The influence of environmental and economic turbulence on civil construction in the region

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Abstract. This article is devoted to the analysis and forecasting of the development of civil engineering in the region in the context of recurring macro-shocks that create political and economic turbulence. The dynamics of the commercial real estate market in St. Petersburg have been studied. The purpose of the article is to study the influence of various factors (including vacancy levels) on market price indicators and to predict the dynamics of its development. Objectives of the study: analyse office, retail, and warehouse real estate in the city, study the degree of influence of the vacancy rate of objects on the market situation; build a forecast of the dynamics of market development, considering the influence of the dynamics of the share of vacant space; identify market trends in an unstable economic situation. The result of the study is a forecast of the dynamics of development of the commercial real estate market in St. Petersburg and, accordingly, civil construction in this region. Based on regression analysis, factors influencing the dynamics of price indicators for commercial premises were identified. The study confirmed the hypothesis about the connection between the dynamics of commercial real estate market segments and key events in the economy. This suggests the need to identify time stages at which the composition and number of key factors changes. The study shows that different segments of the commercial real estate market react differently to the level of vacancy, which is due to their specific functioning.

1 Introduction

At the present stage of development, the Russian economy is faced with a set of macroeconomic destabilizing factors. This is the coronavirus pandemic, declared by WHO at the beginning of 2020, the subsequent restrictions on the work of trade and service enterprises, the unstable situation with prices for Russia’s main export product - oil, unstable dynamics of the national currency exchange rate, sanctions restrictions imposed against the country, etc. In total these factors have a shock effect on the economy. As a result, the economic situation can...
be characterized as turbulent. This political-economic turbulence affects all sectors of the economy. In particular, it affects the development of civil engineering through the instability of the commercial real estate market. Of all the commercial real estate segments, according to consulting companies, warehouse real estate suffered the least, which has become the main driver of growth in recent years due to the development of online commerce and the scaling of business by offline retailers [1].

During the year, the retail real estate segment was negatively impacted by work restrictions; the vacancy rate in 2020 increased compared to previous years due to the fact that tenants were not physically able to fulfil their obligations. Office real estate in recent years has undergone major changes: the presence of coworking spaces is growing, many employees are transferred to remote work due to epidemiological prohibitions, all this leads to an increase in office space vacancy [2]. At the same time, Warehouse Real Estate, which received incentives for development due to the growth in demand for properties, not only did not suffer, but is rapidly striving towards a zero-vacancy rate and even a shortage of space. As of the 1st half of 2020, the vacancy rate by segment is within 0.3-7%, depending on the purpose and quality of commercial space. The purpose of the article is to analyse the dynamics of the commercial real estate market segments and identify development trends.

The problems of assessing the situation in the commercial real estate sector have been studied by many authors. In particular, in the works of Bonefeld W., Melnyk L., Kubatko O., Dehtyarova I., Matsenko O., Rozhko O. [1, 4] the role of industrial revolutions in transformation processes in society is analyzed, similar processes occurring in the European economy are considered. Publications by Mavridis S., Yang D.L. [3, 8] are devoted to the issues of economic transformation in Greece and China, highlighting its impact on the social sphere and political sentiment and vice versa. The conference materials of the authors Shumaev V.A., Morkovkin D.E., Nikonorova A.V., Nezamaikin V.N., Yurzinova I.L., Lavrova T., Plotnikov V. [5, 9] present approaches to analysis tourism sector, its features are highlighted, the agrotourism cluster and methods of managing it are studied. The articles by Gries T., Naudé W., Tolkachev S.A. [2, 6] examine the impact of structural changes in the economy on the development of entrepreneurship and assess changes in industrial policy in the context of ongoing revolutionary changes in production methods. In the works of Kravchenko O., Leshchenko M., Marushchak D., Vdovychenko Y., Boguslavskaya S., Salisu A.A., Raheem I.D., Ndako U.B. [11, 19] analyzed trends in the digitalization of the economy and its impact on society, considered individual properties and ways of influencing inflation.

The works of Vertakova Y.V., Klevtsova M.G., Polozhentseva Y.S., Voskresenskaya E., Vorona-Slivinskaya L., Achba L. [7, 12] consider regional aspects of digitalization of the economy and its legal contexts, as well as features of the implementation of regional policy in modern conditions. Articles by Pirogova O., Gorin E., Plotnikov V., Martín-Peña M., Sánchez-López J., Díaz-Garrido E. [13, 14, 15] are devoted to estimating the parameters of commercial companies; the possibilities of using individual of them for analyzing the success of activities. In the scientific works of Hasan M.M., Bakarich K.M., Hossain M., Weintrop J. [16, 17] approaches to analyzing the life cycle of a company from various angles are considered, social, resource and management areas are highlighted. The works of Eggert A., Hogreve J., Ulaga W., Muenkhoff E., Pirogova O., Plotnikov V. [18, 23] examine certain aspects of the performance of companies in the service sector, approaches to assessing the strategies and potential of such companies. The articles by Yoshida J., Carmichael, B., Coën, A. [10, 22] discuss accounting issues in the real estate market, explore the features of this market, financial and risk aspects. In the works Li Ya., Zhu D., Zhao J., Zheng X., Zhang L., Skribans V., Jurušs M., Demianchuk M., Maslii N., Pastory D. [20, 21] analyzed individual sectors real estate markets of China and Latvia, issues of monitoring and management were raised. The publications of many other authors are devoted to similar issues, however, despite the attention
of the scientific community to this topic, the problems are still far from being completely resolved.

2 Materials and methods

Commercial real estate in Russia began to form only with the beginning of the privatization of enterprises. The commercial real estate sector is much smaller than the residential one, so there are correspondingly fewer transactions, although commercial real estate is the most attractive all over the world.

Commercial real estate can be subdivided into income-generating - commercial real estate itself and creating conditions for its extraction - industrial (industrial) real estate.

Income-generating real estate includes [3]:
- office buildings and premises for administrative and office purposes,
- hotels, motels, holiday homes,
- shops, shopping centres,
- restaurants, cafes and other catering points,
- parking lots, garages.
- points of consumer services, service.

The commercial real estate market, depending on the goods functioning on it, is subdivided [4]:
- office space market;
- retail real estate market;
- warehouse market;
- the industrial real estate market.

Table 1 shows the comparative characteristics of the commercial real estate segments.

In carrying out the research, we used indicators generally accepted in the subject area, characterizing the parameters of the markets of warehouse, office and retail real estate. To exclude inflation from the cost data, the RF Gross Domestic Product Deflator Index (NGDPD) and the RF Consumer Price Index NCPI presented in the basic (cumulative) form were used. The following calculation methods were used to process the data.

Cumulative CPI NCPI is calculated as follows:

\[ \text{NCPI}_t = \text{NCPI}_{t-1} \cdot \frac{\text{CPI}_t}{\text{NCPI}_{t}} \]

where \( \text{CPI}_t \) – consumer price index for goods and services in year \( t \) in relation to the previous year; \( t \) - number of the calendar year; \( \text{NCPI}_t \) (for 2010).

The accumulated GDPD (NGDPD) is calculated by the formula:

\[ \text{NGDPD}_t = \text{NGDPD}_{t-1} \cdot \frac{\text{GDPD}_t}{\text{NGDPD}_{t}} \]

where \( \text{GDPD}_t \) – deflator index of gross domestic product in year \( t \) in relation to the previous year; \( t \) - number of the calendar year; \( \text{NGDPD}_0 = 1 \) (for 2010).

Average wages in constant 2010 prices (RAW) defined as:

\[ \text{RAW}_t = \frac{\text{NAW}_t}{\text{NCPI}_t} \]

where \( \text{NAW}_t \) – nominal accrued wages in year \( t \).
The average (annual) rental rate in constant 2010 prices $RARC_t$ is determined as follows:

$$RARC_t = \frac{ARC_t}{NGDPD_t}$$

where $ARC_t$ – average (annual) rental rate in current prices in year $t$.

**Table 1.** Comparative characteristics of commercial real estate segments

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The vacancy rate ($DVP_t$) is calculated as follows:
\[ DVP_t = \frac{OOP_t}{OVP_t} \]

where \( OOP_t \) – total supply of space in year \( t \); \( OVP_t \) – vacancy rate in year \( t \).

The volume of the rental market (annual) in constant 2010 prices (\( RMR_t \)) is calculated using the formula:

\[ RMR_t = (OOP_t - OOP_t \cdot DVP_t) / RACR_t \]

The volume of space supply per employee (\( OPZ_t \)) is calculated as follows:

\[ OPZ_t = \frac{OOP_t}{CHZ_t} \]

where \( CHZ_t \) – employed population in year \( t \).

Retail trade turnover per capita (\( ORTDN_t \)) is defined as:

\[ ORTDN_t = \frac{ORT_t}{CHN_t} \]

where \( ORT_t \) – total retail turnover in year \( t \); \( CHN_t \) – total population in year \( t \).

Net Area Absorption (CHPP) calculated using the formula:

\[ CHPP_t = OZPK_t - OZPN_t \]

where \( OZPK_t \) – the volume of occupied space at the end of the year \( t \); \( OZPN_t \) – the volume of occupied space at the beginning of the year \( t \).

The provision of areas per capita (\( OPDN_t \)) is calculated as follows:

\[ OPDN_t = \frac{OOP_t}{CHN_t} \]

Deflator indices of gross domestic product (\( GDPD_t \)) and consumer price indices for goods and services (\( CPI_t \)) in relation to the previous year were calculated by Rosstat according to official methodologies.

3 Results and discussion

According to retrospective data for 2010-2021 the main trends in the warehouse, office and retail real estate market of St. Petersburg were analysed. All cost indicators are presented in constant 2010 prices using the GDP deflator and the RF CPI. For 2021, data for the first half of the year were used, therefore, on some graphs, the values of indicators for 2021 are underestimated, which was considered in the analysis.
3.1 Warehouse real estate market

The total supply of warehouse real estate increased over the period under review from 0.97 to 3.5 million sq. M, and until 2013 it was almost unchanged at about 1.0 million sq. M, then sharply increased to 2.44 million sq. M in 2014, then slowly and smoothly grew with an average annual growth of 5.2%. The volume of new space commissioning, on the contrary, fluctuated very significantly, but by the end of the period it returned to the level of its beginning, about 50 thousand square meters per year. Sharp rises were recorded three times: up to 355 thousand square meters in 2014, up to 341 in 2020 and up to 189 in 2016, which may be due to the commissioning of large facilities.

In general, over the period, the linear trend was upward, which positively characterizes the dynamics of development. The total volume of transactions during the period changed significantly, at the beginning its value amounted to 190 thousand square meters, at the end - 167. A sharp increase was observed in 2014 and 2019. up to 327 and 356 thousand square meters, respectively, while the general trend was also growing. The share of vacant space in residential buildings decreased from 11.5% in 2010 to 0.3% in 2021; a decrease in this indicator with slight fluctuations was observed throughout the entire period under consideration, which, on the one hand, indicates an increase in the efficiency of using warehouse areas, on the other - about a decrease in reserves. It should be especially noted that the values of the indicator “Total supply of residential premises” were steadily increasing, and “The share of vacant space for residential premises” - simultaneously decreased, despite the pandemic, which indicates the presence of demand.

Interesting is the change in the average rental rate of warehouse space and the volume of their supply in terms of per person employed in the economy (Fig. 1), as well as estimates of the volume of the warehouse rental market (Fig. 2).

The graphs of the first two indicators (Fig. 1) are almost mirrored, until 2014 they changed insignificantly, but as soon as the supply increased sharply this year, the rental rate began to decline rapidly, followed by a slight stabilization from 2018. This corresponds to classical economic patterns, but also indicates the limited capacity of the market. The growth pattern of the indicator "Supply volume of warehouse real estate per employee" since 2014 (average annual growth is 5.0%) is almost like the same dynamics of the "Total supply of warehouse real estate", which, on the one hand, is natural, on the other hand, indicates insignificant variability "Average annual number of employed" in St. Petersburg in 2014-2021. "The volume of the warehouse real estate rental market" (Fig. 2) until 2013 slowly increased from 2472.34
to 3322.14 million rubles, then in 2014 - a sharp increase by more than 2 times to 6960.25 million rubles., then - variable dynamics with a decline in 2018 to 5668.29 million rubles and reaching roughly the 2014 level in 2021.

An analysis of the correlation between the “Average rental rate” and “The volume of supply of warehouse real estate per employee” revealed the presence of temporal clustering of data: until 2013 and since 2014. At the beginning of the period, there was no mutual influence of these indicators, since 2014 it has appeared (the linear coefficient is –0.82), the model is shown in fig. 3. The dependence of the values of the indicator ”The share of vacant warehouse real estate" on the values of the indicator "Average rental rate" (the linear coefficient is +0.78) was also revealed, the model is shown in Fig. 4. As for the previous indicator - for data only from 2014 for the same reasons.

Features Fig. 3: the dependence is plotted for data from 2014 to 2021 only; the value of the correlation coefficient is quite high and indicates a feedback between the indicators; influence can be described by a power-law function, which corresponds more than others to economic causality and best of all characterizes the trend; the average rental rate is presented in constant 2010 prices.

Features Fig. 4: the dependence is plotted for data from 2014 to 2021 only; the correlation coefficient is high, indicating a direct relationship between the indicators; the influence can be modeled by a logarithmic function, which better than others correspond to economic logic and describes the trend quite well; the average rental rate is presented in constant 2010 prices.

Another relationship was found mathematically - between the "Total supply of warehouse real estate" (x) and "Share of vacant warehouse real estate" (y), also from 2014. The linear correlation coefficient is very high (–0.93), the effect is well described linear function. However, the dependence is inverse: the larger the supply, the lower the share of vacant space on the market, which is not very consistent with the causal logic for these economic indicators. It seems that the values of both are a consequence of a third common reason - an indicator that was not included in the study, and there is no reason to consider this dependence as a model. Correlation between the other named indicators of the warehouse real estate market has not been revealed.

### 3.2 Office real estate market

The total supply of office space throughout the entire period under review grew almost ideally evenly from 1.40 million square meters in 2010 to 3.76 million square meters in 2021, with an average annual growth rate of about 9.4%. The volume of new construction had a different trend: it fluctuated significantly, the trend had a convex parabolic shape with a maximum value in 2014 (along the trend), while the actual values of the indicator changed the
sign of deviation from the trend annually. In general, over the period, the indicator values decreased from 146.0 thousand square meters in 2010 to 87.3 thousand square meters in 2021. It should be emphasized that, as for warehouse real estate, in 2014 there was a change in the market situation, possibly due to the introduction of economic sanctions against the Russian Federation, but the total supply of office real estate continued to grow at the same rate.

“Net absorption” in the office market had a trend similar to the indicator “Volume of new construction”: there was also a parabolic convex trend with a maximum in 2015, fluctuations around it were significant, and the greatest fluctuations were observed in 2015-2019, simultaneously with the beginning of trend changes. In general, over the period, the values of the indicator changed from 130 to 90 thousand square meters, the maximum actual values of 279.0 and 284.0 thousand square meters were typical for 2016 and 2018, respectively. It can be assumed that according to this indicator, the market reacted to the imposition of sanctions with a slight delay. The "level of vacant space" throughout the considered time interval, fluctuating, slowly decreased, at the beginning of the period its value was 18%, at the end - 6.3%. As for the warehouse real estate market, this indicates both an increase in the efficiency of the use of space, and a decrease in reserves.

The dynamics of the average rental rate for office space and the volume of supply of office real estate per person employed in the economy, as well as estimates of the volume of the office real estate rental market was as follows (Fig. 5, 6).

The values of the indicators "Average rental rate of office real estate" and "Volume of supply of office real estate per employee" (Fig. 5) throughout the entire period changed in opposite directions. The increase in supply in the office real estate market was accompanied by a decrease in rates, in contrast to similar indicators of the warehouse real estate market, the changes were extremely small and smooth, did not have sharp changes and “turning years”. The volume of supply per one employed increased from 0.48 sq. m. per person. In 2010 up to 1.17 sq. m. per person. In 2021, the average annual growth was 8.5%. The average rental rate for office real estate for the same period decreased from 11.9 to 7.9 thousand rubles for 1 sq. m per year, on average by 3.7% per year.

A slight decrease was observed from 2015 to 2018, which may be caused by the market adaptation to the introduction of economic sanctions, from 2018-2019. The values returned to the previous trend. The indicator "Volume of the office real estate rental market" (Fig. 6) increased over the period under review from 13.71 to 27.78 billion rubles. (at constant 2010 prices). The growth was almost even with a slight decrease in 2015-2017, probably also due to the sanctions, the average annual growth over the entire observation period was 6.6%.

As a result of the analysis of the correlation of the main indicators of this market, the following was revealed. Only two dependencies are well described by regression models:
“Average rental rate” from “Supply volume per one employed” (Fig. 7) and “Average rental rate” from “Level of vacant space” (Fig. 8).

Features Fig. 7: the dependence is plotted for data for the entire period from 2010 to 2021; the correlation coefficient is high (−0.90) and indicates the presence of feedback between the indicators; the influence is better described by a power function; the quality of the model is good enough; the average rental rate is presented in constant 2010 prices.

Features Fig. 8: the dependence is plotted for data for the entire period from 2010 to 2021; the correlation coefficient is relatively high (+0.81) and indicates a direct connection; the model can be represented as a linear function; its quality is slightly above average; the average rental rate is presented in constant 2010 prices.

The nature of the relationship between indicators in both models corresponds to the classical theoretical laws of economic mechanisms. You should also pay attention to the presence of temporal clustering of data in Fig. 7 - until 2014 the regression relationship is strong (upper left of the graph), since 2015 it has been very significantly weakened (lower right of the graph). In other words, in the office real estate market in 2015, there were key events that partially changed the economic mechanisms.

In addition, as for the warehouse real estate market, mathematically, a regression dependence of the "Level (share) of vacant office real estate premises" on the "Total supply of office space" was revealed, the linear correlation coefficient is high (−0.87). The model can be described by a power function, but the dependence is inverse and contradicts classical economic laws. Therefore, it cannot be a model; most likely, both indicators causally depend on the third, which was not included in the study. Correlation links between other main indicators of the office real estate market were not found.

3.3 Retail real estate market

Unlike the warehouse and office real estate markets, the retail real estate market is more dependent on the number of buyers and their standard of living. The population of St. Petersburg in the period 2010-2021 increased from 4899 to 5384 thousand people, and at the beginning of the period this number increased faster, towards the end its growth slowed down. The size of wages also increased during this period from 27190 to 37667 rubles. (at constant 2010 prices), the trend was close to linear with small fluctuations. Retail trade turnover in St. Petersburg for the period 2010-2020 increased from 685.05 to 828.66 billion rubles, retail trade turnover per capita - from 139.83 to 153.9 thousand rubles. (at constant 2010 prices). The values of the last three indicators decreased in 2014-2015, which coincides with the introduction of economic sanctions; subsequently, they gradually returned to the previous, close to linear, slowly growing trends.
The total retail space of modern shopping centers in St. Petersburg during the entire period under review fluctuated slightly from 2.07 to 3.22 million square meters, the average annual growth rate was about 4.1%. At the same time, there were two periods before 2015 and after it, the values of the indicator in the first period increased relatively quickly, in the second the growth slowed down. In each of the periods, the trends can be described with small errors by linear trends, but with different tilt angles to the X axis. The provision of space in shopping centers per capita for the entire period increased from 0.423 to 0.598 sq. m. As for the previous indicator, two periods were distinguished: before 2015 and after it.

Until 2015, the average annual growth was 5.7%, after - 1.2%, for each of the periods there was a slight fluctuation in values. The average vacancy rate decreased from 10.0% in 2010 to 5.3% in 2021. Throughout the entire period, its values fluctuated quite strongly relative to the general downtrend: 3 years of decline, then 2 years of growth, and then similarly. For the retail real estate market, we managed to find a slightly larger number of regression relationships between indicators. At the same time, it was revealed that for the construction of such models it is possible not to separate the periods before and after 2015.

The strongest were the dependences of the "Trade area of modern shopping centers in St. Petersburg" and, separately, "Provision of areas in shopping centers in St. Petersburg per capita" (Fig. 9 and 10).

![Fig. 9](image1.png) ![Fig. 10](image2.png)

**Fig. 9.** The dependence is plotted for data for the entire period from 2010 to 2021; the linear correlation coefficient is high (+0.98) and indicates the presence of a strong direct relationship between the indicators; the influence is better described by a linear function; the quality of the model is very good.

**Fig. 10.** The dependence is plotted for data for the entire period from 2010 to 2021; the linear correlation coefficient is relatively high (+0.97) and indicates a strong direct connection; the model can be represented as a linear function; its quality is very good.

The nature of the relationship in both models testifies to the favorable development of the economic situation in St. Petersburg in terms of these indicators. The scatter of points in the correlation field is small, no clearly pronounced temporal clustering of data due to possible key events was not revealed.

Less pronounced were the dependences of "Provision of space in shopping centers in St. Petersburg per capita" and, separately, "Average level of vacant space" from "Average monthly wages in St. Petersburg" (Fig. 11 and 12).
Features Fig. 11: the dependence is plotted for data for the entire period from 2010 to 2021; the linear correlation coefficient is quite high (+0.82) and indicates the presence of a relatively strong direct relationship between the indicators; influence is better described by a linear function; the quality of the model is slightly above average due to the high level of scatter in the values of indicators; average monthly wages are presented in constant 2010 prices.

Features Fig. 12: the dependence is plotted for data for the entire period from 2010 to 2021; the linear correlation coefficient is relatively high (−0.79) and indicates a feedback between the factors; the model is better represented as a power function; its quality is slightly above average; average monthly wages are in constant 2010 prices. The nature of the relationship between the factors in these two models corresponds to classical theoretical laws and indicates a good development of the economic situation in St. Petersburg in this aspect. However, there is a large scatter of points in the correlation field, which confirms the low homogeneity of such data. For fig. 11, no explicit temporal data clustering was found; for Fig. 12 there is such clustering - before 2017 and after it. To identify its causes, the information turned out to be insufficient; it is necessary to conduct additional studies using an expanded list of indicators.

Also, a relationship was revealed between the "Average level of vacant space" (y) and "St. Petersburg population" (x) for the data for the entire period under consideration. The linear correlation coefficient is relatively high (−0.79), the influence can be described by a decreasing linear function, but the scatter of points is very large, temporal data clustering is possible, and for several periods of time. To formulate conclusions, including the quality of the model, the number of observations is not enough.

As part of testing the classical hypothesis, an attempt was made to construct two-factor models of regression dependences of the "Selling area of modern shopping centres". However, both models were found to be statistically insignificant.

4 Conclusion

For warehouse real estate, it was revealed that from 2010 to 2013 the market parameters differed from those from 2014 to 2021. It can be assumed that in 2013-2014, key events took place in this market that led to a change in its main characteristics and patterns of mutual influence. In the office real estate market, as well as in the warehouse real estate market, in 2013-2015. There have been events that have led to some change in economic mechanisms. Perhaps they were caused by the same external reasons, the most probable of which is the introduction of economic sanctions against the Russian Federation. Moreover, in the warehouse real estate market, they occurred in 2014, in the office market a year later - in 2015, at least this is reflected in the statistical reports. On the retail real estate market, there was also a noticeable manifestation of key events in 2014-2015, possibly the introduction of sanctions.
However, their effects were less pronounced compared to the warehouse and office real estate markets. In general, these three real estate markets are developing in a positive direction and quite steadily.

It should be noted that economic sanctions were introduced in the second half of 2014, and according to many indicators, their consequences became statistically noticeable only in 2015. On the one hand, these changes did not “affect” all indicators, for some of these three markets did not. Did not respond to the sanctions. On the other hand, according to the “affected” indicators, each of these markets took about 2-3 years to adapt to the new economic conditions, and some of these indicators returned to their previous trends. Also due to the pandemic in 2020-2021. There was a decrease in business activity in many sectors of the domestic and world economies, which was reflected in the values of many indicators of the market under consideration, but this influence was partial and not typical for all market parameters.

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References


