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Financial Factors Explaining Value Migration: Evidence from Central Europe

Abstract
The objective of this article is to identify the relationship between financial factors and value migration on a yearly basis. The data cover nonfinancial firms listed on exchanges in Central European (CE) countries from 2016 to 2020. To evaluate the migration of value between industries, the share in the industry migration balance was estimated. Next, averages in three industry terciles, set on the basis of the change in market value added, were calculated and compared using both parametric and nonparametric tests. It allowed us to analyse the economic and statistical significance of the value drivers in the value migration process. The value migration in the largest Central European industries intensified during the COVID-19 crisis. The largest sectors were not negatively affected by the pandemic. It seems that, at least for some industries, there was a positive relationship between the growth of market value and sales profitability, sales growth, and cash levels. The market value drivers did not significantly change in the first year of the pandemic.
This study contributes to the recent empirical literature on value changes and fills the gaps in the current research for the Central European region, during the time of the macroeconomic crisis induced by the COVID-19 pandemic. The conclusions on the value migration factors may be useful for investors in their decision-making process. Our results can also serve as a valuable reference for managers in the process of defining business strategies, especially during turbulent periods.

Keywords
value migration | value drivers | market value added | macroeconomic crisis

JEL Codes
G65, G15, G32

1. Introduction

Value creation is widely recognised as the main purpose of a company's actions. The growth of the company's value can be realized through several different strategies, but all of them involve the need to compete with other market players. As a result, winners capture value from other companies. Hence, it is important to recognize financial factors that may determine the value inflow or outflow in the market. Such value drivers are defined as economic variables that are crucial to company performance. Previous studies, mostly from the management area, mention a variety of financial value drivers. However, their impact on value migration has not been widely explored in empirical studies, especially from the financial perspective. There is also a need to examine whether and in what direction value migration has occurred.

This research focuses on the largest industries in Central Europe before and during the pandemic period. These sectors are supposed to have a comparative advantage during market turbulence. Many companies

suffered from the crisis, however, including the most prominent examples of market participants. The number of companies in the largest sectors allows for a more detailed analysis. Based on a literature review, the research provides what had been a missing link in the empirical studies and answers the following questions:

1. What has been the extent of value migration in the largest industries in Central Europe before and during the pandemic crisis?
2. Which value drivers are related to market value change?
3. Did value drivers change during the macroeconomic pandemic crisis?

These questions allow for the development of research hypotheses, which are detailed in the existing literature provided in the next section. The main objective of this research is to identify the relationship between financial factors and value migration on a yearly basis. The sample includes nonfinancial companies listed on Central European stock markets, as Europe has been severely affected by the COVID-19 pandemic. The main contribution comes from the fact that we explore the migration of company value between industries. This is important because it allows us to assess the inflow and outflow of value during a pandemic. A comparison of value migration processes can be relevant from the perspective of managers, investors, and public authorities, giving the decision-making process new perspectives. The conclusions can possibly also help to mitigate the effects of macroeconomic crises.

The remainder of the paper is structured as follows. The next section provides a literature overview and develops hypotheses. Then, the research methodology, research sample, methods, and data are described. Next, empirical results are detailed and discussed. The final section presents the conclusions.

2. Literature review and hypotheses development

Value creation depends on how efficiently a firm manages its resources compared to its competitors. More efficient entities capture value from less efficient units. The same occurs between business industries. Some sectors may grow faster than others, attracting investor interest and capturing value. These changes may also be the result of external factors, such as a global crisis. As Slywotzky (1996) noted, companies and the industries in which they operate are continually going through different phases of development, which is also related to the change in their value. Value migration is the process by which value flows away from economically obsolete business models towards new ones that more efficiently manage shareholder value. Phillips (2012) defined value migration as shareholder assets return on profits, which moves between business units of low attractiveness for investors (value outflow) to companies with the highest growth potential (value inflow) and the highest possible return. Value creation by firms plays a central role in the evolution of populations by enabling adaptive efficiency (Di Gregorio, 2013). This process will be influenced by economic, technological, political, and social factors. Rappaport (1995), however, clearly indicates that the process of value migration is influenced by the financial performance of individual firms.

A value migration analysis can be carried out in an aggregate way at the level of individual industries (Siudak, 2014). Sectors experiencing an inflow of value also include companies characterised by an outflow of value. On the other hand, firms with a very good financial standing may belong to an industry in the process of value outflow (Rappaport, 1995). It is therefore worth exploring whether and to what extent there has been value migration in the largest industries of the Central European countries. It will be interesting to investigate whether the process of value migration intensified during the first year of the COVID-19, and, if so, in what direction. Observation of changes in market values during previous major crises, such as the recent global financial crisis (2008–2009), indicates there were large changes in value flows (Bartram and Bodnar, 2009; Fratzscher, 2012). Choi (2021) investigated market efficiency during a crisis in the US stock market in individual sectors of the economy. Each sector showed a different multifractal feature in the periods of the recent global finance crisis and the COVID-19 pandemic, but regardless of the crises, some sectors consistently demonstrate the highest and lowest efficiency. Thus, we hypothesized:

> H1: The migration of value in Central Europe's largest industries intensified during the pandemic crisis.

In his concept of shareholder value networks Rappaport (1995) identified areas of management decisions that determine the value drivers: operational, investment, and financing decisions. Thus, we investigated whether factors relating to these areas were linked to value migration in Central Europe's largest industries. The measures we adopted to determine the effects of operational decisions were as follows: return on sales, sales dynamics, and cash liquidity. In order to analyse the relationship between investment decisions and value creation, we used the following indices: capital expenditure in relation to assets and productivity of fixed assets. Decisions on the method of financing are taken into account in our study by means of the debt-to-assets ratio.

The impact of profitability on the ability to create value is widely reported. It is considered a fundamental factor in value creation. Increasing a company`s profitability can be seen as a positive signal to investors regarding the value of the company. The positive impact of profitability on a firm`s value is evidenced by, i.a., Laitinen, (2008), Rizqia and Sumiati (2013) Fajaria and Isnalita (2018), Djashan and Agustinus (2020). Thus, we assume that:

> H2a: The higher the profitability of sales, the higher the market value added.

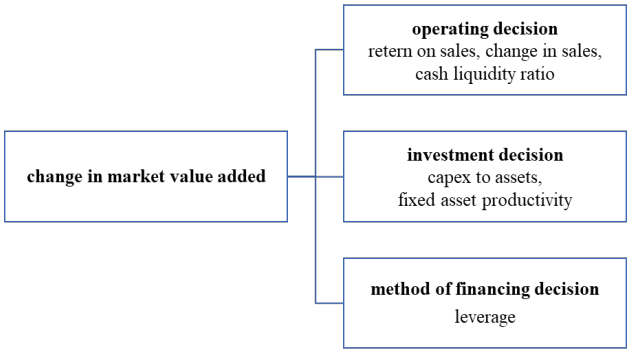

Figure 1. Research concept
Source: Authors' own study

Change in sales is a measure of a company`s growth. It is perceived to be one of the most important factors of value creation. Khanna and Palepu (1999) warn that managers need to change their strategic orientation from "growth now, profitability later" to "profitable growth now." This orientation is in line with empirical results obtained by Ramezani, Soenen and Jung (2002), who indicate that maximizing growth does not maximize corporate profitability or shareholder value. On the contrary, companies with moderate growth in sales or earnings show the highest rates of return and value creation. Bearing these conditions in mind, one might expect that the growth of a firm`s operations is positively correlated with value creation. This is also confirmed by the research of Laitinen (2008), Fajaria and Isnalita (2018), and Djashan and Agustinus (2020). Hence, we hypothesize:

> H2b: The greater the increase in sales, the higher the market value added.

In terms of operating activities, liquidity is also an important area. How liquidity affects value creation is ambiguous. Maintaining high liquidity is associated with high costs (i.e., opportunity costs). The negative impact of liquidity on the value of a company was observed by Zuhroh (2019). There is, however, an increasing number of studies showing that a high level of liquid assets serves to maintain financial flexibility, which has a positive effect on value creation. Using a sample of firms from 33 emerging countries, Yung at el. (2015) show that financial flexibility adds to firm value, particularly during the financial crisis. Bilyay-Erdogan (2020) investigates the effect of financial flexibility on firm value, on a comparative basis between developed and emerging countries in Europe between 2000 and 2016. His results demonstrate that firms` flexibility positively contributes to firm value. Similar conclusions were reached by Yousefi and Yung (2022). Hence, we hypothesize:

> H2c: The higher the value of the cash ratio, the higher the market value added.

Investment in fixed assets and effective management of current assets should contribute to value growth. Investment opportunity has a positive effect on firm value, and investing firms increase value (Del Brio, De Miguel, & Pindado, 2003; Rizqia & Sumiati, 2013). Lew (2015) found a positive association between investment expenditures and firm value across both industries and markets. Likewise, however, he found that the associations between them are different across industries and markets. According to Santoso and Willim (2022), investment decisions in fixed assets positively affect value creation. Thus, we proposed two hypotheses:

> H2d: The greater the relative value of capital expenditures, the higher the market value added.

H2e: The greater the productivity of fixed assets, the higher the market value added.

Previous studies do not provide consistent results regarding the effect of leverage on firm value. Some studies indicate a positive effect (Rizqia & Sumiati, 2013; Kartikasari, Hermantno, & Mahmudah, 2019; Al-Ahdal et al., 2020), and some a negative effect (Kouki & Said, 2011; Fosu et al., 2016; Fajaria & Isnalita, 2018) of debt on firm value. This is likely due to the benefits and costs of debt, which are widely described in capital structure theory. Factors positively affecting the firm value include, for example, a tax shield on interest and increased control of managers. Negative consequences are associated with increased costs of financial distress and agency costs of debt. The level of these benefits and costs depends on many factors (e.g., financial performance, levels of managerial ownership, information asymmetry, debt capacity) and is not uniform for all firms. Thus, it is difficult to suggest the expected direction of the relationship between leverage and changes in market value added (MVA). Given that most of the period we studied was characterized by a bull market, we hypothesized that:

H2f: The higher leverage, the higher the market value added.

He et al. (2020) observed a wide variation in the valuation of stocks in different sectors of the economy during the pandemic in China. Lee, Chen, and Ning (2017) and Gruber (2021) pointed out that the value drivers and the determinants of company performance vary across noncrisis and crisis periods. Thus, we hypothesised:

H3: Value drivers changed during the pandemic crisis.

3. Research methods

We gathered the financial data of firms listed on exchanges in Central European countries from 2016 to 2020. The source of our data is S&P Capital IQ. We excluded firms from the financial sector. We also discard observations with incomplete data. Our final dataset comprises 3980 firm-year observations (Table 1). We collected data on the five most numerous industries: communication services (CS), consumer discretionary (CD), health care (HC), industrials (In), and information technology (IT).

Table 1. Industry year distribution of the sample

Sector / Year	CS	CD	HC	Ind	IT	Total
2016	78	138	83	275	173	747
2017	82	145	84	281	175	767
2018	88	150	86	292	183	799
2019	99	154	93	293	192	831
2020	106	153	97	289	191	836

Source: Authors' own study.

The primary measure of the value of listed companies is MVA (Ehrbar, 2000). It is the difference between the capital that owners invest in a company and what they can get by selling its shares at today's market price.

$$MVA_i = V_i - K_i \tag{1}$$

where: MVA_i - market value added; V_i - gross market value; K_i - book value of equity capital.

To measure industry migration, we used Siudak's (2014) share of industry migration balance (SMB_{ind}) was calculated.

$$SMB_{ind} = \frac{\sum_{i=1}^{n\ ind} \Delta MVA_i}{\sum_{i=1}^{n\ ind} |\Delta MVA|_i} \tag{2}$$

where: *n ind* number of companies in the industry.

The change in MVA between periods is calculated as:

$$\Delta MVA_i = MVA_{i,t} - MVA_{i,ti-1} \tag{3}$$

The change in MVA to invested capital is calculated as:

$$\Delta \frac{MVA_i}{K_i} = \left(\frac{MVA_i}{K_i}\right)_t - \left(\frac{MVA_i}{K_i}\right)_{t-1} \tag{4}$$

We categorised value drivers into three groups relating to managerial decisions, as in Figure 1.

$$ROS = \frac{net\ profit}{sales} \tag{5}$$

where: *ROS* - return on sales.

$$\Delta S = \frac{sales_t - sales_{t-1}}{sales_{t-1}} \quad (6)$$

where: ΔS -change of sales.

$$CLiq = \frac{cash\ and\ its\ equivalents}{current\ liabilities} \quad (7)$$

where: *CLiq* -cash liquidity ratio.

$$CAP = \frac{CAPEX}{total\ assets} \quad (8)$$

where: *CAP* -capital expenditures (CAPEX) to assets.

$$FAP = \frac{fixed\ assets}{sales} \quad (9)$$

where: *FAP* -fixed asset productivity.

$$Lev = \frac{total\ debt}{total\ assets} \quad (10)$$

where: *Lev* -total debt to assets.

To determine the importance of the value factors, we calculated their averages in terciles within each industry. The terciles were determined on the basis of the value of the change in MVA to invested capital. In order to check the significance of differences between amounts of variables for the first and third terciles, we applied the *t*-test and the Mann-Whitney U test of two independent samples.

4. Results and discussion

4.1. The migration of value of the largest industries in Central Europe

The migration of value in entire economies or industries is often related to the overall economic situation. Thus, the Share in the Industry Migration balance is shown separately for each year, including periods of expansion and recession. Such changes are shown in Table 2.

A positive value of Share in the Industry Migration Balance shows that there has been an increase in MVA in a given industry. It means that the sum of the changes in MVA of all companies in the industry was greater than zero. The values in Table 2 relate the sum of the individual changes in MVA for all companies in the industry to the sum of the absolute values of all changes in the MVA reported for companies in the whole industry. Only in 2018 did an outflow of value occur in the analyzed industries. It was very significant in the IT and consumer discretionary industries. The outflow of value in 2018 was a result of the financial crisis. Central European markets followed a worldwide market pattern. The crisis was caused by the slowdown in the United States, the escalating US-China trade war, and Brexit.

Table 2. Share in the Industry Migration Balance (%)

Year / Industry	CS	CD	HC	In	IT
2016	15	12	21	31	16
2017	42	60	62	63	79
2018	-62	-91	-65	-89	-95
2019	48	2	22	22	69
2020	63	47	81	43	68

Source: Authors' own study

The highest inflow of value occurred in the surveyed industries in 2017 and 2020 (the onset of the pandemic). The analyzed industries, due to their characteristics and importance to societies, were not negatively affected by the pandemic. Not surprisingly, in heath care the highest surge in value over the entire period occurred right in 2020. The same relationship was observed for communication services. A very high positive share in the industry migration balance occurred in the IT sector. A similar phenomenon was observed in the case of listed companies in these industries during the pandemic in China (He et al., 2020). The remaining two industries attracted value to a greater extent in 2017 than in 2020; however, increased value attraction was observed for all industries in 2020. Thus, the presented share in the industry migration balance supports the hypothesis that the value migration of Central Europe's largest industries intensified during the pandemic.

4.2. Value drivers and value migration in Central Europe`s biggest industries

By examining the relationship between individual factors and the flow of value, we have estimated the means and medians of value drivers for each

Table 3. Return on sales as operating activity value driver (%)

Year	Industry	CS			CD			HC			In			IT		
	Tercile / Value	*L*	*U*	*U-L*	*L*	*U*	*U-L*	*L*	*U*	*U-L*	*L*	*U*	*U-L*	*L*	*U*	*U-L*
2016	Mean	11.0	7.0	**-4.0**	6.4	6.1	**-0.3**	10.2	7.1	**-3.1**	4.2	5.8	**1.6**	4.1	7.0	**2.9**
		***	***		***	***		***	**		***	***		***	***	
	Median	8.0	6.3	**-1.7**	5.4	4.5	**-0.9**	10.4	9.4	**-1.0**	3.8	5.9	**2.1**	4.1	5.5	**1.3**
		***	***		***	***		***	**		***	***		***	***	
2017	Mean	4.6	7.9	**3.3**	5.7	4.8	**-0.9**	9.6	9.4	**-0.2**	4.6	7.6	**3.0**	3.5	8.5	**5.0**
			***		***	***		***	***		***	***	***	**	***	**
	Median	4.3	8.5	**4.2**	5.6	5.1	**-0.6**	13.0	12.7	**-0.3**	3.1	7.2	**4.2**	3.2	7.9	**4.7**
		**	***		***	***		***	***		***	***	***	***	***	***
2018	Mean	8.8	3.0	**-5.8**	4.6	1.9	**-2.7**	9.1	2.6	**-6.5**	7.2	2.3	**-4.9**	8.1	2.1	**-6.0**
					***			***			***	**	***	***		***
	Median	9.5	4.6	**-4.9**	5.3	3.7	**-1.6**	11.6	4.8	**-6.8**	6.6	3.8	**-2.8**	6.6	3.3	**-3.3**
		***			***	*		***			***	***	***	***	**	***
2019	Mean	8.9	8.6	**-0.3**	4.5	1.7	**-2.8**	2.6	11.0	**8.4**	4.9	6.5	**1.6**	2.8	5.5	**2.7**
		***	***		***				***	***	***	***		*	***	
	Median	8.1	6.0	**-2.1**	4.7	3.5	**-1.2**	2.0	7.4	**5.4**	4.0	6.1	**2.1**	4.5	6.0	**1.5**
		***	***		***	*		*	***	***	***	***	**	***	***	
2020	Mean	6.0	6.9	**0.9**	0.5	3.2	**2.7**	8.3	8.2	**0.1**	1.8	4.7	**2.9**	4.2	8.7	**4.5**
			**					***	***			***	*	**	***	**
	Median	10.5	6.3	**-4.2**	3.9	3.1	**-0.8**	10.2	7.7	**-2.5**	3.3	4.9	**1.6**	4.3	8.0	**3.7**
		**	***		**			***	***		***	***	*	***	***	***

Significant codes: 0.1 *, 0.05 ** and 0.01 ***

Abbreviations: *U – L*, difference between the upper (U) and lower (L) tercile

Source: Authors' own study

industry in terciles, based on the value of the change in market value added (Tables 3, 4, and 5). Such an analysis enables to examine the relationship between individual financial factors and the flow of value. The estimated are reported on a yearly basis. It enables to observe the annual change in the relationship between individual financial factors and value changes.

First, we analyzed indicators that determine performance within the operational activity: return on sales (ROS), change in sales (ΔS), and cash liquidity ratio (CLiq).

In the years in which the industries attracted value (2016, 2017, 2019, 2020 – see Tab. 3), companies with a relatively high MVA in the Industry and IT sectors showed a higher profitability (ROS) than those with a lower ability to attract value. In 2018, a year when firms were losing value, we observed the opposite relationship. However, it should be noted that statistically significant differences were observed only in years 2017, 2018, 2020 and partly in 2019 . In the other sectors the differences in the ROS were neither statistically significant nor followed the similar pattern.

Similar relationships were observed for the other operating activities factor (ΔS). Especially in IT, for firms with a higher market value added (MVA), faster sales growth was observed, except in 2018. The same relationship, but to a lesser extent, occurred in the industrials (In) and communication services (CS). In these industries, the statistically significant

Table 4. Change in sales as operating activity value driver (%)

Year	Industry	CS			CD			HC			In			IT		
	Tercile / Value	*L*	*U*	*U-L*	*L*	*U*	*U-L*	*L*	*U*	*U-L*	*L*	*U*	*U-L*	*L*	*U*	*U-L*
2016	Mean	6.2	4.1	**-2.1**	0.7	3.6	**3.0**	-7.0	3.2	**10.2**	-6.1	1.2	**7.3**	-4.6	4.0	**8.6**
										*	***		***			**
	Median	3.9	2.5	**-1.4**	0.5	4.1	**3.7**	-1.3	4.0	**5.3**	-3.9	0.9	**4.8**	-1.0	5.5	**6.5**
						*					***		***		**	*
2017	Mean	12.2	17.1	**4.9**	19.2	22.3	**3.1**	24.8	23.1	**-1.7**	23.7	22.4	**-1.2**	21.7	25.6	**3.9**
		**	***		***	***		***	***		***	***		***	***	
	Median	8.7	17.8	**9.1**	19.7	24.3	**4.6**	19.2	19.1	**-0.1**	22.1	19.3	**-2.7**	13.8	25.8	**12.1**
		**	***		***	***		***	***		***	***		***	***	**
2018	Mean	0.7	-1.1	**-1.8**	-0.4	-0.9	**-0.5**	4.9	-1.4	**-6.3**	4.8	-0.6	**-5.4**	6.5	-1.9	**-8.5**
											***		**	***		**
	Median	-0.5	-1.9	**-1.4**	-0.5	-3.6	**-3.1**	-0.1	3.6	**3.8**	3.5	0.0	**-3.5**	4.6	0.0	**-4.6**
											***		**	***		***
2019	Mean	-1.8	7.2	**9.0**	3.7	0.0	**-3.6**	2.1	7.5	**5.4**	-2.6	1.4	**4.1**	-3.3	9.7	**13.1**
			*	*					**		*		*		***	***
	Median	-0.9	5.3	**6.2**	1.9	1.0	**-0.9**	2.4	6.9	**4.5**	-2.0	1.3	**3.3**	-1.9	9.0	**10.9**
			*	*	*				**		**		***		***	***
2020	Mean	-8.2	5.6	**13.7**	-10.1	-4.0	**6.1**	-5.1	6.9	**12.0**	-5.4	-0.6	**4.8**	1.1	10.3	**9.2**
		*		*	**				*	*	**				***	**
	Median	-1.4	8.8	**10.2**	-6.9	-2.3	**4.5**	3.8	8.9	**5.0**	-2.8	0.1	**2.8**	0.0	13.2	**13.2**
				**	***				**		**				***	**

Significant codes: 0.1 *, 0.05 ** and 0.01 ***

Abbreviations: *U – L*, difference between the upper (U) and lower (L) tercile

Source: Authors' own study

differences were not observed as commonly as in the IT sector. With the onset of the COVID-19 crisis in 2020, a statistically significant positive difference between extreme terciles also occurred in health care (HC).

The next operating activities factor was CLiq. The differences in the average values of the cash ratio between firms with high and low levels of MVA change are statistically significant in more than a dozen year-cases. In 2018, significant statistical differences between terciles with extreme MVA change occurred in IT and industrials. A higher liquidity ratio occurred in the tercile with a lower MVA value. In the years 2016–17 and 2019–20, there were 13 statistically significant cases of differences between the mean or median, where a higher level of cash liquidity occurred in terciles with high MVA growth. Thus, it can be concluded that beyond 2018, a high level of cash was positively correlated with market value change. This could be the result of the increasing importance of financial flexibility for value creation. Higher cash levels ensure financing of emerging investment opportunities. Having cash holdings, allows to continue uninterrupted operations during market crises. It was of particular importance during the COVID-19 turbulences.

To summarize the study of the relationship between operational activity factors and value migration, it should be noted that for some industries convergent relationships were observed for the years in which the industries attracted value. These observations are presented in Figure 2. The analyses allow H2a, H2b,

Table 5. Cash ratio as operating activity value driver

Year	Industry	CS			CD			HC			In			IT		
	Tercile / Value	*L*	*U*	*U-L*	*L*	*U*	*U-L*	*L*	*U*	*U-L*	*L*	*U*	*U-L*	*L*	*U*	*U-L*
2016	Mean	0.3	0.5	**0.2**	0.6	0.4	**-0.2**	0.4	0.7	**0.3**	0.4	0.4	**0.0**	0.6	0.6	**0.0**
		***	***		***	***		***	***	*	***	***	***		***	
	Median	0.2	0.3	**0.1**	0.3	0.3	**0.0**	0.3	0.7	**0.4**	0.2	0.3	**0.1**	0.5	0.5	**0.0**
		***	***		***	***		***	***	*	***	***	***		***	
2017	Mean	0.5	0.4	**-0.1**	0.3	0.4	**0.1**	0.5	0.8	**0.3**	0.3	0.4	**0.1**	0.5	0.7	**0.2**
		***	***		***	***		***	***		***	***		***	***	*
	Median	0.3	0.3	**-0.0**	0.2	0.2	**0.0**	0.3	0.5	**0.2**	0.2	0.3	**0.1**	0.3	0.6	**0.3**
		***	***		***	***	*	***	***		***	***	**	***	***	**
2018	Mean	0.3	0.4	**0.1**	0.3	0.4	**0.1**	0.6	0.6	**-0.0**	0.4	0.3	**-0.1**	0.6	0.4	**-0.2**
		***	***		***	***		***	***		***	***		***	***	**
	Median	0.2	0.2	**-0.0**	0.2	0.2	**0.0**	0.4	0.3	**-0.1**	0.3	0.1	**-0.2**	0.5	0.3	**-0.2**
		***	***		***	***		***	***		***	***	***	***	***	***
2019	Mean	0.3	0.4	**0.1**	0.3	0.3	**-0.0**	0.4	0.7	**0.3**	0.3	0.4	**0.1**	0.6	0.6	**-0.0**
		***	***		***	***		***	***	*	***	***		***	***	
	Median	0.1	0.2	**0.1**	0.2	0.2	**0.0**	0.2	0.4	**0.2**	0.1	0.2	**0,1**	0.3	0.4	**0.1**
		***	***	*	***	***		***	***	*	***	***	***	***	***	
2020	Mean	0.5	0.8	**0.3**	0.5	0.4	**-0.1**	0.9	0.6	**-0.3**	0.5	0.5	**0.0**	0.6	0.7	**0.1**
		***	***		***	***		***	***		***	***		***	***	
	Median	0.2	0.6	**0.4**	0.3	0.2	**-0.1**	0.6	0.3	**-0.3**	0.3	0.4	**0.1**	0.5	0.6	**0.1**
		***	***	***	***	***		***	***	*	***	***		***	***	

Significant codes: 0.1 *, 0.05 ** and 0.01 ***

Abbreviations: *U – L*, difference between the upper (U) and lower (L) tercile

Source: Authors' own study

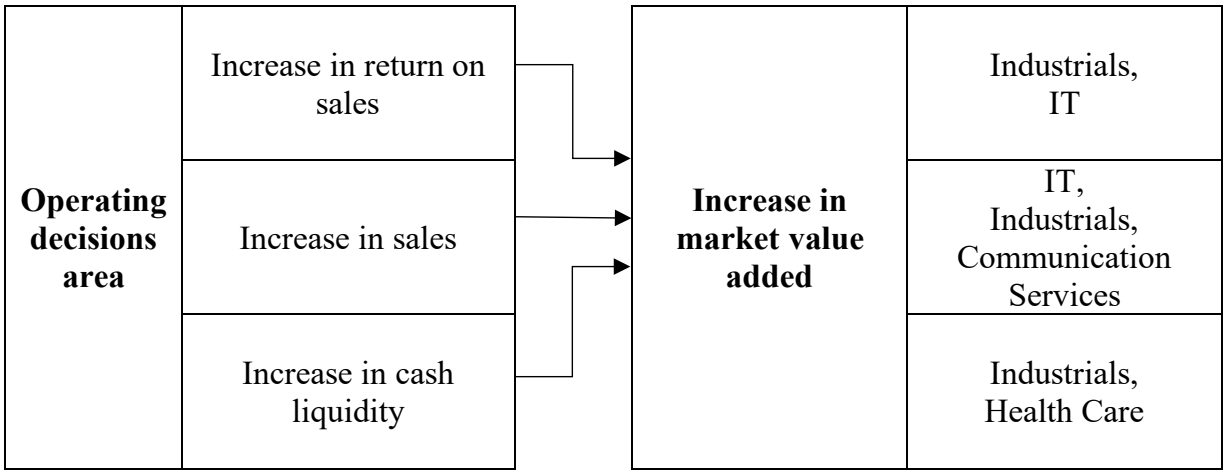

Figure 2. Results summary

Table 6. Capex ratio as investment activity value driver (%)

	Industry	CS			CD			HC			In			IT		
Year	**Tercile / Value**	***L***	***U***	***U-L***	***L***	***U***	***U-L***	***L***	***U***	***U-L***	***L***	***U***	***U-L***	***L***	***U***	***U-L***
2016	Mean	5.0	2.9	**-2.1**	4.5	3.9	**-0.5**	3.4	2.7	**-0.8**	3.3	3.9	**0.6**	3.6	3.3	**-0.3**
		***	***		***	***		***	***		***	***		***	***	
	Median	2.4	2.7	**0.3**	3.8	3.2	**-0.6**	2.6	2.5	**-0.1**	2.4	3.2	**0.8**	2.6	1.9	**-0.7**
		***	***		***	***		***	***		***	***	**	***	***	
2017	Mean	2.7	5.2	**2.5**	3.7	4.5	**0.7**	3.0	2.9	**-0.1**	3.3	3.9	**0.6**	2.9	4.2	**1.3**
		***	***	**	***	***		***	***		***	***		***	***	**
	Median	1.2	3.9	**2.7**	3.3	3.4	**0.2**	2.5	1.8	**-0.6**	2.5	3.3	**0.9**	2.0	3.0	**1.0**
		***	***	**	***	***		***	***		***	***	*	***	***	**
2018	Mean	3.8	2.8	**-1.0**	5.1	3.5	**-1.6**	3.1	3.4	**0.3**	4.4	3.2	**-1.2**	3.9	2.4	**-1.5**
		***	***		***	***	*	***	***		***	***	**	***	***	**
	Median	1.8	1.8	**0.0**	3.2	2.3	**-0.8**	1.7	2.5	**0.9**	3.7	2.1	**-1.6**	2.6	1.3	**-1.3**
		***	***		***	***	*	***	***		***	***	***	***	***	***
2019	Mean	4.3	2.3	**-2.0**	4.2	3.3	**-0.9**	3.1	3.7	**0.6**	3.6	4.0	**0.4**	3.2	3.3	**0.1**
		***	***	*	***	***		***	***		***	***		***	***	
	Median	2.5	1.1	**-1.5**	2.9	2.1	**-0.8**	1.7	3.4	**1.6**	2.5	3.1	**0.5**	1.5	1.6	**0.1**
		***	***	*	***	***		***	***		***	***		***	***	
2020	Mean	3.3	2.8	**-0.6**	3.0	2.3	**-0.7**	2.5	2.9	**0.4**	3.3	2.9	**-0.4**	2.3	2.8	**0.5**
		***	***		***	***		***	***		***	***		***	***	
	Median	1.9	1.5	**-0.4**	1.9	1.6	**-0.3**	1.4	2.3	**0.9**	2.3	2.4	**0.0**	1.3	2.0	**0.7**
		***	***		***	***		***	***		***	***		***	***	

Significant codes: 0.1 *. 0.05 ** and 0.01 ***

Abbreviations: *U – L* the difference between the upper (U) and lower (L) tercile

Source: Authors' own study

H2C to be confirmed for some industries, with the exception of 2018 (crisis in the market). When the value in the markets of Central Europe was growing, the increase in return on sales is combined with high market value added in the sectors of industrials and IT. The increase in sales promotes the growth of market value added in IT, industrials and communication services. Greater cash liquidity accompanies higher market value added in industrials and health care. Similar results for the Polish market were observed by Kowalski and Biliński (2018), indicating that value-attracting firms are characterized by higher sales dynamics and profitability.

The second stage of our research tested the relationship between investment decisions and value migration. These analyses address two indicators: capex and fixed asset productivity (FAP) (Tables 6 and 7).

Capex is not a factor that differentiates value capture. The results referring to this ratio in the extreme terciles are inconclusive. A relatively small number of cases are statistically significant, and these differences take on both additive and negative values.

The lower the fixed asset productivity, the higher the productivity of invested long-term capital. Therefore, a higher value of this indicator (indicating lower efficiency) should be expected in the group of companies with a lower value of MVA change. In other words, a negative difference is expected between the averages of this indicator in firms clustered in

Table 7. Fixed asset productivity as investment activity value driver

	Industry	CS			CD			HC			In			IT		
Year	**Tercile / Value**	***L***	***U***	***U-L***	***L***	***U***	***U-L***	***L***	***U***	***U-L***	***L***	***U***	***U-L***	***L***	***U***	***U-L***
2016	Mean	0.6	0.5	**-0.1**	0.4	0.3	**-0.1**	0.8	0.7	**-0.1**	0.4	0.4	**0.0**	0.4	0.4	**0.0**
		***	***		***	***		***	***		***	***		***	***	
	Median	0.4	0.3	**-0.1**	0.3	0.3	**0.0**	0.8	0.4	**-0.4**	0.3	0.3	**0.0**	0.4	0.2	**-0.1**
		***	***		***	***		***	***		***	***		***	***	
2017	Mean	0.7	0.5	**-0.2**	0.4	0.4	**0.0**	0.8	0.9	**0.0**	0.4	0.4	**0.0**	0.3	0.4	**0.1**
		***	***		***	***		***	***		***	***		***	***	
	Median	0.2	0.3	**0.1**	0.2	0.3	**0.0**	0.7	0.7	**0.0**	0.3	0.3	**0.0**	0.3	0.3	**0.0**
		***	***		***	***		***	***		***	***		***	***	
2018	Mean	0.6	0.5	**-0.1**	0.3	0.6	**0.2**	0.9	0.9	**0.1**	0.4	0.5	**0.1**	0.4	0.3	**-0.1**
		***	***		***	***	**	***	***		***	***		***	***	*
	Median	0.3	0.4	**0.1**	0.3	0.3	**0.0**	0.7	0.8	**0.1**	0.3	0.3	**0.0**	0.2	0.2	**-0.1**
		***	***		***	***		***	***		***	***		***	***	
2019	Mean	0.8	0.4	**-0.3**	0.5	0.4	**-0.2**	0.8	0.8	**0.1**	0.4	0.4	**0.0**	0.4	0.4	**0.0**
		***	***	**	***	***	*	***	***		***	***		***	***	
	Median	0.5	0.3	**-0.2**	0.4	0.3	**-0.1**	0.7	0.7	**0.0**	0.3	0.3	**0.0**	0.3	0.3	**0.0**
		***	***	*	***	***		***	***		***	***		***	***	
2020	Mean	0.6	0.5	**-0.1**	0.7	0.4	**-0.3**	0.8	0.8	**-0.1**	0.5	0.5	**0.0**	0.5	0.4	**0.0**
		***	***		***	***	**	***	***		***	***		***	***	
	Median	0.4	0.2	**-0.2**	0.4	0.3	**-0.1**	0.7	0.8	**0.1**	0.3	0.3	**0.0**	0.3	0.4	**0.1**
		***	***		***	***	*	***	***		***	***		***	***	

Significant codes: 0.1 *. 0.05 ** and 0.01 ***

Abbreviations: *U – L* the difference between the upper (U) and lower (L) tercile

Source: Authors' own study

the upper and lower tercile. Cases in which there were statistically significant negative differences in this indicator occurred 6 times. This does not allow the importance of fixed asset productivity for value creation to be confirmed. Thus, neither of the analyzed ratios indicated a connection between investments and value migration. Thus, H2d and H2e are rejected. This is in line with Kowalski and Biliński (2018), who observed no clear relationship between value migration and fixed asset productivity for Polish firms.

The final stage of our analysis tested the link between debt and value migration (Table 8). The differences in averages of leverage between firms with high and low levels of MVA change are quite rarely statistically significant. The most statistically significant differences in leverage levels between the extreme terciles were observed in Communication Services and Industrials (five and four cases out of 10, respectively). In the other sectors the differences in indebtedness were neither statistically significant nor followed the similar pattern. Such results are not surprising because recent studies suggest both a positive and a negative effect of debt on firm value. Thus, H2f is rejected.

Our final research question was to find out whether the potential value drivers changed in the first year of the pandemic crisis. It was evident for return on sales and sales increase in two industries. However, the relationships observed in these cases

Table 8. Leverage as financing activity value driver (%)

	Industry	CS			CD			HC			In			IT		
Year	Tercile / Value	*L*	*U*	*U-L*	*L*	*U*	*U-L*	*L*	*U*	*U-L*	*L*	*U*	*U-L*	*L*	*U*	*U-L*
2016	Mean	47.6	42.4	**-5.2**	50.5	503.	**-0.2**	38.4	33.8	**-4.6**	55.3	53.4	**-1.9**	45.3	52.4	**7.1**
		***	***		***	***		***	***		***	***		***	***	*
	Median	53.8	42.6	**-11.3**	52.3	54.0	**1.7**	38.6	30.0	**-8.6**	57.6	53.1	**-4.4**	47.2	55.4	**8.2**
		***	***		***	***		***	***		***	***		***	***	
2017	Mean	43.2	48.6	**5.4**	49.5	51.2	**1.7**	35.3	36.7	**1.4**	52.2	58.3	**6.1**	49.2	45.5	**-3.7**
		***	***		***	***		***	***		***	***	**	***	***	
	Median	46.4	50.5	**4.1**	50.2	53.5	**3.3**	32.7	31.6	**-1.1**	54.5	59.3	**4.8**	51.1	42.7	**-8.4**
		***	***		***	***		***	***		***	***	**	***	***	
2018	Mean	57.4	41.7	**-15.6**	54.2	50.9	**-3.3**	38.4	39.2	**0.8**	59.6	50.7	**-9.0**	44.6	49.9	**5.3**
		***	***	**	***	***		***	***		***	***	***	***	***	
	Median	56.0	40.7	**-15.4**	55.0	55.2	**0.2**	37.5	38.5	**1.0**	60.9	50.7	-**10**.2	43.9	48.1	**4.2**
		***	***	*	***	***		***	***		***	***	***	***	***	
2019	Mean	43.8	60.7	**16.9**	54.3	63.7	**9.4**	38.0	45.8	**7.9**	55.3	58.8	**3.5**	44.1	49.0	**4.9**
		***	***	**	***	***	*	***	***		***	***		***	***	
	Median	42.9	60.0	**17.1**	55.0	61.4	**6.4**	28.9	45.7	**16.8**	55.7	61.9	**6.2**	35.9	50.0	**14.1**
		***	***	**	***	***		***	***		***	***		***	***	**
2020	Mean	57.4	48.3	**-9.1**	58.1	56.4	**-1.7**	45.4	45.4	**0.0**	54.6	54.9	**0.3**	45.7	45.8	**0.1**
		***	***		***	***		***	***		***	***		***	***	
	Median	59.8	45.0	**-14.8**	53.9	55.7	**1.8**	43.0	44.6	**1.6**	56.9	56.1	**-0.8**	46.8	44.9	**-1.9**
		***	***	*	***	***		***	***		***	***		***	***	

Significant codes: 0.1 *. 0.05 ** and 0.01 ***
Abbreviations: *U – L* the difference between the upper (U) and lower (L) tercile
Source: Authors' own study

were not essentially different from those in earlier years. Thus, we cannot confirm that value drivers changed during the pandemic crisis.

5. Conclusions

This paper discusses the importance of financial factors affecting value migration among nonfinancial public companies in Central Europe. The following final conclusions can be drawn with regard to the hypotheses:

1. The results of the share in the industry migration balance supports the hypothesis that the value migration in the largest industries in Central Europe intensified during the pandemic crisis. The industries analysed, due to their characteristics, were not negatively affected by the pandemic. Moreover, IT and health industries responded strongly to the pandemic in a positive way. These results are consistent with those observed for other regions. The good performance of companies in these industries was also observed in China during the pandemic (He et al., 2020).

2. Detailed analysis of the relationship between individual factors and the flow of value leads to cautious conclusions. There is a positive relationship between the growth of market value and financial factors like sales profitability, sales growth, and cash

level. Factors related to operating activity, proved to be important for value creation. The is evidence allowed to emphasise the importance of operating factors for firm value, but the direction of this relationship seemed to be ambiguous. This research did not confirm the significance of the relationship between value creation and investing and financing factors. Similar results were observed for the Indonesian market (Nurlela, Sulastri & Hanafi, 2019).

3. The relationship between financial factors and value migration did not change during the pandemic crisis. The importance of financial factors for value migration did not differ significantly from the results observed in earlier years. The crisis caused by the COVID-19 pandemic was driven by noneconomic factors.

This study contributes to the existing empirical literature on value migration in several ways. First, it refers to the Central European region. Next, the period of analysis covers the period of market turbulence caused by the pandemic. Exploring the relationship between financial factors and value migration processes may be useful for investors in the decision-making process. This is also important for proper development of business strategies. A comparison of value migration processes in periods of different macroeconomic conditions is crucial for stakeholders, especially investors. This research extends the discussion on value migration by a comparison of industries. Our conclusions are in line with Fama and French (2007), who emphasised the need for further analysis of value fluctuations in the capital market between companies, as well as sectors. In summary, this research contributes to increasing the efficiency of decision-making in capital allocation.

This study has several limitations, which could provide a starting point for future research. The study was limited to the largest sectors of Central Europe. This ensured the homogeneity of the sample and allowed for a detailed analysis. However, including other regions or industries could also be beneficial. This would probably show other dimensions of company value creation. This research focuses on three dimensions of financial factors. However, nonfinancial factors could also be analysed by experts from other fields, like marketing, business maintenance, logistics, etc. We also see some opportunities in expanding the study to other, smaller sectors, using different methods more appropriate for small samples. Another direction of our future studies could involve the development of value migration proxies. So far, we implemented a two-dimensional indicator approach combining market and book value. For further research, we point to the above opportunities. We also see the need for further research, using different statistical tools. It would allow to shed new light on the relationship between value drivers and value migration.

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