The degree of cost stickiness is higher in the USA than in Australia. The degree of cost stickiness varies across industries. Another study confirms that national culture influences resource management decisions, leading to differences in cost stickiness across countries (Kitching et al., 2016).

Between 2018 and 2022, the economies of the Czech Republic, Slovakia, and Poland followed somewhat different, yet broadly similar trends, reflecting their shared history of economic transformation. By 2022, the Czech Republic had the highest GDP per capita among the three, followed by Slovakia and Poland. This pattern is consistent with Kornai's (2006) analysis of post-communist countries, which highlighted common successes and challenges in their economic growth after 1989. The 2020 pandemic caused GDP per capita to decline across all three countries, with the Czech Republic maintaining its lead, though Poland experienced a more significant drop. In 2021, the economies began to recover, and by 2022, all three countries showed further growth. Poland, while still behind the Czech Republic, demonstrated stronger growth momentum in the later stages (World Bank, 2022).

4.3. The factor of the manufacturing industry sector and its impact on cost stickness

This research also focuses on the impact of the manufacturing industry sector, which is categorized using the "Industry super group" variable into 11 groups listed in Table 1, including the number of companies, on the resulting cost stickiness. The following hypothesis H3 is tested on the data sample containing only SMEs.

H3: "There is a statistically significant difference in cost stickiness among the individual Industry Groups within the manufacturing industry sector."

Within the research sample, companies engaged in the main activity in the manufacturing industry and its groups were examined. The purpose of this analysis is to verify whether there are statistically significant differences between the various groups within the manufacturing industry sector according to the NACE Rev 2 methodology. K-W test is used for initial testing, as in the previous chapters.

Table 9 Testing the impact of the manufacturing industry sector factor using the K-W test

Sticky_coef Year		2018	2019	2020	2021	2022
Sig. (a)	K-W test	0	0	0	0,104	0
a. The significance level is ,050.						

Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024]

The test result suggests the rejection of H0 at the significance level of 0.05. This indicates a statistically significant difference among the groups representing individual sectors of the manufacturing industry in the years 2018-2020 and 2022. The test results for the 2021 data suggest the acceptance of H0, indicating no statistically significant difference among the groups for that year. This outcome may be attributed to the impact of the COVID-19 pandemic, as 2021 was still influenced by its effects on businesses, although the initial shock specific to the year 2020 had already subsided. Since this test provides only significant information, it is supplemented by a comparison of medians between groups (comparison not conducted for 2021 data due to the acceptance of H0).

Table 10 Pairwise comparison of observation groups - segmented by industry factor - 2018 (Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024])

Industry Group Sample1-Sample2			8-5	3-5	8-1	6-5	7-5	3-1	3-11
Pairwise Comparisons	Year 2018	Effect	+	-	+	+	+	+	-
		Adj. Sig.[(a)]	0	0,001	0,002	0,003	0,009	0,034	0,052

Table 11 Pairwise comparison of observation groups - segmented by industry factor – 2019

Industry Group Sample1– Sample2			8-1	8-5
Pairwise Comparisons	Year 2019	Effect	+	+
		Adj. Sig.[(a)]	0,012	0,024

Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024]

The results of pairwise comparison during the period before the COVID-19 pandemic (Table 10, Table 11) suggest the specific positioning of several industry groups - namely the food industry (represented by digit 1), printing and reproduction of recorded media (5), manufacture of leather goods (3), and manufacture of machinery and equipment (8). Based on the number of statistically significant pairs, it can be inferred that the subgroup factor of the manufacturing industry in 2018 is a significant factor. In 2019, there is a much smaller number of significant pairs, again represented by the food industry (1), printing and reproduction of recorded media (5), and manufacture of machinery and equipment (8).

Table 12 Pairwise comparison of observation groups - segmented by industry factor – 2020

Industry Group Sample1– Sample2			7-1	3-1	5-1	3-4	8-1
Pairwise Comparisons	Year 2020	Effect	+	+	+	-	-
		Adj. Sig.[(a)]	0,006	0,016	0,024	0,054	0,056

Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024]

The results of pairwise comparison in the year 2020 (Table 12) suggest that statistically significant differences are observed particularly in the food industry, which can be attributed to the phenomenon corresponding to the pandemic. In 2021, no statistically significant pairs were identified.

Table 13 Pairwise comparison of observation groups - segmented by industry factor – 2022

Industry Group Sample1– Sample2			10-1	7-1	2-6	8-1	2-7	4-1	11-1	5-1	2-8	9-1	2-4
Pairwise Comparisons	Year 2022	Effect	+	+	-	+	-	+	+	+	-	+	-
		Adj. Sig.[(a)]	0	0	0	0	0	0	0	0,002	0,004	0,010	0,013

Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024]

In the year 2022 (Table 13), a return to the situation before the COVID-19 pandemic is observed, namely, that the research sample exhibits numerous statistically significant pairs – once again, the food industry can be mentioned (maintaining its statistical significance throughout the entire time series). Another type of visualization of statistically significant pairs of subgroups in the manufacturing industry is provided by Pairwise Comparisons graphs - Appendix I. Detailed differences between the medians of groups are quantified in table 14.

Table 14 Medians by industry sector groups

Turnover	Industry Super Group	Sticky coef									
		2018		2019		2020		2021		2022	
		Median	N	Median	N	Median	N	Median	N	Median	N
Increase	1	1,0207	1108	1,0252	1241	0,2617	682	0,9631	1185	1,0000	1363
	2	1,0362	554	1,0389	538	0,0377	384	0,9140	543	0,9356	547
	3	1,0345	41	1,0492	49	0,0331	32	0,9437	71	0,9811	68
	4	1,0222	1271	1,0156	1052	0,1681	790	0,9545	1421	0,9641	1271
	5	1,0563	394	1,0583	345	0,0302	196	0,8961	425	0,9430	433
	6	1,0129	1031	1,0132	962	0,0796	685	0,9616	1171	0,9883	1065
	7	1,0159	3486	1,0086	2906	0,1284	1716	0,9464	3727	0,9603	3435
	8	1,0009	1650	0,9999	1413	0,0810	916	0,9491	1656	0,9656	1619
	9	1,0198	218	1,0000	201	0,2542	114	0,9595	235	0,9614	224
	10	1,0208	341	0,9981	308	0,1943	243	0,9351	405	0,9727	339
	11	1,0375	356	1,0201	337	0,1343	211	0,9265	395	0,9362	317
	Total	1,0168	10450	1,0146	9352	0,1288	5969	0,9476	11234	0,9706	10681
Decrease	1	1,0068	765	0,9989	632	-0,3056	1190	0,8815	687	0,9305	510
	2	0,9860	371	0,9833	387	-0,2894	540	0,8276	381	0,8181	378
	3	0,8864	60	0,9787	52	-0,6275	69	1,0049	30	0,9497	33
	4	0,9933	675	1,0067	894	-0,2865	1156	0,8883	525	0,9080	675
	5	1,0186	244	0,9967	293	-0,3661	442	0,9208	213	0,8106	205
	6	0,9941	595	0,9927	664	-0,3560	941	0,8131	455	0,8604	561
	7	0,9978	1674	0,9898	2254	-0,3367	3444	0,9162	1433	0,9161	1725
	8	0,9794	853	0,9825	1090	-0,3364	1586	0,8805	846	0,8731	884
	9	0,9733	133	0,9652	150	-0,3201	237	0,8816	116	0,8278	127
	10	0,9927	218	0,9943	251	-0,3188	316	0,8607	154	0,7867	220
	11	0,9965	197	0,9967	216	-0,3958	342	0,7543	158	0,8241	236
	Total	0,9957	5785	0,9929	6883	-0,3303	10263	0,8864	4998	0,8836	5554

Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024]

The research findings in the area of industry sector factors confirm the results from the first subchapter focusing solely on SME and LE enterprises. The displayed results in the table indicate that the difference in cost stickiness among industry sectors is affirmed. The threshold is once again represented by the year 2020, during which negative values of cost stickiness coefficients were identified, corresponding to the fact that costs increased by 0.33 percentage points when revenue decreased by 1 percentage point. This average value is mitigated by industries such as food or textile, while significantly augmented by sectors such as leather or chemical.

Subramaniam & Watson (2016) examined cost stickiness in US firms using data from 1979-2000 and concluded that cost stickiness behaviour varies across different industries, with the manufacturing sector exhibiting the stickiest behaviour.

4.4. The factor of the COVID-19 pandemic and its impact on cost stickiness.

In the case of the factor representing the impact of the COVID-19 pandemic on the observed businesses and their cost stickiness, it is a factor that is not categorized according to a specific variable. However, its influence can be observed from the previous subchapters of the results. For the COVID-19 pandemic, the following hypothesis was formulated as :

H4: "There is a statistically significant difference in the cost stickiness of individual firms during the COVID-19 pandemic years."

When assessing the impact of the pandemic, the results can be inferred from the individual subchapters concerning hypothesis testing – indicating that the difference between the pandemic years (especially 2020) and others is statistically significant, as well as from the medians of the cost stickiness coefficients.

Table 15 Summary for Evaluating the Impact of the Pandemic Factor

Turnover	2018		2019		2020		2021		2022	
	Sticky coef	N	Sticky coef	N	Sticky coef	N	Sticky coef	N	Sticky coef	N
Increase	1,0168	10450	1,0146	9352	0,1288	5969	0,9476	11234	0,9706	10681
Decrease	0,9957	5785	0,9929	6883	-0,3303	10263	0,8864	4998	0,8836	5554

Source: Own data processing, based on Orbis Europe database and IBM SPSS software, [2024]

The COVID-19 pandemic had an impact on the operations of businesses – specifically on cost stickiness coefficients (Table 15). Businesses exercised caution during revenue growth post-pandemic, with costs increasing at a slower pace than revenues. However, in the case of the opposite trend, i.e., revenue decline, costs decreased at a slower rate than revenues, by approximately 0.12 percentage points for a 1 percentage point decrease in revenues. The pandemic year 2020 demonstrated a very low rate of cost growth during a 1 percentage point increase in revenues, yet the trend during a 1 percentage point decrease in revenues indicated a rise in costs by 0.33 percentage points.

Researchers have incorporated the factor of financial crises into their studies on cost stickiness. For example, Habib and Huang (2019) examined cost stickiness in a sample of charitable firms from New Zealand from 2007 to 2014 and confirmed that the degree of cost stickiness is higher during crisis periods than

in non-crisis periods. The conclusion of Ardiyono's study (2022) suggests that the impact of the pandemic on firm performance is heterogeneous across industries, countries, and time, depending on the speed of the virus spread and the extent of government restrictions.

5. CONCLUSIONS

This study presents and examines cost stickiness in small and medium-sized enterprises (SMEs) in Central European countries (specifically in Poland, the Czech Republic, and Slovakia) from the perspective of several factors during the period from 2018 to 2022. The literature review section mentions the characteristics of sticky costs, including their determinants. The factors influencing the resulting cost stickiness that are examined include (i) geographic factor, (ii) firm size factor, (iii) industry factor (group of manufacturing industries according to the NACE Rev.2 methodology), and (iv) pandemic factor – considering the course and impacts of the COVID-19 pandemic.

The results indicate that the firm size factor is statistically significant in all observed years. In the years preceding the pandemic, costs in SMEs are identified as sticky. During a 1 percentage point increase in revenues, costs increase by 1.01 percentage points, and conversely, during a 1 percentage point decrease in revenues, costs decrease by only 0.99 percentage points. With the onset of the pandemic, costs continue to rise despite a decrease in revenues, as evidenced by the results indicating an increase of 0.33 percentage points (for a 1 percentage point decrease in revenues). The behaviour of costs in the years following the COVID-19 pandemic also exhibits stickiness characteristics, with values significantly different from those before the pandemic – costs increase at a slower pace by 0.05 to 0.03 percentage points during revenue growth by 1 percentage point, while the pace of cost reduction slows to 0.88 percentage points during a 1 percentage point decrease in revenues.

Regarding the geographic factor, which is statistically significant throughout the observed period, significant differences in cost stickiness are found, particularly between "PL" and "SK", and also between "CZ-SK" – in this case, only until 2020. The best results before the COVID-19 pandemic were achieved by the Czech Republic and Poland, where the difference between the change in costs during revenue growth and decline is maximally 0.01 percentage points. In the period after the pandemic, costs exhibit the stickiest behaviour in Polish enterprises – the rate of cost increase is slower; however, when revenues decrease by 1 percentage point, costs decrease by a rate of 0.82 percentage points. However, the geographic factor can be viewed from a much broader perspective. Macroeconomic data presented in the results indicate that, despite facing common macroeconomic challenges, the three countries achieved different outcomes. These outcomes were influenced not only by the size and structure of their economies but also by cultural and regional differences. Research on regional cultural variations in Europe shows that such differences can have a significant impact on the business environment and innovation behavior (Kaasa et al., 2013). This supports the idea that regions

with higher levels of industrialization and urbanization exhibit different patterns of economic growth compared to rural areas. In addition to cultural differences, tax policy also plays an important role. The Czech Republic maintained a Corporate Income Tax (CIT) rate of 19%, while Slovakia had a higher rate of 21%. Poland introduced a reduced CIT rate of 9% for small businesses, enhancing its competitiveness (OECD, 2021; Tax Foundation, 2022). Poland also had the highest VAT rate at 23%, which was balanced by reforms aimed at improving conditions for small and medium-sized enterprises. Slovakia and the Czech Republic faced higher mandatory contributions to social and health insurance, increasing costs for businesses (World Bank, 2020).The findings suggest that, despite the research sample being composed entirely of countries from a single macroregion, certain differences can be identified (whether in macroeconomic, cultural, or regional areas). Therefore, the data on the significance of differences in cost stickiness are relevant when viewed from this broader perspective.

In the context of the industry factor, it was found that during the pandemic period, significant pairs were identified in pairwise comparisons with the food industry. Significant differences in cost stickiness were found among individual representatives of the manufacturing industry. The pandemic factor manifests itself in cost stickiness, especially in 2020, when the coefficient values also assume negative values, indicating that costs did not decrease despite a decrease in revenues. In the period following 2020, there is a reduction in the pace of cost increase during revenue growth, but companies do not reach the pre-pandemic value of the cost stickiness coefficient.

The research has several limitations, including: (i) the design of the research sample and data collection, (ii) the methodological approach to examining cost stickiness, and (iii) interpretative techniques. The data sample was based on the Orbis Europe database and consists of quantitative data. The chosen methodological approach is suitable for the application of univariate statistical methods. A limitation of this research is that the methods used provide only static interpretation.

The next step in this research is to determine the quantitative influence of the examined factors using coefficients and to formulate the basic framework of the model. This research confirmed that the factors influencing cost stickiness are statistically significant in most cases, making them suitable for the subsequent formulation of the basic model framework.

The research will also focus on individual quantitative and qualitative variables that will represent additional factors within the model framework from both a macroeconomic and microeconomic perspective. These variables will include tax policy, interest rates, inflation, and other macroeconomic factors, as well as variables representing internal company factors (e.g., social and corporate governance factors, factors influencing internal processes, employee-related variables, customer base, number of employees, and the region in which the company is located). This is supported by the research of Guenther et al. (2014), Himme (2012), Ballas et al. (2020), Sun & Gong (2023), Pan et al. (2024), Lefebvre

(2024), Kong, Liu, & Shen (2023), and Zhang et al. (2023). Additionally, environmental factors may also be considered.

These factors will enable the analysis to be expanded with a broader context that influences cost stickiness, thereby offering a more comprehensive view of the factors affecting cost behavior, not only from a quantitative and qualitative perspective but also in relation to macroeconomic aspects.

This approach will help ensure that the resulting basic model framework better reflects the real conditions of the corporate environment and incorporates important dimensions that impact cost stickiness, which cannot be captured solely through quantitative data.

Author Contributions: Conceptualization, J.M. and A.K.; Methodology, J.M.; Software, J.M.; Validation, J.M. and A.K.; Formal Analysis, J.M.; Investigation, J.M.; Resources, J.M.; Data Curation, J.M.; Writing – Original Draft Preparation, J.M.; Writing – Review & Editing, A.K.; Visualization, J.M.; Supervision, A.K.; Project Administration, J.M.; Funding Acquisition, J.M. and A.K.

Funding: The research presented in the manuscript did not receive any external funding. This research was funded by the Brno University of Technology, Faculty of Business and Management.

Conflict of interest: None.

Acknowledgments: This paper was supported by the Brno University of Technology, Faculty of Business and Management [Grant title "Research on the determinants of the cost reduction process in small and medium-sized enterprises", grant number FP-J-24-8539].

REFERENCES

Anderson, M. C., Banker, R. D., & Janakiraman, S. N. (2003). Are Selling, General, and Administrative Costs "Sticky"?. *Journal of Accounting Research*, 41(1), 47-63. https://doi.org/10.1111/1475-679X.00095

Ardiyono, S. K. (2022). COVID-19 pandemic, firms' responses, and unemployment in the ASEAN-5. *Economic Analysis and Policy*, 76, 337-372. https://doi.org/10.1016/j.eap.2022.08.021

Baek, S., Mohanty, S. K., & Glambosky, M. (2020). COVID-19 and stock market volatility: An industry-level analysis. *Finance Research Letters*, 37, 101748. https://doi.org/10.1016/j.frl.2020.101748

Balakrishnan, R., Labro, E., & Soderstrom, N. (2014). Cost Structure and Sticky Costs. *Journal of Management Accounting Research*, 26(2), 91-116. https://doi.org/10.2308/jmar-50831

Ballas, A., Naoum, V.-C., & Vlismas, O. (2022). The Effect of Strategy on the Asymmetric Cost Behavior of SG&A Expenses. *European Accounting Review*, 31(2), 409-447. https://doi.org/10.1080/09638180.2020.1813601

Bragg, S. M. (2010). *Cost reduction analysis: Tools and strategies*. Hoboken: John Wiley & Sons. https://doi.org/10.1002/9781118268346

Cannon, J. N. (2014). Determinants of "Sticky Costs": An Analysis of Cost Behavior using United States Air Transportation Industry Data. *The Accounting Review*, 89(5), 1645-1672. https://doi.org/10.2308/accr-50806

Chen, C. X., Lu, H., & Sougiannis, T. (2012). The Agency Problem, Corporate Governance, and the Asymmetrical Behavior of Selling, General, and Administrative Costs*. *Contemporary Accounting Research*, 29(1), 252-282. https://doi.org/10.1111/j.1911-3846.2011.01094.x

Cheng, S., Jiang, W., & Zeng, Y. (2016). Does access to capital affect cost stickiness? Evidence from China*. *Asia-Pacific Journal of Accounting & Economics*, 25(1-2), 177-198. https://doi.org/10.1080/16081625.2016.1253483

Cohen, S., Karatzimas, S., & Naoum, V.-C. (2017). The sticky cost phenomenon at the local government level: Empirical evidence from Greece. *Journal of Applied Accounting Research*, 18(4), 445-463. https://doi.org/10.1108/JAAR-03-2015-0019

Dierynck, B., Landsman, W. R., & Renders, A. (2012). Do Managerial Incentives Drive Cost Behavior? Evidence about the Role of the Zero Earnings Benchmark for Labor Cost Behavior in Private Belgian Firms. *The Accounting Review*, 87(4), 1219-1246. https://doi.org/10.2308/accr-50153

Guenther, T. W., Riehl, A., & Rößler, R. (2014). Cost stickiness: State-of the-art of research and implications. *Journal of Management Control*, 24(4), 301-318. https://doi.org/10.1007/s00187-013-0176-0

Habib, A., & Huang, H. J. (2019). Cost Stickiness in the New Zealand Charity Sector. *The International Journal of Accounting*, 54(3), 1950012. https://doi.org/10.1142/S1094406019500124

Han, S., Rezaee, Z., & Tuo, L. (2020). Is cost stickiness associated with management earnings forecasts? *Asian Review of Accounting*, 28(2), 173-211. https://doi.org/10.1108/ARA-04-2018-0096

Himme, A. (2012). Critical success factors of strategic cost reduction: Results from an empirical survey of German cost reduction projects. *Journal of Management Control*, 23(3), 183-210. https://doi.org/10.1007/s00187-012-0157-8

Ibrahim, A. E. A., Ali, H., & Aboelkheir, H. (2022). Cost stickiness: A systematic literature review of 27 years of research and a future research agenda. *Journal of International Accounting, Auditing and Taxation,* 46, 100439. https://doi.org/10.1016/j.intaccaudtax.2021.100439

Jeon, H.-J. (2024). CEO narcissism and asymmetric cost behavior. *The North American Journal of Economics and Finance*, 70, 102076. https://doi.org/10.1016/j.najef.2023.102076

Kaasa, A., Vadi, M., & Varblane, U. (2013). European Social Survey as a source of new cultural dimensions estimates for regions. *International Journal of Cross Cultural Management*, 13(2), 137-157. https://doi.org/10.1177/1470595813485379

Kong, D., Liu, S., & Shen, R. (2023). Labor cost stickiness and managerial decisions on human capital adjustment. *Journal of Accounting Literature*. https://doi.org/10.1108/JAL-06-2023-0090

Kornai, J. (2006). The great transformation of Central Eastern Europe. *Economics of Transition*, 14(2), 207-244. https://doi.org/10.1111/j.1468-0351.2006.00252.x

Kuckertz, A., Brändle, L., Gaudig, A., Hinderer, S., Morales Reyes, C. A., Prochotta, A., Steinbrink, K. M., & Berger, E. S. C. (2020). Startups in times of crisis – A rapid response to the COVID-19 pandemic. *Journal of Business Venturing Insights*, 13, e00169. https://doi.org/10.1016/j.jbvi.2020.e00169

Lefebvre, V. (2024). Looking at the relationship between growth and profitability: the role of cost stickiness as a strategic liability. *Journal of Accounting & Organizational Change.* https://doi.org/10.1108/JAOC-06-2023-0107

Milanović Glavan, Lj. (2023). Process Maturity Of Croatian Companies. *Ekonomska misao i praksa*, 32(1), 261-272. https://doi.org/10.17818/EMIP/2023/1.13

Musil, J. (2024). Přístupy ke snižování nákladů a jejich vývoj vzhledem k pandemii covid-19. *Acta Sting*, 2024/1, 18-46.

Nguyen, H. H., Ngo, V. M., & Tran, A. N. T. (2021). Financial performances, entrepreneurial factors and coping strategy to survive in the COVID-19 pandemic: Case of Vietnam. *Research in International Business and Finance*, 56, 101380. https://doi.org/10.1016/j.ribaf.2021.101380

OECD. (2021). *Tax policy reforms in the European Union 2021*. OECD. Retrieved from: https://www.oecd.org/tax/tax-policy-reforms-2021-eu.htm

Pan, A., Wang, H., & Xu, L. (2024). Confucian culture and cost stickiness. *Accounting & Finance*, acfi.13247. https://doi.org/10.1111/acfi.13247

Pathak, M. D., Kar, B., & Panda, M. C. (2022). Chaos and complexity: Entrepreneurial planning during pandemic. *Journal of Global Entrepreneurship Research*, 12(1), 1-11. https://doi.org/10.1007/s40497-022-00306-4

Slišković, T., Solenički, M., & Beg, M. (2021). 2020 – godina šokova: Procjena učinaka na cijene stanova u Hrvatskoj. *Ekonomska misao i praksa*, 30(2), 393-416. https://doi.org/10.17818/EMIP/2021/2.4

Subramaniam, C., & Watson, M. W. (2016). Additional Evidence on the Sticky Behavior of Costs. In *Advances in Management Accounting* (Vol. 26, 275-305). Emerald Group Publishing Limited. https://doi.org/10.1108/S1474-787120150000026006

Sun, Y., & Gong, H. (2023). Firm financialization and cost stickness behavior. *Finance Research Letters*, 57, 104236. https://doi.org/10.1016/j.frl.2023.104236

Talíř, M., & Straková, J. (2023). Innovation of the production process of engineering companies in relation to business portfolio. *Entrepreneurship and Sustainability Issues*, 10(4), 118-134. https://doi.org/10.9770/jesi.2023.10.4(8)

Tax Foundation. (2022). *Corporate Tax Rates in Europe*. https://taxfoundation.org/corporate-tax-rates-europe-2022/

Weidenmier, M. L., & Subramaniam, C. (2003). Additional evidence on the sticky behavior of costs. *The Accounting Review*, 78(4), 1023-1045. https://doi.org/10.2139/ssrn.369941

Weiss, D. (2010). Cost Behavior and Analysts' Earnings Forecasts. *The Accounting Review*, 85(4), 1441-1471. https://doi.org/10.2308/accr.2010.85.4.1441

World Bank (2022). GDP per capita (current US$) – Czech Republic, Poland, Slovakia. World Bank. Retrieved from: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD

World Bank (2020). *Doing business 2020: Comparing business regulation in 190 economies.* World Bank, Washington, DC. https://hdl.handle.net/10986/32436 (License: CC BY 3.0 IGO)

Zhang, X., Ding, Z., Hang, J., & He, Q. (2022). How do stock price indices absorb the COVID-19 pandemic shocks?. *The North American Journal of Economics and Finance*, 60, 101672. https://doi.org/10.1016/j.najef.2022.101672

Zhang, B., Yang, L., & Zhou, R. (2023). Internal Governance and Cost Stickiness. *Journal of Management Accounting Research*. https://doi.org/10.2308/JMAR-2020-043

APPENDIX

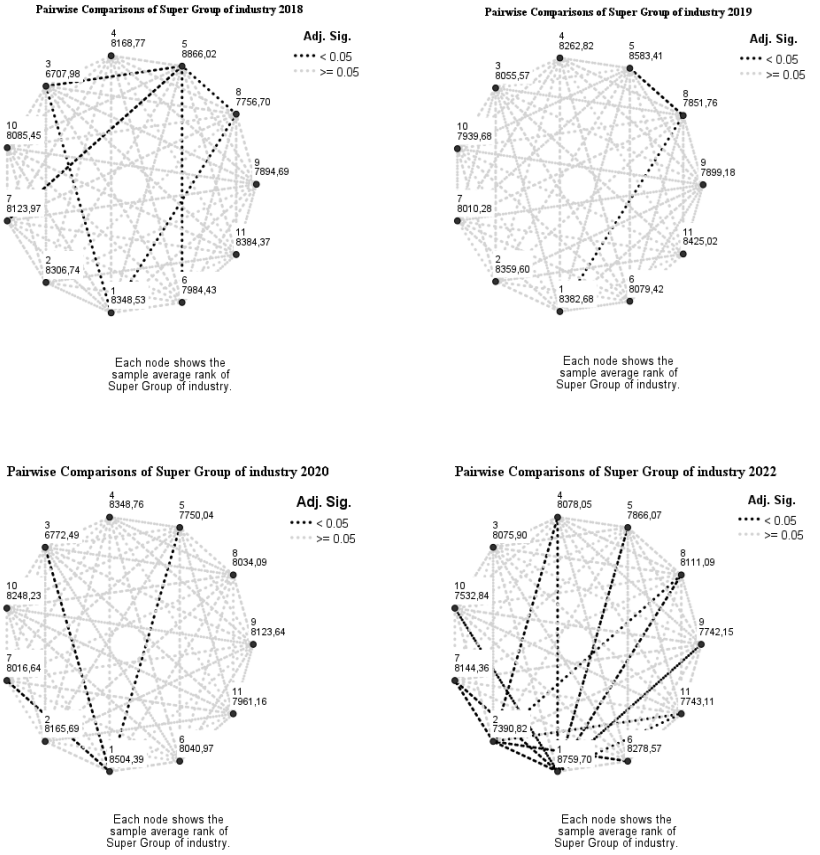

Figure 1 Pairwise Comparisons of Super Group of Industry for years 2018,2019,2020,2022

Source: Own data processing, based on IBM SPSS software, [2024]

Mr. sc. Jan Musil

Doktorand
Tehnološko sveučilište u Brnu, Češka Republika
Fakultet za poslovanje i menadžment
E-mail: Jan.Musil2@vut.cz
Orcid: https://orcid.org/0000-0002-7249-7701

Dr. sc. Alena Kocmanova

Profesorica
Tehnološko sveučilište u Brnu, Češka Republika
Fakultet za poslovanje i menadžment
E-mail: kocmanova@vut.cz
Orcid: https://orcid.org/ 0000-0002-9518-1179

NEELASTIČNI TROŠKOVI U ODNOSU NA GEOGRAFSKE, SEKTORSKE I PANDEMIJSKE ČIMBENIKE U MALIM I SREDNJIM PODUZEĆIMA U ZEMLJAMA SREDNJE EUROPE

Sažetak

Ovo istraživanje analizira fenomen neelastičnosti troškova među malim i srednjim poduzećima u Češkoj Republici, Poljskoj i Slovačkoj, s posebnim osvrtom na razdoblje od 2018. do 2022. godine, prije i poslije pandemije COVIDA-19. Cilj je istraživanja procijeniti utjecaj geografske lokacije, sektora industrije i veličine poduzeća na neelastičnost troškova. Podaci prikupljeni iz Orbis Europe baze podataka podvrgnuti su univarijatnoj statističkoj analizi kako bi se istražili navedeni odnosi. Rezultati ukazuju na značajne učinke veličine poduzeća i sektora industrije na neelastičnost troškova tijekom promatranog razdoblja. Dok veličina poduzeća konzistentno utječe na neelastičnost troškova, sektori industrije pokazuju varijacije, pri čemu neki sektori pokazuju stabilnu neelastičnost prije pandemije, dok su drugi pokazali odstupanja tijekom pandemije. Nakon pandemije, zabilježen je ukupan porast neelastičnosti troškova, pri čemu je faktor pandemije pokazao statističku značajnost. Geografska lokacija također je imala konzistentan utjecaj na neelastičnost troškova. Dobiveni uvidi doprinose razumijevanju ponašanja troškova u malim i srednjim poduzećima u različitim kontekstima te nude praktične implikacije za strategije upravljanja troškovima, potencijalno informirajući prilagodbe politika na razini vlada. Ovo istraživanje obogaćuje znanje o dinamici troškova u malim i srednjim poduzećima, što je posebno relevantno u svjetlu ekonomskih poremećaja kao što je pandemija COVID-19.

Ključne riječi: neelastični troškovi, neelastičnost troškova, čimbenik, mala i srednja poduzeća, zemlje srednje Europe.

JEL klasifikacija: L11, D22, D24.