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LEGAL BUSINESS GEOGRAPHY IN RUSSIA: REGIONAL ANALYSIS AND MAPPING USING TAX SERVICE OPEN DATA

ABSTRACT

This paper presents an exploratory regional analysis of legal business in Russia over the period from 2016 to 2021. The primary data source for the analysis is the Federal Tax Service (FTS) open data on small and medium-sized businesses and the number of employees of organizations. The paper proposes a reproducible methodology of working with FTS open data for regional analysis in service geography that was partially implemented in a specially designed Python command line tool. The analysis includes questions regarding the number of law firms and their employees by region, the proportion of organizations engaged in the regional legal business, the role of regions in the country's legal business sector, the role of legal business in the regions' economies, and the change in the number of law firms in regions over the observed period. Additionally, it briefly addresses the potential correlation between the location of district-level courts and the development of legal business. The analysis revealed that the legal business sector in Russia is highly concentrated in Moscow and St. Petersburg. These regions also occupy the top position in terms of the role of legal business within the region. However, there are other regions with relatively high levels of legal business development, which are primarily located in the European south of Russia, the Volga-Urals, and Siberia. A dichotomy emerges between regions where legal business is dominated by organizations and those where individual entrepreneurs prevail over companies. District courts are typically situated in regions with a high level of legal business development. However, the underlying mechanism of this co-location requires further investigation. The number of legal firms increased from 2016 to 2021 in the majority of regions. The year-by-year changes within the regions typically follow an inverted U-shaped pattern. This pattern is likely explained by the coronavirus (COVID-19) pandemic, which negatively impacted small and medium businesses and reversed the initial growth trend.

KEYWORDS: regional analysis, geography of services, legal services, legal business, open data

INTRODUCTION

Geography of services is an important branch of modern economic and social geography. In Russia, the discipline can be traced back to the 1960s, when pioneering research papers were published on this subject [*Tkachenko*, *Fomkina*, 2016]. In foreign countries, the spatial aspects of services were treated as a part of human geography and were first touched upon in the scholarly works about retail [*Reilly*, 1931; *Berry*, 1967] and cities [*Brush*, 1953], which were usually based on the central places theory [*Christaller*, *Baskin*, 1966]. A series of review research articles published in 1985–1987 directly employs the term "geography of services" and cites numerous original papers related to this topic [*Daniels*, 1985, 1986, 1987]. More recent foreign studies in this field have focused on the processes and phenomena occurring in peripheral or smaller economies [*Hermelin*, *Rusten*, 2007] or on the rising sectors such as FinTech [*Lai*, *Samers*, 2021; *Wójcik*, 2021]. Recent research in the geography of services in Russia addresses spatial properties of banking [*Shustova*, 2015], education [*Shulgina*, 2019], car rental [*Zyrianova*, 2018], food service [*Preobrazhenskiy*, *Kushnir*, 2018], and the service sector in general [*Lisin* et al., 2020].

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Nevertheless, several types of services remain understudied by geographers, including business and legal services [*Tkachenko*, *Fomkina*, 2016].

The research on the geography of legal services in Russia is limited. To date, only an analytical review describing the legal market in Russia has been published, which contains a chapter on its spatial aspects [*Moiseeva*, *Skougarevskiy*, 2016]. Another paper briefly addresses the role of Russia in the global legal services market without delving into the internal spatial properties of the Russian legal business [*Yastrebov*, *Tinkova*, 2021]. In addition to scientific publications, there are business products about the legal services market in Russia that include its regional analysis[1]. Despite a low observed interest in this issue from other researchers, it can be argued that geographical studies of legal services are essential. First, legal services, as a subset of other business or producer services, play a substantial role in the development of regions and territories and economic growth [*Hansen*, 1993]. In some cases, the lack of professional legal advice may even act as a limiting factor, causing problems for entrepreneurs, especially small ones, and decreasing their performance [*Hitchens*, 1997]. Next, a comprehensive examination of law firms may yield valuable insights into the business sectors they serve [*Faulconbridge*, 2019] or enhance the theoretical understanding of markets and industries in general [*Henderson*, *Alderson*, 2016]. Finally, legal services should be considered not only in terms of their narrow economic function but also as an integral element of the broader legal system. This system is responsible for protecting human rights and freedoms, ensuring the rule of law, and acting as an intermediary between people, businesses and government. It helps to resolve conflicts, increase certainty and orderliness in social relations, and thus contributes to the stability and development of society. This aspect of legal services is closely related to the social dimension of the geography of services. It is therefore unsurprising that research is being conducted on the problem of legal services availability [*Baxter*, *Yoon*, 2015].

The field of legal services represents a narrow and specific area of the economy that is not reported separately in the official statistics. Consequently, to analyze this sector, it is necessary to draw upon other sources of information. Georeferenced data on distinct firms is of particular value in this context, as it can be readily filtered to exclude firms that are not engaged in the requisite activity and then aggregated according to their spatial attributes to make a geographical summary. Researchers typically extract such information from public geoinformation (GIS) services [*Lachininsky*, *Sorokin*, 2021] or business intelligence (BI) systems [*Moiseeva*, *Skougarevskiy*, 2016]. However, this method has two disadvantages. Firstly, the complexity of data preprocessing makes it difficult to use. Secondly, the relatively high price of the data makes it unaffordable for many researchers. Furthermore, GIS and BI systems often do not enable access to historical data, providing only a real-time picture, while geographical studies may be enhanced by combining spatial and temporal properties. To address these challenges, the use of open administrative data may be a viable solution. In particular, the publicly available archives of the Registry of small and medium-sized businesses (SMB registry) distributed by the Federal Tax Service (FTS) of Russia, in combination with a few other open data collections of the same governmental body, appear to be a valuable resource for the task at hand. These data sources have already been used by geographers [*Rostislav*, 2021; *Gumenyuk*, 2022].

The objective of this paper is twofold. Primarily, it seeks to provide an overview of the geography of legal business in Russia. The scope of the research is intentionally limited due to various organizational and technical constraints. It focuses exclusively on service providers, or the supply side of the market, and does not address customers, the demand side. Furthermore, it concentrates on commercial legal businesses, excluding other market participants such as notaries,

[1] Analysis of the legal services market in Russia in 2019–2023 with forecast for 2024–2028 (in Russian). Web resource: https://marketing.rbc.ru/research/41683/ (accessed 14.04.2024)

advocacy firms, and non-profit legal organizations. Finally, only a subset of metrics indicative of characteristics of legal businesses is included in the analysis. The specific research questions are presented in the "Materials and methods" section below.

In addition to the primary purpose, the paper proposes a reproducible methodology of working with FTS open data for analyzing the geography of services in Russia, particularly those not reported separately in official statistics, such as specific types of business and customer services. Their analysis would be difficult using the traditional tools and data sources of economic geographers.

RESEARCH MATERIALS AND METHODS

Data

The research utilizes two primary data sources: the Unified registry of small and medium-sized businesses (SMB registry)[1] and the Information about the average number of employees of organizations (Information about employees)[2]. Both of these are available on the FTS website as open data.

The SMB registry dataset contains full dumps of the respective registry in zipped XML files. The initial dataset was made available in August 2016, and updates have been released every month. Each dump contains the entire registry and includes, in particular, the company or individual names, taxpayer IDs, and activity codes according to the All-Russia Classifier of Kinds of Economic Activity, as well as addresses of incorporation (up to the settlement name). According to Russian laws, the registry includes information about all commercial organizations and individual entrepreneurs that meet several criteria (SMB subjects). The most important criteria are limits on the revenue (no more than 2B Russian rubles) and on the average number of employees (no more than 250). Consequently, the open dumps of this registry represent the most comprehensive publicly accessible data source on Russian business entities. Moreover, the archive of these dumps constitutes a time series spanning from August 2016 to the present, thereby providing a history of small and medium-sized business changes.

The Information about employees dataset contains company taxpayer IDs and average yearly numbers of employees for the previous year. The data was initially published in 2019 and has been updated with varying frequencies, though at least annually. Consequently, the data archive encompasses the period from 2018 to 2023. For reasons that are not specified, the older versions of the dataset which included information for the years from 2018 to 2022 are not currently available on the FTS website. However, the data had already been downloaded by the author before its removal, and thus it is used in this research.

In addition to the primary data sources, two lookup tables with information on Russian cities and settlements are used to normalize and geocode the raw addresses contained in the FTS data. The first table is "Settlements of Russia: population and geographical coordinates"[3] prepared by the nonprofit open data initiative known as "Research Data Infrastructure" (RDI). The second table is "Cities of Russia"[4] published by the commercial company HFLabs. Data on several cities

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1 Unified registry of small and medium-sized businesses (in Russian). Web resource: https: //www.nalog.gov.ru/open data/7707329152-rsmp/ (accessed 15.04.2024)

2 Information about the average number of employees of organizations (in Russian). Web resource: https://www.nal og.gov.ru/opendata/7707329152-sshr2019/ (accessed 15.04.2024)

3 Settlements of Russia: population and geographical coordinates (in Russian). Web resource: https://data.rcsi.scienc e/data-catalog/datasets/160/ (accessed 15.04.2024)

4 Cities of Russia (in Russian). Web resource: https://github.com/hflabs/city (accessed 15.04.2024)

is absent from this table, so it was entered manually. Both tables contain information that is actual for the beginning of 2022, and thus there may be some inaccuracies in geocoding and normalization. However, these are likely to be negligible.

Apart from these datasets, a small manually collected table with the locations of Russian district-level courts is utilized. District-level courts span their activity over two or more regions of Russia that constitute a judicial district, checking and reviewing decisions of lower-level courts. This category includes appeal and cassation ordinary and commercial courts, with a total of 47 such courts in Russia. The location data was obtained from the Supreme Court of Russia website[1] and the legal information system called "Consultant Plus"[2]. While not the primary focus of this paper, the court location data was utilized to supplement the regional analysis by examining the relationship between the legal business geography and the placement of district-level courts.

Finally, an aggregated official statistic on the annual total number of employees in the regions of Russia[3] and on the average annual resident population[4] was utilized. This data is provided by the Federal Statistics Service (Rosstat) through the publicly available Unified Interdepartmental Information and Statistical System. It contains region names and corresponding numbers of employees in all sectors of the economy for each selected year.

Methods

A Python command line tool, ru-smb-companies, was developed by the author of this paper to initially process large and complex raw XML datasets from the FTS servers and transform them into a single CSV table. The source code of this tool, along with a brief documentation, is published in the author's personal GitHub account[5]. Here, a concise summary of the data processing workflow is provided. The data processing takes several steps.

Step 1 is data download. The dumps of the SMB registry and the archives of Information about employees were downloaded from the FTS servers and stored on the local machine. Additionally, their backup was uploaded to the author's personal Yandex.Disk account, thus enabling other researchers to access the raw data even if FTS decides to remove it (as indeed occurred with the data on employees).

Step 2 is data unpacking. A "filter-on-extract" approach was used to facilitate the retrieval of necessary information into intermediary CSV tables. This approach entails the program reading the contents of the archive file by file, rather than unpacking the entire archive on the disk. Each XML file is temporarily extracted from the archive to the memory and parsed. The program filters the records with the data on organizations and individuals contained in the XML file by activity code equal to 69.10 ("activity in the area of law" according to the All-Russia Classifier of Kinds of Economic Activity). The resulting set of filtered records is then subjected to attribute extraction, and the extracted data is stored on disk. Once this process is complete, the memory occupied by the temporarily extracted XML file is freed, and the next file is processed. The preliminary filtering

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1 Information about cassation and appeal ordinary courts (in Russian). Web resource: https://vsrf.ru/press_center/news/28148/ (accessed 15.04.2024)

2 Reference information: "Commercial courts" (in Russian). Web resource: https://www.consultant.ru/document/cons_doc_LAW_56549/ (accessed 15.04.2024)

3 Number of people employed (in Russian). Web resource: https://fedstat.ru/indicator/34051 (accessed 24.04.2024)

4 Average annual resident population (in Russian). Web resource: https://fedstat.ru/indicator/31556 (accessed 06.07.2024)

5 Russian small and medium business dataset generator. Web resource: https://github.com/PavelSyomin/russian-smb-companies (accessed 15.04.2024)

by activity code decreases the runtime of the application, while the direct reading of archive contents reduces the disk space occupied by temporary files. Consequently, this step is executed relatively fast in comparison to the less optimized "extract, then filter" approach.

Step 3 is data aggregation. The intermediary CSV tables generated in Step 2 were processed to remove duplicate records. The reason for the duplicates is the procedure of data publication. As previously stated, each version of the source datasets contains the complete data for the time of publication rather than updates only. This results in a significant number of repeating records.

Step 4 is geocoding. This involves the addition of the geographical coordinates and municipal codes of the settlements where the SMB subjects are located to the original data table. Furthermore, the addresses were normalized by converting from the original administrative division format, which consists of region, district, city, and settlement names, to a simpler yet useful format with region, area, and settlement names.

Step 5 is data panelization. The data on SMB subjects was combined with the data on employees using taxpayer ID as a unique identifier common to both datasets and converted into a panel time series table that includes yearly information for each company or individual. This resulting table is used in the further analysis.

The research adheres to the general framework of regional analysis and employs the methods of descriptive statistics and data visualization, including the plotting of data on a tile-grid map of Russia. In this study, the concept of legal business is approached in a relatively narrow sense and with a strong emphasis on formal considerations. The term encompasses commercial legal entities or individual entrepreneurs registered in Russia according to the Russian civil law whose main activity is classified under code 69.10 in the All-Russia Classifier of Kinds of Economic Activity. This technique is consistent with the selection criterion for law firms used in [*Moiseeva*, *Skougarevskiy*, 2016]. The analysis does not include non-profit legal services providers or specialized professionals such as notaries and advocates. Due to data availability constraints, it also omits large companies that are not present in the small and medium-sized businesses registry. In essence, the legal business, as it is defined in this context, encompasses legal counseling or similar activities. The analysis is comprised of four research problems, or questions, which are enumerated below with the description of the relevant techniques used to find the answers. The term "law firm" denotes both companies (organizations) and individuals (individual entrepreneurs). The term "lawyers" in this paper refers to the employees of these firms.

Problem 1 is the distribution of law firms across Russia's regions. To discover this distribution, the median number of law firms in each region per 100 000 population is calculated for the period from 2016 to 2021. This result is then visualized on a map.

Problem 2 is the structure of legal business in the regions with respect to the kind of firms (either individuals or companies). To address this issue, the median share of organizations among law firms in each region over the 2016–2021 period is calculated and then mapped.

Problem 3 is the relative importance of regional legal business. This issue is divided into two sub-problems. The first is the importance of a region's legal services in the Russian legal market measured by the share of lawyers in a region in the number of country's lawyers. The second is the importance of these services within a given region estimated as a share of lawyers in a region in the total number of employees in that region. Both metrics are calculated for each year from 2018 to 2021, averaged by a median function, and then plotted on a tile-grid map. Additionally, regions with district-level courts are marked on the map to analyze the relationship between the location of such courts and the development of legal business.

Problem 4 is the temporal change in the legal business sector across regions. To reach conclusions, law firms are calculated by region and year for the 2016–2021 period. The time series of counts are visualized as line plots to identify temporal patterns. The regions are divided into

three groups based on the overall growth, decline, or stability of legal business in the observed period, and the group is also marked on the map.

Technically, the analysis is carried out using the R programming language (including additional packages). A tile grid map of Russia by I. Dianov[1] is used with a modified implementation by Yu. Tukachev[2]. The source code of this paper is published in the author's repository on GitHub[3].

RESEARCH RESULTS AND DISCUSSION

Fig. 1 depicts the average relative annual number of law firms by region. Several conclusions can be drawn from this visualization. First, Moscow and Saint Petersburg stand out as the only cities in Russia where the number of law firms exceeds 100 per 100 000 inhabitants. Secondly, certain regions also have a relatively high number of law firms per capita. Geographically, these regions are situated in different parts of the country, and in some cases they form clusters or groups. The most prominent of these groups is located in the Middle and Southern Urals with Western Siberia and consists of Sverdlovsk, Chelyabinsk, Tyumen, Omsk, and Novosibirsk regions. Another group is located in the Far East and includes Primorye territory, Sakhalin Region, and, somewhat surprisingly, Kamchatka territory. Krasnodar territory, the Republic of Tatarstan, the Republic of Karelia, and Arkhangelsk Region are distinct centers with a high number of law firms per capita surrounded by the regions with a more moderate number of such firms. Moscow Region and its neighboring Ivanovo Region are also characterized by a considerable number of law firms per capita, but it seems that their metrics may be the result of a "spillover effect" originating from Moscow City. Third, several republics of the North Caucasus and Altai and a portion of regions of the Russian North have relatively small number of law firms, sometimes incorporating less than ten such businesses. It can be hypothesized that the number of law firms per capita is contingent upon the economic development of a region.

The relative location of regions and groups with different numbers of law firms per capita suggests the possibility of central-periphery relations between them. For instance, Moscow City and Region, St. Petersburg City, and the Republic of Tatarstan may serve as hubs for their surrounding areas of Central, North-Western Russia, and Volga Region (Povolzhye). A similar phenomenon may be observed in other parts of the country: the Ural-Siberian cluster provides legal services for Eastern Siberia and the Far East, while the Krasnodar Territory serves Rostov and Stavropol.

Fig. 2 illustrates the median annual share of organizations among all law firms in regions. The value varies considerably, ranging from approximately 30 % to almost 70 %. However, a substantial proportion of regions exhibit a share of companies ranging from 45 % to 55 %, which is almost equal to the share of individuals. All other regions may be divided into two broad groups: either having a dominance of individuals or organizations in the legal market. The former category encompasses the European North and South, as well as certain regions in the Far East, Central Russia, and Western Siberia. The latter category comprises Moscow and St. Petersburg cities, along with the majority of the Volga and Siberian regions. The comparison of Fig. 1 with Fig. 2 leads to the conclusion that there is no clear relationship between the number of law firms and the share of companies among them.

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1 Tile grid map of Russia (in Russian). Web resource: https://dianov.org/all/plitochnaya-karta-rossii/ (accessed 23.04.2024)

2 Tile grid map of Russia. Web resource: https://gist.github.com/tukachev/ c3262242a20b3050e0459b4e3afc3a51 (accessed 23.04.2024)

3 PavelSyomin. Russian smb companies papers. Web resource: https://github.com/PavelSyomin/ru-smb-companies-papers/tree/main/law-firms-geography (accessed 23.04.2024)

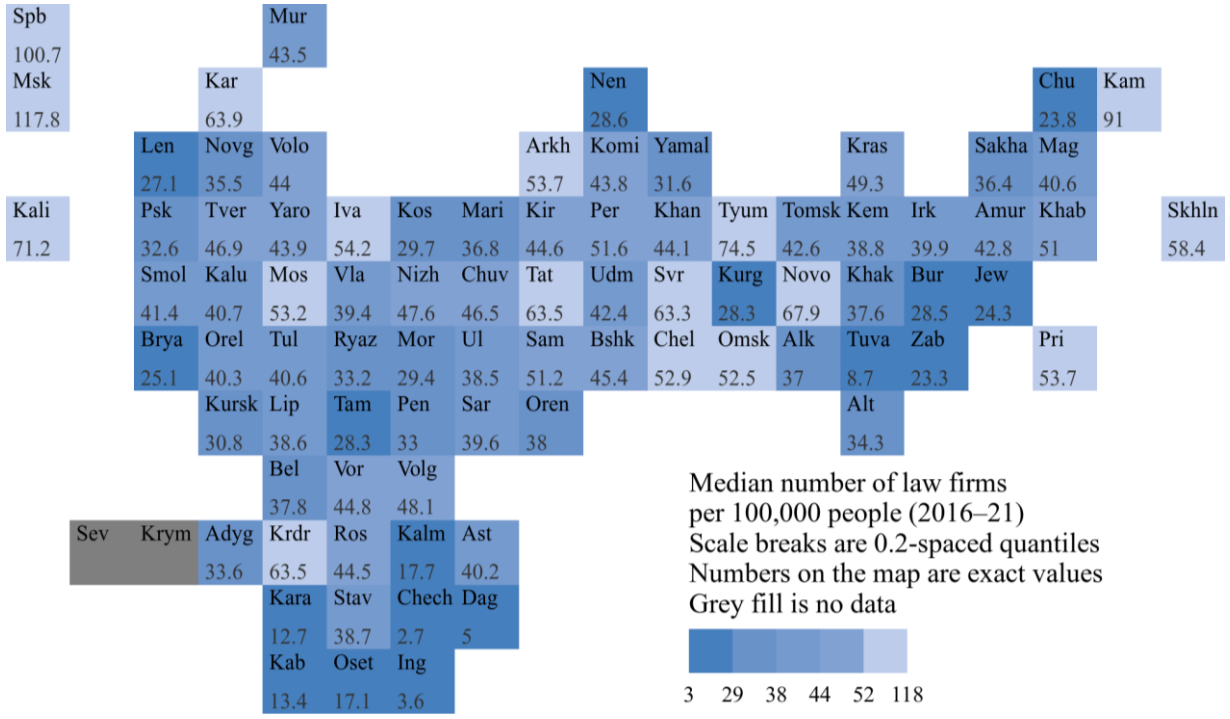

Fig. 1. The median annual count of law firms per capita by regions of Russia over the period from 2016 to 2021

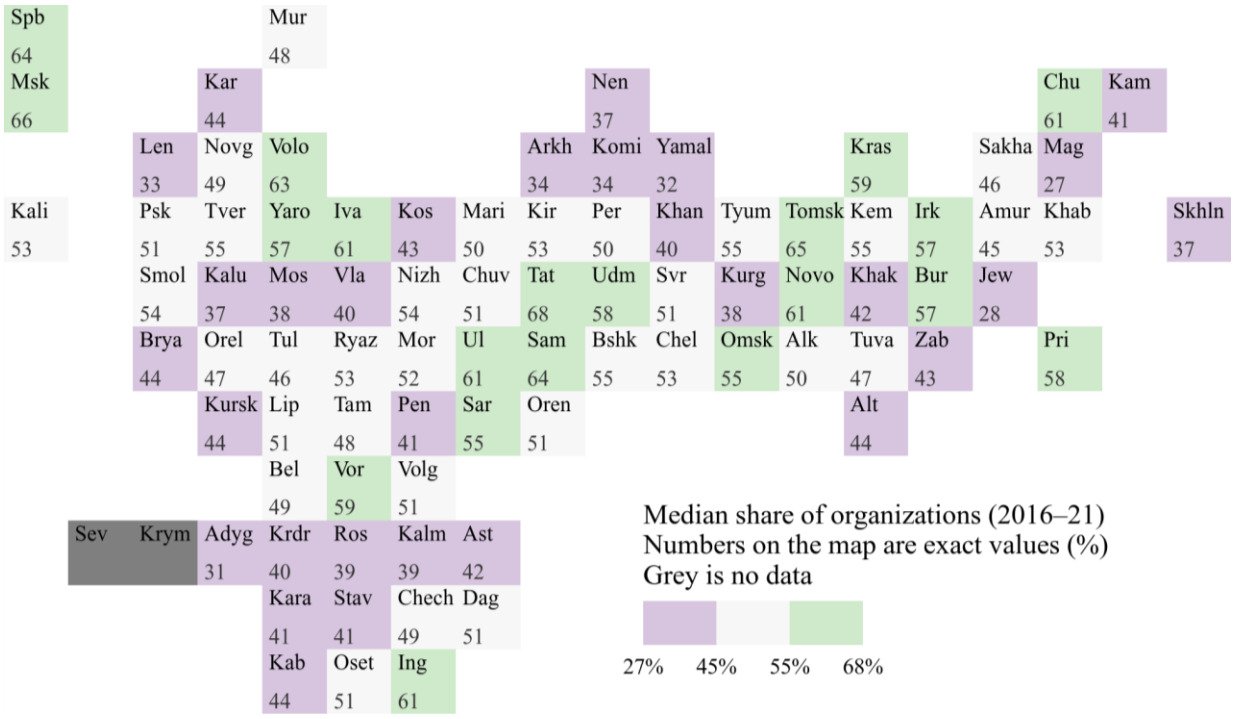

Fig. 2. The median annual share of companies among law firms by regions of Russia over the period from 2016 to 2021

Fig. 3 presents the combined results of the regional analysis based on the number of lawyers. The distribution of lawyers across regions is similar to that of law firms themselves (see Fig. 1), suggesting that legal companies in different regions are quite similar to each other in the number of employees. However, the role of legal business in regions' economies, as indicated by the share of lawyers in regions' labor forces, is distributed differently. Moscow and St. Petersburg, the two most populous cities, account for the largest number of lawyers and also exhibit the highest proportion of lawyers in the region's labor force. In contrast, the vast majority of other regions is characterized by a relatively uniform low share of lawyers (0.1–0.2 %) in the local labor force, with Sverdlovsk, Tyumen, and Novosibirsk regions being remarkable exceptions. Regions with an extremely low representation in the country's legal sector (for example, the Republic of Tuva and Altai Territory) also typically have a low proportion of lawyers in their regional labor force, except for the Jewish Autonomous Region.

The regional role of legal business does not appear to be contingent upon the presence or absence of district-level courts. However, it seems that the national role of a region in the legal sector is somehow connected with the location of such courts. This is evidenced by the fact that almost all regions with a relatively high share of the country's lawyers (>1 %) have at least one district-level court, while other regions typically do not have such courts. It is important to note that there are exceptions to this trend. For instance, the Republic of Bashkortostan and Volgograd Region have relatively high shares of lawyers but no district-level courts. In contrast, three sub-Moscow regions, Vologda and Tomsk regions, as well as Khabarovsk and Trans-Baikal territories, have an opposite situation. These discrepancies may be explained by several factors. For example, the presence of district-level courts in Tula, Vladimir, and Kaluga regions is not associated with the development of legal business, because the proximity to Moscow reduces the necessity for local law firms.

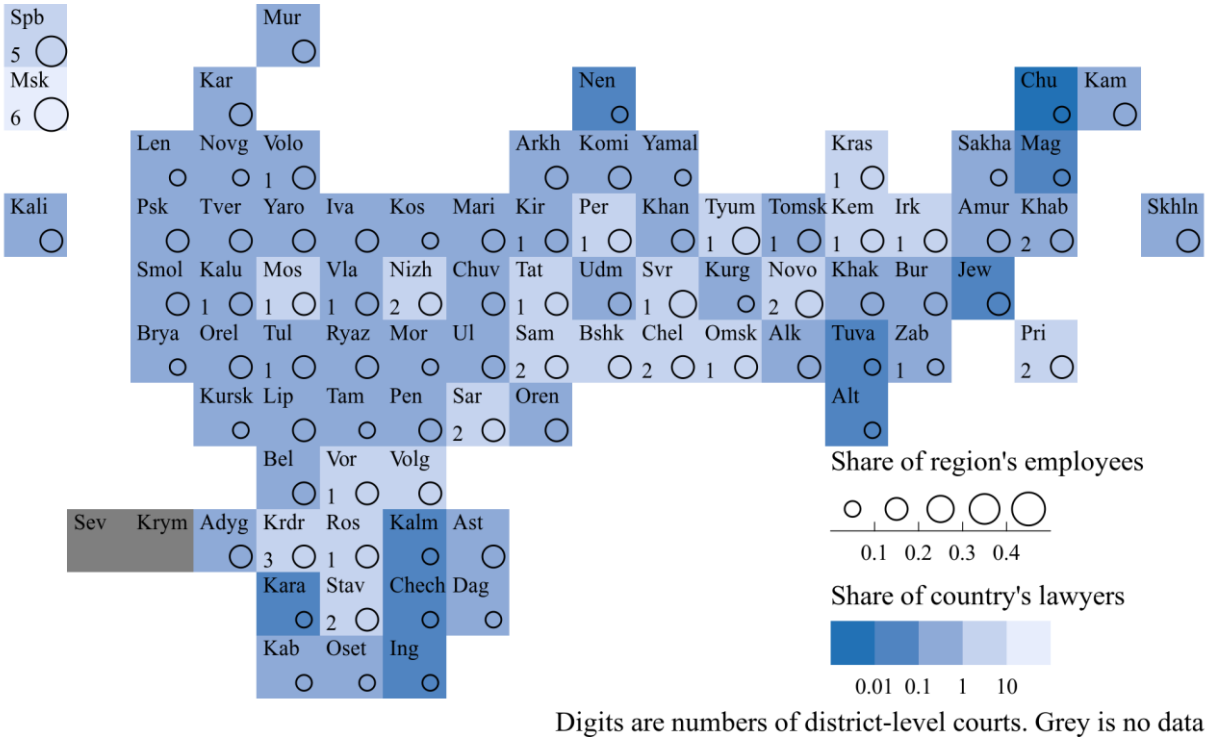

Fig. 3. The national and regional median annual shares of lawyers in regions of Russia over the period from 2018 to 2021

The changes in the number of law firms by region are depicted in Fig. 4. The number of such firms increased in the majority of regions, indicating the development of the legal business sector. In contrast, several regions, all of which are located in the European part of Russia, have experienced a net decrease in the number of law firms. In comparison to the increase rates observed in other regions, the net change in the number of law firms from 2016 to 2021 in these regions is relatively low (usually less than 10 %). In some cases, neither decline nor growth was clearly expressed (for example, in the Republic of Altai, Lipetsk, and Tambov regions). The regions with the most significant growth are some republics in the North Caucasus, as well as the Republic of Kalmykia and Nenets Autonomous Area. Their results are likely attributable to the low base effect, given that the absolute counts of law firms in all these regions are below 100 (see Fig. 1). It is noteworthy that Leningrad and Moscow regions also demonstrated one of the highest growth rates. It is likely that the relocation of law firms from the cities of Moscow and St. Petersburg to the surrounding regions has contributed to this outcome. Nevertheless, both Moscow and St. Petersburg cities also exhibited high net gain of law firms.

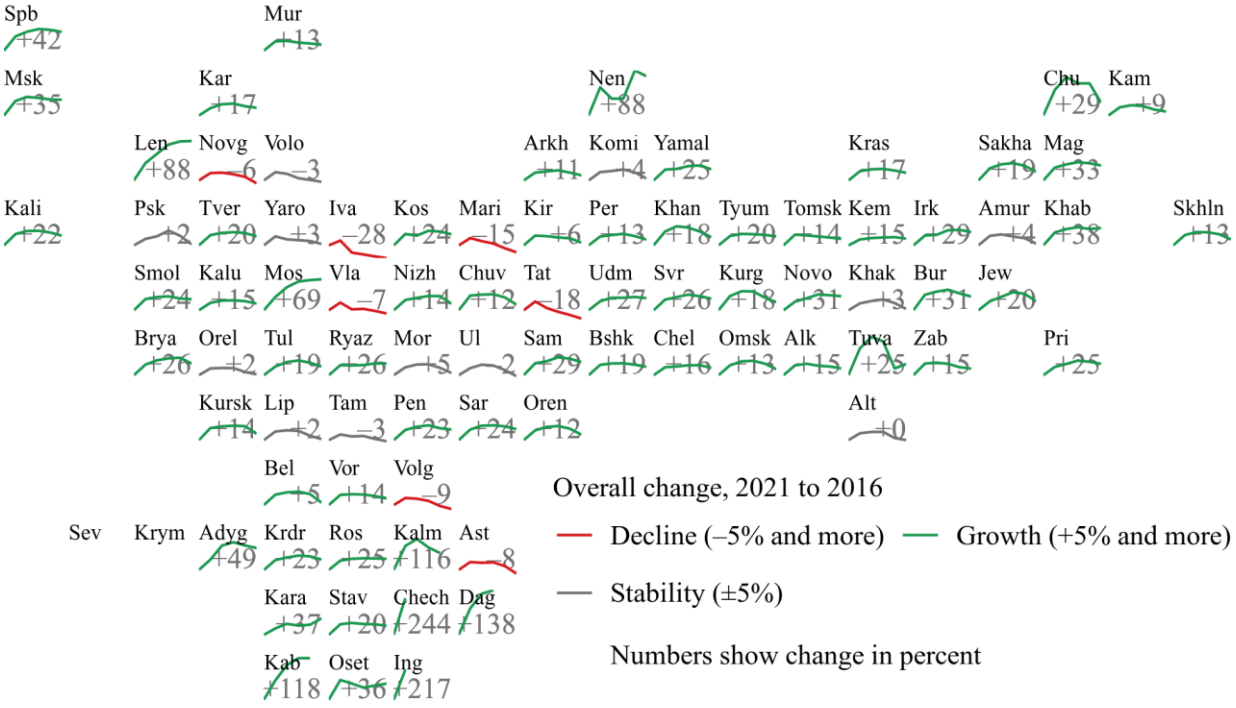

Fig. 4. The change in the number of law firms by region over the period from 2016 to 2021

The observed patterns of change indicated by line plots on the map can be divided into several groups. The first is the stable yet saturating increase typical for Moscow and Leningrad regions, and, to a lesser extent, Khabarovsk Territory, Rostov, and Ryazan Regions. The second is the inverted U-shaped curve which is characteristic of the majority of regions with overall growth in the number of legal firms. This pattern can be explained by the effect of the coronavirus (COVID-19) pandemic, which has negatively impacted small and medium-sized businesses and reversed the previous trend of growth. The height of the inverted U varies by region, with the highest observed in Chukotka Autonomous Area, the Republic of Tuva, and the Republic of Adygea. It can be hypothesized that the first group is a subset of the second, but that its intrinsic growth rate before the pandemic was higher, resulting in a slowing down of the growth rather than in a final decrease. The third pattern is typical of the regions with a general fall in the number of

law firms, and it can be described as a continuous decline following an initial period of short-term growth. The fourth group is a mixture of increase and decrease. For example, Nenets Autonomous Area and the Republic of North Ossetia — Alania demonstrate this pattern.

CONCLUSIONS

The regional analysis revealed several spatial features of legal business in Russia. First, the regions exhibit considerable variation in the number of law firms and lawyers. Several areas with a relatively high number of lawyers per capita are identified, including the Urals and Western Siberia cluster, a few regions of the Far East, Krasnodar Territory, the Republic of Tatarstan, and a number of other regions. As might be expected, the cities of Moscow and St. Petersburg are home to the largest number of law firms and lawyers. Furthermore, it is again Moscow and St. Petersburg cities that have the highest share of lawyers in their total labor force. Nevertheless, there are other regions with a relatively high role of legal businesses in their regional economies, including Sverdlovsk, Tyumen, and Novosibirsk.

Regions can be roughly divided into three categories: one with the legal organizations prevailing in the legal business, another with individual entrepreneurs prevailing over companies, and the last one where the proportion of individuals is almost equal to the proportion of companies. The high role of companies is typical for Moscow, Saint Petersburg, Volga, and Siberian regions. The opposite is observed in the European North and South, as well as certain regions in the Far East, Central Russia, and Western Siberia.

The role of the region in the country's legal business is typically associated with the presence of one or more district-level courts in the administrative center of the region. Only two regions do not act as hosts for any of these courts but still have a relatively high level of legal business development: Volgograd Region and the Republic of Bashkortostan. This observation can be explained in two ways. One possibility is that the courts act as a magnet for legal business because they are necessary for many legal activities. Alternatively, the courts are placed in regions and cities with already highly developed legal business sector. Further research may shed light on the direction of this court-business relationship.

From 2016 to 2021, the number of law firms in the majority of Russia's regions generally increased. However, a decrease was observed in some regions. The cities of Moscow and St. Petersburg with the surrounding regions are characterized by one of the highest increase rates. Additionally, some regions (mainly in the North Caucasus) exhibited extreme growth, but this may be attributed to the low base effect. The yearly patterns of change can be categorized into four groups. The inverted U-shaped change, which is likely explained by the coronavirus (COVID-19) pandemic, is the most common pattern among the regions.

The results of this exploratory study provide an overview of Russia's recent legal business geography and may be used as support for data-driven business and governmental decisions. Several research hypotheses may also be conducted from this analysis; thus, this study may be treated as a base for further academic development in the field of legal services geography in Russia. Furthermore, the reproducible data-driven methodology employed in this study, which is based entirely on open data and open source software tools may be utilized (with minor modifications) for regional analysis and mapping of other narrow service sector areas.

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