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Russian transport high-growth firms during the COVID-19 pandemic

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Abstract

The Russian transport industry is an important sector of the Russian economy. Because of a large territory, Russian supply chains and human flows face unique challenges, induced by natural and anthropogenic reasons. One of them is the COVID-19 pandemic, which caused supply chains disruption and changes in travel plans. The paper aims to identify the differences in the reaction of Russian transport high-growth firms and other transport firms’ performance on the COVID-19 pandemic. The sample includes 2621 transport firms (including 119 high-growth firms). The research uses the official financial data provided by Rosstat and the Russian Tax Service. The hypotheses are tested on 2020 data using one-way ANOVA. The research showed no significant differences in high-growth and normal firms’ profitability, efficiency, and solvency. High-growth firms keep a better ability to grow in pandemic and employability. High-growth firms allow the whole industry to keep a good development perspective. The research results agree with earlier studies and confirm that high-growth firms are vital for transport sector development.

Keywords: High-growth-firms, Transport SMEs, Russian economy, firm performance, transport industry development

1. Introduction

Market relations are constantly transforming in current conditions, and business entities are under the pressure of current struggles and challenges and quickly cope with difficulties. At the end of 2019, the world encountered a crisis of the COVID-19 pandemic. The peak of the rapidly emerging crisis over the past decade occurred in mid-2020. The consequences of the pandemic are still taking place. For several months, almost all types of production...
and business activities were suspended or slowed down in many countries worldwide during the first wave of the pandemic. Some countries and industries survived the pandemic more successfully, while others have succumbed to stagnation and depression. The transport industry has not been left behind and has also suffered from the effects of the pandemic.

The phenomenon of high-growth firms is a recent category for the economic society and was mentioned for the first time less than half a century ago. The pioneering scholar is David Birch (1979), who found the small-sized group of first with untypically high and resistant growth. David Birch named such kinds of firms as ‘gazelles’. Later gazelles possessed the alternative formulations as high-growth firms, fast-growing companies, etc. Birch’s definition of gazelles uses a revenue growth ratio of more than 20% annually for at least five years in a row as a base. However, later researches offer alternatives ways for growth calculation. For example, “high-impact firms” are similar to gazelles, but they distinguish them by significant revenue growth and expanding employment criteria (Acs, Parsons & Tracy, 2008). The “hidden champions” (Simon, 2012) fundamental characteristic is not the level of growth, but its leading position in highly specialized product niche on the world stage. Some scholars are more oriented to the innovative aspect of gazelle’s activity (Lilischkis, Korlaar, Barjak, Meyer, 2013; Kolar, 2014; Costa, 2017). However, the prevalent part of researchers follows the most common HGF’s definition of OECD (Audretsch, 2012, p.3). According to OECD, a high-growth firm has average annualized growth (number of employees and turnover) of more than 20% per annum over three years. High-growth firms should have ten or more employees at the beginning of the observation period.

High-growth firms are significant for the economy and society due to different reasons. First of all, HGFs are leading job generators (Birch & Medoff, 1994; Fritsch & Mueller, 2004; Acs, & Mueller, 2008; Schreyer, 2000). This feature is especially actual during the COVID-19 pandemic and crisis. COVID-19 pandemic caused the spontaneous dismissal of millions of employees; it provoked a sharp rise in unemployment. Gazelles can create disproportionately more new jobs than their share on the market. The other advantage of high-growth firms’ activity for entities directly (employees, partners, etc.) and indirectly (society, government) related to them is innovation production. The normal firms of the same industry share the spillovers from the HGFs’ activity: “Productivity growth is stronger when firms operate in industries with more HGFs or supply such industries” (de Nicola, B. Muraközy, S.W. Tan, 2021, p.143). Several gazelles deal with new technologies (Teruel, Coad, Domnick, 2021), investing in the future and are associated with performance, innovation, and dynamics (Rocha and Ferreira, 2021). The research of Majeed, Balaguer, Hansell, Hendrickson, Latcham & Satherley (2021) proposes that HGFs are more successful in returns on investment in research and development generation than slower-growing firms.

Gazelles’ nature is engaging with holding the high growth in the future. The dispute about it is still active. On the one hand, HGFs seem to be «one-hit-wonders» (Daunfeldt & Halvarsson, 2015), several gazelles are impossible to achieve the same high growth in the next year after becoming HGF. On the other hand, Erhardt (2021) explains the presence of HGF’s resistance dispute by the difference in used indicators. The low resistance in holding HGF status is more pessimistic than reality.

There is no one opinion about the correlation between age and the ability to grow of HGFs. Cruz, Baghdadi & Arouri (2020) claim HGF status is prevalent among small and young firms. Moreno and Code (2015) argue that gazelles are characterized by small size and young age, determining their ability to grow rapidly. At the same time, Mason, Brown, Hart, and Anyadijk-Daneks (2015) refute the above statement and claim no differences in the average age of high-growth and normal firm samples. A company can get HGF at any stage of its development. Sirc and Mocnik’s (2014) and Megaravalli and Sampagnaro’s (2018) found a negative relationship between HGF’s size and ability to grow.

One more discussion item is the higher resistance of gazelles during crises. Bannò, and Varum (2021, p.17) claim that «very few HGFs are indeed persistent high growth, also in crisis years». But, Krošláková, Kubíčková & Jurkovičová (2015) suggest gazelles to be more resilient during crises. One of the pioneer scholars of Russian high-growth firms Yudanov (Poliniun &Yudanov, 2016) accessed the behavior of Russian high-growth firms in terms of the crisis 2008. Russian gazelles’ share was 3-4 times higher than developed countries’ share. However, the Russian gazelle could not survive after super-sharp and had a fourfold population reduction after 2008. Gazelles exposed the negative influence of crisis and economic instability and also had the same financial results. Gazelles “have lower volatility and higher survival rates, but no greater persistence in growth” (Mogos, Davis & Baptista, 2021, p.135). The influence of the COVID-19 pandemic to HGFs is not clear. Scholars only start to determine the reaction of
high-growth firms (Benedetti Fasil et al., 2021; Greene, Rosiello, Golra & Vidmar, 2020; Schepers, Vandekerkhof & Dillen, 2021).

Previously, the authors have already conducted a study of high-growth firms in the Russian transport industry (Pletnev, Naumova 2019) and (Pletnev, Barkhatov, 2020). The current research question is ‘Are Russian transport high-growth firms perform better than normal firms during the COVID-19 pandemic’? The research plan consists of the following stages:

- Formulating the research hypotheses based on recent literature review
- The sample formation based on Rosstat and Federal Tax Service of Russia databases, filtering the outliers and out-of-data sample items
- Exploring the Russian transport industry by activity type and gross value added
- Financial ratio calculations
- Hypotheses testing with one-way ANOVA

2. Methods and techniques

The authors follow the OECD (Audretsch, 2012) methodology with some remarks and define a high-growth firm with average revenue growth greater than twenty percent per annum over three years. The period of observation is from 2016 to 2020. We selected the 2017-19 period to identify the HGF status (the first revenue growth rate is calculated for 2016-17 data). Then we analyze the behavior of firms in the 2020 pandemic year. To search for transport firms, we used the All-Russian Classifier of Economic Activities 2 (OKVED 2), section ‘H - Transportation and storage, code 49’ land and pipeline transport activities’, code 50 ‘water transport activities’, code 51 ‘air and space transport activities’. The assessing of HGFs’ reaction to COVID-19 pandemic is based on five characteristic analyses, reflecting different aspects of firm success and being common calculated financial statement indicators and ratios: revenue growth ratio, return on sales (ROS) (1), equity-to-assets ratio (EAR) (2), total assets turnover ratio (TATR) (3) and employment growth rate.

\[
\text{Return on sales (ROS)} = \frac{\text{Net income}}{\text{Sales (revenue)}} \quad (1)
\]

\[
\text{Equity-to-assets ratio (EAR)} = \frac{\text{Equity}}{\text{Total assets}} \quad (2)
\]

\[
\text{Total assets turnover ratio (TATR)} = \frac{\text{Sales (revenue)}}{\text{Total assets}} \quad (3)
\]

The above-listed indicators of HGFs and normal firms should be compared by direct comparison using one-way ANOVA (Holliday, 2019).

We use financial reporting data from the FIRA PRO database to combine a sample of transport firms. The size of firms is limited. The firm revenue is more than 50 million rubles in the first year of observation 2016.

We formulated the hypotheses to answer the research question, which allows finding differences between HGFs and normal firms. The hypotheses are based on a literature review.

1. The firms’ revenue growth rate in 2020 is not significantly higher for transport HGFs than transport normal firms
2. The firm’s average ROS in 2020 is not significantly higher for transport HGFs than transport normal firms.
3. The average firm’s EAR in 2020 is not significantly higher for transport HGFs than transport normal firms.
4. The average firm’s TATR in 2020 is not significantly higher for transport HGFs than transport normal firms.
5. The firm’s employment growth rate in 2020 is not significantly higher for transport HGFs than transport normal firms.

The null hypotheses propose insignificant differences between HGF and normal firms.

The entire sample consists of 3350 Russian transport firms for 2016-2020. We check the sample for homogeneity and exclude observations with extraordinary values of revenue rate and return of sale rate. The sample is limited by
revenue growth rates of more than -0.9 and less than 10.0. Returns on sales of more than -0.9 and less than 4.0. As a result, we received a sample consisting of 2740 firms.

3. Results and discussion

The sample includes 2621 normal firms and 119 high-growth firms. The debate regarding the firm’s age and its ability to become HGF is still actual. One camp of scholars argues that the company “roots” with age, getting concomitant “diseases” in the form of bureaucracy, opportunism, decentralization, and so on, which do not allow the company to achieve rapid growth. Brown, Mawson and Mason (2017) consider the young age of gazelles a sort of myth. The company is capable of becoming HGF at any stage of its development. The average age of normal firms is 14.5 years, while the average high-growth firm age is 12.6 years old. The difference is not significant, so we cannot confidently say that the firm’s age directly impacts its ability to become HGF. If we compare the average age by type of activity, the older age is specified for normal (16.9) and high-growth (16) air and space transport firms. The embarrassing fact is that gazelles (16.25) of water transport is older than normal firms (15.7).

The share of firms according to the size is virtually the same for gazelles and normal firms. The small-sized firms share 90% of the gazelles and normal firms’ samples. Medium-sized firms are only 7% of the samples. The smallest share has large-sized firms. According to the Russian law regulation, the criteria for business size are the following. The total revenue of small-sized is up to 800 mln RUR, middle-sized firms’ total revenue is between 800 mln RUR and 2000 mln RUR, large-sized firms have the more significant total revenue (Pletnev, Barkhatov & Naumova, 2021).

The activity type distribution of HGFs is presented in table 1.

| Code | Activity type | Number of normal firms | Number of HGFs | Share of HGFs in the whole sample, % |
|------|---------------|------------------------|----------------|-------------------------------------|
| 49.1 | Railway transport activities: intercity and international passenger transportation | 28 | 1 | 3.45 |
| 49.2 | Railway transport activities: freight transport | 140 | 7 | 4.76 |
| 49.3 | Activities of other land passenger transport | 515 | 16 | 3.01 |
| 49.4 | Road freight transport activities and transportation services | 1612 | 82 | 4.84 |
| 49.5 | Pipeline transport activity | 15 | - | - |
| 49 | Activities of land and pipeline transport | 2310 | 106 | 4.39 |
| 50.1 | Activities of maritime passenger transport | 19 | - | - |
| 50.2 | Activities of maritime freight transport | 82 | 4 | 4.65 |
| 50.3 | Activities of inland waterway passenger transport | 43 | 1 | 2.27 |
| 50.4 | Activities of inland waterway freight transport | 90 | 3 | 3.23 |
| 50 | Water transport activities | 234 | 8 | 3.31 |
| 51.1 | Passenger Air Transport Activities | 46 | 3 | 6.12 |
| 51.2 | Air cargo and space transport activities | 31 | 2 | 6.06 |
| 51 | Air and space transport activities | 77 | 5 | 6.10 |
| Total | | 2621 | 119 | 4.34 |

Dillen and Vandekerkhof (2021) investigate the relationship between the ability of firms to become HGF in different industries and found that ‘… HGFs active in declining and stable industries are significantly more productive than HGFs active in growth industries and high-growth industries’. The scholars offer the graduation of industries growth types: ‘a declining industry (negative growth), a stable industry (0 –5% growth), a growing industry (5 –10% growth) and a high-growth industry (>10% growth)’. According to statistic data, we aim to
identify the Russian transport industry growth type by Dillen and Vandekerkhof’s (2021) methodology. We decided to take ‘Gross value added by industry’ as the growth indicator (table 2).

| Code | Activity type                        | 2016  | 2017  | 2018  | 2019  | 2020  |
|------|--------------------------------------|-------|-------|-------|-------|-------|
| H    | Transportation and storage           | 14.79 | 2.40  | 2.65  | 8.96  | -9.85 |
| H 49 | Activities of land and pipeline transport | 15.13 | 1.52  | 3.56  | 9.36  | -7.88 |
| H 50 | Water transport activities           | 8.96  | 8.84  | -6.57 | -6.31 | 3.94  |
| H 51 | Air and space transport activities   | 12.76 | 11.25 | -4.54 | 9.50  | -39.32|

Sours: Federal State Statistics Service https://rosstat.gov.ru/accounts

The dynamic of gross value added in all activity types is heterogeneous. Water transport activity shows a decline from 2014 to 2019. The water transport industry showed negative growth in 2019, while the other two types of activities grew at almost an equal rate (more than 9%). But in 2020, when the impact of the pandemic hit business the most, shipping firms showed positive growth of about 4%, while land and pipeline transport firms decreased by almost 8%, and air and space transport firms decreased up to 40% (maximum decrease during the observation period).

Revenue and ROS distribution of HGFs and normal firms in 2020 is presented in fig. 1, 2. Revenue distribution is close to normal. HGFs’ revenue is much higher than normal firms’ revenue (fig. 1). HGFs keep high growth rates, despite pandemics.

![Fig. 1. Average revenue growth of Russian transport high-growth and normal firms in 2017-2020.](image)

The return on sale (ROS) dynamic is more complicated. The ROS rate of normal firms is slightly higher than HGFs’ rates (fig.2). ROS rates are similar in the 2020 pandemic year. Both HGFs and normal firms’ ROS rates have the same tendency during the period of observation.

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identify the Russian transport industry growth type by Dillen and Vandekerkhof’s (2021) methodology. We decided to take ‘Gross value added by industry’ as the growth indicator (table 2).

Table 2. Gross value added of transport sector, 2016-2020, at current prices, %.

| Code Activity type | 2016   | 2017   | 2018   | 2019   | 2020   |
|-------------------|--------|--------|--------|--------|--------|
| Transportation and storage | 14.79  | 2.40   | 2.65   | 8.96   | -9.85  |
| Activities of land and pipeline transport | 15.13  | 1.52   | 3.56   | 9.36   | -7.88  |
| Water transport activities | 8.96   | 8.84   | -6.57  | -6.31  | 3.94   |
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Fig. 2. The average return on sale ratio of Russian transport high-growth and normal firms in 2017-2020.

Table 3 shows a calculation of average values of indicators used in hypothesis testing for HGFs and normal firms.

Table 3. Average values of financial indicators used in hypotheses testing, 2020.

| Indicator                     | Hypothesis | Normal firms average | HGFs average |
|-------------------------------|------------|----------------------|--------------|
| Revenue growth rate           | H01        | -0.03                | 0.07         |
| ROS                           | H02        | 0.03                 | 0.02         |
| EAR                           | H03        | 0.29                 | 0.24         |
| TATR                          | H04        | 3.46                 | 2.36         |

Table 4 shows the results of testing hypotheses with the one-way ANOVA.

Table 4. ANOVA-tested hypotheses results (2020).

| Hypothesis | Indicator                     | Average values | One-way ANOVA |
|------------|-------------------------------|----------------|---------------|
|            |                               | Sample Normal firms | HGFs F-value Pr(>F) |
| H1         | Revenue growth rate           | -0.028 | -0.032 | 0.07 | 5.12 | 0.024 |
| H2         | ROS                           | 0.025 | 0.025 | 0.024 | 0.003 | 0.959 |
| H3         | EAR                           | 0.05  | 0.309 | 0.245 | 1.286 | 0.257 |
| H4         | TATR                          | 2.06  | 2.048 | 2.36 | 1.16 | 0.282 |
| H5         | Avr. Employment growth rate   | 0.022 | 0.015 | 0.159 | 5.792 | 0.016 |

Following the hypotheses testing, H2, H3 and H4 are confirmed. It means that Russian high-growth firms do not have significant differences in profitability (identified by ROS), solvency (identified by equity-to-assets ratio) and efficiency (identified by total assets turnover ratio). H1 and H5 are rejected on a 5-percent significance level. It means HGF keeps a better ability to grow during the pandemic (average growth rate is 0.07 compared to -0.032 for normal firms). Also, HGF has better employability (+0.159 in comparison with 0.015).
Concerning the high-growth firm survivability (Erhardt, 2021) and «one-hit-wonders» theory (Daunfeldt & Halvarsson, 2015), 28 (24%) firms (out of 119) possess the HGF status in 2020. The share of surviving firms is relatively low (Bannò and Varum, 2021), but gazelles were strong enough to hold the status in the pandemic year. Contrary to Sirec and Mocnik’s (2014) and Megaravalli and Sampagnaro’s (2018), Russian transport gazelles are younger than normal firms. The prevalent share of gazelles is small and young firms (Moreno, Code, 2015). However, there is not enough evidence to confirm the reliable relationship between HGF’s size and ability to grow.

4. Conclusions

The world faced spontaneous challenges of the COVID-19 pandemic. Russian high-growth firms coped with pandemic stragglers and quickly adapted to new conditions. Gazelles stayed more resilient than most other entities on the market. Russian high-growth transport firms are strong enough to ensure growth, hold profit generation on the market level, and generate new jobs.

The applied methodology has some limitations. The research is based on the financial data of Russian transport firms (according to section ‘Transportation and storage’ of All-Russian Classifier of Economic Activities 2). We narrowed down the field of research to three types of activities, including land and pipeline transport activities, water transport activities, and air and space transport activities. Small-sized firms take the largest share in the sample for gazelles and normal firms (90% share). The initial sample includes 3350 firms, but we noticed untypical behavior observations with extremely high or low revenue growth of ROS rate. We excluded outlier observations from the sample, including six high-growth firms. The applied limitations allow presenting the reliable description of Russian high-growth transport firms in the first year of the COVID-19 pandemic. Russian high-growth firms do not significantly differ in profitability, solvency, and efficiency from normal transport firms. Gazelles hold a better ability to grow and better employability in the pandemic.

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