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# Financial obstacles for new enterprises: industry differences and the dynamic of changes

**Summary.** Aim of the article – identification and the assessment of diversity in occurrences of financial barriers limiting the functioning of newly established enterprises in Poland by their activity type. Research methods – a thesis has been put forward that the intensification of occurrences of financial barriers limiting the functioning of newly established enterprises is diversified according to their activity type. The study uses Central Statistical Office (CSO) data for the years 2005–2014. Source material comprised data on the percentage of newly created enterprises that were active one year after the beginning of operations, according to the reported supply difficulties and according to selected cross-sections. In order to identify industries with similar tendencies of financial obstacles limiting their operations, the method of multidimensional comparative analysis (MCA) was used, including the k-means method which is classified as an optimization method. Results – lack of sufficient financial resources is indicated by the owners of newly established enterprises as one of the main and often the most important barrier to running and developing business operations. In the years 2005–2014, in the majority of analyzed industries, the percentage of newly established enterprises whose activity was limited due to a lack of sufficient financial resources increased on average, and the percentage indicating that the barriers limiting their functioning and development are difficulties in collection of receivables, as well as the access to bank loans was decreasing. In the analyzed period, the percentage of newly established enterprises operating in particular industries was diversified significantly in terms of the average pace of changes in the occurrence of certain financial obstacles limiting their functioning. Innovation/value – the value of the article is to indicate the variation in the scale and dynamics of changes in the financial barriers faced by newly established enterprises, which may contribute to creating better conditions for start-ups.

## Introduction

The activity of newly created enterprises in various industries is complex[1] which may have a significant impact on their survival. It should be noted that the development of entrepreneurship faces countless challenges and difficulties of various types (Zawadzka, Kurdyś-Kujawska, 2017, p. 517–524; Zawadzka, Kurdyś-Kujawska, 2018, p. 125–135). One of the conditions for the functioning and development of newly created enterprises is to have adequate financial resources to ensure business continuity. Therefore, it is important not only to accrue appropriate initial capital from owners, or to gain access to external financing sources but also to adopt an appropriate recipient financing policy. Most entrepreneurs starting a business face financial difficulties which fact has been proven empirically many times. Lamea's (2002, p. 26–32), as well as Jafarnejda and others' (2013, p. 207–216) research shows that one of many difficulties that not only prevents starting a business but also constitutes a barrier to the development of small entrepreneurship in many industries is access to bank loans. This is confirmed by the results of Fielden and others (2000, p. 295–304) conducted in the UK among potential and new owners of enterprises. The authors pointed out that the banks' attitudes towards new business owners constitute a major obstacle to a successful start of the company. In turn, Zhuplev and Shtykhno (2009, p. 25–49) and Kazan and others (2006, p. 114–129) showed that it is inadequate financial resources that are the most important barrier to starting a business and its further development. Sobekova-Majkova (2010, p. 1018–1032) and Jakubec and Solika (2006, p. 14–22) came to similar conclusions when they proved that lack of capital or access to finance is one of the biggest problems of starting and further developing of enterprises in Slovakia. Staniewski and Awruk (2015, p. 583–592) analyzing the motives and difficulties faced by potential entrepreneurs setting up their own business in Poland, proved that it is the lack of capital that is one of the most important difficulties in starting a business. There is also evidence that the proper recipients' lending policy, as well as the costs associated with the creation of payment bottlenecks have an impact on the functioning and development of enterprises. According to Antonowicz (2010) the main reason for the problems of enterprises operating on the market is the loss of liquidity, which is the result of growing delays in payments between enterprises and enterprises and clients. Bojnec (2002, p. 277–297) came to similar conclusions stating that overdue payments affect further functioning of the company. And according to Białowolski and Łaszek (2017) overdue payments hinder the formation of new enterprises. Payment bottlenecks constitute major barriers to the functioning and are a brake on the growth of enterprises, which is visible in the data contained in the Intrum Justitia report (2016) according to which 42% of entrepreneurs in Poland indicate that payment bottlenecks have medium and high inhibiting effect on the growth of their enterprises. The situation is slightly worse in Bosnia, Ireland, Slovenia, Italy, Spain, Portugal (over 50%), Romania, Germany and Greece (over 60%). In turn, according to the Hausemer and others' (2015) study carried

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[1]   The problem of complex phenomena has been raised, for example, at work (Jajuga, 1993).

out at the request of the European Commission in Poland, about 90% of enterprises report problems with payment bottlenecks.

A number of previous studies on financial barriers to the functioning and development of newly established enterprises focus on their diversity due to the social characteristics of their owners and economic or spatial characteristics related to the location of economic activity. There is no research, however, which would indicate a differentiation of the occurrence of individual financial barriers according to the sectors in which the activity is conducted. The aim of the study is to identify and assess the diversity of the occurrence of financial barriers limiting the functioning of newly created enterprises in Poland by type of activity. The goal was implemented in two stages. In the first stage, financial barriers to the functioning of newly established enterprises were identified. In the second stage, the differentiation of the percentage of newly created enterprises with similar tendencies of financial difficulties was assessed. The second stage of research was carried out by choosing the typological groups of industries, characterized by a similar level of average rate of change of the percentage of newly established enterprises indicating the existence of financial barriers. Due to the complex nature of the studied phenomenon, the chosen method of multivariate comparative analysis, i.e. *k*-means, was used to achieve the goal. The study proposes a thesis that *the degree of occurrence of financial barriers limiting the functioning of newly created enterprises is diversified according to the type of activity.*

## 1. Materials and research methods

The study used panel data from the years 2005–2014 derived from Central Statistical Office report "*Creation and operation condition, development prospects of Polish enterprises*". The source material included data on the percentage of newly established enterprises one year after the start of operations according to the reported supply difficulties and according to selected cross-sections. According to the Polish Classification of Activities (PKD) 2004, ten areas of activity of newly established enterprises were distinguished: industry (sections C, D, E), construction (section F), trade (section G), hotels and restaurants (section H), transport (section I), financial intermediation (section J), real estate and business services (section K), education (section M), healthcare (section N) and other service activities (section O). The methods of multidimensional comparative analysis (MCA) can be used to identify industries with similar tendencies of financial difficulties limiting their operations (Nowak, 1990). Among many methods, the *k*-means method was chosen which is one of the optimization methods. Optimization methods aim to improve the initial goodness of object grouping by optimizing grouping by moving objects between groups (Panek, 2009). Optimization of grouping is made from the point of view of a defined grouping goodness criterion (Malina, 2004). The variant proposed by Hartigan is considered a classic variant of the *k*-means method. The procedure in this method is as follows (Grabiński, 1992):

1. The maximum number of iterations $I$ and the number of groups $k$ of the set $\Omega$ are given, wherein $k \in \langle 2, n-1 \rangle$, where $n$ is the number of objects;

2. Initial matrix of group centroid is set:

$$B = [b_{lj}], \ (l=1, ..., k; j = 1, ..., m),$$

where $m$ is the number of variables and assigns individual objects to groups for which their Euclidean distance from the centroid of a given group is the smallest;

3. The value of the output error of partitioning objects between $k$ groups is determined:

$$e = \sum_{i=1}^{n} d_{il}^2,$$

where: $d_{il}$ is the Euclidean distance between the $i$-th object and the closest $l$-th centroid:

$$d_{il}^2 = \sum_{j=1}^{m} \left( x_{ij} - b_{lj} \right)^2 \ (i = 1, ..., n);$$

4. For the first object, changes are determined in the division error resulting from successive assignment to all existing groups:

$$\Delta e_l^{(1)} = \frac{n_l \cdot d_{1l}^2}{n_l + 1} - \frac{n_{ll} \cdot d_{1l_1}^2}{n_{l_1} - 1},$$

where: $n_l$ – size of the $l$-th group, $d_{1l}$ – the distance of the first object to the centroid of the $l$-th group, $n_{1l}$ – size of the group which includes the first object, $d_{1l_1}$ – the distance of the first object from the nearest centroid.

If the minimum value $\Delta e_l^{(1)}$ for all $l \neq l_1$ is negative, the first object is assigned to the group for which $\Delta e_l^{(1)} = \min$. Centroids of the groups B are then calculated, taking the applied transformation into account and the current value of the allocation error is determined. If the minimum value $\Delta e_l^{(1)}$ is non-negative, then no changes are made.

1. The procedure described in points 1-4 is repeated for each subsequent object, which completes the first iteration of the procedure.

2. If in the given iteration no shifts of objects from group to group were observed then the proceedings are completed. Otherwise, the next iteration starts until the number of iterations does not exceed any $I$ value.

In the grouping, the following designations for individual industries were adopted: B1 – industry; B2 – construction; B3 – trade; B4 – hotels; B5 – transport; B6 – financial intermediation; B7 – education; B8 – healthcare; B9 – other activity; B10 – real estate and business services. The features used in the grouping concern the average rate of change in the percentage of newly created enterprises in particular industries in terms of: insufficient financial resources ($X_1$); difficulties in collecting receivables ($X_2$) and the limited access to credit ($X_3$).

## 2. Research results

The data presented in Figure 1 show that the largest percentage of newly established enterprises indicates among the financial barriers for their development a lack of sufficient financial resources. In one third of the newly established enterprises, the activity is hampered by limited access to credit, while in one fourth difficulty results from ineffective debt collection. It should be noted that in the years 2005–2014 an increasing percentage of newly established enterprises among financial barriers limiting their activities pointed to limited funds. On average, the percentage of these enterprises increased by 0.45 percentage point annually. In contrast, in 2014 as compared to 2005, there was a decrease in the percentage of newly created enterprises having difficulties in collecting receivables (by 6 pp) and those having insufficient access to loans (by 3.7 pp). This decrease was on average at the level of 1.35 pp and 2.47 pp annually.
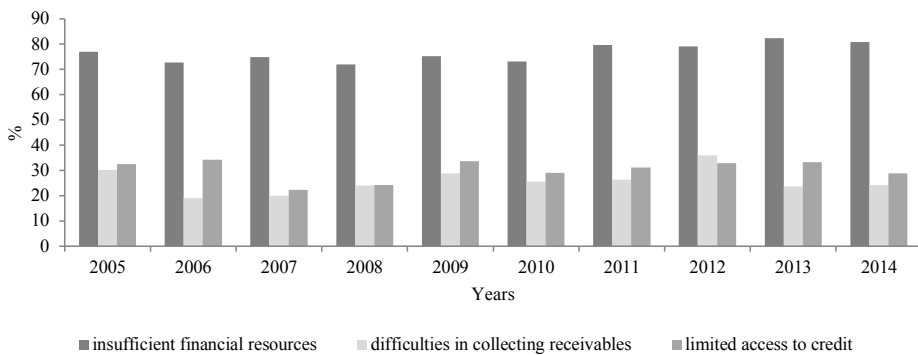


Figure 1.    The percentage of newly established enterprises indicating the occurrence of financial difficulties limiting their functioning and development in Poland in 2005–2014

Source: own studies based on CSO data.

In the analyzed period, the highest percentage of newly established enterprises whose activity was limited by insufficient financial resources concerned entities operating within the healthcare industry (average of 80.97%) and trade (average 75.30%) (fig. 2). In 2014 as compared to 2005 the percentage of these companies increased by 30.1 pp. and 2.2 pp. To the smallest extent difficulties related to the lack of sufficient financial resources were seen in entities operating in financial intermediation (52.43% on average). Difficulties resulting from the lack of sufficient financial resources in 2014 as compared to 2005 decreased among newly established enterprises from the hotel and gastronomy industry (decrease by 37.6 pp), as well as those dealing with real estate and business services (decline by 5.1 pp). A slight decrease in the percentage of newly established

enterprises whose activity was limited by insufficient financial resources was also noted in the construction industry (a 1.6 pp decrease). In the years 2005–2014, the highest percentage of newly established enterprises whose activity was limited by ineffective debt collection was recorded among entities dealing in real estate and business services (on average 43.53%), education (37.31% on average) and the construction industry (average 37.53%) and transport (average 32.36%). It is worth noting, however, that in 2014 when compared to 2005, the percentage of newly established enterprises having difficulties in collecting debts increased among enterprises related to real estate and business services (by 64.8 pp.) and transport industry (19.7 pp.), while it decreased in newly created enterprises from the education (54.6 pp.) and construction industries.
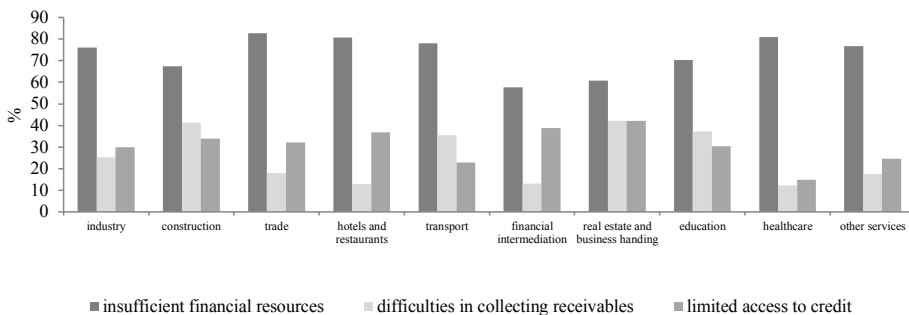


Figure 2. The percentage of newly established enterprises indicating the occurrence of financial difficulties limiting their functioning and development according to their industry in Poland in 2005-2014

Source: own studies based on CSO data.

Limited access to credit to the greatest extent hampered the activity of newly established companies involved in real estate and business activities (an average of 42.21%) and financial intermediation (average 35.36%) and hotel industry (average 33.60%). In 2014 as compared to 2005, there was an increase by 40.5 pp, 18.2 pp and 45.2 pp, respectively in the percentage of newly created enterprises related to the abovementioned industries for which the main barrier to functioning was a limited access to loans. To the smallest extent, limited access to credit by start-up companies concerned entities in the healthcare industry (average 14.97%). Difficulties related to crediting the activities of newly established enterprises in 2014 compared to 2005 to a lesser extent concerned entities from the construction industry (decrease by 42.6 pp), transport (decrease by 44.6 pp), education (decrease by 26.5 pp) and trade (6.2 pp).

Analysis of the average rate of change in the percentage of newly established enterprises whose activities are limited by certain financial barriers has shown that in three industries, i.e. construction, hotels and real estate and business services, the percentage of

newly created enterprises whose activity was limited by insufficient financial resources was reduced (fig. 3). The highest percentage decrease was recorded among the enterprises from the hotel industry (6.30 pp). In other industries, the percentage of newly established enterprises whose activity was limited due to a lack of sufficient financial resources increased every year. The highest average annual increase in the percentage of these enterprises was recorded among entities dealing with healthcare (5.59 pp). In most industries, the percentage of newly created enterprises indicated that the obstacles limiting their functioning and development are difficulties in collecting receivables decreased every year. The largest average annual decrease in the percentage of these enterprises was recorded among entities operating in healthcare (19.44 pp) and education (18.49 pp). On the other hand there was an increase in the percentage of new enterprises indicating difficulties resulting from ineffective debt collection in industries such as hospitality, transport, financial intermediation and real estate and business services. Furthermore, from year to year, the percentage of newly established enterprises having difficulties with access to loans in industries such as hotels, industry, financial intermediation and real estate and business services also increased. In other industries, the percentage of newly established enterprises whose activity was limited by insufficient access to loans decreased. The largest decrease in these entities was recorded in the transport industry (35.33 pp) and construction (13.83 pp.), as well as among enterprises dealing with education (13.26 pp).
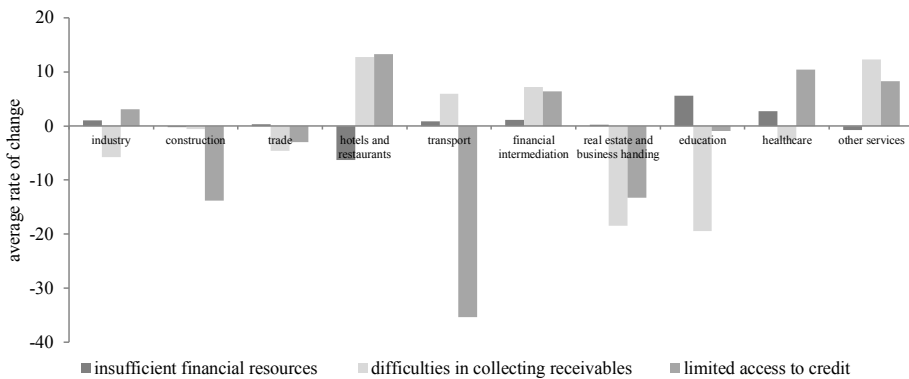


Figure 3. Average rate of change in the percentage of newly created enterprises indicating the existence of financial barriers limiting their functioning and development according to their industry in Poland in 2005–2014

Source: own studies based on CSO data.

Using the *k*-means method, a division of the studied population into three groups was obtained. It should, however, be noted that there are significant differences between the industries included in individual groups. The first group includes newly established

enterprises operating in the construction and transport industries (tab. 1). What is characteristic for this group is the growing percentage of newly created enterprises for which barriers for running a business resulted from the lack of sufficient financial resources and ineffective debt collection. This is a group in which there was by far the greatest decline in the percentage of newly established enterprises limited by the lack of lending opportunities for their activities (24.58 pp).

Table 1. Classification of industries in terms of financial barriers using *k*-means method

| Group | Industry | Average rate of change in the percentage of newly established enterprises pointing to financial barriers | | |
| | | insufficient financial resources | difficulties in collecting receivables | limited access to loans |
| --- | --- | --- | --- | --- |
| I | construction, transport | 0.278 | 2.671 | −24.585 |
| II | hotels, financial intermediations, real estate and business services | −1.968 | 10.732 | 9.350 |
| III | industry, trade, education, healthcare, other activity | 1.977 | −10.214 | −0.723 |
| Over All average | | 0.453 | −1.354 | −2.474 |

Source: own studies based on CSO data.

The second group consists of newly established enterprises dealing with hotel industry, financial intermediation and real estate and business services. This group includes industries in which there was an increase in the analyzed period in the percentage of newly established firms whose activities were limited due to insufficient access to loans. At the same time, this group was characterized by a positive value of the average rate of change of newly created enterprises indicating difficulties in conducting business resulting from ineffective debt collection. The average increase in the ratio for all entities in this group was on the level of 9.35 pp. and 10.73 pp. It should be noted that only in this group there was an average annual drop in the percentage of newly created enterprises limited due to insufficient financial resources. The third and the largest group consists of newly established companies from the following industries: trade, industry, education, healthcare and other activities. In this group, the average annual percentage increase of newly created enterprises having difficulties with sufficient financial resources was the highest (1.97 pp). At the same time, the percentage of enterprises whose business limitations resulted from the consumer lending policy was decreasing. There was also a slight decrease year by year in the percentage of newly established companies hampered by limited access to loans.

# Conclusions

The conducted research enabled a positive verification of the thesis put forward in the introduction about the diversity of the occurrence of financial barriers limiting the functioning of newly created enterprises due to their activity type. As it is shown in the obtained results, a lack of sufficient financial resources is indicated by the owners of newly established enterprises as one of the main and often the most important barrier to running and developing business operations. This applies in particular to entities dealing with healthcare (on average 81%) and trade (on average 82%). To a lesser extent this barrier is present in the sector of financial intermediation (average 57%) and real estate and business services (average 60%). The operations of a significant part of newly created enterprises are limited by access to external sources of financing in the form of bank loans. This problem occurred to a greater extent in service enterprises, including those offering services in the field of real estate and business services (on average 42%), financial intermediation (on average 41%) or hospitality (on average 36%), rather than in healthcare (15% on average) or transport enterprises (average 22%). Improper lending policy in the newly created enterprises and the related difficulties in collecting receivables limited the activity of every fourth analyzed entity on average. Most often this barrier occurred in enterprises dealing with real estate and business services (43% on average), construction (on average 41%), education (average 37%) and transport (on average 35%). These limitations were indicated by a relatively small percentage of newly created enterprises from the healthcare sector (10% on average), financial intermediation (average 13%) and hospitality (14% on average). It should be noted that in the years 2005–2014, in the majority of analyzed industries, the percentage of newly established enterprises whose activity was limited due to a lack of sufficient financial resources was increasing on average year by year, while there was a decrease in the percentage of those newly established enterprises that indicated barriers limiting their functioning and development as difficulties in collecting debts and access to bank loans.

To sum up, in the analyzed period, the proportion of newly established companies operating in various industries differed considerably in terms of average rate of change and the occurrence of certain financial barriers limiting their functioning. The use of the *k*-means method, however, enabled the indication of relatively homogeneous industry groups with similar tendencies related to the occurrence of these difficulties. The largest group of newly established enterprises with similar tendencies for financial difficulties was group III which included entities from industries (mainly service but industrial as well) in which the percentage of enterprises limited by a lack of sufficient financial resources increased year by year, with a simultaneous decrease in the percentage of enterprises indicating difficulties with collecting receivables or access to bank loans. The second group mainly gathered newly established enterprises dealing in service activities (hotels, financial intermediation, real estate and business services). It was characterized by a decreasing percentage of enterprises limited by insufficient financial resources and

an increasing percentage of those having difficulties in collecting debts and access to bank loans. The third and the smallest group comprised enterprises operating in two industries, i.e. construction and transport. Among these entities there was a tendency for a decrease in the percentage of newly established enterprises having access to bank loans, while at the same time for an increase in the percentage of those enterprises with insufficient funds and difficulties in collecting receivables.

The conducted research contributes to the existing literature on barriers to the functioning and development of enterprises from the SME sector. It should be pointed out that the scale of occurrence of individual financial barriers may decrease as a result of increased access to external financing. But this is largely dependent on financial literacy. It is mainly about familiarizing potential entrepreneurs with an effective and efficient use of credits and loans, promoting an effective commercial credit policies among them, as well as advising on financial decisions related to the selection of financing sources.

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## FINANSOWE BARIERY NOWO POWSTAŁYCH PRZEDSIĘBIORSTW: ZRÓŻNICOWANIE BRANŻOWE I DYNAMIKA ZMIAN

**Słowa kluczowe:** bariery finansowe, nowo powstałe przedsiębiorstwa, kredyty bankowe, ściąganie należności

**Streszczenie.** Cel artykułu – identyfikacja i ocena zróżnicowania występowania finansowych barier ograniczających funkcjonowanie nowo powstałych przedsiębiorstw w Polsce według rodzaju prowadzonej działalności. Metodologia badania – postawiono tezę, iż stopień nasilenia występowania barier finansowych ograniczających funkcjonowanie nowo powstałych przedsiębiorstw jest zróżnicowany ze względu na rodzaj prowadzonej działalności. W opracowaniu wykorzystano dane GUS za lata 2005–2014. Materiał źródłowy obejmował dane dotyczące odsetka nowo powstałych przedsiębiorstw aktywnych rok po rozpoczęciu działalności według zgłaszanych trudności podażowych oraz według wybranych przekrojów. Do identyfikacji branż charakteryzujących się podobnymi tendencjami występowania trudności o charakterze finansowym ograniczających ich działalność wykorzystano metodę wielowymiarowej analizy porównawczej (WAP), w tym metodę $k$-średnich, należącą do metod optymalizacyjnych. Wyniki – brak wystarczających środków finansowych jest wskazywane przez właścicieli nowo powstałych przedsiębiorstw, jako jedna z głównych, a często najważniejsza bariera prowadzenia i rozwoju działalności gospodarczej. W latach 2005–2014 w większości analizowanych branż średnio z roku na rok wzrastał odsetek nowo

powstałych przedsiębiorstw, których działalność ograniczana jest ze względu na brak wystarczających środków finansowych, malał zaś odsetek nowo powstałych przedsiębiorstw wskazujących, iż barierą ograniczającą ich funkcjonowanie i rozwój są trudności w ściąganiu należności oraz dostęp do kredytów bankowych. W analizowanym okresie odsetek nowo powstałych przedsiębiorstw działających w poszczególnych branżach różniły się znacznie pod względem średniego tempa zmian występowania określonych barier finansowych ograniczających ich funkcjonowanie. Oryginalność/wartość – wartością artykułu jest wskazanie zróżnicowania skali i dynamiki zmian barier finansowych napotykanych przez nowo powstałe przedsiębiorstwa, co może przyczynić się do tworzenia lepszych warunków dla przedsiębiorstw rozpoczynających działalność gospodarczą.

**Cytowanie**