INDERSCIENCE PUBLISHERS
Linking academia, business and industry through research

International Journal of Economics and Business Research

ISSN online: 1756-9869 - ISSN print: 1756-9850
https://www.inderscience.com/ijebr

Amazon's behaviour during corona pandemic: the case study of office and stationery category in Germany

Robert Laskowski, Petr Wawrosz, Lenka Kopecká, Zora Říhová, Roman Svoboda

DOI: 10.1504/IJEBR.2024.10065366

Article History:

Received:	13 February 2024
Last revised:	06 June 2024
Accepted:	06 June 2024
Published online:	29 July 2024

Amazon's behaviour during corona pandemic: the case study of office and stationery category in Germany

Robert Laskowski

Faculty of Economic Sciences,
University of Finance and Administration,
Estonská 500, 101 00 Praha 10-Vršovice, Czech Republic
Email: rlaskowski@amvisor.com

Petr Wawrosz and Lenka Kopecká

Faculty of Economics and Management,
Czech University of Life Sciences in Prague,
Kamýcká 129, Prague 6 – Suchdol, 16500, Czech Republic
Email: wawrosz@pef.czu.cz
Email: kopeckal@pef.czu.cz

Zora Říhová

Faculty of Science,
University of South Bohemia in České Budějovice,
Branišovská 1645/31a, 370 05 České Budějovice, Czech Republic
Email: zrihova@prf.jcu.cz

Roman Svoboda*

Faculty of Economics and Management,
Czech University of Life Sciences in Prague,
Kamýcká 129, Prague 6 – Suchdol, 16500, Czech Republic
Email: svobodar@pef.czu.cz
*Corresponding author

Abstract: The study presented in the paper concentrates on the behaviour of the world's largest online retailer Amazon in Germany in the office and stationery category for the period from January 2020 to December 2021. We revealed that the company mainly concentrated on maintaining the share of products that are sold on its website by itself and not by other sellers. It, therefore, had to decrease its sales price from March to November 2020. The sales prices then followed the development of the purchase prices till May 2021 and exceeded them for the rest of the investigated period; however the average growth of sales prices that was not caused by the growth of purchased prices and the VAT effect achieved only 2.83%. Amazon seems to have not abused its dominant position when it tried to keep its customers and not to give them a reason for switching to its competitors.

Keywords: Amazon; firm behaviour; corona pandemic; Buy Box; dominant market position; prices; online price index (indices); online trade; office and stationery goods; Germany.

Reference to this paper should be made as follows: Laskowski, R., Wawrosz, P., Kopecká, L., Říhová, Z. and Svoboda, R. (2024) 'Amazon's behaviour during corona pandemic: the case study of office and stationery category in Germany', *Int. J. Economics and Business Research*, Vol. 28, No. 5, pp.1–23.

Biographical notes: Robert Laskowski is presently working for the company AMVisor. He is also studying his PhD study concentrated on finance at the University of Finance and Administration, Prague, the Czech Republic. He specialises in his research on features of online shopping, how companies set prices, and the differences between online and official inflation.

Petr Wawrosz is currently working as an Associate Professor at the Czech University of Life Science, Faculty of Economics and Management where he is teaching microeconomics and macroeconomics. He devotes in his research to institutional and behavioural economics, cultural intelligence and other issues. He studied economic at University of Economics, Prague and law at Faculty of Law, Charles University, Prague. He collaborated many years with the University of Finance and Administration, Prague and also worked as a journalist for the Czech main economic journals and magazines.

Lenka Kopecká studied at the Faculty of Economics (Economic Statistics) of the University of Economics, Prague, from which she successfully graduated in 1991. After this, she worked in several state institutions and the banking sector. In 2007, she joined the Department of Economic Theories of the Czech University of Life Sciences as an Assistant Professor. In 2011, she obtained a doctorate in the Company and Branch Economics from the Czech University of Life Sciences. Over the years, she has lectured on microeconomics and macroeconomics at the CULS. In the research area, she focuses on issues related to human resources and price competition models in oligopolistic markets. She has co-authored a number of scientific and technical papers and attended numerous international scientific conferences.

Zora Říhová is a graduate of the University of Economics in Prague. Then, she has a scientific study at the Faculty of Informatics and Statistics, field of management. For many years, she lectured System Analysis and IT Governance at the Department of Automated Management Systems at University of Economics, where she also received a docent's degree at the branch information management. For many years, she worked in practice, e.g., as the Head of the Organisation and Informatics Department of the holding UNIPETROL, or a senior project manager at Siemens Business Services, where she managed important projects for the introduction of information systems. He currently works at the Faculty of Science of the University of South Bohemia at the Department of Applied Informatics, where she applies the acquired practical experience by teaching courses in System Analysis, Project Management or Process Modelling, in the scientific and research field, she deals with information management and project management.

Roman Svoboda studied Informatics at the Faculty of Economics and Management of the Czech University of Life Sciences Prague, graduating in 2008. In 2010–2012, he studied the Company and Branch Economics PhD programme at the Department of Economic Theories of the Faculty of Economics and Management of the Czech University of Life Sciences Prague,

writing his dissertation on the imperfect competition between agricultural and foodstuff companies. Since 2013, he has been working at this faculty as a lecturer of microeconomics and macroeconomics. Within his research activities, he focuses on the issues of imperfectly competitive markets in agriculture and services.

1 Introduction

On 11.03.2020, the World Health Organization (WHO) declared a pandemic in the wake of the spread of the coronavirus (Räker et al., 2021). The virus affected the whole world including Germany. To protect the health system, German Governments (on the federal level and the level of the so-called Bundesland) took various measures to slow down the spread of the disease. One of the first measures was to cancel all large events in Germany, followed by distance requirements and mandatory masks. As early as 22 March 2020, the government sent the country into its first lockdown, which was only partially lifted again with initial relaxations on 4 May 2020. During this time far-reaching curfew was imposed. Stationary trade was closed across the board except for shops for daily needs, such as grocery shops, drugstores and pharmacies. People were ordered to stay in their homes and only go outside for shopping, certain leisure activities and unavoidable trips. Many workers were forced to work from home from that moment on. Children had to be educated at home also by their parents or via online education. With these measures, life in Germany has changed permanently for many people. On 2 November 2020, the German Government imposed the next 'light' lockdown to further reduce the number of infections through contact restrictions and to break the waves of spread. On 13 December, the measures were tightened as a hard lockdown and extended until spring 2021, when they were gradually eased, but some restrictions remained in force or introduced again for some time until the beginning of 2022 (German Government, 2022). As Verhoef et al. (2023) emphasise although there were external shocks or crises in the past, such massive shocks have not been observed in modern retailing (since the end of the Second World War) and the crisis necessarily had to affect both behaviour of customers and producers. Some authors (e.g., Weber, 2021) label the pandemic as a black-swan even, although it is emphasised (Magableh, 2021) that it differs from other similar events as it simultaneously disrupted both demand and supply.

A temporary VAT cut from 19% to 16% from July to December 2020 should boost the gloomy economy in Germany (German real GPP declined by 3.70% in 2020). This measure will certainly benefit all online retailers. In many cases, people in Germany had no choice but to shop online since brick-and-mortar retail in most categories was closed all over the country. Online trade experienced a positive demand shock. However, online supply was limited. The offer was in Germany mainly provided by several large companies such as Amazon, Otto, Zalando and Ebay when Amazon had a dominant position – its turnover achieved 13,876 billion EUR in 2020. The turnover of the second online shop Otto was only 4.5 billion EUR. The sum of the turnovers of online shops in second to tenth place did not exceed Amazon's turnover (Handelsverband Deutschland, 2021). Such a situation gave Amazon the power to increase the prices of offered goods if demand for them grows. The article therefore investigates whether Amazon exploited its

dominant market position during the coronavirus pandemic in 2020 and 2021 in Germany in the office and stationery category (where we have available data) and really increased its prices and profit. Understanding Amazon's pricing decisions during the COVID-19 pandemic is essential as it sheds light on the company's responsiveness to market dynamics, alignment with consumer interests, and adaptability to economic realities. These insights offer valuable lessons not only for researchers but also for policymakers, businesses, and consumers alike (Hospodková et al., 2021). We explore business-to-consumer exchanges (Shettar, 2023) when a business often has better information and knowledge, the abilities, skills and time of consumers could be reduced and a business can abuse this fact. According to our best knowledge, there is no research investigating the selected category during the COVID-19 period. Some articles researched grocery shopping (e.g., Pop et al., 2024; Žurek and Rudy, 2024; Fedoseeva and Van Droogenbroeck, 2023 – the last article concentrates specifically on Germany but only on the first wave of the pandemic, i.e., approximately until the end of June 2020). Our category can be considered as an example of goods that are, in the modern world important for life, albeit not essential and it makes sense to investigate companies behaviour here.

The article is organised as follows: literature review brings a brief insight into online retail including its development during the COVID pandemic. Section 3 for the next understanding describes how goods are sold on the Amazon web page followed by material and methods and by results. Discussion further analyses Amazon are decision-making about price development in the investigated category during corona pandemic. Conclusion summarises main findings.

2 Literal review: online retail

Online commerce is the process of buying and selling goods on the internet using electronic data (Grandon and Pearson, 2004). With just a few clicks, the customer receives countless offers for his current needs (Tsagkias et al., 2021). Once the desired item has been identified, internet portals such as Idealo or Google Shopping make it easy to compare the prices of the desired products and link directly to the cheapest offer. With some more clicks of the mouse, the item is paid for and usually at the doorstep of the home just one day later. This convenient shopping behaviour in online retail has been a major threat to brick-and-mortar retail (Danaher et al., 2008). Current retail development can be thus characterised as undergoing a series of major transformations as platform-based multi-sided marketplaces, like Amazon, Alibaba, eBay, JD.com and Rakuten that challenge incumbent retailers. From the thriving brick-and-mortar stores and the development of shopping centres, malls and retail chains throughout the 1900s, retail has become increasingly digital as multi-sided marketplaces are uniting the online and offline to create more sophisticated and personalised customer experiences (Hanninen et al., 2018; Gauri et al., 2021) giving higher benefits to customers using modern forms of retail.

Online retailing can be divided into different forms, including brand shops, marketplaces and online shops. All forms have their advantages and disadvantages both for sellers and buyers (Veselova, 2020). A brand shop is an online shop of a brand manufacturer that exclusively sells its own manufactured and branded articles on its website. An online shop is usually run by a retailer who sells different items from

different brands to the end consumer. In an online marketplace, different suppliers of products, traders and consumers meet to sell and buy goods. Since it is easy for consumers to compare prices in e-commerce and this is one of the most important reasons when and why a customer buys a product from an online retailer, suppliers sometimes use automatic price adjustment systems to generate optimum prices and sales (Jorge et al., 2020). Amazon itself is a combination of all three forms. Amazon sells exclusively, items under its brand, sells millions of products from other brands and provides the largest marketplace in the world.

Pricing in online retail is very volatile and works mainly by looking at prices in other online shops that offer the same products. Nowadays, this is no longer done manually, but mostly with the support of specially developed software solutions. If the first online shop reduces the price of an item, the next online shops follow suit and, at best, undercut the price again. In this way, a market price is established in the online market (Cavallo, 2018). In addition to the price of an item, other features such as trust, security, user-friendliness of a webshop including the structure of the web, delivery quality and speed of the items purchased when a purchase is realised, experiences of customers including their intelligence are other factors important for consumers and affecting an online shop's sales and profits (Chen and Dibb, 2010; Sredl et al., 2013; Vakulenko et al., 2019; Wawrosz and Jurásek, 2021; Shaw et al., 2022). The quality of a good bought online is often rather invisible to customers and they may hesitate to make a purchase. Online shops thus pay special attention to emphasising quality characteristics (Liu et al., 2023). Online reviews belong to the most important factors that affect a final decision to buy or not (Korfiatis et al., 2012). Pourgholamali et al. (2020) add that product reviews written by the crowd on e-commerce shopping websites have become a main critical information source for making purchasing decisions.

However, because most online shops are constantly working on the improvement of delivery quality, speed and other factors (Cui et al., 2020) the price of an item remains the main differentiator. Another way for online shops to increase sales is to display the current availability of goods. If the availability decreases, the purchase of the product increases which can, in the case of inelastic demand, lead to higher revenue for the shop customer returns (Calvo et al., 2020). In the case of a shortage, shoppers even compete in the form of an auction who buy a good.

Especially during the times of the pandemic, online sales increased strongly. Credit card data from different nations before, during and after the pandemic was analysed to determine how much online trade developed in each country (Alcedo et al., 2022). It was confirmed that online sales in technically developed countries increased much faster than in countries that were not yet as developed in technical know-how and infrastructure (Mishra et al., 2022), namely if a country had pre-pandemic e-commerce share as well as persistently higher online spending shares in retail and restaurants. Cavallo (2020) has found that inflation rates during COVID-19 were higher than the inflation rates determined by the statistical offices. This is mainly attributed to the changes in the buying and demand behaviour of consumers. The demand increased not only because many brick-and-mortar shops were closed during the pandemic. Customers were also afraid of the risk of infection and preferred shopping forms that reduced this risk (Hazée and Van Vaerenbergh, 2021). The already known online retailers such as Amazon profited most from this shift (Verhoef et al., 2023). What concerns Germany: its e-commerce expenditures were around 3% of total consumption expenditures in 2015 but doubled within the five following years (Wolf, 2024). COVID-19 pandemic accelerated

further development. One in seven euros in retail was spent online in 2021, which means growth in comparison with 2019 of over 43%. If only non-food items are considered, every fifth euro was invested online for goods and services. In total, online trade achieved a turnover of 85 billion euros in the year 2021 (Handelsverand Deutschland, 2021).

3 Amazon: both seller and marketplace

Amazon can be defined both as an online shop and a marketplace. It sells now almost any product divided into many product categories (its web page now includes 25 categories). Amazon's growth, from the first American online bookstore in 1994 to today, is mainly due to a wide product selection, fast delivery, customer-focused service and low market prices. All of this leads to Amazon's overarching goal of building the highest possible consumer trust (Albrecht et al., 2023). To achieve the lowest prices Amazon uses its scraping system that searches the entire online market to find if other online shops sell for a lower price the item offered by Amazon too. If a cheaper price is found, Amazon's price is usually discontinued or undercut (Cavallo, 2018). This policy guarantees customers to find the best offer on Amazon's web page (Khan, 2017). In addition, millions of customers have already committed to Amazon via a Prime membership to receive mostly postage-free deliveries. In the case of Germany, over 63% of German households already had already before the start of COVID-19 pandemic an existing Amazon Prime membership and do not have to pay any additional shipping costs when they shop at Amazon (McKinsey & Company, 2019). Thus, a large part of the German population had already committed to Amazon before they have even bought products.

Amazon uses its website both as a seller and as a marketplace (Levitan, 2021). In the first case, it behaves as a typical retailer – it buys the goods directly from the manufacturer and then sells them to the consumer on the website. Just like a brick-and-mortar retail, Amazon determines the selling price and shipping costs for these items and collects the margin and the downstream conditions negotiated with the supplier in return. Downstream conditions can be advertising allowances negotiated with the supplier, discounts, bonus payments through volume agreements, return flat rates and other services. The difference to brick-and-mortar trade is Amazon's pricing. As mentioned in the previous paragraph, Amazon reacts to the prices of its competitors and generally strives to offer the cheapest price. Thus, prices on Amazon are highly volatile and can change several times in one day (Cavallo, 2018).

When Amazon acts as a marketplace it offers its web page to other sellers who can here also offer goods to customers. It does not matter whether Amazon also sells this item or not. Amazon does not set up the selling price or other conditions under which other sellers offer their goods on Amazon's web page. For example, the same coffee maker is offered by Amazon itself and by other sellers in the marketplace. When the customer gets to the Amazon detail page of the coffee maker, he sees different offers for the coffee maker. One offer comes from Amazon directly and many more from other sellers. Both Amazon and other sellers must determine their selling (i.e., retail) price. Only the marketplace fees and continuing services on Amazon's part can indirectly influence the selling price of other marketplace participants. A consumer has a free choice from what seller the coffee maker is bought. However, the best offer for the consumer for each item is placed by Amazon on its page in the so-called Buy Box. The term can be seen as a synonym for the best deal that concerns price and shipping costs, and the customer can

finally buy the item from buy-box with a click. Buy-box creates competition among all sellers including Amazon on Amazon's web page. If a seller offers an item for a lower price compared to other competitors, the competitors (mainly Amazon) tend to decrease their price.

Sellers as well as Amazon use modern computer-aided price adjustment systems for this, which partially or fully automate the fight for the Buy Box. If a seller wins the Buy Box because it has the best offer, it must pay Amazon a marketplace fee or a commission. Amazon is satisfied in any case. It either earns a trading commission because it allows selling the good or service offered by somebody else on Amazon marketplace, or Amazon sells the item itself and profits from its trading margin. Thus, Amazon still weighs its pricing on its profit. If the marketplace commission is higher than Amazon's trading margin, Amazon has a profit incentive to allow the seller to win the Buy Box and Amazon gives up its margin.

On the other hand, one of Amazon's goals is to make the customer the best offer in the entire online trade to generate a high level of buyer confidence. To achieve this, Amazon is willing to forego margins that could be achieved through higher prices of its competitors (Levitan, 2021). Even if a higher profit could be achieved through a seller's commission, Amazon still can take over the Buy Box to offer the best deal on its marketplace. In addition, Amazon managed to build a high service standard for its customers as fast delivery to consumers or uncomplicated returns management (Cui et al., 2020). These features generate a very strong trust among consumers. Thus, Amazon usually has the highest conversion rate. If Amazon takes over the Buy Box, it sells more products than any other seller would at the same time (Khan, 2017) which contributes to Amazon's total profitability. These circumstances also influence Amazon's Buy Box behaviour. If Amazon forgoes margin and, if applicable, the trade commission, the total revenue can be still maximised via the higher number of successful sales without a situation when a customer returns a product to the shop.

4 Material and methods

The research on whether Amazon used the opportunity and increased its price due to limited competition during COVID-19 pandemic is based on data concerning 9,977 items that cover 17 different parts in the office supplies and stationery sector (for instance, pens, pencils, envelopes, paper, staplers, paste, exercise book, scissors, printed forms, cartridge, writing pads, etc.) for the period from 01.01.2019 to 31.12.2021 on a daily basis. The data is provided by the special analysis software. It scraps once a day at a random time of day the current Amazon purchase price (PP) and sales price (RP), whether Amazon has taken over the Buy Box (BB) and what profitability on a weekly basis (Net-PPM) Amazon has achieved with the sale of the goods (Table 1).

A purchase price (PP) is the price at which a supplier sells an item to Amazon. It is a result of negotiation between a supplier and Amazon. When a deal is made, its validity is commonly one year and the price becomes usually stable for that period. Purchase prices determine the decisive part of Amazon's cost connected with buying the product. The Amazon gross sales (i.e., retail, RP) price including VAT represents the price at which a product is offered by Amazon on its web page.

Table 1 Data collection scheme – daily Amazon purchase price, daily Amazon retail price, daily Amazon Buy Box and daily Amazon net profit margin per week

		01/01/2019		
	PP	*RP*	*BB*	*Net-PPM*
Product 0001	4.67 €	5.78 €	Yes	53%
Product 0002	23.56 €	32.99 €	Yes	19%
Product 0003	12.87 €	17.50 €	No	32%
…				
Product 9977	8.65 €	10.67 €	Yes	41%
		02/01/2019		
Product 0001	4.67 €	4.78 €	No	23%
Product 0002	23.56 €	32.99 €	Yes	19%
Product 0003	12.87 €	18.36 €	Yes	38%
…				
Product 9977	8.65 €	11.34 €	Yes	45%
…				
		31/12/2021		
Product 0001	4.88 €	6.12 €	Yes	45%
Product 0002	22.50 €	29.34 €	No	12%
Product 0003	13.45 €	19.99 €	Yes	26%
…				
Product 9977	9.34 €	12.56 €	No	41%

Source: Own work; Amazon data (2022)

Both prices are used to count price development and to investigate whether Amazon changed its prices if it met higher demand if there is a VAT change or another event. The price changes of products are measured against the respective month of the previous year. If data from the previous year is not available, this item is not considered for the current month. The Laspeyres index formula is used for the calculations of the online price index because it is also used in the calculation of the consumer price index and the harmonised index of consumer prices in Germany (Camba-Mendez et al., 2002).

Amazon's purchase price inflation (*PPI*) and retail price inflation (*RPI*):

$$PPI = \sum_{t=0}^{t} \frac{PP_t - PP_{t-1}}{PP_{t-1}} \tag{1}$$

$$RPI = \sum_{t=0}^{t} \frac{RP_t - RP_{t-1}}{RP_{t-1}} \tag{2}$$

t = period month, $t - 1$ = same month, previous year.

Table 2 Amazon's PPI with valid sample size, median, standard deviation and range

Month[1]	*Valid*[2]	*Missing*[3]	*PPI*[4]	*Median*[5]	*SD*[6]	*Range*[7]	*Minimum*[8]	*Maximum*[9]	*Percentile 25*	*Percentile 50*	*Percentile 75*
Jan-20	1,969.00	6,237.00	–0.78	0.00	6.62	120.92	–57.15	63.77	–1.43	0.00	0.62
Feb-20	3,395.00	4,811.00	–0.44	0.00	4.01	194.93	–59.36	135.57	0.00	0.00	0.00
Mar-20	3,401.00	4,805.00	–0.16	0.00	4.25	215.20	–59.36	155.84	0.00	0.00	0.00
Apr-20	3,506.00	4,700.00	0.12	0.00	4.11	231.90	–59.36	172.54	0.00	0.00	0.66
May-20	4,011.00	4,195.00	0.32	0.00	3.61	247.38	–74.84	172.54	0.00	0.00	0.00
Jun-20	4,045.00	4,161.00	0.65	0.00	3.74	224.18	–51.64	172.54	0.00	0.00	1.41
Jul-20	4,049.00	4,157.00	0.76	0.00	3.40	222.54	–50.00	172.54	0.00	0.00	1.41
Aug-20	4,216.00	3,990.00	0.75	0.00	3.19	200.45	–27.91	172.54	0.00	0.00	1.39
Sep-20	4,243.00	3,963.00	0.77	0.00	3.14	198.35	–25.81	172.54	0.00	0.00	1.39
Oct-20	4,263.00	3,943.00	0.77	0.00	3.14	198.35	–25.81	172.54	0.00	0.00	1.39
Nov-20	4,326.00	3,880.00	0.76	0.00	3.11	198.35	–25.81	172.54	0.00	0.00	1.39
Dec-20	4,401.00	3,805.00	0.70	0.00	3.48	248.10	–75.56	172.54	0.00	0.00	1.36
Jan-21	4,725.00	3,481.00	8.50	0.09	52.75	478.51	–79.83	398.68	–1.90	0.09	2.66
Feb-21	3,400.00	4,806.00	8.63	0.00	52.45	476.54	–79.75	396.73	0.00	0.00	0.00
Mar-21	4,694.00	3,512.00	9.49	0.00	51.71	474.60	–79.62	394.98	0.00	0.00	2.17
Apr-21	4,744.00	3,462.00	9.32	0.00	51.78	473.81	–79.74	394.07	0.00	0.00	1.71
May-21	4,771.00	3,435.00	9.25	0.00	51.67	473.81	–79.74	394.07	0.00	0.00	1.69
Jun-21	4,784.00	3,422.00	9.00	0.00	51.68	473.81	–79.74	394.07	0.00	0.00	1.34
Jul-21	4,801.00	3,405.00	9.06	0.00	52.05	473.81	–79.74	394.07	0.00	0.00	1.34
Aug-21	4,921.00	3,285.00	8.88	0.00	51.41	473.81	–79.74	394.07	0.00	0.00	1.35
Sep-21	4,934.00	3,272.00	9.11	0.00	52.16	473.69	–79.62	394.07	0.00	0.00	1.35
Oct-21	4,977.00	3,229.00	9.17	0.00	51.92	473.81	–79.74	394.07	0.00	0.00	1.57
Nov-21	5,046.00	3,160.00	9.12	0.00	51.81	473.81	–79.74	394.07	0.00	0.00	1.57
Dec-21	5,117.00	3,089.00	8.95	0.00	51.49	473.81	–79.74	394.07	0.00	0.00	1.57

Notes: [1]The individual month under consideration in the period 2019 to 2021. [2]Valid results of the sample after trimming the data. [3]Invalid results of the sample after trimming the data. [4]Change in Amazon's purchase price compared to the previous month. [5]The value that lies exactly in the middle of all valid results of the sample. [6]Average deviation of all valid results from the average. [7]Span between the largest and the smallest valid result of the sample. [8]The smallest value of the valid results of the sample. [9]The largest value of the valid results of the sample.

Source: Own work; Amazon data (2022)

Table 3 Amazon's retail price inflation with valid sample size, median, standard deviation and range

Month[1]	*Valid*[2]	*Missing*[3]	*PPI*[4]	*Median*[5]	*SD*[6]	*Range*[7]	*Mnimum*[8]	*Maximum*[9]	*Percentile 25*	*Percentile 50*	*Percentile 75*
Jan-20	1,812.00	6,394.00	6.23	0.00	38.67	431.07	–79.32	351.75	–9.80	0.00	11.43
Feb-20	2,992.00	5,214.00	1.76	0.00	31.25	450.99	–76.81	374.18	–12.54	0.00	8.74
Mar-20	3,141.00	5,065.00	3.50	0.00	31.44	431.07	–78.39	352.68	–10.94	0.00	10.48
Apr-20	3,038.00	5,168.00	6.25	0.76	31.30	468.51	–79.97	388.55	–6.31	0.76	13.37
May-20	3,635.00	4,571.00	2.92	0.00	32.29	436.34	–78.39	357.96	–10.40	0.00	8.83
Jun-20	3,645.00	4,561.00	0.04	–0.19	31.92	427.46	–79.56	347.89	–14.26	–0.19	7.35
Jul-20	3,629.00	4,577.00	–2.70	–2.90	31.65	431.74	–78.32	353.42	–17.60	–2.90	4.96
Aug-20	3,910.00	4,296.00	–5.58	–5.57	33.57	463.73	–79.49	384.23	–21.87	–5.57	2.59
Sep-20	3,702.00	4,504.00	–7.63	–6.77	31.84	468.74	–78.75	389.99	–23.16	–6.77	0.71
Oct-20	3,707.00	4,499.00	–6.50	–5.60	31.97	407.74	–79.87	327.87	–20.70	–5.60	0.99
Nov-20	3,681.00	4,525.00	–3.95	–3.16	30.29	450.06	–79.80	370.26	–14.81	–3.16	1.83
Dec-20	3,742.00	4,464.00	–2.89	–2.67	31.58	448.90	–78.75	370.14	–14.68	–2.67	3.00
Jan-21	4,521.00	3,685.00	10.36	0.00	59.80	477.66	–79.98	397.67	–12.30	0.00	13.93
Feb-21	4,355.00	3,851.00	11.14	0.00	59.00	478.18	–79.91	398.27	–10.50	0.00	14.33
Mar-21	4,532.00	3,674.00	9.95	0.00	58.13	477.24	–79.84	397.39	–11.72	0.00	12.80
Apr-21	4,238.00	3,968.00	8.11	–0.77	59.12	479.39	–79.95	399.44	–14.74	–0.77	9.30
May-21	4,509.00	3,697.00	7.99	–0.46	58.20	471.65	–79.89	391.75	–13.15	–0.46	9.71
Jun-21	4,481.00	3,725.00	9.14	–0.09	61.04	479.98	–79.98	400.00	–12.88	–0.09	10.96
Jul-21	4,443.00	3,763.00	14.03	2.58	60.46	476.91	–79.89	397.02	–6.91	2.58	16.08
Aug-21	4,659.00	3,547.00	15.24	3.05	58.95	474.09	–79.89	394.20	–5.51	3.05	17.62
Sep-21	4,459.00	3,747.00	15.34	3.32	59.57	479.21	–79.99	399.22	–4.45	3.32	17.29
Oct-21	4,496.00	3,710.00	15.89	3.60	60.28	477.04	–79.90	397.14	–4.11	3.60	16.46
Nov-21	4,600.00	3,606.00	15.04	3.16	61.15	477.52	–79.77	397.75	–4.94	3.16	16.04
Dec-21	4,652.00	3,554.00	10.82	2.39	58.92	478.66	–79.11	399.55	–9.58	2.39	11.83

Notes: [1]The individual month under consideration in the period 2019 to 2021. [2]Valid results of the sample after trimming the data. [3]Invalid results of the sample after trimming the data. [4]Change in Amazon's purchase price compared to the previous month. [5]The value that lies exactly in the middle of all valid results of the sample. [6]Average deviation of all valid results from the average. [7]Span between the largest and the smallest valid result of the sample. [8]The smallest value of the valid results of the sample. [9]The largest value of the valid results of the sample.

Source: Own work; Amazon data (2022)

It must be emphasised that Amazon's retail price can be higher than the price of a different seller (i.e., not Amazon) that won the Buy. As items are usually sold at buy-box price (Gómez-Losada et al., 2022), Amazon's price thus does not necessarily represent the price at which an item is bought by most customers. From that point, an important indicator showing how much Amazon itself wins the Buy Box is the Amazon Buy Box quota (*BBQ*). The monthly BBQ per item is calculated (3) from the number of days on which Amazon itself was in the Buy Box (*ADB*) to the number of days in a month (*DpM*).

$$BBQ = \frac{ADB}{DpM} \tag{3}$$

The total BBQ per month is calculated from the average of all BBQs per article and month.

The Amazon net profit margin (*Net-PPM*) is reported by the company weekly and it shows the profitability of an item for Amazon if Amazon itself has won the Buy Box. In addition to the downstream condition and the trade margin, *Net-PPM* also includes the return rate of an item and the storage costs. The change in Amazon's net profit margin (*CnetPPM*) is calculated (4) with a simple subtraction of the *Net-PPM* from the current year and the *Net-PPM* from the previous year. An extraordinary positive difference can indicate that the company abused its power and increased retail prices to achieve higher profit.

$$CnetPPM = netPPM_t - netPPM_{t-1} \tag{4}$$

To minimise errors in the raw data the following approach is used: if there is a price deviation of more than 80% downwards or 400% upwards from the previous daily price, the item is not included in the calculation. This approach is based on Hansen (2020) who investigated in his article the development of online prices. Data about the purchase price and retail price for an item must be further available at least ten days per month; otherwise the item is not also included in the analysis. If all the above-mentioned conditions are satisfied, daily prices are aggregated to an arithmetic average price per month. We started our investigation in January 2020 when we had, based on the above-mentioned conditions, only 1,812 valid items and 6,649 invalid ones (see Table 2 and Table 3). The situation in December 2021 was 5,117 valid items and 3,096 invalid ones. The values of net profit margin are available only for 2020 and 2021, so its change (*CnetPPM*) could only be measured in 2021.

For our investigation, we check whether the sample is representative. Since we do not know the size of the population for our study, we can use the simplified form of the equation to determine a representative sample size [see equation (5) and e.g., Frost, 2020]. In equations (5) and (6) we set $\pi = 0.5$ to ensure that the sample contains the true value even in the worst case. The π-value can range from 0% to 100% and is usually not known in advance of a sample investigation. With $\pi = 0.5$, it is ensured that the equation for determining the sample with $\pi\ (1 - \pi)$ obtains its maximum. To ensure a high confidence level in our sample of at least 99%, we set $z = 2.58$, as can be seen in equations (6) and (7). We determined the z-value using the z-value table of the standard normal distribution (Taherdoost, 2016):

Confidence level (z-value table): 90% → 1.65, 95% → 1.96, 99% → 2.58.

$$E = z * \sqrt{\frac{\pi(1-\pi)}{n}} \tag{5}$$

n = sample size, π = proportion of the characters in the population, z = width of the confidence interval, E = margin of error.

$$E = 2.58 * \sqrt{\frac{0.5(1-0.5)}{1{,}812}} = 0.0303 (\text{with the smallest sample size, } n = 1{,}812) \tag{6}$$

$$E = 2.58 * \sqrt{\frac{0.5(1-0.5)}{5.17}} = 0.0180 (\text{with the smallest sample size, } n = 5{,}117) \tag{7}$$

A margin of error (1) of a maximum of 3.03% is achieved when the sample size contains 1,812 measurements (2). Similarly, a margin of error of only 1.8% is achieved when the sample size has 5,117 measurements (3). From that point, the sample of at least 1,812 items is always representative with a probability of 99% and with a margin of error of 3.03%.

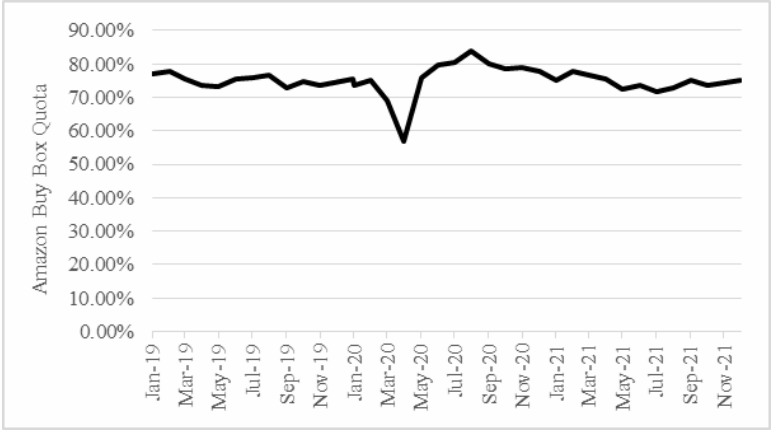
5 Results

Let's first concentrate on the development of Amazon's annual average Buy-Box rate which indicates Amazon's position on its web page in competition with other sellers. The rate was around 75% for the investigated period (see Figure 1). However, it decreased to the value of 69.22% and then 56.73% at the beginning of the pandemic and the start of the first German lockdown in March and April 2020. The closure of brick-and-mortar retail at this time forced customers to move from these shops to online ones and Amazon as the biggest online shop in Germany (see Introduction) was often the first customers' choice for shopping. Amazon did not have enough stocks to satisfy the whole demand. It sold out during the first lockdown many items and had to let other sellers on the Amazon marketplace (web page) win Buy Box. Amazon first had to obtain the goods for selling from its suppliers. But the company reacted quickly, increased its inventory and was able to meet all the demand for its products from May 2020 when Amazon again reached a Buy Box value of 75%. It seems that Amazon's aim in the following period was to make up for the lost share of Buy Box in March and April. The company significantly increased its BBQ with an average of 79.97% in the second half of the year. The highest value of 84% was achieved in August 2020. The average annual value for 2020 was 75.83%, which is similar to the values for 2019 – 75.19% and for 2021 – 74.46%. Amazon's Buy Box share did not even decrease during the second German lockdown that started in November 2020. The company was now prepared for possible impending restrictions and had sufficient goods in stock.

What concerns the price development of our sample (see Figure 2); the changes in the company sales price diverged significantly from the change in Amazon purchase price in two periods. The first is between May and November 2020, when the change in retail price was negative, but the change in purchase price moved between 0% and 1%. The retail price decrease during that period correlates with Amazon's increased Buy Box share. If the company wanted to win back lost Buy Box shares it had to lower prices. The higher the Buy Box ratio, the lower the Amazon prices. The company thus mainly

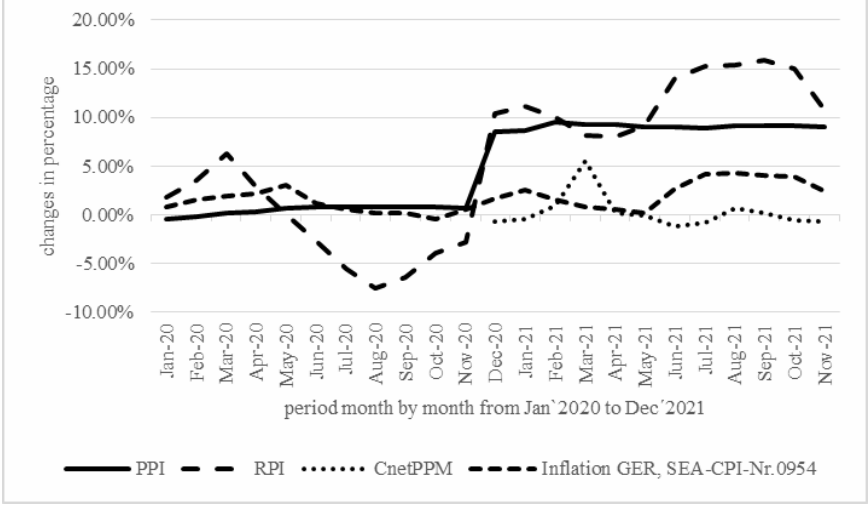
concentrated on restoration and keeping its market share and not on increasing its retail prices and achieving higher profit.

Figure 1 Amazon BBQ from January 2019 to December 2021



Source: Own work; Amazon data (2022)

Figure 2 Comparison of German Federal Statistical Inflation with Amazon retail price index, Amazon purchase price index and Amazon net profit margin in the period January 2020 – December 2021



Source: Own work; own work; Amazon data (2022); German Federal Statistical Office (2022a)

German Government decreased its VAT from 19% to 16% for the period July – December 2020 intending to activate total consumption and spending. Our analysis shows that Amazon used this 3% VAT cut to decrease its prices to stimulate the consumption of its customers when its retail prices in the investigated category aggregately fell by 2.52%. As Figure 2 shows negative inflation achieved its trough in

August and September 2020 – the prices declined by 7.63% in August, respectively by 6.50% in September compared to the previous period.

VAT was again raised to the old rate of 19% in January 2021. Amazon sales prices increased this month by 10.36% compared to the same month of the previous year. The main factor of the jump was the growth of purchased prices – they grew in January by 8.5% in the investigated category. The price deal between Amazon and a supplier often goes into effect at the beginning of the New Year and most suppliers requested in the beginning of 2021 to increase the price at which Amazon buys their items. In the period from December 2020 to May 2021, Amazon's retail price compared to the same month of the previous month generally developed almost similarly to its purchase price which does not indicate an abuse of Amazon's position.

The development of retail prices in the second half of 2021 compared to the same period in 2020 was affected by the fact that the VAT was temporally reduced in the base period. While the reduction contributed to the negative value of inflation of Amazon price in the second half of 2020, the end of the reduction and the return to the original VAT value caused growth in retail prices by 2.52% (on average for the period July – December 2021). The average increase in purchase prices from July to December 2021 was 9.05% and the average increase in retail price for the same period was 14.40%. This means that Amazon raised in the period from July to December 2021 its prices in the investigated category by 2.83% (= 14.40 – 9.05 – 2.52) without the influence of VAT and the purchase price increase. This increase in retail prices is quite common (Lorr, 2020) and does not mean abuse of a dominant position, so it again refutes our hypothesis.

The values of the year-on-year change in Net PPM were around values around zero (see Table 4) which also confirms the already mentioned fact that Amazon, if it wanted to archive its standard Buy Box share, must have given up its margins. The only exception is April 2021, when the net profit margin compared to the same period of the previous year-increased by 5.48%. However, it is a specific case. The jump in the net profit margin was not caused by the increase in selling price and the decrease in buying prices in 2021 but by the overall situation in April 2020. A margin can be calculated only if items are sold. Since many items were not available in March and April 2020, no profit margin can be achieved and calculated for these months. If April 2021 is not included, AZN-Net PPM deviated by 1% upwards and downwards compared to the same month of the previous year. This change is insignificant and quite common. From that point, the hypothesis that Amazon exploited its market position during the pandemic times to maximise profits at the expense of consumers must be also refuted.

It makes sense to mention that inflation of the Federal Statistical Office in the category SEA-VPI-No.0954 stationery and drawing materials (see Table 5) developed differently compared to inflation of Amazon's retail price. Amazon's inflation is higher from the beginning of the investigated period till May 2020, then lower from May to November 2020 and significantly higher from November 2020 till the end of the investigated period. The highest negative value of the difference between Amazon's inflation and the inflation of the Federal Statistical Office occurred in August 2020 (–7.73 percentage points, Amazon's inflation –7.63%, the Federal Statistical Office Inflation 0.10%). The opposite situation occurred in October 2021 when Amazon's retail price inflation achieved 15.89%, but the Federal Statistical Office was only 4%.

Table 4 Amazon's net profit margin changes compared to the same month of the previous year with valid sample size, median, standard deviation and range

Month	*Valid*	*Missing*	*CnetPPM*	*Median*	*SD*	*Range*	*Minimum*	*Maximum*	*Percentile 25*	*Percentile 50*	*Percentile 75*
Jan-21	2,158.00	6,048.00	–0.71	0.00	23.79	316.27	–78.20	238.07	–12.91	0.00	10.21
Feb-21	2,294.00	5,912.00	–0.48	0.44	22.83	170.30	–74.90	95.40	–11.09	0.44	10.41
Mar-21	2,294.00	5,912.00	0.95	0.60	22.45	184.13	–72.81	111.32	–10.19	0.60	11.75
Apr-21	3,338.00	4,8,68.00	5.48	4.39	25.62	320.38	–79.28	241.10	–5.56	4.39	18.55
May-21	3,557.00	4,649.00	0.20	1.17	24.43	337.94	–79.40	258.54	–10.91	1.17	12.34
Jun-21	3,509.00	4,697.00	–0.10	0.64	23.95	256.90	–79.50	177.40	–11.63	0.64	12.32
Jul-21	3,531.00	4,675.00	–1.25	0.00	20.54	213.44	–79.74	133.70	–10.36	0.00	8.96
Aug-21	3,874.00	4,332.00	–0.79	0.23	21.50	334.11	–79.60	254.51	–10.99	0.23	9.16
Sep-21	3,846.00	4,360.00	0.68	0.91	20.93	280.36	–75.45	204.91	–8.80	0.91	10.18
Oct-21	3,895.00	4,311.00	0.16	0.56	21.42	294.06	–77.18	216.88	–9.34	0.56	10.03
Nov-21	3,951.00	4,255.00	–0.57	0.51	21.48	325.98	–79.31	246.67	–10.63	0.51	9.35
Dec-21	3,929.00	4,277.00	–0.68	0.00	20.88	228.52	–78.74	149.77	–10.22	0.00	8.57

Notes: [1]The individual month under consideration in the period 2019 to 2021. [2]Valid results of the sample after trimming the data. [3]Invalid results of the sample after trimming the data. [4]Change in Amazon's purchase price compared to the previous month. [5]The value that lies exactly in the middle of all valid results of the sample. [6]Average deviation of all valid results from the average. [7]Span between the largest and the smallest valid result of the sample. [8]The smallest value of the valid results of the sample. [9]The largest value of the valid results of the sample.

Source: Own work; Amazon data (2022)

Table 5 Inflation rate by the German Federal Statistical on the 3rd stellar level from January 2020 to December 2021 for the Goods Class Stationery and Drawing Materials (SEA CPI No. 0954)

Jan-20	*Feb-20*	*Mar-20*	*Apr-20*	*May-20*	*Jun-20*	*Jul-20*	*Aug-20*	*Sep-20*	*Oct-20*	*Nov-20*	*Dec-20*
1.70	0.80	1.50	1.90	2.20	3.00	1.10	0.50	0.10	0.10	–0.50	0.50
Jan-21	*Feb-21*	*Mar-21*	*Apr-21*	*May-21*	*Jun-21*	*Jul-21*	*Aug-21*	*Sep-21*	*Oct-21*	*Nov-21*	*Dec-21*
1.70	2.50	1.50	0.80	0.50	0.10	2.60	4.10	4.30	4.00	3.90	2.40

Source: Own work; German Federal Statistical Office (2022a, 2022b)

6 Discussion

Our analysis shows that Amazon first significantly decreased its retail prices in the investigated category during the coronavirus pandemic between May and November 2020 when Amazon's retail price inflation compared to the same period of the previous year was lower than Amazon's PPI. The reason for the price decrease was the development of Amazon's Buy Box share at the beginning of the pandemic. Amazon was not logically prepared for the demand increase caused by the shift from brick-and-mortar to online retail that happened in March and April 2020, as COVID-19 pandemic was an unpredictable event. The company could not satisfy higher demand, suffered a shortage of many items and thus was not able to win Buy Box. Other online retailers faced the same problems and each of them was usually able, if it had a requested item, to sell it. The battle for the Buy Box share was temporarily stopped. The pandemic confirmed that in a highly competitive market like the Amazon marketplace, an extraordinary event can interrupt price competition with a tendency for price decline and reverse prices upward.

However, when Amazon and all other marketplace participants were able to replenish their stock and the demand stabilised, the Buy Box battle could again start. Amazon then had no choice but to lower its prices if it wanted to regain its Buy Box share. Amazon's effort to win the Buy Box caused its retail price inflation rates to decline significantly below the official inflation rate of the German Federal Statistical Office at the comparable level. Amazon's behaviour can be interpreted that the company wanted to prevent customers from the massive switching to other sellers, even if they use Amazon's web page as a marketplace. This switch, although it is connected with a trading commission that Amazon receives from other sellers for using its web page, threats Amazon's dominant position – customers, if they become accustomed to a product from a seller, could start buying goods (products) directly from the other subject and Amazon share on total online trade would decline.

Amazon price strategy is based on a large algorithm that has to handle millions of products. It is not possible for humans to make optimisations at item level. To achieve Amazon's goals, the algorithm must set targets under which it should generate maximum sales and growth. There are certainly targets that are higher and targets that are less prioritised. The average BBQ of 75% per year indicates that the Buy Box share and thus sales growth are prioritised higher than profitability. Only if Amazon obtains a sufficient BBQ it can drive sales. If Amazon's Buy Box share decrease, as it occurred during the first lockdown of the COVID-19 pandemic, the algorithm restored the target value of the

Buy Box rate with corresponding price reductions by the end of the year, even if profit had to be sacrificed. Our findings correspond with other studies. Sadq et al. (2018) mention Amazon innovation simply means searching for what the customers do not know they want and delivering it to them, i.e., the company concentrate on customers satisfaction and it is convinced that products sold directly by itself contributes to the highest costumers value. Vidani and Sharma (2023) emphasise that Amazon's supply chain is capable of delivering products to customers quickly and without any damage, even during higher-spot shopping seasons. To keep the efficiency of such a chain the company must permanently satisfy costumers' needs. If its BBQ decreases, the efficiency is reduced and the average cost increases. From that point of view, the value of the BBQ is an important company indicator with high priority (see also the following part of this section).

While the first lockdown was an unexpected event, the second that occurred in autumn 2020 was not. Amazon learned from the consequences of the first lockdown and made preparations for other possible demand waves. Its Buy Box share archived values slightly below 80% in October, November and December 2020 when restrictions were again imposed. It was around 75% in the whole year 2021. Even another adverse unpredictable event – the blocking of the Suez Canal by the cargo ship Ever Given in March 2021 for several days, which caused the international logistics shock, did not affect Amazon prices. The competition forced online retailers to be prepared for possible lockdowns or other supply restrictions. There were many signs indicated at the beginning of autumn 2020 that the pandemic might return. It made thus sense to create extraordinary stocks – a retailer that failed to do so would lose out customers who would have moved to other merchants. Amazon expected growth in online shopping, its sentiment-driven expectations about behaviour of German customers were optimistic and it was not afraid, based on this sentiment and expectations, of investing in stock, improving its web pages and other technological solutions (Buchheim et al., 2022). Although uncertainty, especially at the beginning of the pandemic, was high, the period can be labelled as difficult, the company expectations about the future were, due to the situation that the pandemic created, optimistic – even people who had no online shopping experience, acquired them. The company logically assumed that the new habits would not be completely abandoned even in the event of the end of the lockdown. Our results confirm Lautenbacher's findings (Lautenbacher, 2020) concerning the view of German companies on uncertainty and expectation that the link is in bad times such as a pandemic much weaker since uncertainty is then persistently high – even when expectations are favourable.

What affected retail prices was the reduction in VAT from July to December 2020. Our analysis shows that Amazon passed on the VAT advantage to its customers and did not exploit its dominant market position in the first pandemic year (i.e., 2020). The development of prices in the investigated category in the second pandemic year 2021 was mainly affected by the purchase price increase and the VAT return to its original value of 19% in January 2021. A maximum price deviation between purchase and sales prices adjusted for the VAT effect – of up to 4% that cannot be explained by these factors was achieved in October 2021. However, no significant increase in Amazon's net profit margin could be found in the same period and this unique development does not mean that Amazon abused its dominant market position. It seems that October 2021 price growth occurred due to higher energy and logistics costs. Overall, the development of net profit margin suggests that Amazon, despite its dominant position in the investigated

sector, was afraid that a significant increase in retail prices could lead its customers to change to other online platforms.

As described in the introduction, pricing in online retail tends to be driven by automatisms. With the help of software and automatic pricing systems, prices from different online shops are repeatedly undercut and harmonised. This creates a best-price scenario for the consumer over time. As the strongest online shop and marketplace and as a technical software giant, Amazon plays a central role in this. As a rule, Amazon regulates all prices solely on the basis of the competition's offers and vice versa. If a smaller online shop wants to sell something, it must have a better price than Amazon. However, it can only maintain this advantage until Amazon has recognised this price and has produced it on its own site. During the period under review, however, Amazon also appears to have cancelled out this principle, as demand in online retail remained high over a longer period of time, but Amazon prices fell in order to catch up with the Buy Box share. Only when the Buy Box share returned to an annual average of 75% did Amazon increase prices again and adjust them to market prices.

Our results generally show, based on the classification used by Quinones et al. (2023) that the company in the investigated category followed in Germany the strategy to keep and enhance the number of customers using its web page and buying its products: it still offered reliable and affordable products and emphasised the delivery quality in comparison with other shops. It tried to enhance the possibilities of online shopping, reduce overhead costs and lower transaction fees which enabled it to keep the share of Buy Box wins on the standard level, similar to the values before the pandemic. The company name was perceived among customers as a brand they could rely on (Arumugam and Balraj, 2022) and offer them shopping satisfying their needs. Birkholz et al. (2022) analysed, based on the articles published in newspapers and magazines from 1st December 2019 to 10th January 2021 behaviour of German firms if they behaved exploratively or exploited the event for themselves. The study found that:

1 large and 'technology-intensive' firms perform more likely explorative innovation activities than SMEs and or not 'technology-intensive firms'

2 that technology intensity contributes to explorative innovation behaviour during the pandemic.

Amazon is certainly large and technology-intensive company. The development of Amazon's retail price, net profit margin and Buy Box share confirm, from that point of view, Birkholz's conclusion. The firm wanted, even during the pandemic, i.e., in an unfavourable business environment with high uncertainty, to keep or even increase its sales and market share. To achieve this goal, customers have to buy on Amazon. They will only do so, mainly if they buy the goods at the best price, to ensure the best prices Amazon seemed to monitor other online shops and accommodated its price strategy according to them regardless the value of its profit. The company declared in its annual reports for 2020 and 2021 (e.g., Amazon, 2021) that its financial focus is on the long-term, the price strategy used for the investigated category corresponds with the declaration.

Among the interesting findings of our study is that the inflation of Amazon sales prices was well below the inflation of the German Federal Statistical Office from May to November 2020 and well above it for the rest of the investigated period. It can be partially explained by the demand shock due to the closure of brick-and-mortar retail.

Demand regulates supply. When demand rises (shifts to the right), prices usually also rise. However, this logic is only partially embedded in the algorithm of the retail giant Amazon. As the study shows, Amazon in the period from May to November 2020 was not taking advantage of this particular market situation to increase prices and boost profits but is instead trying to make up for lost Buy Box shares by lowering prices and reducing profits. The development from November 2020 is mainly driven by the increase in Amazon's purchase prices. Amazon's retail prices exceeded its purchase prices only from May 2021 but without any increase in company's net profit margin. The retail price increase can be assigned to the increase in other price, mainly transport and logistic costs. Regardless of this explanation we emphasise that because every fifth euro (excluding food) is spent online in Germany, the calculated inflation of the Amazon sales price should rather go hand in hand with the official German inflation. Other research is necessary to investigate in detail the causes of the revealed difference.

7 Conclusions

Our results did not confirm the hypothesis that Amazon exploited its dominant power during Corona pandemic and lockdowns in Germany in 2020 and 2021 to increase its retail price due to lower competition when the number of its competitors was reduced because brick-and-mortar retails were closed. Instead of it, Amazon lowered its retail prices and waived its margins, especially in 2020. The main reason for such behaviour is that Amazon itself wanted to offer its customers the best, (i.e., the cheapest) price compared to other online shops and achieves the highest share of its products in total share. The low value of Amazon's net profit margin due to low retail prices value was offset and outweighed by sales growth so Amazon's net sales overall grew in 2020 and 2021. Amazon's behaviour makes sense for company profitability and performance in the long run. The firm creates strong ties between it and its customers, who have no reason to look for another (e-)shop and make their purchases elsewhere. Amazon by giving up its net profit margin in the short run strengthens its dominant position for the long run. It makes sense, from that point of view to research whether the company does not abuse its position in the following periods or if it tries to prevent its customers from changing the shop. Although the cost of the shop change in the case of online shopping is quite low, companies can find ways to increase it and can create obstacles reducing the possibility of this change.

It is worth mentioning that contemporary comprehensive literature on pricing strategies in online business-to-customer retail (Gerpott and Berendes, 2022) does not pay Buy Box competition on Amazon's web page sufficient attention and our article can be seen as one of the first attempt in this field. The article has some limitations. It researched only Amazon's behaviour in Germany and only in the office and stationery category, where we have available data. The investigated period was very specific and it cannot guarantee that the firm does not abuse its oligopoly position under different conditions or in different goods segments. It would be useful to expand the subject of the investigation to other countries, or in the case of Germany to other categories of goods to confirm or reject the hypothesis that Amazon has not abused its dominant position at all. Further research should also include, for instance, the issue of sustainability, whether the company considered it and if yes, what measures it took to reduce aspects that harm the environment and other aspects of human life.

Acknowledgements

This work was supported by the Faculty of Economics and Management, Czech University of Life Sciences in Prague under Grant 2022B0004.

References

Albrecht, M.G., Green, M. and Hoffman, L. (2023) *Principles of Marketing*, Rice University, Houston.

Alcedo, J., Cavallo, A., Dwyer, B., Mishra, P. and Spilimbergo, A. (2022) *E-Commerce during COVID: Stylized Facts from 47 Economies*, International Monetary Fund, Washington.

Amazon INC. (2022) *FORM 10-KFor the Fiscal Year, 2022*, Ended December 31, 2021 [online] https://sec.report/Document/0001018724-22-000005/ (accessed 5 July 2024).

Arumugam, D. and Balraj, A. (2022) 'Online purchase of textile products during Covid-19 crisis and the role of brand recognition – an empirical study', *Industria Textila*, Vol. 73, No. 6, p.693, DOI: 10.35530/IT.073.06.202146.

Birkholz, J., Kühn, J. and Shkolnykova, M. (2022) 'Exploration or exploitation: innovation behavior of SMEs and large firms during the COVID-19 crisis', *Bremen Papers on Economics & Innovation 2022*, University of Bremen, Faculty of Business Studies and Economics.

Buchheim, L., Dovern, J., Krolage, C. and Link, S. (2022) 'Sentiment and firm behavior during the COVID-19 pandemic', *Journal of Economic Behavior & Organization*, Vol. 195, pp.186–198, DOI: 10.1016/j.jebo.2022.01.011.

Calvo, E., Cui, R. and Wagner, L. (2020) 'Disclosing product availability in online retail', *Manufacturing & Service Operations Management*, Early Access, DOI: 10.1287/msom.2020.0882.

Camba-Mendez, G., Gaspar, V. and Wynne, M. (2002) *Measurement Issues in European Consumer Price Indices and the Conceptual Framework of the HICP*, European Central Bank, Frankfurt.

Cavallo, A. (2018) *More Amazon Effects: Online Competition and Pricing Behaviors*, National Bureau of Economic Research, Cambridge.

Cavallo, A. (2020) *Inflation with Covid Consumption Baskets*, National Bureau of Economic Research, Cambridge.

Chen, J. and Dibb, S. (2010) 'Consumer trust in the online retail context: exploring the antecedents and consequences', *Psychology & Marketing*, Vol. 27, No. 4, pp.323–346, DOI: 10.1002/mar.20334.

Cui, R., Lu, Z., Sun, T. and Golden, J. (2020) 'Sooner or later? Promising delivery speed in online retail', *Promising Delivery Speed in Online Retail*, Early Access, DOI: 10.13140/RG.2.2.17771.69927.

Danaher, P.J., Bonfrer, A. and Dhar, S. (2008) 'The effect of competitive advertising interference on sales for packaged goods', *Journal of Marketing Research*, Vol. 45, No. 2, pp.211–225, DOI: 10.1509/jmkr.45.2.211.

Fedoseeva, S. and Van Droogenbroeck, E. (2023) 'Pandemic pricing: evidence from German grocery e-commerce', *Agribusiness*, Vol. 39, No. 4, pp.1139–1156, DOI: 10.1002/agr.21807.

Frost, J. (2020) *Introduction to Statistics: An Intuitive Guide for Analyzing Data and Unlocking Discoveries*, James Publishing, New York.

Gauri, D.K., Jindal, R.P., Ratchford, B., Fox, E., Bhatnagar, A., Pandey, A., Navallo, J.R., Fogarty, J., Carr, S. and Howerton, E. (2021) 'Evolution of retail formats: past, present, and future', *Journal of Retailing*, Vol. 97, No. 1, pp 42–61, DOI: 10.1016/j.jretai.2020.11.002.

German Federal Statistical Office (2022a) *Verbraucherpreisindizes für Deutschland – Monatsbericht Februar 2022* [online] https://www-genesis.destatis.de/genesis/online (accessed 5 July 2024).

German Federal Statistical Office (2022b) *Zu den Auswirkungen der Corona-Krise auf die Preiserhebung für den Verbraucherpreisindex/Harmonisierten Verbraucherpreisindex German* [online] https://www.destatis.de/DE/Themen/Wirtschaft/Preise/Verbraucherpreisindex/Methoden/Downloads/corona-vpi-hvpi.pdf?__blob=publicationFile (accessed 5 July 2024).

German Government (2022) *Coronavirus in Deutschland* [online] https://www.bundesregierung.de/breg-de/themen/coronavirus/regelungen-ab-2-november-1806818 (accessed 5 July 2024).

Gerpott, T.J. and Berends, J. (2022) 'Competitive pricing on online markets: a literature review', *Journal of Revenue and Pricing Management*, Vol. 21, No. 6, pp.596–622, DOI: 10.1057/s41272-022-00390-x.

Gómez-Losada, Á., Asencio-Cortés, G. and Duch-Brown, N. (2022) 'Automatic eligibility of sellers in an online marketplace: a case study of Amazon algorithm', *Information*, Vol. 13, No. 2, p.44, DOI: 10.3390/info13020044.

Grandon, E.E. and Pearson, J.M. (2004) 'Electronic commerce adoption: an empirical study of small and medium US businesses', *Information & Management*, Vol. 42, No. 1, pp.197–216, DOI: 10.1016/j.im.2003.12.010.

Handelsverband Deutschland (2021) *Online Monitor 2021* [online] https://einzelhandel.de/index.php?option=com_attachments&task=download&id=10572 (accessed 5 July 2024).

Hanninen, M., Mitronen, L. and Kwan, S.K. (2018) 'Multi-sided marketplaces and the transformation of retail: a service systems perspective', *Journal of Retailing and Consumer Services*, Vol. 49, pp.380–388, DOI: 10.1016/j.jretconser.2019.04.015.

Hansen, M. (2020) 'Dynamische Preissetzung im Onlinehandel: zur langfristigen Anwendung von automatisierter Preiserhebung', *WISTA-Wirtschaft und Statistik*, Vol. 72, No. 3, pp.14–23.

Hazée, S. and Van Vaerenbergh, Y. (2021) 'Customers' contamination concerns: an integrative framework and future prospects for service management', *Journal of Service Management*, Vol. 32, No. 2, pp.161–175, DOI: 10.1108/JOSM-04-2020-0129.

Hospodková, P., Husár, T., Klícová, B., Severová, L., Šrédl, K. and Svoboda, R. (2021) 'Cost analysis of selected radiotherapeutic modalities for prostate cancer treatment-Czech Republic case study for the purposes of hospital based HTA', *Healthcare*, Vol. 9, No. 1, p.98, DOI: 10.3390/healthcare9010098.

Jorge, O., Pons, A., Rius, J., Vintró, C., Mateo, J. and Vilaplana, J. (2020) 'Increasing online shop revenues with web scraping: a case study for the wine sector', *British Food Journal*, Vol. 122, No. 11, pp.3383–3401, DOI: 10.1108/BFJ-07-2019-0522.

Khan, L. (2017) 'Amazon's antitrust paradox', *Yale Law Journal* [online] https://www.yalelawjournal.org/note/amazons-antitrust-paradox (accessed 15 September 2023).

Korfiatis, N., Garcia-Bariocanal, E. and Sanchez-Alonso, S. (2012) 'Evaluating content quality and helpfulness of online product reviews: the interplay of review helpfulness vs. review content', *Electronic Commerce Research and Applications*, Vol. 11, No. 3, pp.205–217, DOI: 10.1016/j.elerap.2011.10.003.

Lautenbacher, S. (2020) *Subjective Uncertainty, Expectations, and Firm Behavior*, MPRA Paper 103516, University Library of Munich, Germany.

Levitan, J. (2021) 'Price gouging, the Amazon marketplace, and the dormant commerce clause', *Colum. JL & Soc. Probs.*, Vol. 55, No. 3, pp.373–413.

Liu, H.M., Wu, S., Zhong, C.W. and Liu, Y. (2023) 'The effects of customer online reviews on sales performance: the role of mobile phone's quality characteristics', *Electronic Commerce Research and Applications*, Vol. 57, DOI: 10.1016/j.elerap.2022.101229.

Lorr, B. (2021) *The Secret Life of Groceries*, Bantam Doubleday Dell Publishing Group, New York.

Magableh, G.M. (2021) 'Supply chains and the COVID-19 pandemic: a comprehensive framework', *European Management Review*, Vol. 18, pp.363–382, DOI: 10.1111/emre.12449.

McKinsey & Company (2019) *The Amazon Prime Day Effect. Consumer Anticipation and Excitement Grows* [online] https://www.mckinsey.de/news/presse/2019-07-09-periscope-prime-day (accessed 5 July 2024)

Mishra, P., Cavallo, A. and Spilimbergo A. (2022) *E-commerce during Covid: Stylized Facts from 47 Economies*, IMF Working Papers, 2022/019.

Pop, R-A., Dabija, D-C. and Pocol, C.B. (2024) 'Food retail resilience pre-, during, and post-COVID-19: a bibliometric analysis and research agenda', *Foods*, Vol. 13, No. 2, p.257, DOI: 10.3390/foods13020257.

Pourgholamali, F., Kahani, M. and Bagheri, E. (2020) 'A neural graph embedding approach for selecting review sentences', *Electronic Commerce Research and Applications*, Vol. 40, DOI: 10.1016/j.elerap.2019.100917.

Quinones, M., Gomez-Suarez, M., Cruz-Roche, I. and Díaz-Martín, A.M. (2023) 'Technology: a strategic imperative for successful retailers', *International Journal of Retail & Distribution Management*, Vol. 51, No. 4, pp.546–566, DOI: 10.1108/IJRDM-03-2022-0088.

Räker, M., Klauber, J. and Schwinger, A. (2021) *Pflegerische Versorgung in der ersten Welle der COVID-19-Pandemie*, in Pflege-Report 2021, Springer, Berlin, pp.33–58.

Sadq, Z.N., Sabir, N. and Saeed, H. (2018) 'Analyzing the Amazon success strategies', *Journal of Process Management – New Technologies, International*, Vol. 6, No 4, pp.65–69, DOI: 10.5937/jouproman6-19264.

Shaw, N., Eschenbrenner, B. and Baier, D. (2022) 'Online shopping continuance after COVID-19: a comparison of Canada, Germany and the United States', *Journal of Retailing and Consumer Services*, Vol. 69, p.103100, DOI: 10.1016/j.jretconser.2022.103100.

Shettar, R. (2023) 'E-commerce: an empirical study', *Productivity*, Vol. 64, No. 2, pp.115–122, DOI: 10.32381/PROD.2023.64.02.1.

Sredl, K., Soukup, A. and Severova, L. (2013) 'Models of consumer's choice', *E & M Ekonomie a Management*, Vol. 16, No. 2, pp.4–9.

Taherdoost, H. (2016) 'Sampling methods in research methodology – how to choose a sampling technique for research', *SSRN Electronic Journal*, Vol. 5, No. 2, pp.18–27.

Tsagkias, M., King, T.H., Kallumadi, S., Murdock, V. and de Rijke, M. (2021) 'Challenges and research opportunities in ecommerce search and recommendations', *ACM SIGIR Forum*, Vol. 54, No. 1, pp.1–23, DOI: 10.1145/3451964.3451966.

Vakulenko, Y., Shams, P., Hellström, D. and Hjort, K. (2019) 'Online retail experience and customer satisfaction: the mediating role of last mile delivery', *The International Review of Retail, Distribution and Consumer Research*, Vol. 29, No. 3, pp.306–320, DOI: 10.1080/09593969.2019.1598466.

Verhoef, P.C., Noordhoff, C.S. and Sloot, L. (2023) 'Reflections and predictions on effects of COVID-19 pandemic on retailing', *Journal of Service Management*, Vol. 34, No. 2, pp.274–293, DOI: 10.1108/JOSM-09-2021-0343.

Veselova, A. (2020) 'Market place vs. online shop', *Economic and Social Development*. *Book of Proceedings*, Vol. 62, No. 4, pp.30–36.

Vidani, C.J. and Sharma, S. (2023) 'To study the consumer attitude towards purchase intention of online courses on Udemy using regression with reference to English speaking and excel among Gen-Z in Ahmedabad', *International Journal of Management Analytics*, Vol. 1, No. 2, pp.213–234, DOI: 10.59890/ijma.v1i2.116.

Wawrosz, P. and Jurásek, M. (2021) 'Developing intercultural efficiency: the relationship between cultural intelligence and self-efficacy', *Social Sciences*, Vol. 10, No. 8, p.312, DOI: 10.3390/socsci10080312.

Weber, A.N. (2021) 'Responding to supply chain disruptions caused by the COVID-19 pandemic: a Black Swan event for omnichannel retailers', *Journal of Transport and Supply Chain Management*, Vol. 15, No. a628, DOI: 10.4102/jtscm.v15i0.628.

Wolf, G. (2024) 'Pandemics, payments and fiscal policy: lessons from four years after the outbreak of Covid-19', *EconPol Forum*, Vol. 25, No. 2, pp.61–67.

Žurek, J. and Rudy, M. (2024) 'Impact of the COVID-19 pandemic on changes in consumer purchasing behavior in the food market with a focus on meat and meat products – a comprehensive literature review', *Foods*, Vol. 13, No. 6, p.933, DOI: 10.3390/foods13060933.