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### Development of the *de minimis* guarantee programme for SMEs in the transportation sector in Poland. Does COVID-19 matter?

### Rozwój programu gwarancji *de minimis* dla MŚP z sektora transportowego w Polsce. Czy COVID-19 ma znaczenie?

**Abstract.** The paper aims to present the functioning of the *de minimis* guarantee programme for SMEs in the transportation sector in Poland. Moreover, our study assesses the impact of COVID-19 on numbers and values of obtained guarantees by the analysed enterprises. We use data from Bank Gospodarstwa Krajowego, a state development bank. The research period covers 2013–2020. The government *de minimis* guarantee programme aims to support entrepreneurship using BGK guarantees to ease banking loan barriers for SMEs in Poland. The study reveals that the value of guarantees granted to SMEs in the transportation sector is continuously growing, while the number of guarantees fluctuates in the analysed period. Micro-enterprises obtain about 50% of the total value of all guarantees. SMEs in the transportation sector primarily use the *de minimis* guarantee programme to secure revolving working capital loans. We observe significant differences in the number and value of granted guarantees among 16 Polish voivodeships. The t-test analysis confirms that both numbers and values of credit guarantees are significantly greater in the COVID-19 than in the pre-COVID-19 year. Such results may indicate the deteriorating financial situation of the surveyed SMEs, resulting in the need to use *de minimis* guarantees to successfully borrow financial capital from the bank.

**Key words:** *de minimis* guarantee programme, credit guarantee, transportation sector, SMEs, COVID-19 pandemic

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**Synopsis.** Celem artykułu było przedstawienie funkcjonowania programu gwarancji *de minimis* dla MŚP z sektora transportowego w Polsce. Ponadto badanie ocenia wpływ COVID-19 na liczbę i wartość uzyskanych gwarancji przez analizowane przedsiębiorstwa. Wykorzystano dane Banku Gospodarstwa Krajowego, państwowego banku rozwoju. Okres badawczy obejmował lata 2013–2020. Rządowy program gwarancji *de minimis* ma na celu wspieranie przedsiębiorczości korzystającej z gwarancji BGK, w celu złagodzenia barier kredytowych dla MŚP w Polsce. Z badania wynika, że wartość poręczeń udzielanych MŚP z sektora transportowego nieprzerwanie rosła, a liczba poręczeń wahała się w analizowanym okresie. Badane MŚP z sektora transportowego korzystają przede wszystkim z programu gwarancji *de minimis*, aby zabezpieczyć odnawialne kredyty obrotowe. Mikroprzedsiębiorstwa uzyskały ok. 50% łącznej wartości wszystkich gwarancji. Zaobserwowano znaczne różnice w liczbie i wartości udzielonych gwarancji wśród 16 polskich województw. Analiza testu *t* potwierdziła, że zarówno liczba, jak i wartość gwarancji kredytowych były znacznie wyższe w okresie COVID-19 (2020) niż w okresie przed COVID-19 (2019). Uzyskane wyniki wskazują na pogarszającą się sytuację finansową badanych MŚP spowodowaną wystąpieniem pandemii COVID-19 skutkującą koniecznością skorzystania z gwarancji *de minimis*.

**Słowa kluczowe:** program gwarancji *de minimis*, gwarancje kredytowe, sektor transportowy, MŚP, pandemia COVID-19

**JEL codes:** G18, G32, L90, R40

## Introduction

Micro, small and medium-sized enterprises (SMEs) are crucial for the economy, as they provide jobs, become a powerhouse of the economy and GDP creation, and substantially contribute to the private sector's [Ayyagari et al. 2007, Xia and Gan 2020].

Financial capital is an essential element for the functioning and development of any economic entity [Brown et al. 2011]. The issue of financing activities is a ubiquitous problem that companies face at different stages of their development [Kuchciński 2019]. However, the differences between SMEs and large enterprises are manifested, inter alia, in the preference of financing sources, costs related to obtaining new funds, and, unfortunately, in access to capital [Sokół 2015]. Enterprises often use borrowed capital for investment and current activities. SMEs recognise access to bank financing as crucial to their performance, namely operation, survival, and expansion [Vasilescu 2014].

A vast number of research studies observe that SMEs not only report higher financing hurdles in obtaining borrowed capital than larger enterprises, and in consequence, the effects of these financing constraints are stronger for SMEs than for larger firms [Beck and Demircuc-Kunt 2006, Coluzzi et al. 2015, Wang 2016, Nizaeva and Coskun 2018].

The most common barriers to accessing a bank loan for SMEs are insufficient security, short credit history and market experience, poor financial indicators, poor investment performance, and errors in the documentation submitted by the company [Andrzejak 2017].

It is crucial to create programmes that help companies raise finance when they cannot meet rigorous banks' requirements in obtaining credit or loans [Bieńkowska 2009].

Due to restrictions and imperfections in the markets, public administrations, mainly governments, can use guarantee schemes to facilitate credit access for enterprises [Garcia-Tabuenca and Crespo-Espert 2010]. According to Arping et al. [2010], public support for en-

trepreneurs is unnecessary only when markets are effective. Public credit guarantee programmes are common both in developing and developed countries worldwide [Beck et al. 2010]. In the European Union, the main form of public aid for SMEs was subsidies for business in the past. However, in 2000 the European Council decided to reduce direct public support and concentrate on indirect assistance for SMEs. Consequently, the EU institutions recommended creating guarantee funds to ease SMEs' process of obtaining bank loans and developing their creditworthiness [Waniak-Michalak and Michalak 2019]. The *de minimis* guarantee programme was designed to facilitate access to bank loans for SMEs in Poland [Andrzejak 2017]. The programme (fund) is managed by Bank Gospodarstwa Krajowego (BGK), which, as part of the programme implementation, concludes direct portfolio agreements with financial institutions (lenders). Financial institutions provide individual guarantees to borrowers from the SME sector within their limits. The principle of operation of the *de minimis* guarantee is based on the obligation of the financial institution (BGK) to perform the service consisting of the repayment of the obligation incurred by the borrower with the lender in the event of failure complete the original service. The essence of the guarantee is to secure the beneficiary by the guarantee issuer and the assumption by the guarantee issuer of the risk of performance by the principal under the primary relationship.

In the era of intensive economic development, the importance of transport is growing. The transport system is defined as a system of technical, organizational, and human measures related to each other in such a way as to carry out the transport of people and goods efficiently [Jacyna 2012]. The transportation sector, including transport and storage, is one of the fundamental pillars of the Polish economy, accounting for about 6% of Polish GDP. Poland is the EU leader in terms of road transport [KRD 2021]. According to Statistics Poland (GUS), there are about 125 thousand companies in the transportation sector, which employ approximately 660,000 people. More than 90% of transportation companies are small businesses. It is also worth pointing out that revenues from the sale of services in all transport units in Poland in 2020, i.e., the first year of the COVID-19 pandemic, were 1.2% lower than in 2019 and amounted to approximately PLN 280 billion [GUS 2021].

COVID-19 pandemic has substantially hit the world economy [Laing 2020], including Polish [Czech et al. 2020]. However, the studies show that the novel coronavirus's impact is more severe among SMEs than large companies [Fabeil et al. 2020]. Zając et al. [2021] reveal that the COVID-19 pandemic negatively affects the credit financing of small enterprises in Poland. The transportation sector belongs to the first and the most negatively affected branches of the economy [He et al. 2020, Shen et al. 2020].

Our contribution is that we assess the functioning of the *de minimis* guarantee programme by analysing the changes in the number and values of obtained guarantees in the group of SMEs (micro, small, and medium-sized enterprises) from the transportation sector in Poland. We conduct the analysis from a national and voivodeship perspective. Moreover, we examine the impact of COVID-19 on the guarantees measures. Our research might be useful for decision-makers and credit market participants, including the government, financial market supervisory institutions, banks, and SME entrepreneurs.

The paper is organised as follows: the next section presents the methodology, i.e., the aim of the study, research hypothesis, and description of material and methods. The subsequent section presents the empirical findings, while the final section offers conclusions.

## Materials and methods

The paper aims to present the functioning of the *de minimis* guarantee programme for SMEs in the transport sector in Poland. Moreover, the study assesses the impact of the COVID-19 pandemic on the number and value of guarantees granted in the analysed group of enterprises.

We analyse all enterprises from the transportation sector, i.e., enterprises that, when applying for financing with guarantee support, have declared the type of activity they conduct as transport and warehouse management (Section H – Transport and warehouse management of the Polish Classification of Activities – PKD).

We analyse obtained guarantees securing investment loans and revolving and non-revolving working capital loans. We define investment loans as loans for enterprises intended for a specific purpose related to financing new or increasing the borrower's existing production and service capacities. Moreover, investment loans finance other joint and accompanying investments, granted for financing projects aimed at replacing, modernizing, and increasing fixed assets, including financing planned investments, expanding the enterprise, purchasing a machine park, or creating a new production line. Revolving and non-revolving working capital loans are loans for enterprises, granted for any purpose related to the borrower's day-to-day operations. Revolving loans include credit lines or overdraft facilities, while non-revolving loans are loans with a repayment schedule.

The analysis is conducted from a national (Polish) and regional (voivodeship) perspective. The research period covers 2013–2020, i.e., from the beginning of the programme functioning. We use descriptive statistics in the analysis. Moreover, to assess the impact of the COVID-19 pandemic on the guarantee programme in the transportation sector, we apply the two-sample *t*-test [Snedecor and Cochran 1989] to verify whether the mean values of analysed credit measures among Polish voivodeships differ significantly in 2020 and 2019, i.e., the COVID-19- and pre-COVID-19 years.

The applied formula of our two-sample *t*-test is as follows:

$$t = \frac{\bar{X}_{2020} - \bar{X}_{2019}}{\sqrt{\frac{s_{2020}^2}{n_{2020}} + \frac{s_{2019}^2}{n_{2019}}}}$$

where  $X_{2020}$  refers to the average numbers and values of credit guarantees in 2020, the COVID-19 year and  $X_{2019}$  represents the average values of applied variables in the 2019, i.e., the pre-COVID-19 year,  $s_{2020}$  and  $s_{2019}$  are the standard deviations of the two analysed samples, and  $n_{2020}$  and  $n_{2019}$  are numbers of observations in samples. The data are paired. Thus, we assume that there is a one-to-one correspondence between the values in the two samples. That is, if  $X_{2020_1}, X_{2020_2}, \dots, X_{2020_n}$  and  $X_{2019_1}, X_{2019_2}, \dots, X_{2019_n}$  are the two samples, then  $X_{2020_i}$  corresponds to  $X_{2019_i}$ . As we analyse the issue from the regional (voivodeship) perspective, in the study  $n = 16$ , which refers to 16 pairs representing all Polish voivodeships. We verify the joint distribution of analysed variables' normality with the Shapiro-Wilk test. Moreover, to check the heteroscedasticity, we apply the Breusch-Pagan test.

We formulate the following research hypothesis:

Hypothesis: Both numbers and values of credit guarantees among SMEs from the transportation sector in Poland are significantly greater in the first COVID-19 year than in the pre-COVID-19 year.

In the applied t-test the null and alternative hypotheses are as follows:

$$\begin{aligned}H_0: \mu_{2020} &= \mu_{2019} \\H_1: \mu_{2020} &> \mu_{2019},\end{aligned}$$

where  $\mu_{2020}$  and  $\mu_{2019}$  represent the mean values of *de minimis* guarantees in COVID-19 (2020) and pre-COVID-19 (2019) years, respectively. The null hypothesis assumes that the analysed guarantee measures, i.e., number and values, do not differ in both analysed years. The alternative hypothesis assumes that the first pandemic year (2020) brought a significant increase in the number and value of guarantees granted to SMEs in the transport sector in Poland compared to the previous year.

Data on the number and value of granted guarantees by SMEs were obtained from Bank Gospodarstwa Krajowego (BGK). BGK is a Polish development bank. Its main aim is to support the sustainable socio-economic development of Poland. The bank manages the National Guarantee Fund (KFG) that grants *de minimis* guarantees.

## Research Results

The *de minimis* guarantee programme is Poland's largest and longest operating guarantee programme. From the beginning of the programme until the end of 2020, SMEs got over 380 thousand guarantees, and their total value amounted to nearly PLN 90 billion. *De minimis* guarantees are offered only within the available limit of *de minimis* aid. Therefore, entrepreneurs with an unused limit can only use this instrument. The funds at BGK's disposal when granting *de minimis* guarantees come from the National Guarantee Fund (KFG), which operates according to the provisions of the Act on sureties and guarantees. The source of the funds accumulated in the fund may be different, i.e., the funds may come from EU funds, BGK resources, and the national budget. One of the main principles of operation of the National Guarantee Fund (KFG) is the diversification of the sources of capital origin. The final risk related to the functioning of the *de minimis* guarantee scheme is assumed by the Polish government [BGK 2021].

The conditions to be met by a borrower applying for financing secured by guarantees are [BGK 2021]:

- having a resident status;
- having creditworthiness, confirmed by a credit assessment made by the bank providing the financing in accordance with its internal rules of assessing its ability as at the date of the credit decision;
- not having an entry in any of the systems in which the financing bank verifies the borrower during the financing process in accordance with its internal procedures;
- within three months before applying for financing to the financing bank, the borrower must not have: a terminated loan, an overdue debt exceeding 30 days and the amount exceeding PLN 500, an exposure considered "at-risk" according to the RMF

or in the case of which there is evidence impairment in accordance with IFRS 9 and Recommendation R.

The *de minimis* guarantee cannot cover the loan for [BGK 2021]:

- refinancing of expenses incurred before the conclusion of the investment loan agreement,
- capital investments,
- purchase of financial instruments,
- purchase of receivables,
- purchase of an organized part of the enterprise,
- repayment of the loan or credit facility granted to finance the purposes indicated above.

The *de minimis* guarantee is characterised by the following parameters [BGK 2021]:

- the subject of collateral, i.e., the type of loan that can be guaranteed (working capital and investment loans);
- the value of the guarantee, i.e., the percentage of the secured liability; in the case of *de minimis* guarantees, it is up to 60% of the loan amount (during the COVID-19 pandemic, the maximum value of the guarantee increased to 80% of the loan amount);
- the maximum amount of a guarantee per unit, which is PLN 3.5 million (this limit was lifted as part of the aid package introduced to counteract the effects of the COVID-19 pandemic);
- guarantee period; for a working capital loan it is 39 months (during the COVID-19 pandemic, it is extended to 75 months), and for an investment loan, it is 99 months (during the pandemic period it is extended to 120 months);
- commission for granting a guarantee, which is 0.5% of the guarantee amount.

The possibility of granting guarantees results from Article 34a of the Act on sureties and guarantees granted by the State Treasury and certain legal entities [Ustawa z dnia 8 maja 1997 r.] and was regulated in the regulation issued by the Minister of Finance on the granting of *de minimis* aid by BGK in the form of a loan repayment guarantee [Rozporządzenie Ministra Finansów z dnia 10 czerwca 2014 r.].

Table 1 shows that the total value of granted guarantees to SMEs in the transportation sector continuously grows in the analysed period. Their value in 2020 is approximately 3.5 times higher than in 2013.

The total number of guarantees fluctuates in the analysed period (Table 1). However, the number is 60% higher in 2020 than in the first year of the *de minimis* guarantee programme. Data in Table 1 show that granted guarantees equal 58% of the total loans value in the 2013–2019 period, while in 2020 – almost 73%.

Table 2 depicts that about 3/4 of the total number of guarantees are obtained by the microenterprises in the analysed period. However, among all three types of SMEs, the most substantial upward trend in the number of guarantees is observed in the case of medium-sized companies, i.e., more than 70% increase. In the first pandemic year, we reveal rapid growth in the total number of granted guarantees in SMEs in the transportation sector.

Table 1. The total number and value of secured loans and granted guarantees for SMEs in the transportation sector in Poland in 2013–2020

Tabela 1. Łączna liczba i wartość kredytów zabezpieczonych i udzielonych gwarancji dla MŚP z sektora transportowego w Polsce w latach 2013–2020

Variable	2013	2014	2015	2016	2017	2018	2019	2020	Mean value	Standard deviation	2013–2020 change (%)
Loan value (PLN million)	706	1047	953	1023	1089	1148	1384	2025	1171.9	393.3	186.9
Guarantee value (PLN million)	416	589	547	597	634	668	807	1470	716.0	324.0	252.9
Number of guarantees	3738	5888	5202	4692	3901	3089	3734	6125	4546.1	1108.2	63.8

Source: own calculations based on BGK data.

Table 2. The total number of granted guarantees for SMEs in the transportation sector in Poland in 2013–2020 by enterprise size (PLN million)

Tabela 2. Łączna liczba udzielonych gwarancji dla MŚP z sektora transportowego w Polsce w latach 2013–2020 według wielkości przedsiębiorstw (milion PLN)

Enterprise size	2013	2014	2015	2016	2017	2018	2019	2020	Mean value	Standard deviation	2013–2020 change (%)
Micro	2964	4991	4538	3947	3033	2244	2727	4550	3624.3	1011.4	34.9
Small	675	772	565	558	600	681	771	1214	729.5	212.8	43.4
Medium-sized	99	125	99	187	268	164	236	361	192.4	91.7	72.6

Source: Source: own calculations based on BGK data.

Table 3. The total value of granted guarantees for SMEs in the transportation sector in Poland in 2013–2020 by enterprise size (PLN million)

Tabela 3. Łączna wartość udzielonych gwarancji dla MŚP z sektora transportowego w Polsce w latach 2013–2020 według wielkości przedsiębiorstw (milion PLN)

Enterprise size	2013	2014	2015	2016	2017	2018	2019	2020	Mean value	Standard deviation	2013–2020 change (%)
Micro	221	354	325	341	323	280	329	614	348.5	115.3	64.0
Small	148	176	171	176	217	256	306	516	245.5	121.2	71.4
Medium-sized	48	60	51	80	94	132	172	340	122.1	98.0	86.0

Source: own calculations based on BGK data.

Table 3 shows that micro-enterprises obtain about 50% of the total value of all guarantees in the entire analysed period. In 2013–2019 (i.e., before the outbreak of the novel coronavirus pandemic), we observe that the total nominal value of guarantees in the group of medium-sized enterprises has more than tripled, small enterprises – doubled, while in the case of micro-enterprises has increased only about 50%. The total value of granted guarantees among all three types of SMEs increases sharply in 2020.

Table 4. The total number of granted guarantees for SMEs in the transportation sector in Poland in 2013–2020 by loan type

Tabela 4. Łączna liczba udzielonych poręczeń dla MŚP z sektora transportowego w Polsce w latach 2013–2020 według rodzaju kredytu

Loan type	2013	2014	2015	2016	2017	2018	2019	2020	Mean value	Standard deviation	2013–2020 change (%)
Investment loan	9	91	137	256	165	39	42	70	101.1	81.3	677.8
Non-revolving working capital loan	600	1709	2066	1382	1012	683	1166	1867	1310.6	541.6	211.2
Revolving working capital loan	3129	4088	2999	3054	2724	2367	2526	4188	3134.4	673.1	33.8

Source: own calculations based on BGK data.

Table 4 results depicts that in 2013–2020, in the analysed group of SMEs in the transportation sector, almost all guarantees concern working capital loans (more than 95%). Moreover, the majority of secured working capital loans are revolving loans. However, the most substantial growth in the total number of guaranties is observed in the case of investment loans, from only nine loans in 2013 to 70 loans in 2020.

Table 5. The total value of granted guarantees for SMEs in the transportation sector in Poland in 2013–2020 by loans type (PLN million)

Tabela 5. Łączna wartość udzielonych poręczeń dla MŚP z sektora transportowego w Polsce w latach 2013–2020 według rodzaju kredytu (milion PLN)

Loan type	2013	2014	2015	2016	2017	2018	2019	2020	Mean value	Standard deviation	2013–2020 change (%)
Investment loan	1.41	17	22	28	29	13	15	36	20.1	10.9	2427.9
Non-revolving working capital loan	41	91	103	90	76	65	114	238	102.4	59.4	485.6
Revolving working capital loan	374	480	421	478	529	590	679	1196	593.5	261.4	219.5

Source: own calculations based on BGK data.

Table 5 shows that similarly to the total number of guarantees among all three types of banking loans in 2013–2020, almost the entire value of the *de minimis* guarantees relates to the working capital loans. In more detail, more than 80% of the total value of the guarantees obtained to secure revolving working capital loans. The nominal value of the guarantees increases regardless of the banking loan type. Moreover, the value of guarantees in 2020 doubles in relation to 2019.

Table 6. The number of granted guarantees for SMEs in the transportation sector in Poland in 2013–2020 (by voivodeship)

Tabela 6. Liczba udzielonych poręczeń dla MŚP z sektora transportowego w Polsce w latach 2013–2020 (wg województw)

Voivodeship	2013	2014	2015	2016	2017	2018	2019	2020	Mean value	Standard deviation	2013–2020 change (%)
Dolnośląskie	355	503	448	350	282	236	246	463	360.4	102.4	30.4



Kujawsko-pomorskie	183	304	275	263	211	154	157	316	232.9	65.0	72.7
Lubelskie	155	237	234	195	163	130	188	343	205.6	66.7	121.3
Lubuskie	156	214	193	134	117	100	125	240	159.9	50.4	53.9
Łódzkie	325	468	338	351	319	246	295	477	352.4	80.7	46.8
Małopolskie	280	455	410	377	297	264	311	437	353.9	75.1	56.1
Mazowieckie	561	892	789	785	663	507	612	960	721.1	161.1	71.1
Opolskie	66	115	71	65	43	42	52	111	70.6	28.2	68.2
Podkarpackie	124	212	230	196	157	138	214	260	191.4	47.4	109.7
Podlaskie	113	157	120	114	103	91	125	181	125.5	29.5	60.2
Pomorskie	238	406	379	316	289	187	216	402	304.1	86.0	68.9
Śląskie	350	604	577	525	431	329	388	517	465.1	104.9	47.7
Świętokrzyskie	92	171	148	143	97	95	117	194	132.1	38.1	110.9
Warmińsko-mazurskie	172	187	158	161	116	95	121	189	149.9	35.0	9.9
Wielkopolskie	401	647	562	485	418	313	382	749	494.6	147.8	86.8
Zachodniopomorskie	167	316	270	232	195	162	185	286	226.6	58.4	71.3

Source: own calculations based on BGK data.

Table 6 depicts that the most significant number of guarantees are obtained by the SMEs from Mazowieckie, Wielkopolskie, and Śląskie voivodeships. In contrast, the smallest number of guarantees from the *de minimis* programme is observed in Opolskie voivodeship. However, it is directly related to the size of voivodships, i.e., their population and the number of operating enterprises. We reveal the most substantial growth in the number of obtained guarantees in Lubelskie, Świętokrzyskie, and Podkarpackie voivodeships.

Analysing the number of loan guarantees granted by voivodship in relation to the number of enterprises operating in the transport sector registered in these voivodships, we can see that in the analysed period, the highest average value of this indicator occurs in the following voivodships: Lubuskie, Łódzkie, and Warmińsko-Mazurskie. It may probably mean that transportation companies located in these voivodships face the most significant barriers to access to financing or that their economic and financial situation is the worst. The rate of granted guarantees is observed in the Podlaskie, Mazowieckie and Śląskie voivodships

Table 7. The number of granted guarantees per number of companies for SMEs in the transportation sector in Poland in 2013–2020 by voivodeship (%)

Tabela 7. Liczba udzielonych gwarancji na liczbę firm dla MŚP sektora transportowego w Polsce w latach 2013–2020 wg województw (%)

Voivodeship	2013	2014	2015	2016	2017	2018	2019	2020	Mean value	Standard deviation	2013-2020 change (%)
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Dolnośląskie	3.50	5.03	4.24	3.06	2.56	2.15	2.35	4.43	3.41	1.06	26.68
Kujawsko-pomorskie	2.70	4.25	3.77	3.30	2.72	1.99	2.05	4.13	3.11	0.89	52.74
Lubelskie	2.63	3.61	3.33	2.64	2.12	1.67	2.47	4.51	2.87	0.90	71.46
Lubuskie	4.56	5.75	4.64	3.15	2.84	2.35	2.93	5.62	3.98	1.33	23.16
Łódzkie	3.95	5.26	3.50	3.48	3.15	2.56	3.09	5.00	3.75	0.94	26.45
Małopolskie	2.17	3.48	3.06	2.61	1.97	1.79	2.11	2.97	2.52	0.60	37.03
Mazowieckie	2.41	3.67	3.12	2.96	2.45	1.88	2.25	3.54	2.79	0.64	46.49
Opolskie	2.87	5.15	3.12	2.86	1.70	1.69	2.13	4.56	3.01	1.27	58.59
Podkarpackie	2.28	3.46	3.78	2.92	2.28	1.99	2.96	3.59	2.91	0.67	57.77
Podlaskie	2.61	3.73	2.85	2.74	2.31	2.10	2.92	4.22	2.94	0.71	61.48
Pomorskie	2.55	4.17	3.83	2.98	2.76	1.76	2.13	3.96	3.02	0.89	55.14
Śląskie	2.28	3.56	3.47	3.12	2.51	1.95	2.47	3.29	2.83	0.60	44.47
Świętokrzyskie	2.45	4.76	3.77	3.53	2.37	2.48	3.04	5.04	3.43	1.04	105.55
Warmińsko-mazurskie	4.15	4.80	3.98	3.89	2.52	2.17	2.87	4.49	3.61	0.96	7.95
Wielkopolskie	3.04	4.95	4.05	3.27	2.87	2.14	2.72	5.33	3.55	1.12	75.43
Zachodniopomorskie	2.47	4.41	3.49	3.00	2.38	2.10	2.73	4.23	3.10	0.86	71.33

Source: own calculations based on BGK data.

Table 8 shows that the total amount of the guarantee depends on the voivodeship's size, primarily its GDP and population. In the analysed period, there was a significant increase in the nominal value of the guarantee in all voivodeships. In six regions, the value of guarantees in 2020 was more than four times higher than in 2013. In 2020, i.e., a pandemic year, we observe a visible increase in guarantees value compared to 2019.

Table 9 depicts the visible differences in the average value of granted guarantees for SMEs in the transportation sector among Polish voivodeships. The lowest guarantees values are in Podlaskie, Opolskie, Kujawsko-pomorskie and Podkarpackie voivodeships, i.e., below PLN 140 thousand on average. On the other hand, the highest guarantees values are observed in Świętokrzyskie and Pomorskie voivodeships – close to PLN 200 thousand. We observe a substantial growth in the nominal value of average guarantee in all voivodeships in the entire research period. The COVID-19 pandemic has caused an increase in the average value of credit guarantees in 13 voivodeships.

Table 8. The total value of granted guarantees for SMEs in the transportation sector in Poland in 2013–2020 by voivodeship (PLN million)

Tabela 8. Łączna wartość udzielonych gwarancji dla MŚP z sektora transportowego w Polsce w latach 2013–2020 według województw (milion PLN)

Voivodeship	2013	2014	2015	2016	2017	2018	2019	2020	Mean value	Standard deviation	2013–2020 change (%)
Dolnośląskie	36.1	49.9	42.0	38.2	39.3	45.0	44.3	103.7	49.8	22.2	187.3

Kujawsko-pomorskie	18.9	25.5	26.0	26.5	27.8	27.2	30.4	63.8	30.8	13.8	237.9
Lubelskie	17.8	25.6	23.4	18.1	21.1	23.9	36.1	70.2	29.5	17.4	294.0
Lubuskie	15.9	19.3	14.8	13.7	17.9	28.1	29.3	61.0	25.0	15.7	283.8
Łódzkie	27.1	40.4	32.3	41.1	50.4	51.8	58.1	110.1	51.4	25.8	305.7
Małopolskie	32.6	45.9	42.2	50.5	48.0	50.6	58.0	110.8	54.8	23.8	239.7
Mazowieckie	72.4	103.1	90.3	116.8	108.4	104.4	132.0	237.3	120.6	50.3	227.9
Opolskie	6.7	11.3	6.1	5.3	4.6	5.9	8.3	28.3	9.6	7.9	320.6
Podkarpackie	14.5	16.6	19.3	20.9	25.5	23.3	38.4	52.7	26.4	12.9	263.6
Podlaskie	9.0	12.9	9.4	10.3	11.1	17.3	20.4	36.5	15.9	9.3	305.8
Pomorskie	37.8	48.0	48.3	42.8	53.7	49.7	66.3	112.1	57.3	23.7	196.7
Śląskie	40.8	59.2	60.7	74.6	73.1	78.1	104.6	147.4	79.8	32.9	261.8
Świętokrzyskie	10.7	18.7	19.6	27.2	25.8	27.4	31.0	47.4	26.0	10.8	341.6
Warmińsko-mazurskie	16.6	16.1	14.2	14.6	24.5	16.4	21.9	36.3	20.1	7.5	118.6
Wielkopolskie	43.6	65.1	66.7	68.0	72.7	81.1	92.0	182.5	84.0	42.2	319.0
Zachodniopomorskie	16.0	31.4	31.2	28.4	30.2	37.6	36.3	69.6	35.1	15.4	336.6

Source: own calculations based on BGK data.

Table 10 shows the statistical measures related to the number and values of granted *de minimis* credit guarantees for SMEs in the transportation sector in Poland in 2019–2020. In the research hypothesis, we assume that both numbers and values of credit guarantees are significantly larger in the COVID-19 than in the pre-COVID-19 year. Descriptive statistics presented in table 10 support our assumption. We apply a *t*-test to verify the null hypothesis that mean values of analysed guarantee measures do not differ significantly between the COVID-19 (2020) and pre-COVID-19 (2019) years, i.e.,  $H_0: \mu_{2020} = \mu_{2019}$ . Table 10 results show that we reject the null hypothesis at a 5% significance level. It implies that the average values of analysed measures are significantly greater in 2020, i.e., the COVID-19 period (one-sided *p*-value lower than 5%). Positive values of *t*-test statistics imply the increase of the analysed variables in the research periods. Thus we can confirm the formulated research hypothesis.

Table 9. The average value of granted guarantees for SMEs in the transportation sector in Poland in 2013–2020 by voivodeship (PLN thousand)

Tabela 9. Średnia wartość udzielonych poręczeń dla MŚP z sektora transportowego w Polsce w latach 2013–2020 według województw (tysiące PLN)

Voivodeship	2013	2014	2015	2016	2017	2018	2019	2020	Mean value	Standard deviation	2013–2020 change (%)
Dolnośląskie	101.7	99.1	93.8	109.2	139.4	190.7	180.2	224.0	142.3	49.9	120.2

Kujawsko-pomorskie	103.3	84.0	94.4	100.7	131.9	176.4	193.4	201.9	135.8	47.9	95.4
Lubelskie	115.0	108.0	100.1	92.7	129.5	183.5	192.2	204.7	140.7	45.3	78.0
Lubuskie	101.9	90.0	76.5	102.0	152.7	280.8	234.6	254.2	161.6	82.5	149.4
Łódzkie	83.5	86.2	95.7	117.2	158.1	210.7	197.0	230.8	147.4	59.7	176.5
Małopolskie	116.6	100.9	102.9	133.9	161.6	191.7	186.4	253.6	155.9	53.0	117.5
Mazowieckie	129.0	115.6	114.5	148.8	163.5	205.9	215.7	247.2	167.5	50.0	91.6
Opolskie	102.0	98.6	85.9	81.2	106.5	140.0	159.8	255.0	128.6	57.6	150.0
Podkarpackie	116.9	78.4	83.9	106.6	162.1	168.8	179.2	202.7	137.4	46.8	73.3
Podlaskie	79.7	82.0	78.5	89.9	108.0	189.8	163.1	201.7	124.1	52.3	153.2
Pomorskie	158.8	118.3	127.4	135.4	185.9	265.6	306.8	278.9	197.1	75.5	75.6
Śląskie	116.5	98.0	105.2	142.0	169.5	237.4	269.6	285.1	177.9	75.8	144.8
Świętokrzyskie	116.7	109.3	132.2	190.2	265.5	288.1	265.0	244.3	201.4	73.7	109.3
Warmińsko-mazurskie	96.6	86.2	89.8	90.5	211.4	172.8	181.3	192.1	140.1	53.9	98.9
Wielkopolskie	108.7	100.6	118.7	140.1	173.9	259.2	240.8	243.7	173.2	65.9	124.3
Zachodniopomorskie	95.5	99.3	115.4	122.5	154.8	231.9	196.3	243.4	157.4	59.3	154.8

Source: own calculations based on BGK data.

Table 10. The granted guarantees for SMEs in the transportation sector in Poland in pre-COVID-19 (2019) and COVID-19 (2020) years: *t*-test analysis

Tabela 10. Udzielone gwarancje dla MŚP z sektora transportowego w Polsce w latach przed COVID-19 (2019) i COVID-19 (2020): analiza testu-*t*

Variable	Mean value		Standard deviation		<i>t</i> -test statistic	<i>p</i> -value (one-sided)
	2020	2019	2020	2019		
Number of guarantees	382.81	233.38	222.50	139.72	6.24	<0.001
Number of guarantees per number of companies	4.31	2.58	0.73	0.37	11.06	<0.001
Total value of guarantees	91.86	50.46	57.79	33.65	6.24	<0.001
Average value of the guarantee	235.18	210.09	28.38	41.95	3.29	<0.001

Source: own calculations based on BGK data.

Our results may indicate the deteriorating financial situation of the surveyed SMEs, resulting in the need to use *de minimis* guarantees to borrow financial capital from the bank successfully. Moreover, it indicates the growing financial obstacles that SMEs from the transportation sector in Poland try to overcome by obtaining credit guarantees.

## Conclusion

SMEs in the transport sector in Poland face many barriers in obtaining the capital needed for their functioning and development. The government *de minimis* guarantee program, operating since 2013, aimed at supporting entrepreneurship with the use of sureties and guarantees from Bank Gospodarstwa Krajowego (BGK), is one of the tools to combat these barriers.

Our study reveals that the value of guarantees granted to SMEs in the transportation sector is continuously growing, while the number of guarantees fluctuates in the analysed period. Micro-enterprises obtain about 50% of the total value of all guarantees. SMEs in the transportation sector primarily use the *de minimis* guarantee programme to secure revolving working capital loans. The increasing use of the *de minimis* guarantee scheme shows that this tool effectively helps overcome barriers to access to capital for SMEs in the transportation sector in Poland. We observe significant differences in the number and value of granted guarantees among 16 Polish voivodeships.

The COVID-19 pandemic has hit the Polish economy, and transportation belongs to substantially affected sectors. The t-test analysis confirms that both numbers and values of credit guarantees are significantly greater in the COVID-19 than in the pre-COVID-19 year. Such results may indicate the deteriorating financial situation of the surveyed SMEs, resulting in the need to use *de minimis* guarantees to borrow financial capital from the bank successfully.

## References

- Andrzejak M., 2017: Program gwarancyjny *de minimis* jako inicjatywa zwalczania barier dostępu do kapitału dla MSP, Zeszyty Naukowe PWSZ w Płocku. Nauki Ekonomiczne 25, 79–90, [https://doi.org/10.19251/ne/2017.25\(5\)](https://doi.org/10.19251/ne/2017.25(5))
- Arping S., Lóránth G., Morrison A.D., 2010: Public initiatives to support entrepreneurs: Credit guarantees versus co-funding, *Journal of Financial Stability* 6(1), 26–35, <https://doi.org/10.1016/j.jfs.2009.05.009>
- Ayyagari M., Beck T., Demirguc-Kunt A., 2007: Small and Medium Enterprises Across the Globe, *Small Business Economics* 29(4), 415–434, <https://doi.org/10.1007/s11187-006-9002-5>
- Beck T., Demirguc-Kunt A., 2006: Small and medium-size enterprises: Access to finance as a growth constraint, *Journal of Banking & Finance* 30(11), 2931–2943, <https://doi.org/10.1016/j.jbankfin.2006.05.009>
- Beck T., Klapper L.F., Mendoza J.C., 2010: The typology of partial credit guarantee funds around the world, *Journal of Financial Stability* 6(1), 10–25, <https://doi.org/10.1016/j.jfs.2008.12.003>
- BGK, 2021: Gwarancja *de minimis*. Bank Gospodarstwa Krajowego, [electronic source] <https://www.bgk.pl/male-i-srednie-przedsiębiorstwa/zabezpieczenie-finansowania/gwarancja-de-minimis> [access: 05.03.2021].
- Bieńkowska B., 2009: Fundusze poręczeniowe jako wsparcie dla finansowania działalności MŚP, Zeszyty Naukowe Uniwersytetu Szczecińskiego. Ekonomiczne Problemy Usług, Uwarunkowania rynkowe rozwoju Mikro i małych przedsiębiorstw Mikrofirma 34, 28–35.
- Brown A., Garguilo S., Mehta K., 2011: The Relentless Pursuit of Financial Capital for Micro-enterprises: Importance of Trust and Social Capital, *International Journal for Service Learning in Engineering, Humanitarian Engineering and Social Entrepreneurship* 6(2), 78–97, <https://doi.org/10.24908/ijse.v6i2.3660>
- Coluzzi C., Ferrando A., Martínez-Carrascal C., 2015: Financing obstacles and growth: An analysis for euro area non-financial firms, *The European Journal of Finance* 21(10–11), 773–790, <https://doi.org/10.1080/1351847X.2012.664154>
- Czech K., Karpio A., Wielechowski M., Woźniakowski T., Żebrowska-Suchodolska D., 2020: Polska gospodarka w początkowym okresie pandemii COVID-19, Wydawnictwo SGGW, Warszawa.
- Fabeil N.F., Pazim K.H., Langgat J., 2020: The Impact of COVID-19 Pandemic Crisis on Micro-Enterprises: Entrepreneurs' Perspective on Business Continuity and Recovery Strategy (SSRN Scholarly Paper ID 3612830), Social Science Research Network, [electronic source] <https://papers.ssrn.com/abstract=3612830> [access: 05.03.2021].
- García-Tabuenca A., Crespo-Espert J. L., 2010: Credit guarantees and SME efficiency, *Small Business Economics* 35(1), 113–128, <https://doi.org/10.1007/s11187-008-9148-4>

- GUS, 2021: Transport – wyniki działalności w 2020 r. Transport – activity results in 2020, Warszawa – Szczecin, [electronic source] <https://stat.gov.pl/obszary-tematyczne/transport-i-lacznosc/transport/transport-wyniki-dzialalnosci-w-2020-roku,9,20.html> [access: 03.04.2021].
- He P., Sun Y., Zhang Y., Li T., 2020: COVID-19's Impact on Stock Prices Across Different Sectors – An Event Study Based on the Chinese Stock Market, *Emerging Markets Finance and Trade* 56(10), 2198–2212, <https://doi.org/10.1080/1540496X.2020.1785865>
- Jacyna M., 2012: System logistyczny Polski: uwarunkowania techniczno-technologiczne komodalności transportu, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa.
- KRD, 2021: Obciążenia ponad normę – czyli sytuacja finansowa w branży TSL, [electronic source] <https://krd.pl/centrum-prasowe/raporty/2021/obciazenie-ponad-norme-czyli-sytuacja-finansowa-w-branzy-tsl> [access: 05.03.2021].
- Kuchciński A., 2019: The role of guarantee funds in supporting entrepreneurship in Poland, *Sciences of Europe* 46–2(46), 3–8.
- Laing T., 2020: The economic impact of the Coronavirus 2019 (COVID-2019): Implications for the mining industry, *The Extractive Industries and Society* 7(2), 580–582, <https://doi.org/10.1016/j.exis.2020.04.003>
- Nizaeva M., Coskun A., 2018: Determinants of the Financing Obstacles Faced by SMEs: An Empirical Study of Emerging Economies, *Journal of Economic and Social Studies* 7(2), 81–99, <https://doi.org/10.14706/JECOSS17725>
- Rozporządzenie Ministra Finansów z dnia 10 czerwca 2014 r. w sprawie udzielania przez Bank Gospodarstwa Krajowego pomocy de minimis w formie gwarancji spłaty kredytów (Dz.U. 2014 poz. 790).
- Shen H., Fu M., Pan H., Yu Z., Chen Y., 2020. The Impact of the COVID-19 Pandemic on Firm Performance, *Emerging Markets Finance and Trade* 56(10), 2213–2230, <https://doi.org/10.1080/1540496X.2020.1785863>
- Snedecor G.W., Cochran W.G., 1989: *Statistical Methods* (8th Edition), Iowa State University Press, Iowa.
- Sokół H., 2015: Możliwości finansowania rozwoju małych i średnich przedsiębiorstw, [w:] *Struktura kapitału w przedsiębiorstwie w warunkach ekspansji, kryzysu i zjawisk upadłościowych*, J. Grzywacz (red.), Oficyna Wydawnicza Szkoły Głównej Handlowej, Warszawa 105–168.
- Ustawa z dnia 8 maja 1997 r. o poręczeniach i gwarancjach udzielanych przez Skarb Państwa oraz niektóre osoby prawne (Dz.U. z 2017, poz. 2022).
- Vasilescu L., 2014: Accessing Finance for Innovative EU SMEs Key Drivers and Challenges, *Economic Review: Journal of Economics and Business* 12(2), 35–47.
- Wang Y., 2016: What are the biggest obstacles to growth of SMEs in developing countries? – An empirical evidence from an enterprise survey, *Borsa Istanbul Review* 16(3), 167–176, <https://doi.org/10.1016/j.bir.2016.06.001>
- Waniak-Michalak H., Michalak J., 2019: Consequences of public financial aid for organizations providing guarantees for SMEs, *Business and Economic Horizons (BEH)* 15(1232-2020-357), 474–489.
- Xia X., Gan L., 2020: SME financing with new credit guarantee contracts over the business cycle, *International Review of Economics & Finance* 69, 515–538, <https://doi.org/10.1016/j.iref.2020.04.015>
- Zajac A., Wielechowski M., Czech K., 2021: The impact of covid-19 pandemic on credit financing of microenterprises and farmer business activity in Poland, *Journal of Modern Science* 47(2), 475–496, <https://doi.org/10.13166/jms/143524>