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Assessing the Financial Vulnerability in a Changing Business Environment: The Case of E-Commerce Industry

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Abstract

The outbreak of COVID-19 has created a very challenging business climate for all the industries worldwide. Differently from other sectors, e-business industry, being the least harmed with the new circumstances, has been given a wide range of opportunities to experience the flourishing sales and profitability, particularly at the start of the pandemic. The aim of this study is to assess the short-term and the potential long-term impact of COVID-19 crises on e-commerce. Employing the comprehensive profitability and liquidity ratio analysis for the top five cross-border e-commerce companies in the last ten years (2013-2022), the study provides an in-depth understanding of the e-commerce sector financial vulnerability and its response to the changed business climate. The results have revealed the sharp increase in the sales and profitability levels of the assessed companies, thus confirming that COVID-19 had in general a positive impact on the e-commerce industry financial performance, with different extent across the examined firms, which implies that the pandemic has impacted subdivisions of e-commerce asymmetrically. Consequently, the study allows policy makers to identify the distinctive strategies for each area of e-commerce industry.

Keywords: E-commerce, COVID-19, liquidity, profitability, E-commerce companies.

JEL: 030, 060, F20, F63, F65

1. Introduction

The outbreak of COVID-19, qualified as an event with no precedence in the recent history, has plunged the world economy into one of the most severe recessions, bringing a vast uncertainty and extraordinary long lasting effects for the businesses operations all over the globe (Panopio & Cudia, 2022). The economic impairment, induced due to the anti-pandemic measures taken by the national governments, has been driven by a negative shock incurred on both, the demand and the supply side. The store closure and accompanying restrictions have resulted in a significant decrease in the products and service availability and consumption (particularly of industrial and luxury goods). The shocks have reinforced

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each other, leading to a significant disturbance in the supply chains, international trade, investments, labor markets and collapse of the economic activity worldwide. Such a crisis, reflected in the decreased volume of operations, resources' shortage, decreased demand, and consequently drop in sales revenues and cash flows has induced the firms' financial vulnerability having the implications on their corporate finance (Baldwin & Weder di Mauro, 2020; Gretzel et al., 2020; Kowalewski & Spiewanowski, 2020).

Even though the impact of COVID-19 has uncourtly affected the operations of all the industries, its damaging effects have depended on their vulnerability and introduced anti COVID measures. Accordingly, while the activity of the airline and hospitality industry has been severely plunged, the online retailers and software providers have faced the enormous jump in the demand for their services. Due to these asymmetries, which have reshaped the output demand and labor supply across the industries, many businesses have been faced with the need for rethinking and restructuring their business models and strategies towards meeting changed customer needs, strengthening a market position and securing their survival in the global market (Barrero et al., 2020; Bloom et al., 2020; Deloitte, 2020, Denger, 2020).

This intention to best adapt to the new business conditions outlook has resulted in exploring the potential of e-commerce and digital innovations implementation as a new or more dominant mode of "doing business" among conventional market players. Even though e-commerce is not a new phenomenon which emerged with the recent pandemic, its dramatic boom after the new technological revolution and particularly in the light of the COVID-19 lockdown could be explained by the fact that it provides a number of opportunities towards significant cost reduction, thus giving rise to an increased efficiency. Along with that, due to better information management and market understanding together with a possibility for finer suppliers' consolidation, distribution partnership, market determination and expansion, e-commerce brings an immense opportunity for revenue increase and better overall performance in today's highly competitive business environment (Xia & Zhang, 2010; Cosgun & Dogerlioglu, 2010; Damanpour, 2001). Accordingly, even before COVID-19, the indisputable role of the e-commerce being qualified as a driver of digital innovation in the contemporaneous business environment over the last decade was evidenced (Statista, 2022). According to the Eurostat statistics, the number of businesses that utilize e-commerce increased by 7% from 2008 to 2018. Accordingly, in 2018, e-commerce participated with 18% of the total sales in the European Union countries (Eurostat, 2019). Such a growth in the e-commerce could be largely attributed to the occurrence of the e-commerce platforms such as Amazon, Alibaba, MercadoLibre, Jumia, Walmart, and others (World Bank, 2020). However, with a sharp decline of the opportunity for traditional trade transactions due to social distancing measures, e-commerce has become the retail alternative which has recorded an immense growth during and in the aftermath of the COVID-19 pandemic (Zou & Cheshmehzangi, 2022).

Despite the fact that the rise of the online retail due to the recent pandemic has opened the door for many firms to take the opportunities from the new business model adoption, not all online sellers have benefited from it. In fact, the dynamics and fruitfulness from e-sales varies across the sectors and countries, suggesting that a significant portion of the e-commerce sellers have been faced with the same economic obstacles and challenges due to difficult business climate as traditional retailers, whose revenues have been severely affected with the decline in overall spending, particularly for non-essentials. The significant e-commerce rise has been identified in some countries, mostly in the domain of the food supply chain, personal protection, home activities and ICT equipment (OECD, 2020). Moreover, in spite of the fact that the governments worldwide have invested efforts to boost the development of e-commerce, its boost has been particularly challenging in the developing economies where the online retail has still been a new phenomenon (Tarhini et al. 2019). A lack of e-commerce relevant regulation, infrastructure needed to support payments and customer service, and shortages of digital skills, consumer protection and trust, have been the obstacles, which have limited the role of e-commerce in supporting the economic activities during and in the aftermath of COVID-19 in emerging markets (OECD, 2020).

Accordingly, the impact of the recent pandemic on the online retail sector remains a black box, despite promising expectations. Aiming to fit this gap, this study intends to examine the impact of the COVID-19 pandemic on the financial performance of the e-commerce, analyzing its effects on the top five cross border e-business firms' profitability and liquidity in the examined period. Thus, the study provides an in-depth understanding of the e-commerce sector financial vulnerability and its response to the changed business climate. Having an understanding of the experience that the e-commerce had throughout the COVID-19 era is highly relevant to a number of stakeholders in their decision making and attempt to mitigate the new risks and assess the future prospects of the companies, entire sector and economies.

The rest of the study comprises four sections. The first section provides a theoretical background and review of the relevant literature and is followed by a second section that briefly describes the research questions and methodology used to address them. The third section provides the insight into the main results of this study, while the last section provides the concluding remarks.

2. Literature Review

Along with imposition of the social distance and other COVID-related measures, there has been a radical decrease in the purchase, which in turn has implied the reasonable concerns of the retailers regarding the expected reduction of the firms' sales and, accordingly, their revenues (Crets, 2020). With the decrease in the operations, an accompanying decline in the firms' operational costs has been expected. Nevertheless, given the low cost-to-revenue elasticity, attributed to the high portion of the fixed costs, such as salaries and charges, the firms have not been able to cut much of their operational costs in the short run. Such an asymmetric behavior of "sticky" costs which do not shrink together with declining revenues is expected to impose a decrease in their profitability (Golden et al. 2020; Canon 2014; Shust & Weiss, 2014).

Accordingly, in line with sinking revenues, a plunge of the cash inflows, which would imply vanishing of the firms' cash reserves for covering the arising loss has been anticipated. Such impaired cash flows are expected to further challenge the companies' liquidity, which consequently would be faced with a number of compounding problems in terms of struggling to meet the commitments for salaries, suppliers, taxes or similar items. Aiming to cope with the short-term liquidity needs to meet their due financial obligations, the firms may go in debt further, thus questioning their future financial position (Putri & Rahyada, 2020, D'amato 2020, Padoveze & Benedicto, 2014; Ellis, 2021, Mirza et al. 2020, Shoukry, 2020). Taken together, the COVID-19 crisis and accompanying circumstances have challenged all the business by a sharp decline in their turnover and profitability, which accompanied with increased indebtedness has made their financial performance and position inquiring (Devi et al., 2020).

Since after the COVID pandemic breakout e-commerce for many has become the only viable channel for essentials' purchases, online retail has experienced immense acceleration in its operations. Accordingly, despite the fact that the overall retail in Europe declined by 17,9% during 2020, e-commerce has recorded an enormous increase of 174%. China as the greatest market has been followed by other key global players such as the US, Japan, the UK and Germany. The online retail website traffic worldwide recorded more than 5 billion visits' increase from 2019 to 2020. In line with that, Amazon, being a leader in the global e-commerce has recorded a 40% increase in the net sales (Statista, 2022). Given the statistics of Global Data, nine top world e-retail companies have recorded a double-digit growth of their revenues, thus supporting the hypothesis of an expected boom in the e-retail sector during the COVID crisis, despite the e-business expansion roots before the pandemic (Global Data, 2020). Such an acceleration of the e-commerce has enabled many businesses to preserve their operations, providing an access to a wider range of products while satisfying the need for safety to customers. In addition, the online retail boom has given rise to new firms, products and customer groups enclosures, thus contributing to a greater e-commerce dynamism and scope enhancement. The switch from conventional to e-commerce transactions has varied across the countries, being characterized by a shift from luxury goods and services to essential products. Therefore, under the modified circumstances induced with the social distance measures, some e-commerce businesses, including a number of those who adopted e-sales as a new business model, have obtained the opportunity to enhance their operations and sales and therefore their financial performance (WTO, 2020). However, there have been mixed empirical evidence on the e-business firms' financial performance identified in the light of the recent pandemic.

Several studies examining the impact of COVID-19 on e-commerce trends have provided evidence in this hypothesis support. In line with that, Bhatti et al. (2020), who investigated the growth of the e-commerce induced with the pandemic have suggested that e-commerce has become a meaningful substitute for the traditional retail due to changed consumer behavior and preferences. Moreover, a study which has provided an across countries assessment of the impact of the COVID-19 crisis on e-commerce has suggested that the online retail enhancement was found to be more significant in the countries that adopted stricter pandemic-related measures and in the countries in which e-commerce has been a developing business model. The authors suggest that the new trends identified in the consumer behavior were expected to be longer-lasting (Alfonso et al. 2021). Similarly, a study applying a nonlinear regression model and correlation analysis to assess the relation between the recent pandemic and e-market behavior in Romania, has revealed the evidence confirming the significant positive association between the effect of the pandemic and increase in sales in the e-market (Boldea & Boldea, 2021). With an incentive to examine the impact of e-commerce during the recent pandemic on the income and sales of MSMEs, Mandsari & Pratama (2020) have identified a positive and significant impact, thus pointing out that employing online retail during the COVID crisis has meaningfully contributed to the income rise.

Still, even though there has been a reasonable expectation that the e-commerce would contribute to the e-business better performance, still, some findings suggest that the reality is much more complex than that (Sterling, 2020). Accordingly, having an enormous increase in e-commerce during the pandemic may cause the delays and the extension of time needed for their fulfillment, thus creating an uncertainty in distribution, which in turn could cause customer dissatisfaction and uncertainty in future demand. In addition, such a scenario could be worsening due to the fact that the factory closure in China and travel restrictions can create production issues due to inventory shortages. Thus, both product shortages and decline in the consumer demand may put limitations even for e-businesses (Sterling, 2020; Crets, 2020; Porter, 2020). In line with that, as pointed out by Porter (2020), companies such as Amazon, FedEx and UPS have been faced with delays in their order fulfillment, which has been attributed to a significant rise in the number of orders and shipping issues in the COVID pandemic period. In this light, even though the expansion of e-commerce during the recent pandemic could be associated to the decrease in the profit margins of traditional retailers, the study which has investigated this relationship in six European countries (France, Germany, Italy, Switzerland and UK) has revealed a negative correlation between the share of the e-sales and profit margins (Alvarez & Marsal, 2021).

Taking the above findings, one could conclude that the convenience and the benefits arising from e-commerce seem to have permanently reshaped the consumer and firms' behavior in favor of the everlasting trend of e-commerce consumers and purchase growing that is expected to be of a long-term nature and remain much beyond the COVID-19 era (OECD, 2020). Nevertheless, the impact of COVID-19 on the financial performance of the e-commerce businesses is still a black box. While the e-commerce may bring the benefits to firms and their financial performance, particularly during the pandemic period, still, the perspective of taking the advantages from such hard time period is uncertain and will depend on many factors. Investing into e-commerce as an innovative and promising business model is not enough. This is supported with the fact that there are findings which point out no direct relationship between the e-commerce and firm's financial performance. Such a success rather requires a complex interaction and fit among the complementary resources and capabilities (Andonov & Dimitrov, 2021). Thus, as suggested by Flemming (2020), in order to alleviate the negative impacts and take the advantage of the opportunities arising in the time of the pandemic, the e-commerce businesses are highly recommended to keep struggling in meeting the customers' needs by being flexible, providing affordable shipping and bringing the value to the customer service, thus fulfilling their e-commerce expected experience.

3. Methodology and Research Questions

The authors strive, based on the research, to determine the economic and financial challenges that e-commerce companies have faced in time of COVID-19. Aiming to explore the short-term and potential long-term impact of COVID-19 crises on e-commerce, the top five cross-border e-commerce companies have been analysed from the aspect of profitability and liquidity. The time frame of the last ten years (2013-2022) provides information about a trend in their sales, costs, ability to meet current obligation, as well as to reach and maintain a positive financial result. In accordance with the Eurostat 2023, e-commerce companies with the highest revenue in 2022 are the following: Amazon (513.9 billion), Alphabet (282.8 billion), JD (151.7 billion), Alibaba (134.6 billion), and Meta (116.6 billion).

The financial analysis relies on the income statement and balance sheet of the selected companies, as financial statements available on companies' websites for external stakeholders. In addition to the comprehensive liquidity and profitability analysis, a comparative overview takes its place in the research.

Given the main research goal reflected in the need to examine a financial performance of the selected e-commerce companies in the last ten years with a special focus on the period affected by COVID-19, the article is structured around the following research questions:

1. Have the e-commerce companies benefited from the COVID-19 crises in terms of sales volume and financial results?
2. Given a trade-off between liquidity and profitability, have the e-commerce companies managed to maintain the minimum level of liquidity without jeopardizing a positive financial result?
3. Do obtained financial results (positive or negative) in time of COVID-19 crises keep their trend in the years after, determining the future companies' perspective?

4. Results and Discussion

Following the research objectives structured around liquidity and profitability of the selected e-commerce companies, this section has been organized and divided into two parts.

Liquidity analysis gives an overview of the company ability to repay creditors from available current assets. Possession of more liquid assets directly lowers a financial risk. As a crucial section of a financial analysis, liquidity ratios evaluate the firm's capacity to convert its current assets into cash in order to respond to short term liabilities without relying on external funds (Cornett, Adair, Nofsinger, 2012). Liquidity in the research of the e-commerce companies has been analyzed through the following ratios:

- Current ratio
- Acid-test ratio
- Cash ratio
- Working capital
- Working capital to sales

Liquidity ratios of the selected e-commerce companies (table 1) show their determination to keep liquidity at a certain level in the observed period, with exception in some years. Alphabet, Alibaba and Meta have a positive *working capital* in the whole period, while Amazon's current liabilities exceed current assets in 2022 and JD's in three years (2018-2020). JD, Alibaba and Meta increased the number of euro of current assets on their disposal to cover each euro of short term debts (Madushanka, Jathurika, 2018) in 2020 as the pandemic peaked compared to the previous year. On the other hand, Amazon and Alphabet lower the value of *current ratio* in 2020. While the other four companies have similar current ratio values over this ten-year period, Meta decreased it 5-6 times in 2022 compared to the period from 2013 to 2017. With the intention to repay short term debt using more liquid assets, *acid-test ratio* excludes inventory as the least liquid current assets whose book value usually does not match market value (Cornett, Adair, Nofsinger, 2012). These changes additionally lowered the companies' liquidity, but Alphabet, Alibaba and Meta still have the value of this ratio above one in all years. Taking into consideration only

Table 1. Liquidity ratios for the e-commerce companies, 2013-2022

E-commerce companies	Liquidity ratios	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
Amazon	*Current ratio*	0.94	1.14	1.05	1.10	1.10	1.04	1.04	1.05	1.12	1.07
Alphabet		2.38	2.93	3.07	3.37	3.92	5.14	6.29	4.67	4.69	4.58
JD		1.35	1.35	0.99	0.87	0.97	1.02	1.19	1.72	1.34	1.37
Alibaba		1.66	1.70	1.91	1.30	1.89	1.95	2.58	3.58	1.81	1.80
Meta		2.20	3.15	5.05	4.40	7.19	12.92	11.97	11.25	9.40	11.88
Amazon	*Acid-test ratio*	0.72	0.91	0.86	0.86	0.85	0.76	0.78	0.75	0.82	0.75
Alphabet		2.34	2.91	3.05	3.35	3.89	5.11	6.27	4.64	4.69	4.58
JD		1.01	1.01	0.58	0.50	0.62	0.74	0.77	1.30	0.96	0.95
Alibaba		1.66	1.70	1.91	1.30	1.89	1.95	2.58	3.58	1.81	1.80
Meta		2.20	3.15	5.05	4.40	7.19	12.92	11.97	11.25	9.40	11.88
Amazon	*Cash ratio*	0.45	0.68	0.67	0.63	0.60	0.54	0.59	0.58	0.62	0.54
Alphabet		1.64	2.17	2.41	2.65	3.15	4.21	5.15	3.78	3.84	3.69
JD		0.87	0.87	0.46	0.33	0.32	0.41	0.46	1.11	0.87	0.89
Alibaba		1.28	1.37	1.57	1.02	1.57	1.64	2.25	3.23	1.34	1.54
Meta		1.51	2.27	4.14	3.64	5.86	11.09	10.24	9.58	7.86	10.41
Amazon	*Working capital (in bil)*	-8,6	19,3	6,3	8,5	6,7	2,3	1,9	1,8	3,2	1,6
Alphabet		95,5	123,9	117,5	107,4	101,1	100,1	88,7	70,8	61,9	56,9
JD		12,2	9,3	-132,5	-2,3	-495,2	315,7	1,5	3,4	943,2	685,6
Alibaba		40,2	40,6	31,2	9,3	19,3	12,9	12,7	16,5	4,9	3,1
Meta		32,5	45,5	60,7	51,2	43,5	44,8	31,5	19,7	11,9	11,9
Amazon	*Working capital to sales*	-0.02	0.04	0.02	0.03	0.03	0.01	0.01	0.02	0.04	0.02
Alphabet		0.34	0.48	0.64	0.66	0.74	0.90	0.98	0.94	0.94	1.03
JD		0.08	0.06	0.00	-0.03	-0.01	0.01	0.04	0.12	0.05	0.06
Alibaba		0.30	0.37	0.43	0.17	0.48	0.56	0.81	1.34	0.58	0.56
Meta		0.28	0.39	0.71	0.72	0.78	1.10	1.14	1.10	0.96	1.52

Source: Authors' calculations

cash and marketable securities as the most liquid assets (Cornett, Adair, Nofsinger, 2012) ends up with the same conclusion since the same three companies managed to keep the *cash ratio* values above one, while Amazon and JD would not be able to pay off current liabilities only with cash. For example, the JD company in 2022 has 1.35 euro of all current assets available to respond to current debts, compared to 0.87 euro of cash and marketable securities in the same year and for the same purpose. Having low *working capital to sales* ratio, the e-commerce companies try to release funds for operations.

Liquidity analysis of the top cross-border e-commerce companies indicates their frequent fluctuations in the level of liquid assets in the last ten years. Considering the research aim to examine the COVID-19 crises' impact on the companies' liquidity, there is not clear evidence that the companies change to a large extent their ability to deal with short term liabilities in that period of time. Liquidity ratio above 1, as an indicator of a company's liquidity, has been noticed for Alphabet, Alibaba and Meta in all three ratios (current, acid-test and cash ratios). On the other hand, Amazon and JD have only current ratio above 1, as the broadest liquidity ratio that includes all current assets. In line with that, as for the working capital, only Amazon and JD recorded negative working capital when Amazon's (in 2022) and JD's (in 2018-2022) current assets were not enough to meet current liabilities.

Profitability analysis indicates a firm's capacity to generate positive financial results from its operations (Andekina, Rakhmetova, 2013). Profitability ratios examine a firm's ability to exploit its assets in order to make and increase income, as well as shareholder value (Mitrović, Knežević, & Milašinović, 2021). The research applies the following ratios for measuring the company's profitability:

- Gross profit margin (GPM)
- Operating profit margin (OPM)
- Net profit margin (NPM)
- Basic earnings power ratio (BEP)
- Return on assets (ROA)
- Return on equity (ROE)
- Return on debt (ROD)
- Debt to equity ratio (D/E)

All profitability ratios for the observed e-commerce companies have been included in table 2 as return and margin ratios. *Gross profit margin*, as an indicator of the company's income left over after cost of goods sold are covered, slightly lowered its value for all analyzed companies in 2020. On the other hand, *operating profit margin*, also known as return on sales, and *net profit margin* or profit margin ratio, increased in 2020 compared to 2019. Whether they point to the income after operating expenses or net profit left after all costs (Cornett, Adair, Nofsinger, 2012), these two ratios confirm that e-commerce companies managed to be profitable in the time of the COVID-19 crises. Moreover, they managed to even increase their profitability in 2020. However, none of them succeed in keeping that high profitability in the following years (2021&2022). In line with the previous interpretation, net income earned per euro of assets, known as *basic earning power ratio*, also increased in 2020 for the analyzed companies. *Return on assets* and *return on equity* as well increased their value in 2020 compared to 2019, even though this is not the highest value achieved in the analyzed period. The last two ratios, *return on debt* and *debt to equity ratio*, show the companies' reliance on external funds to earn profit.

Thus, Amazon and JD decreased the reliance on debt in financing their business in the last years, Alibaba only in the first two analyzed years used more external than internal sources, while Meta and Alphabet in the whole period rely more on owner equity in financing operations. However, Meta over time has significantly increased the usage of external funds.

Table 2. Profitability ratios for the e-commerce companies, 2013-2022

E-commerce companies	Profitability ratios	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
Amazon	*Gross profit margin*	43.81	42.03	39.57	40.99	40.25	37.07	35.09	33.04	29.48	27.23
Alphabet		55.38	56.94	53.58	55.58	56.48	58.88	61.08	62.44	61.07	60.39
JD		14.06	13.56	14.63	14.63	14.28	14.02	15.16	13.39	11.63	9.87
Alibaba		36.76	41.28	44.60	45.09	57.23	62.42	66.03	68.72	74.54	71.85
Meta		78.35	80.79	80.58	81.94	83.25	86.58	86.29	84.01	82.73	76.18
Amazon	*Operating profit margin*	2.38	5.30	5.93	5.18	5.33	2.31	3.08	2.09	0.20	1.00
Alphabet		26.46	30.55	22.59	21.15	20.12	23.61	26.27	25.82	24.99	27.74
JD		1.89	0.44	1.65	1.56	-0.57	-0.23	-0.82	-3.56	-5.07	-0.82
Alibaba		11.11	12.50	18.05	15.15	27.89	30.36	29.22	30.59	47.55	31.66
Meta		24.82	39.65	38.01	33.93	44.62	49.70	44.96	34.72	40.06	35.62
Amazon	*Net profit margin*	-0.53	7.10	5.53	4.13	4.33	1.71	1.74	0.56	-0.27	0.37
Alphabet		21.20	29.51	22.06	21.22	22.46	11.42	21.58	21.10	21.42	22.93
JD		0.99	-0.37	6.62	2.11	-0.54	-0.04	-1.46	-5.33	-11.32	-3.53
Alibaba		7.26	20.95	29.28	23.25	25.57	27.59	70.66	31.69	43.96	24.35
Meta		19.90	33.38	33.90	26.15	39.60	39.16	36.86	20.47	23.46	18.94
Amazon	*Basic earnings power ratio (BEP)*	2.65	5.92	7.13	6.46	7.64	3.13	5.02	3.45	0.33	1.86
Alphabet		26.46	30.55	22.59	21.15	20.12	23.61	26.27	25.82	24.99	27.74
JD		3.67	1.00	5.07	4.25	-1.35	-0.56	-2.28	-9.26	-21.88	-3.22
Alibaba		5.59	5.31	7.01	5.87	9.73	9.48	8.11	9.12	22.38	17.13
Meta		15.58	28.17	20.51	17.98	25.60	23.90	19.13	12.60	12.50	15.67
Amazon	*Return on assets (ROA)*	-0.59	7.93	6.64	5.14	6.19	2.31	2.84	0.92	-0.44	0.68
Alphabet		16.42	21.16	12.60	12.45	13.20	6.42	11.63	10.73	10.94	11.48
JD		1.93	-0.86	20.30	5.75	-1.28	-0.10	-4.05	-13.84	-48.85	-13.84
Alibaba		3.65	8.89	11.37	9.01	8.92	8.62	19.61	9.45	20.69	13.18
Meta		12.49	23.72	18.29	13.86	22.72	18.83	15.68	7.43	7.32	8.33
Amazon	*Return on equity (ROE)*	-1.86	24.13	22.84	18.67	23.13	10.95	12.29	4.45	-2.24	2.81
Alphabet		23.41	30.22	18.09	17.05	17.30	8.30	14.01	13.15	13.61	14.58
JD		3.91	-1.78	62.26	19.77	-4.50	-0.48	-11.24	-24.54	-137.52	-38.65
Alibaba		5.78	13.98	17.15	14.39	14.66	13.60	28.64	15.34	56.70	76.69
Meta		18.45	31.53	22.72	18.29	26.28	21.41	17.21	8.30	8.10	9.64

E-commerce companies	Profitability ratios	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
Amazon	*Return on debt (ROD)*	-0.86	11.82	9.36	7.10	8.46	2.93	3.70	1.16	-0.55	0.90
Alphabet		54.96	70.64	41.48	46.12	55.72	28.27	68.44	58.33	55.81	53.93
JD		3.83	-1.67	30.11	8.11	-1.79	-0.13	-6.33	-31.73	-75.77	-21.55
Alibaba		9.95	24.43	33.74	24.57	22.80	23.52	62.19	24.64	32.57	15.91
Meta		38.66	95.77	93.94	57.19	167.42	156.43	176.66	70.71	75.58	61.48
Amazon	*Debt to equity ratio*	2.17	2.04	2.44	2.63	2.73	3.74	3.32	3.84	4.07	3.12
Alphabet		0.43	0.43	0.44	0.37	0.31	0.29	0.20	0.23	0.24	0.27
JD		1.02	1.07	2.07	2.44	2.51	3.69	1.78	0.77	1.81	1.79
Alibaba		0.58	0.57	0.51	0.59	0.64	0.58	0.46	0.62	1.74	4.82
Meta		0.48	0.33	0.24	0.32	0.16	0.14	0.10	0.12	0.11	0.16

Source: Authors' calculations

The conducted ten-year financial analysis, emphasizing the profitability and liquidity aspect of the companies, responded to the main research goal and related questions. All the examined e-commerce companies managed to respond to the COVID-19 crises and keep the positive trend in their businesses. Their sales volume was increased in 2022 in relation to 2013 several times (Alibaba: 24 times, Meta: 15 times, JD: 13 times, Amazon: 7 times, Alphabet: 5 times) and the positive trend over these ten years has not been interrupted by crises. Although revenue grew in absolute terms, value of profitability measures remains almost the same, with some slight fluctuations. Positive financial result, obtained in the time of COVID-19 crises, was kept in the following years, except Amazon in 2022 and JD in 2021. The selected top five e-commerce companies in this challenging time succeed in having a balance between a need to keep liquid assets and increase profit at the same time. The main driving force of their financial success is reflected in the constant increase of sales value over years.

5. Conclusion

Along with an imposition of the social distance and other anti-pandemic measures, a sharp decline in the sales, which in turn has implied the reasonable concerns of the retailers about expected decline in their turnover, profitability and cash flows has been recorded. Accordingly, the COVID-19 crisis and accompanying circumstances have challenged all the business making their financial performance and position inquiring. The intention to best adapt to the new business conditions has resulted in exploring the potential of e-commerce which has experienced the immense acceleration in its operations. However, despite the fact that the pandemic has opened the door for many businesses to take the opportunities from the new business model adoption, not all the online sellers have benefited from it. Even though there has been a reasonable expectation that the e-commerce would contribute to the e-business better performance, still, there is mixed empirical evidence on their financial performance in the light of the recent pandemic.

Aiming to assess the impact of the COVID-19 pandemic on the financial performance of e-commerce, the study employs the profitability and liquidity ratio analysis on the corporate data of the top five cross-border e-companies within the period 2013-2022. The results suggest that all the examined e-commerce companies managed to successfully respond to the COVID-19 crises and keep the positive trend in their financial performance, given the sharp increase in their sales revenues and maintenance of their profitability levels over the entire examined period, except for Amazon in 2022 and JD in 2021. Accordingly, the selected e-commerce companies succeeded to balance between a need to keep liquid assets and increase profit in this challenging time. The main driving force of their financial success is reflected in the constant increase of sales value over years. Thus, the findings of this study have confirmed that COVID-19 had a meaningful positive impact on the e-commerce industry financial performance, with a different extent across the examined firms, which implies that the pandemic has impacted subdivisions of e-commerce asymmetrically.

Taking the above findings, one could conclude that the convenience and the benefits arising from e-commerce seem to have permanently reshaped the consumer and firms' behavior in favor of the everlasting trend of e-commerce consumers and purchase growing that is expected to be of a long-term nature and remain much beyond the COVID-19 era. However, while e-commerce may bring the benefits to firms and their financial performance, particularly during the pandemic period, still, the perspective of taking the advantages from such a hard time period is uncertain and will depend on many factors. To fully benefit from such a business model, the e-commerce businesses are highly recommended to keep struggling in meeting the customers' needs by being innovative, flexible, providing affordable shipping and bringing the value to the customer service, thus fulfilling their e-commerce expected experience. The exploitation of the benefits from the e-business models has been particularly challenging in the developing economies where the online retail has still been a new phenomenon due to which the role of e-commerce in emerging markets to support the economic recuperation during and in the aftermath of the COVID-19 was limited.

The limitations of the study are reflected in the fact that the data were collected only for several companies belonging to the assessed sector, which may constrain the generalization. In addition, the study employs only selected financial ratios, focusing on the profitability and liquidity aspects for drawing the conclusions on the business financial performance in the examined period. Lastly, the study does not investigate the internal and external factors which may have impact on the adoption and usage of the e-commerce mechanisms, barriers for the full exploitation of their benefits during the pandemic, as well as possible strategies to maximize the benefits and mitigate the burdens associated with e-business models implementation. Accordingly, the research could be further extended to fit these gaps thus respectively enhancing the quality of the study's findings and conclusions.

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