EBER
Entrepreneurial Business and Economics Review
2023, Vol. 11, No. 4
10.15678/EBER.2023.110406

Anti-crisis activities and export performance in the Covid-19 pandemic: The case of Polish exporters

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ABSTRACT

Objective: The article aims to investigate the impact of anti-crisis activities undertaken by the Polish exporting firms on their export sales during the Covid-19 pandemic.

Research Design & Methods: In our study, we used a quantitative research design. We conducted the survey on the sample of 161 manufacturing Polish exporting firms between April 21 and June 25, 2021. To verify the assumed relationships, we used the probit regression model.

Findings: We found that some firm key features, such as firm size, the territorial scope of international activity, the share of foreign ownership in assets, the degree of innovation, and the presence of a market diversification strategy significantly impacted export sales during the pandemic. The results also suggest that a temporary reduction in employment, the sale of new/adapted products, and the search for new foreign export partners strongly supported the sales growth of Polish exporters during the Covid-19 pandemic.

Implications & Recommendations: This study can be valuable for researchers, managers, and policymakers. First, we highlight activities that promote export/sales during the pandemic period, which can be helpful for both researchers and policymakers in creating support tools for exporters. Second, managers may gain valuable lessons on the importance of having an internationalisation strategy and marketing strategies in place during demand and supply shocks.

Contribution & Value Added: The main novelty is a firm-level analysis of the Covid-19 pandemic impact on exporting firms from the perspective of the anti-crisis activities they undertook, which fills a gap in the literature and informs discussions of the potential impact of Covid-19 on export performance.

Article type:	research article
Keywords:	Polish exporting firms; manufacturing firms; export sales; COVID-19 pandemic; firm's strategy; firm-level survey
JEL codes:	D22; F10; F26; L60

Received: 4 May 2023 | Revised: 11 August 2023 | Accepted: 30 August 2023

Suggested citation:
Daszkiewicz, N., Kordalska, A., & Olczyk, M. (2023). Anti-crisis activities and export performance in the Covid-19 pandemic: The case of Polish exporters. *Entrepreneurial Business and Economics Review,* 11(4), 91-108. https://doi.org/10.15678/EBER.2023.110406

INTRODUCTION

In 2020, the Covid-19 outbreak rocked the world's economies. The Covid-19 pandemic spread at an alarming rate, infecting millions of people and bringing economies to a near standstill as countries have imposed strict travel restrictions to stop the spread of the virus (World Bank, 2020). The pandemic-related restrictions on economic activity resulted in supply shocks (unexpected changes in production caused by lockdowns, mobility restrictions, production stoppages, disruptions of global value chains, and uncertainty about short-term prospects) accompanied by a supply chain disruption (Attinasi *et al*., 2021). The supply shock rapidly turned into a demand shock, *i.e.* changes to the households' expenditure related to job layoffs, reduced work time and wages, and decreased disposable incomes and taxes (Szustak *et al*., 2021).

One of the business activities most affected by the pandemic was international trade. The pandemic triggered supply chain disruptions, which particularly affected globally oriented and highly interconnected sectors and companies (Sforza & Steininger, 2020). This was because international flows of intermediate inputs constitute two-thirds of international trade and half of global trade is embodied in global value chains (GVCs) (Antràs, 2020). Moreover, international trade companies struggled also with the increase in trade costs (Li & Lin, 2021).

The specificity of firms operating in foreign trade means that they are strongly and immediately exposed to both supply and demand shocks. This is because major global traders are closely linked in global value chains, *i.e.* as they are both suppliers and buyers of inputs (Baldwin & Tomiura, 2020). On the one hand, Covid-19 causes direct shocks to total consumption by changing household behaviour in almost all countries in the world and indirect demand shocks through the closures of non-essential sectors (Gourinchas *et al*., 2022; Halmai, 2022; Dao *et al*., 2022; Rybaczewska *et al*., 2023). We may see how severe the demand shock for international companies was thanks to the analysis of Andersen *et al*. (2020), who compared personal expenditure between Denmark, a country that imposed a lockdown, and Sweden, a country that did not. Andersen *et al*. (2020) found that consumption expenditures fell in both countries by similar amounts. On the other hand, firms operating in foreign trade experienced significant supply-side disruptions (restriction of labour supply and limitation of workforce management) caused by external lockdowns. This is especially noticeable in the labour-intensive trade sectors and international activities with lower capacity to allow workers to work from home (Papanikolaou & Schmidt, 2020; Mishchuk *et al*., 2023). Some authors (*e.g.* de Lucio *et al*., 2022) argue that demand factors play a more important role in explaining the shock, but other researchers (*e.g.* Meza, 2020) conclude that both shocks (demand and supply) are present in the crisis and emphasize the role of global value chains in the transmission of shocks.

Furthermore, Borino *et al*. (2021) suggest that international firms are simply more susceptible to shocks than firms operating only domestically. They also claim that firms can respond to different shocks in many ways. Generally, a firms' response to a negative shock is determined by three factors: the shock's nature, the firm's particular situation when the shock occurs, and the firm's product and labour market environments (Fabiani *et al*., 2015). For instance, firms can cope with a supply shock by finding alternative sources of inputs, including green energies sources (Androniceanu & Sabie, 2022). They may also reduce production in response to a demand shock. In turn, this can involve laying off workers or reducing investments. However, firms rather use a cocktail of actions to deal which a shock like looking for new suppliers, moving sales online, or instating a policy of remote work. Such coincidental use of several actions was especially important during the Covid-19 crisis.

Borino *et al*. (2021) used a firm-level dataset from the ITC Covid-19 Business Impact Survey in their research. They found that the Covid-19 pandemic hit international firms harder along both supply and demand channels than domestic firms due to their exposure to international markets. On the other hand, they proved that international firms were more resilient to the Covid-19 crisis than domestic firms. Moreover, international firms were less likely than domestic ones to lay off workers or file for bankruptcy and more likely to adopt different activities to continue production *e.g.* remote work.

Our study concentrated on anti-crisis activities undertaken by exporting firms on their export sales during the Covid-19 pandemic based on the survey conducted on the sample of 161 manufacturing Polish exporting firms between April 21 and June 25, 2021. This study contributes to the existing literature in two ways. Firstly, it joins the growing literature of firm-level analyses of the impact of Covid-19 on exporters' performance (see for exploring forms from Slovenia (*e.g.* Jaklič & Burger, 2020); Nord Macedonia (*e.g.* Srbinoski *et al*., 2022); Indonesia (*e.g.* Eschachasthi, 2022), and South Africa (*e.g.* Matthee *et al*., 2022). Secondly, the study was exploratory in nature and analysed multiple dimensions of Polish firm activity related to anti-crisis activities undertaken by exporting firms. The novelty of the paper lies in estimating the impact of individual exporters' anti-crisis activities and of a mix of these activities on export sales, based on firm-level data.

The study is organized as follows. In Section Two, we will review the recent literature on the impact of Covid-19 on exporting businesses. In Section Three, we will summarise the survey and describe the data and methods used. In Section Four, we will assess the impact of Covid-19 on Polish exporters. In Section Five, we will provide concluding remarks.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Covid-19 Pandemic and International Business/Export Operations (Firm-Level Impact)

The literature related to Covid-19 consequences on international businesses at the firm level is still scarce but rapidly growing. Marinov and Marinova (2021) draw attention to the fact that the detailed impact of the Covid-19 pandemic on international business is still unknown. Moreover, Barber and Ojala (2021) agree that the impact of the Covid-19 pandemic on the international business environment is tremendous, incontrovertible, and not yet clear. In turn, Tesar (2020) claims that in modern times, no other systemic interruptions like wars or dictatorships have hindered the international operations of firms as much as the coronavirus. Undoubtedly, the Covid-19 pandemic disturbed even the most stable international operations, in particular export operations. Thus, during the pandemic export operations, direct exports were perceived as high-risk operations. Having international relationships and receiving most of the export orders over the Internet is crucial (Hadasik & Kubiczek, 2020). Moreover, international firms will have to reconsider their strategies and national governments – their trade and investment policies that can best support the international firms in the future (Marinov & Marinova, 2021).

The literature related to firm-level analyses of the Covid-19 impact concentrates on very different aspects, *i.e.* the impact of Covid-19 pandemic on the liquidity of companies (Acharya & Steffen, 2020; Bilan *et al.,* 2023; Kryeziu *et al*., 2022), financial flexibility (Fahlenbrach *et al*., 2021), stock prices of company shares (Ramelli & Wagner, 2020; Kaźmierska-Jóźwiak *et al.,* 2021), the equity shortfall (Carletti *et al*., 2020), price-setting decisions of firms (Balleer *et al*., 2020), supply chain disruptions (Aral *et al*., 2020; Gigauri & Bogacz-Wojtanowska, 2022), government policies on firms' aid, and furlough decisions (Bennedsen *et al*., 2020; Kudej *et al*., 2021, Androniceanu, 2020). However, only a few of these studies directly address exporters and the impact of the Covid-19 pandemic on their activities.

Previous exporters-level analyses focused mainly on identifying difficulties, risk areas, and areas of exporters' activity that have been most affected by the Covid-19 pandemic. Analyses based on exporter surveys from China (Dai *et al*., 2021) and North Macedonia (Srbinoski *et al*., 2022) indicate that exporters experienced a systematic slowdown in their growth rates in sales, profits, investment, capital, employment, and wages. The supply difficulties and a decline in demand were the biggest risks for exporting firms during the pandemic (Lebastard *et al.*, 2023).

Additionally, firm-level analyses of Covid-19 pandemic impact on exporting firms try to identify factors, which determine why some exporters cope with the pandemic better than others. Exporters with limited access to finance, high import dependence on EU markets, high labour intensity, export dependence on non-EU markets, and lower competitiveness were less resilient to the shocks of the pandemic (Matthee *et al*., 2022). A survey of Colombian export companies confirms that larger companies are more likely to survive despite weaker export growth (Benguria, 2021). The research of Polish exporting companies shows that the impact of the pandemic on companies' exports (performance and outlook) also depends on the type of economic activity and sectors, *e.g.*, the automotive, computer, and electronic equipment sectors were more affected than the other sectors (Talar *et al*., 2023).

Our research focused on a completely new aspect in the study of exporters. We tried to assess what actions taken by exporters during the difficult time of the pandemic turned out to be effective and positively impacted export performance.

Determinants of Export Performance and Hypotheses Development

The analysis of the determinants of export performance is one of the most widely discussed subjects in internationalization research (Vološin *et al.,* 2011; Cieślik *et al*., 2012; Nikensari *et al.,* 2021; Pini & Tchorek, 2022).

Scholars generally agree that having a planned internationalization strategy (formal or informal) contributes to good firm export performance (Daszkiewicz, 2016). Noteworthy, any foreign market entry requires applying an internationalization strategy, which is a strategy considering foreign factors. In the literature, there are many classifications of internationalization strategies according to different

dimensions and configurations (Daszkiewicz & Wach, 2012), *e.g.* market concentration vs. market diversification strategy or offensive vs. defensive strategy. Nevertheless, to increase their export performance, firms need to develop competitive strategies that enable them to compete in competitive markets by leveraging profits and a sustainable market strategy (Zehir *et al*., 2015; Wach & Głodowska, 2021; Kiforenko, 2023). Especially marketing strategy and capabilities considerably enhance firm export activities. Leonidou *et al.* (2002) did a meta-analysis on the relationship between marketing strategy and export performance and found that the implementation of a well-designed export marketing strategy can indeed determine export success, as the vast majority of marketing strategy variables (market segmentation, product quality, pricing strategy, dealer support, and promotion) are significantly associated with overall export success rates. Moreover, Pham *et al*. (2017) and Haddoud *et al*. (2019) confirm that marketing capabilities could be a source of low costs and branding advantages and then contribute to a firm's competitive advantage in foreign markets.

Thus, we formulated the following hypotheses:

H1: Firms with the internationalization strategy (formal or informal) are more likely to increase their export sales/increased their exports more often.

H2: Firms that implemented new marketing activities (promotion, market diversification) in the face of the Covid-19 pandemic are more likely to increase their export sales/increased their exports more often.

After the decision to start export activities, choosing a foreign market expansion strategy is one of the key decisions in the firm internationalization process (Cos *et al*., 2019). It relates to two aspects: market concertation and geographic diversification. Noteworthy, researchers discussed two alternative diversification strategies – the geographic diversification of export sales and key markets – many times. The discussion concerned different areas, *i.e.* export, management, strategy, entrepreneurship, and economics. Nevertheless, they have not unequivocally stated how these strategies impact the performance of international sales. Some research affirms that an export market concentration strategy leads to better export performance (*e.g.* Bodur, 1994). However, more studies showed that there is a positive association between export performance and geographic diversification strategy (*e.g.* Aulakh *et al*., 2000). It is all the more interesting to examine whether any of the strategies employed proved useful in boosting export performance during the pandemic.

Although seeking new markets could help firms to survive or even increase their export sales, Reymen *et al*. (2015) claim that entrepreneurs could respond to environmental uncertainty by modifying the scope of the firm activity and changing the way they do business. Covid-19 suddenly forced firms to adapt their strategies to lower demand and so they had lower costs. The costs are related to employee costs such as wages and labour productivity. Some firms (SMEs) are less resilient and flexible in dealing with the costs the COVID-19 pandemic, so they can change work processes, which may involve a shift to remote work (OECD, 2020).

Thus, we formulated the following hypotheses:

H3: Firms that increased the geographical scope of their activities (entered into new foreign markets or found new suppliers) in the face of the Covid-19 pandemic are more likely to increase their export sales.

H4: Firms that reduced employee costs (layoffs, remote work) in the face of the Covid-19 pandemic are more likely to increase their export sales.

In our study, in addition to the above-mentioned potential factors affecting the export performance of Polish exporters during the pandemic, we also wanted to consider control variables, which – as confirmed in the literature – impact companies' export. The factors are: company's age (export intensity is negatively associated with firm age: *e.g.* Kirpalani & McIntosh, 1980), firm size (firm size leads to higher export volumes: *e.g.* Hirsch & Adar, 1974; Daszkiewicz & Wach, 2013) firms' innovativeness (exporting is positively related to both product and process innovations, *e.g.* Cieślik & Michałek, 2017) or the ownership status (exporters with foreign capital are more export-oriented and have better performance than indigenous firms *e.g.* Jongwanich and Kohpaiboon, 2008).

RESEARCH METHODOLOGY

In this article, with the aid of econometric modelling tools, we quantitatively examined the impact of anti-crisis activities undertaken by Polish exporting firms during the Covid-19 pandemic on their export performance increase. To do this, we conducted a survey among Polish exporting manufacturers between April 21 and June 25, 2021. We retrieved the database for this study from Kompass Poland Sp. z o.o. and it covered 2 500 firms. We shared the survey questionnaire online and supported it with the CATI method. The response rate amounted to 11.7%. It allowed us to collect information from 292 Polish exporting firms. In total, 161 firms filled the questionnaire fully (185 of them filled in the form in at least 83%). In our study, we considered manufacturing enterprises only.

We did not obtain the sample in the database of 2 500 exporting firms randomly. Thus, the sample was not representative. The results from the survey characterize the group of firms mentioned above only and we cannot generalise them to the population of all Polish exporting firms.

In the final sample of exporting firms that answered the survey questions, medium-sized firms (45.6%) and small-sized firms (27.7%) dominated. The share of micro and large firms in the total number of enterprises was equal and amounted to 13.3% (Table 1). It means the overrepresentation of large firms and underrepresentation of micro firms in comparison to the size structure of a number of exporting firms in Poland (Doryń, 2016).

Table 1. Size distribution of surveyed firms

CATEGORY	Frequency	Percentage
Micro firm (1-9 employees)	26	13.33
Small firm (10-49 employees)	54	27.69
Medium firm (50-249 employees)	89	45.64
Large firm (250 employees)	26	13.33
Total:	195	100.00

Source: own elaboration based on the conducted survey.

Among all firms in our sample, the largest share, *i.e.* 33.3% is for exporters with 25-30 years of experience. The majority of examined firms were manufacturers of fabricated metal products (17.7%), rubber and plastic products (10.3%), and machinery and equipment non-else classified (9.7%). Table 2 presents a full sectoral coverage. The share of foreign assets in total firms' assets indicates that the sample is dominated by domestic enterprises (92.6%). Considering firms' geographical distribution, the largest representation came from Mazowieckie, Śląskie, and Pomorskie voivodships, which was 18.6%, 14.9%, and 12.8% respectively (Table 3). The geographical scope of exporting activity supported the thesis on the importance of regional trade linkages. In total, 38.8% of firms exported their products to directly neighbouring countries. An additional 8.8% were opened to the other Central Eastern European countries and the Western European countries are the market for a further 33.3% of firms. Only 19% of them spread their exporting activity beyond Europe.

Table 2. Geographic distribution of surveyed firms

Voivodeship	Frequency	Percentage	Voivodeship	Frequency	Percentage
Dolnośląskie	11	5.85	Podlaskie	5	2.66
Kujawsko-Pomorskie	11	5.85	Pomorskie	24	12.77
Lubelskie	8	4.26	Śląskie	28	14.89
Łódzkie	12	6.38	Świętokrzyskie	2	1.06
Mazowieckie	35	18.62	Warmińsko-mazurskie	3	1.6
Małopolskie	15	7.98	Wielkopolskie	13	6.91
Opolskie	2	1.06	Zachodniopomorskie	5	2.66
Podkarpackie	14	7.45	**Total:**	188	100.00

Source: own elaboration based on the conducted survey.

Table 3. Industrial distribution of surveyed firms

Industry	Industry description. Manufacture of:	Frequency	Percentage
10	food products	11	6.29
11	beverages	1	0.57
13	textiles	6	3.43
14	wearing apparel	7	4.00
15	leather and related products	1	0.57
16	wood and of products of wood and cork	3	1.71
18	printing and reproduction of recorded media	4	2.29
19	coke and refined petroleum products	1	0.57
20	chemicals and chemical products	15	8.57
21	basic pharmaceutical products and pharmaceutical preparations	2	1.14
22	rubber and plastic products	18	10.29
23	other non-metallic mineral products	3	1.71
24	basic metals	4	2.29
25	fabricated metal products, except machinery and equipment	31	17.71
26	computer, electronic, and optical products	8	4.57
27	electrical equipment	13	7.43
28	machinery and equipment n.e.c.	17	9.71
29	motor vehicles, trailers, and semi-trailers	5	2.86
30	other transport equipment	4	2.29
31	furniture	2	1.14
32	other manufacturing	13	7.43
33	repair and installation of machinery and equipment	6	3.43
	Total:	175	100.00

Source: own elaboration based on the conducted survey.

The sample description presented above provides the background for the main aim of the research. In our survey, we asked the question whether the Covid-19 pandemic affected the sale of the firm's products, in particular, whether the firm noted: (*i*) a decrease in domestic sales, (*ii*) an increase in domestic sales (*iii*) a decrease in export sales, and (*iv*) an increase in export sales. Focusing on the last answer, we obtain a dummy variable that we coded as '1' when the firm recorded an increase in export sales, and '0' if it did not. Taking into account firms' sales, 18% of these firms reached the growth of export sales (Table 4).

Table 4. The percentage of firms which noted the changes in their sales during the pandemic

Characteristics	Frequency	Percentage
Decrease in domestic sales	49	34.03
Increase in domestic sales	27	18.75
Decrease in export sales	45	31.25
Increase in export sales	26	18.06

Note: n=144, the question 'Did the COVID-19 pandemic affect the sale of the firm's products' was a multiple-choice question.
Source: own elaboration based on the conducted survey.

In our survey, we considered a group of factors related to two types of strategies undertaken by firms. The first factor was more general and concerned the possession of internationalisation strategies that were both formally and informally formulated. Such frames for a firm's activity in foreign markets possess slightly less than 40% of surveyed enterprises (Figure 1). In the second step, we examined the specific activities that firms undertook during the Covid-19 crisis and related to three particular areas – (i) employees and their wages (*COV-19 Strategy1*), (ii) marketing activities and new products (*COV19-Strategy2*), and (iii) new markets and new suppliers of intermediate products (*COV19-Strategy3*). The most used tools are related to *COV-19 Strategy1* – nearly 80% of responders employed one or more solutions connected to employees and their wages, specifically, these solutions

considered temporary employment reduction (*EmpReduction*), dismissing of employees (*EmpDismiss*), wages reduction (*WageReduction*), and remote work (*RemoteWork*).

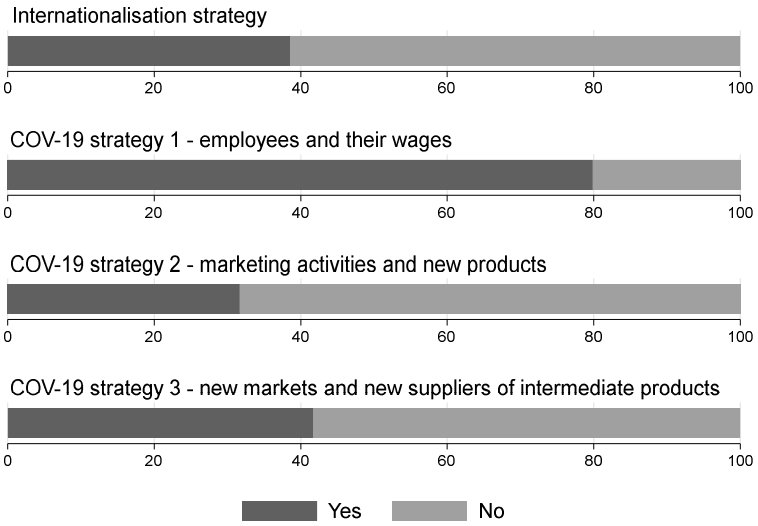

Figure 1. The possession and the use of Covid-19 strategies by Polish exporting firms (%)
Source: own elaboration based on the conducted survey.

The second group of Covid-19 anti-crisis activities (*COV-19 Strategy2*) focused on the intensification of marketing activities (*Marketing*), and sales of new/custom products (*Products*). Only 31.7% of firms made efforts in that direction.

The Covid-19 crisis significantly affected value chains. They shortened and became more regional than global. Firms were forced to search for new materials or/and new intermediate products from new suppliers (*BackwardLinks*), and/or search for new foreign partners in exports (*ForwardLinks*). These activities formed the third strategy named *COV-19 Strategy3*. Slightly above 40% of exporters decided to use one or both paths to protect their enterprises.

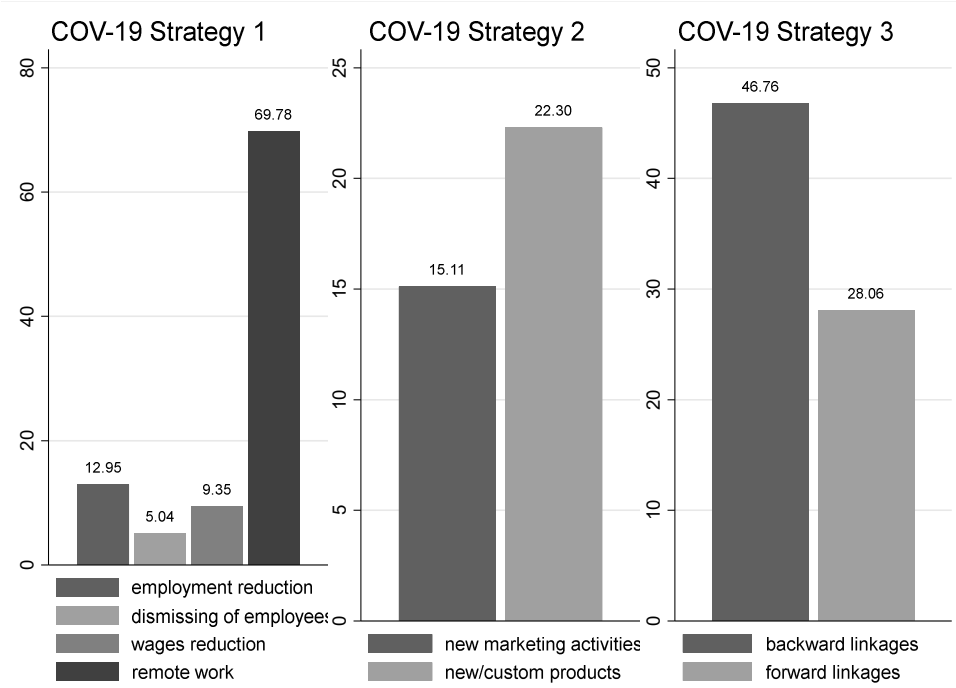

Figure 2. The use of Covid-19 sub-strategies in % of surveyed firms
Source: own elaboration based on the conducted survey.

During the analysed period firms refrained from reducing employment and wages. The usage of these instruments was rare in comparison to others (Figure 2). The most used strategies related to remote work – 69.78% of firms employed this solution; to backward linkages understood as new intermediate products or new suppliers of intermediates (46.76%); and the search for new or customised products (22.30%).

Table 5. Summary statistics for variables used in model estimation

Variable	Obs	Mean	Standard Deviation	Min	Max
Δexports>0	144	0.181	0.386	0	1
COV-19 Strategy1	139	0.971	0.691	0	4
EmpReduction	139	0.129	0.337	0	1
EmpDismiss	139	0.050	0.219	0	1
WageReduction	139	0.094	0.292	0	1
RemoteWork	139	0.698	0.461	0	1
COV-19 Strategy2	139	0.374	0.593	0	2
Marketing	139	0.151	0.359	0	1
Products	139	0.223	0.418	0	1
COV-19 Strategy3	139	0.748	0.723	0	2
BackwardLinks	139	0.468	0.501	0	1
ForwardLinks	139	0.281	0.451	0	1
Age	186	35.946	27.000	3	175
Size	195	2.590	0.883	1	4
ForeignMarket	143	2.629	1.249	1	4
Ownership	182	13.950	33.328	0	100
Inno	142	0.387	0.489	0	1

Source: own elaboration based on the conducted survey.

To evaluate the impact of Covid-19 strategies on firms' export performance growth (*Δexports*), we formulated the following regression:

$$\Delta exports_i = \beta_o + \gamma_1 IntStrategy_i + \gamma_2 COV-19\ Strategy_i + \beta_1 Z_i + \varepsilon_i \quad (1)$$

in which *COV-19 Strategy* contains the firm's activities related to Covid anti-crisis strategies as described above and *Z* is a matrix of control variables. It covers the firm's characteristics such as age (*Age*), size (*Size*), the number of foreign markets on which a particular firm operates (*ForMarket*), the ownership structure (*Ownership*), and the firms' innovativeness (*Inno*). The summary statistics are presented in Table 5. Moreover, we controlled the exports growth for industry fixed effects and NUTS2 region fixed effects respectively. Finally, ε_i is a random disturbance.

In the next step, we transformed the latent variable *Δexports* into a binary variable *y* defined as below:

$$y = y_i = \begin{cases} 1, & if\ \Delta exports > 0 \\ 0, & otherwise \end{cases} \quad (2)$$

This allowed us to consider a binary choice model:

$$P(y = 1|IntStrategy, COV-19\ Strategy, Z) = f(\beta_o + \gamma_1 IntStrategy_i + \gamma_2 COV-19\ Strategy_i + \beta_1 Z_i) \quad (3)$$

Assuming that *f* in (3) is a standard normal cumulative distribution function, our model took the form of a probit regression model with normally distributed error terms. We estimated this model with the aid of the maximum likelihood method. Next, to measure the magnitude of the particular explanatory variables' impact, we used the average marginal effects.

RESULTS AND DISCUSSION

Our empirical analysis started with the assessment of correlation coefficients for all explanatory factors. Because of the relatively high association between main Covid-19 strategies and their

Table 6. Correlation matrix for the explanatory variables

Variable	***IntStrategy***	***COV19--Strategy1***	*Emp Reduction*	*EmpDismiss*	*Wage Reduction*	*RemoteWork*	***COV19--Strategy2***	*Marketing*	*Products*	***COV19-Strategy3***	*BackwardLinks*	*ForwardLinks*	*Age*	*Size*	*Foreign MarketN*	*Ownership*	*Inno*
IntStrategy	1.000																
COV-19 Strategy1	0.141	1.000															
EmpReduction	0.086	0.514*	1.000														
EmpDismiss	0.153	0.488*	0.205	1.000													
WageReduction	-0.004	0.552*	0.171	0.265*	1.000												
RemoteWork	0.079	0.541*	-0.166	-0.063	-0.058	1.000											
COV-19 Strategy2	0.067	-0.027	-0.099	0.021	0.006	0.019	1.000										
Marketing	0.115	0.018	-0.103	-0.005	0.003	0.103	0.719*	1.000									
Products	-0.005	-0.053	-0.052	0.035	0.006	-0.062	0.801*	0.160	1.000								
COV-19 Strategy3	0.274*	-0.073	-0.044	-0.057	-0.059	-0.013	0.255*	0.231*	0.163	1.000							
BackwardLinks	0.285*	-0.087	0.025	-0.084	-0.053	-0.074	0.090	0.007	0.121	0.788*	1.000						
ForwardLinks	0.123	-0.020	-0.098	0.003	-0.036	0.062	0.309*	0.363*	0.127	0.729*	0.153	1.000					
Age	-0.111	0.065	0.021	-0.047	0.083	0.052	0.085	-0.022	0.140	0.020	0.025	0.005	1.000				
Size	-0.061	0.016	0.080	0.087	0.121	-0.152	-0.097	-0.025	-0.115	0.025	0.000	0.039	-0.134	1.000			
ForeignMarketN	0.342*	0.122	0.018	-0.061	-0.154	0.294*	0.151	0.149	0.088	0.211	0.049	0.279*	-0.041	-0.220*	1.000		
Ownership	0.075	0.095	-0.007	0.121	0.018	0.075	0.019	-0.001	0.027	-0.118	-0.021	-0.167	-0.074	-0.338*	0.134	1.000	
Inno	0.264*	0.141	0.052	0.023	0.003	0.161	0.209	0.127	0.188	0.206	0.202	0.107	0.193	-0.129	0.289*	0.011	1.000

Note: * indicates a statistically significant correlation at the 1% level.

Source: own elaboration based on the conducted survey.

sub-strat-egies (Table 6), we considered COV-19 Strategy1, COV-19 Strategy2, and COV-19 Strategy3 in a separate model specification and particular firms' anti-Covid activities in another one.

Possessing internationalisation strategy, both formally and informally formulated makes the analysed firms more likely to export (Table 7). This result is robust to different model specifications. Main Covid-19 strategies presented in specifications (1), (2), (4), and (6) clearly indicated a lack of importance of tools gathered in Strategy 1. In turn, *COV-19 Strategy2* which focused on new marketing actions and new products offered on the market, was statistically significant in explaining export performance growth. It means that the increasing number of tools related to this strategy and used by the firm increases the probability of improving the export performance by about 13 percentage points (columns (1) and (4)). The significance of the third strategy depends on whether we consider it separately (model (6)) or together with other Covid-19 strategies (1).

Taking a closer look at individual activities set in order to avoid/overcome Covid-19 effects, we can see that even if only a small portion of firms decided to reduce their employment during the pandemic, this instrument became significant in increasing export probability. Moreover, within the other strategies, particular tools (searching for new or customised products, and searching for new partners for exported goods) importantly affected firms which were more prone to export.

Table 7. Estimation results for the increase in export sales

Dependent variable	**1=firm increased its export sale, 0=firm did not increase its export sale**						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IntStrategy	0.285***	0.332***	0.379***	0.309***	0.308***	0.252***	0.250***
	[0.911]	[0.079]	[0.074]	[0.078]	[0.078]	[0.080]	[0.083]
Cov-19 Strategy 1	-0.510	-0.036					
(Employment and Wages)	[0.046]	[0.043]					
EmpReduction			0.201*				
			[0.105]				
EmpDismiss			-0.064				
			[0.150]				
WageReduction			-0.168				
			[0.142]				
RemoteWork			-0.074				
			[0.062]				
Cov-19 Strategy 2	0.126**			0.134***			
(Marketing and Products)	[0.053]			[0.050]			
Marketing					0.120		
					[0.096]		
Products					0.146*		
					[0.075]		
Cov-19 Strategy 3	0.073					0.100**	
(Forward, Backward Links)	[0.045]					[0.044]	
BackwardLinks							0.009
							[0.068]
ForwardLinks							0.182***
							[0.068]
Pseudo-R2	0.368	0.302	0.352	0.342	0.342	0.327	0.348
N	113	113	113	113	113	113	113
Wald chi2	411.240	315.589	376.410	362.326	360.522	393.66	321.953
p-val for chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Note: * p<0.10, ** p<0.05, *** p<0.01; coefficients reflect marginal effects for probit models; robust standard errors in parentheses; *pseudo-R2, chi2 test statistics and p-value for chi2 are for original probit models*; each specification contains constant, fixed effects for manufacturing industries and voivodeship.
Source: own elaboration based on the conducted survey.

In Table 8, we examined the impact of possessing an internationalisation strategy and anti-crisis activities undertaken by Polish exporting firms, taking into account the control variables described in the previous section. These results supported our findings from Table 3. Additional control factors kept our estimates robust. Omitting nonsignificant *COVID-19 Strategy1* makes both remaining strategies start significant regardless of whether they entered the model together (specification (1)) or were considered separately (model (2) and (4)).

Generally, all control variables, except for firms' age, positively and significantly affected the propensity to increase export, but the older the firm was the lower probability that this firm would boost its exports.

Our results highlighted the exceptional role of the exporter's internationalization strategy. We tried to find a combination of anti-crisis actions and evaluate their impact on export sales growth during the pandemic period. Only when we combined the fact that the firm formulates its internationalisation strategy and creates new value chain linkages (COVID Strategy 3) did we observe a synergistic effect (Table 9). A deeper look into Strategy 3, allowed us to note that the firms which formulate their internationalisation strategy and look intensively for new export partners gain in exports (specification 4). Therefore, support programs to strengthen exporters' resilience to pandemics should not only focus on employment or financial support, but also contribute to the creation or consolidation a long-term internationalisation strategy.

Table 8. Estimation results for the increase of export sales (with control variables Z)

Dependent variable	1=firm increased its export sale, 0=firm did not increase its export sale				
	(1)	(2)	(3)	(4)	(5)
IntStrategy	0.472**	0.513***	0.583***	0.283***	0.318***
	[0.193]	[0.160]	[0.132]	[0.081]	[0.085]
Cov-19 Strategy 2	0.236**	0.247***			
(Marketing and Products)	[0.091]	[0.071]			
Marketing			0.037		
			[0.087]		
Products			0.396***		
			[0.063]		
Cov-19 Strategy 3	0.202**			0.195***	
(Forward, Backward Links)	[0.093]			[0.064]	
BackwardLinks					0.121*
					[0.073]
ForwardLinks					0.289***
					[0.073]
Age	-0.011***	-0.008***	-0.010***	-0.007***	-0.008***
	[0.003]	[0.002]	[0.003]	[0.001]	[0.002]
Size	0.004	0.135**	0.193***	0.095	0.105*
	[0.106]	[0.066]	[0.047]	[0.066]	[0.063]
ForMarket	0.266***	0.203***	0.274***	0.196***	0.196***
	[0.075]	[0.045]	[0.041]	[0.030]	[0.031]
Ownership	0.003***	0.002**	0.002***	0.003***	0.004***
	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]
Inno	0.293***	0.124*	0.302***	0.270***	0.307***
	[0.101]	[0.070]	[0.076]	[0.064]	[0.058]
Pseudo-R2	0.723	0.674	0.743	0.624	0.647
N	105	105	105	105	105
Wald chi2	642.040	556.213	612.788	493.780	487.227
p-val for chi2	0.000	0.000	0.000	0.000	0.000

Note: * p<0.10, ** p<0.05, *** p<0.01; coefficients reflect marginal effects for probit models; robust standard errors in parentheses; *pseudo-R2, chi2 test statistics, and p-value for chi2 are for original probit models;* each specification contains constant, fixed effects for manufacturing industries and voivodeship.
Source: own elaboration based on the conducted survey.

Table 9. Estimation results for the increase of export sales including interactions between firms' strategies

Dependent variable	1=firm increased its export sale, 0=firm did not increase its export sale				
	(1)	(2)	(3)	(4)	(5)
IntStrategy	0.314***	0.373***	0.092	0.109	0.274***
	[0.110]	[0.111]	[0.123]	[0.112]	[0.094]
Cov-19 Strategy 2 (Marketing and Products)	0.192**		0.096*		0.177**
	[0.078]		[0.056]		[0.087]
Marketing		0.254*			
		[0.134]			
Products		0.235**			
		[0.112]			
Cov-19 Strategy 3 (Forward, Backward Links)	0.090*		-0.015		0.092*
	[0.048]		[0.066]		[0.053]
BackwardLinks				-0.050	
				[0.093]	
ForwardLinks				0.000	
				[0.122]	
Interactions					
IntStrategy # Cov-19 Strategy 2	-0.136				
	[0.114]				
IntStrategy # Marketing		-0.054			
		[0.162]			
IntStrategy # Products		-0.047			
		[0.151]			
Marketing # Products		-0.282			
		[0.202]			
IntStrategy # Cov-19 Strategy 3			0.185**		
			[0.090]		
IntStrategy # BackwardLinks				0.135	
				[0.120]	
IntStrategy # ForwardLinks				0.240*	
				[0.124]	
BackwardLinks # ForwardLinks				0.038	
				[0.131]	
Cov-19 Strategy 2 # Cov-19 Strategy 3					-0.055
					[0.067]
Pseudo-R2	0.3698	0.3605	0.3883	0.3826	0.3622
N	113	113	113	113	113
Wald chi2	345.13	351.27	367.52	345.94	387.34
p-val for chi2	0.000	0.000	0.000	0.000	0.000

Note: * p<0.10, ** p<0.05, *** p<0.01; coefficients reflect marginal effects for probit models; robust standard errors in parentheses; pseudo-R2, chi2 test statistics and p-value for chi2 are for original probit models; each specification contains constant, fixed effects for manufacturing industries and voivodeship.
Source: own elaboration based on the conducted survey.

We hope that our research results will constitute an important voice in the discussion on the resilience of exporting firms in the face of the pandemic. The Covid-19 pandemic crisis was sudden and unexpected and many researchers all over the world tried to find how enterprises, including firms operating internationally, cope with it. Thus far, conducted studies have been rather fragmentary. They identify anti-crisis actions but do not estimate their impact on firms' performance, which makes

them difficult to compare with each other. However, the key anti-crisis activities undertaken by exporters to cope with the crisis analysed in our article are generally consistent with other research (*e.g.* Borino *et al*., 2021; Gorynia & Trąpczyński, 2022). Gorynia and Trąpczyński (2022) claim that the level of internationalisation, both in terms of its depth (*i.e.* intensity of servicing foreign markets) and breadth (*i.e.* the number of foreign markets served) may have a moderating role in relation to the effects of the pandemic crisis. Stronger international engagement compensates for external shocks by recurring to different sources of demand. Firms may also benefit from a more diversified sourcing and production base. Moreover, using a dataset of 4433 enterprises across 133 countries, Borino *et al*. (2021) show that despite being more strongly affected by the Covid-19 crisis, firms engaged in international trade have taken more resilient actions than firms that only operate domestically.

Therefore, our research complements the widely held knowledge in the economic literature that multinational firms are more vulnerable to shocks than firms that operate only within the country (Vannoorenberghe, 2012; Kurz & Senses, 2016). This is certainly the case, but as our research shows, exporting firms are able to take actions that not only counteract the pandemic's effects o but also lead to an increase in export sales. Of course, many questions remain, *e.g.* what determines the effectiveness of these actions, and whether these actions will work in the conditions of the next pandemic. Thus, future and more in-depth research is required.

CONCLUSIONS

Although most countries have already managed the Covid-19 pandemic, the question of the effectiveness and range of tools (what has worked, what has not) that certain countries have used to support businesses during the pandemic is highly relevant (OECD, 2022). However, we believe that the more interesting question is what the companies did themselves during this Covid-19 period and which of their anti-crisis activities were most successful. In our study, we focused on exporters, *i.e.* companies exposed to international and domestic disruptions (weaker foreign demand for export goods and services, shortages of intermediate goods, transportation, and travel restrictions).

Based on a survey of 161 Polish manufacturing export firms between April 21 and June 25, we identified crucial anti-crisis activities undertaken by firms to increase their export sales during the pandemic period. We found that some key firm characteristics such as firm size, foreign ownership, scale of international operations, innovation degree, and market diversification strategy have significantly impacted export sales during the pandemic period. Three anti-crisis activities such as temporary reduction in employment, selling new/adapted products, and finding new foreign export partners strongly supported Polish exporters' sales growth during the Covid-19 pandemic.

The results of our empirical analysis have some policy implications. The main effective anti-crisis activity undertaken by exporters was temporary job reduction. Hence, it is important to support export firms in this area. We believe that governments should develop job retention programs that are adapted to the needs of exporters and can be launched quickly during the next pandemic. The development of automation of export production and digital tools that can replace on-site production should also be a key part of export-supporting policies against future pandemics.

Moreover, we showed that the sale of new/adapted products and the search for new foreign export partners strongly supported the sales growth of Polish exporters during the pandemic Covid-19. Our findings indicate the need to implement resource flexibility management programs as a way to adapt to an uncertain environment. This should increase companies' ability to expand or change the pallet of their products or services in the future. Moreover, in sectors that are heavily dependent on a small group of buyers, smart diversification efforts must become policymakers' major priority.

Furthermore, our analysis resulted in some recommendations for management. Our findings highlighted the importance of export market diversification in building resilient business models among exporters. We also recommend focusing on product innovation as the core of resilient business models that help exporters not only survive the pandemic period but also expand the export sale during such a period.

Our research has some limitations. They are related to the small sample size and the analysis of exporters from only one country. To test the robustness of our results, it is necessary to conduct research based on a much larger sample of exporters. It would also be desirable if the sample included exporters from other EU countries. This would allow for formulating recommendations for the entire EU in the area of support instruments for exporters during the pandemic. Further research could also focus on additional firm features that impact their export performance in the pandemic period like the degree of innovation, having different internationalization/marketing strategies, possessing resources, or functioning in different networks or clusters. Moreover, the review of the existing research on actions undertaken by firms during different shocks in the past decades like *e.g.* financial crisis of 2008-2009, Covid-19, or the Russian invasion of Ukraine also shows several possible directions for further investigation. *i.e.* taking into account supply-side factors like *e.g.* alternative input sources.

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Acknowledgements and Financial Disclosure

The research has been conducted within the project 'Competitiveness and Internationalization Patterns of Firms' financed by the Gdańsk University of Technology, Faculty of Management and Economics, Poland.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Published by Krakow University of Economics – Krakow, Poland

Ministry of Education and Science
Republic of Poland

The journal is co-financed in the years 2022-2024 by the Ministry of Education and Science of the Republic of Poland in the framework of the ministerial programme "Development of Scientific Journals" (RCN) on the basis of contract no. RCN/SP/0583/2021/1 concluded on 13 October 2022 and being in force until 13 October 2024.