Features of Industrial Production Dynamics in the Research of Textile Enterprises' Financial Security: In case of Uzbekistan

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Abstract- **In this paper have been investigated regional features of industrial production dynamics in the research of textile enterprises` financial security in Uzbekistan. As per creator's thought introductory phase of a quantitative investigation of the monetary strength of material ventures in the Republic of Uzbekistan at the provincial level ought to be the phase of bunching districts to recognize bunches that remember homogeneous areas for terms of mechanical development rates, periods of financial cyclicality of modern elements. This will permit, when looking at the monetary supportability of material undertakings situated in various locales, to consider comparative or various states of modern advancement in the individual domains. In article has been introduced a hypothetical defense, and set of calculations, just as the consequences of computations dependent on information from the State Statistics Committee of the Republic of Uzbekistan, which made it conceivable to arrange locales as per the attributes of development and cyclicality of mechanical creation for the time frame 2010-2018.**

Keywords: Financial security, financial stability, production, trend-cyclical component, clustering regions, textile enterprises.

1. INTRODUCTION

The economic literature presents works on the analysis of the financial stability of enterprises, taking into account the impact of macroeconomic conditions in specific time periods. For example, in the work "Modeling the financial stability of an enterprise taking into account macroeconomic indicators" [1], the authors investigate the financial stability of metallurgical enterprises using mathematical models that include the parameters of dynamic models of macroeconomic indicators. characterizing their fluctuation in time. This provided the authors with the opportunity to take into account in the specification of models of financial stability of enterprises the special conditions of their activities in different periods of time.

The main hypothesis adopted by the authors during this study was as follows: the financial stability of enterprises at the regional level is determined not only by the peculiarities of the manifestation of general macroeconomic factors in time and in a given territory, but also by the specifics of mesoeconomic factors that determine the growth and cyclical dynamics of production by industry and sectors of the regional economy. For enterprises of the textile industry on the territory of the regions of the Republic of Uzbekistan, an assessment of the impact of mesofactors on financial stability can be obtained by examining the dynamics of industrial production as a whole. The purpose of the study was to identify and assess the territorial specifics of the economic dynamics of industrial production in the Republic of Uzbekistan. A mathematical and statistical decomposition of the investigated dynamics of industrial production in the regions of the Republic of Uzbekistan is carried out, with the allocation of a trend-cyclical component of dynamics, which is a combination of the main trend (trend) and a cyclical component due to market factors [2]. This allows us to identify regions that have general and specific characteristics of the trend-cyclical components of the dynamics of industrial production as a whole, which will allow taking these features into account in the study of the factors of financial security of textile enterprises located in these regions.

2. LITERATURE REVIEW

The last twenty years have been studies in the study of production capacity, the organization of production at industrial enterprises and the management of production processes were analyzed by Y. Levin, et al [3], A. Sebastiano, et al [4], C. Chien, et al [5], M. Davis, et al [6], D. Huang, et al [7], Jingfeng Shao, et al [8] and T. Koltai, et al [9], Tursunov B. and others [12;13].

Some of these scientists has been investigated, interrelated functions had been examined, the implementation of which is the management of production capacity. Methodology for assessment the efficiency of production capacities management at textile enterprises were investigated by B. O. Tursunov in other works [13] and this research is a logic continue of last research part.

Uzbek professor Burkhanov A. [10] researched main indicators of textile enterprises' financial security

assessment, Kalandarovna, A. G. [11] and others studied methodical aspects of establishing a control system over compliance with principles of decent work and social security in textile enterprises. But in upper researches have not been studied regional features of industrial production dynamics in the research of textile enterprises` financial security in Uzbekistan.

3. METHODOLOGY

The study is based on a set of mathematical and statistical methods, including:

- assessment of the parameters of the trend-cyclical component of the dynamics of industrial production in the regions of the Republic of Uzbekistan;
- a combination grouping of the regions of the Republic of Uzbekistan by the parameters of the trend-cyclical components of the dynamics of industrial production, combining:
  - Grouping of regions according to the type of linear trend (upward or downward);
  - Grouping of regions according to the parameters of the cyclical components of the time series of industrial production growth rates.
- Determination of specific economic types of regions, taking into account the results of the combination grouping.

The initial model for approximating the time series of industrial production growth rates in the j-th region of the Republic of Uzbekistan:

$$\bar{y}_j = a_0 + a_1 * t + a_2 \mathrm{Sin}(k*t) + a_3 \mathrm{Cos}(k*t),$$

here:

$\bar{y}_j$ – calculated values of the trend-cyclical component of the time series of the annual growth rates of industrial production in the *j*-th region of the Republic of Uzbekistan;

t- year number, t = 2000,….,2018 yy.

a_0 , a_1 – model parameters that determine the trend component of the time series;

k– parameter determining the wavelength (period) of cyclic oscillations;

a_2 , a_3 – parameters of the contribution of harmonic vibrations to the general model.

To determine the wavelength (period, years), the formula is used:

$$L = 2\pi/k$$

The quality of the model is assessed using the multiple correlation coefficient (R), as well as the multiple determination coefficient (D), which makes it possible to determine the specific weight of the explained variation (the percentage of the actual values of industrial production growth rates in the region corresponding to the model trend-cyclical values).

4. ANALYSIS AND RESULTS

Based on the results of building models, it was found that the above formula describes the trend-cyclical component of the studied time series rather reliably: the explained variation across regions was 55-78%.

The graphs of the most reliable models are shown below (Fig. 1-4).

The resulting model for the Republic of Uzbekistan looks like:

$$\bar{y}_1 = 108{,}19 + 0{,}096*t + 1{,}912\ \mathrm{Sin}((-0{,}679)*t) - 1{,}155\ \mathrm{Cos}((-0{,}6791)*t).$$

This model explains 66% of the variation (D) in the actual annual growth rate of industrial production in the Republic of Uzbekistan as a whole. The wavelength is 9.25 years, i.e. its half-life is approximately 4.5 years (Fig. 1).

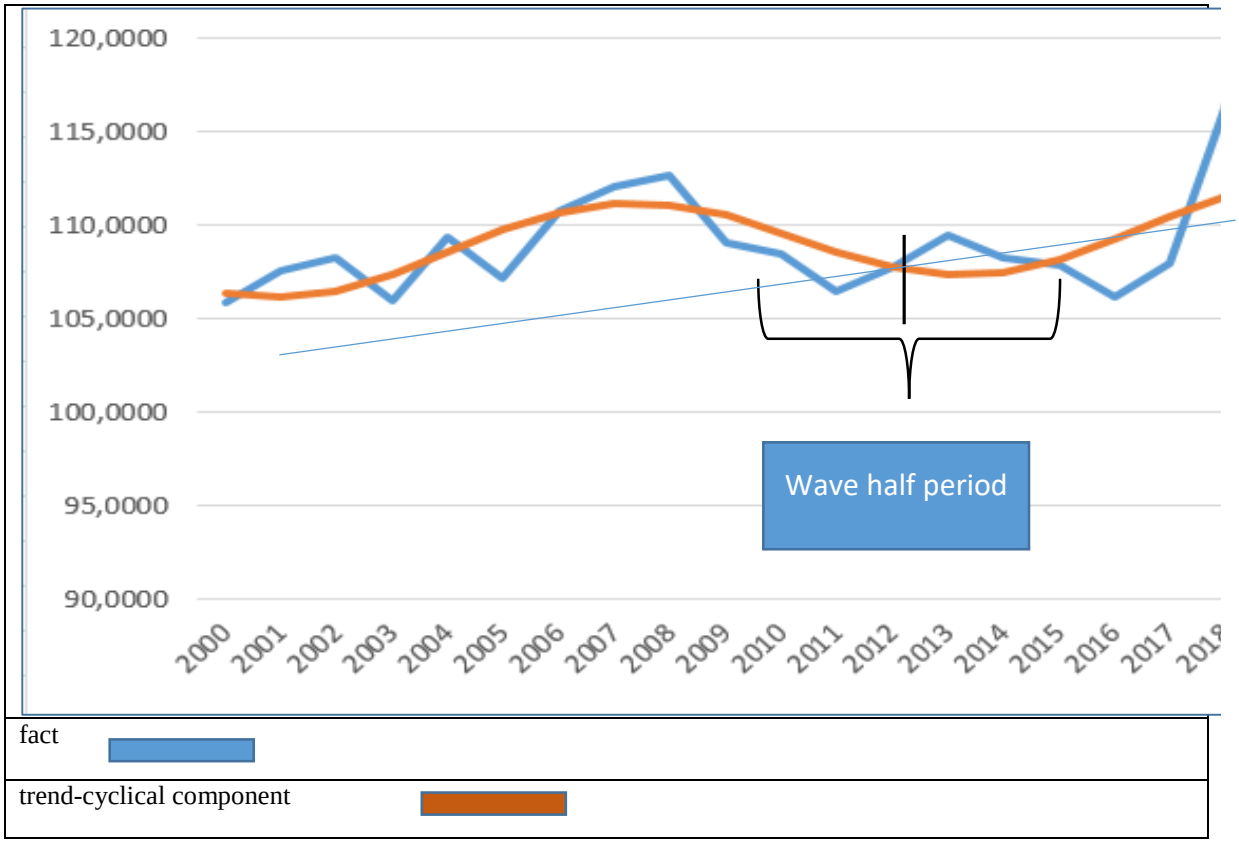


Fig.1. Graph of the trend-cyclical component of the time series (orange line) of the annual rates of industrial production in the Republic of Uzbekistan, 2000-2018 [14]

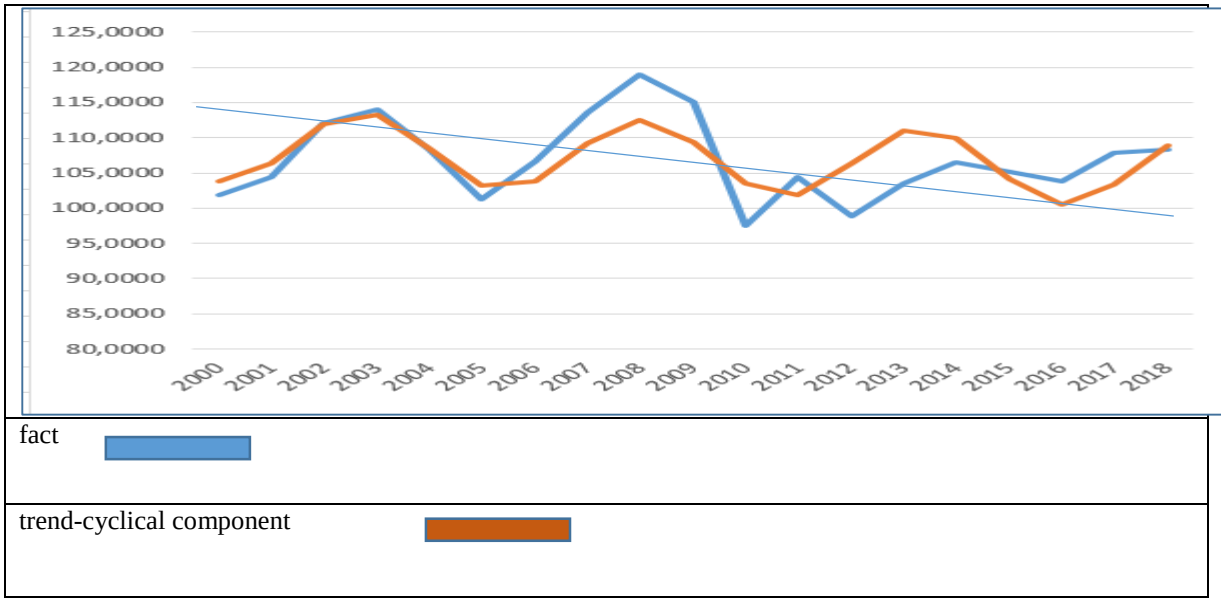


Fig. 2. Graph of the trend-cyclical component of the time series of the annual rates of industrial production in the Kashkadarya region, 2000-2018.(D=76%).[14]

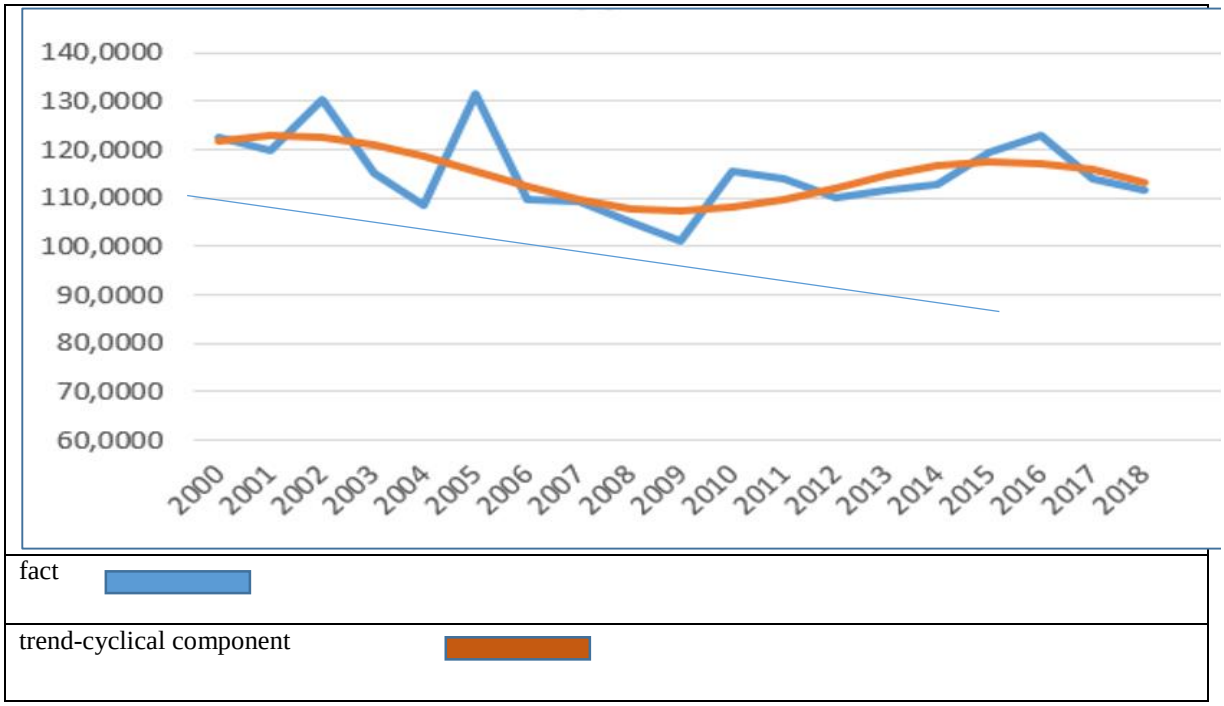
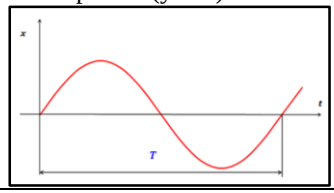


Fig. 3. Graph of the trend-cyclical component of the time series of the annual rates of industrial production in the Jizzakh region, 2000-2018. (D=71%).[14]

Fig. 4. Graph of the trend-cyclical component of the time series of the annual rates of industrial production in the Namangan region, 2000-2018. (D=78%) [14]

Table 1. Parameters of the models of trend-cyclical components of the dynamics of industrial production in the regions of the Republic of Uzbekistan, built according to data on annual growth rates for 2000-2018.

Regions		**Model parameters**				
	Type of trend: ascending descending	***a1***	***a2***	***a3***	***k2 (abs.)***	Wave period (years) 
Republic of Karakalpakstan	↘	1,199	-6,687	6,971	2,346	4,94
Andijan	↘	-0,329	9,411	-7,224	5,484	5,72
Bukhara	↗	0,169	1,836	-2,828	2,026	4,46
Jizzakh	↘	-0,294	7,169	-6,88	2,512	8,94
Kashkadarya	↘	-0,287	-5,894	7,649	1,79	4,62
Navoi	↗	0,0009	-1,505	-0,747	3,376	9,37
Namangan	↘	-0,125	2,903	-1,604	0,573	5,47
Samarkand	↗	0,537	2,055	-6,461	5,906	5,31
Surkhandarya	↗	0,515	4,491	2,305	0,471	6,66
Syrdarya	↘	-0,151	2,773	3,885	4,376	7,17
Tashkent	↗	0,621	-1,091	4,057	0,233	7,25
Fergana	↗	-0,094	-1,605	1,001	5,891	5,33
Khorezm	↗	1,02	-4,285	8,115	1,506	6,96
Tashkent city	↗	0,722	7,017	0,982	0,746	4,21

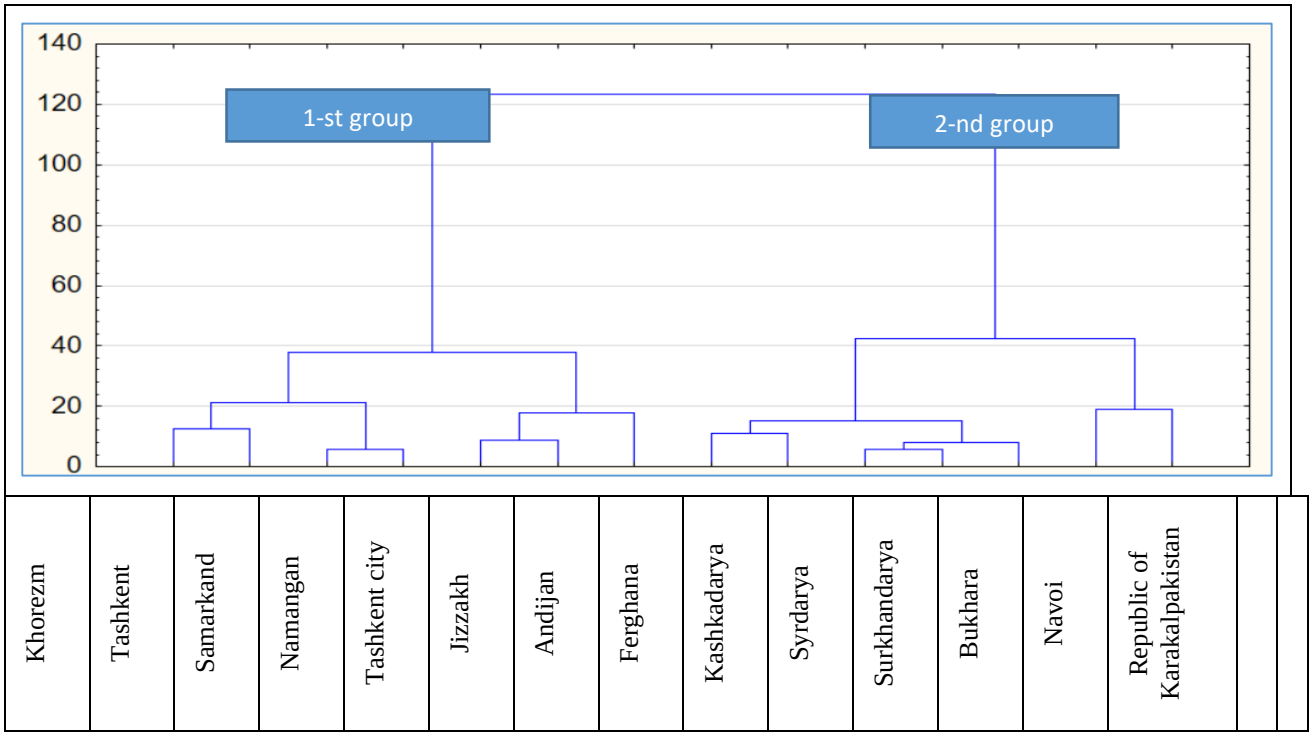


Fig. 5. Dendrogram of the distribution of regions of the Republic of Uzbekistan into homogeneous groups according to the parameters of the trend-cyclical components of the dynamics of industrial production.

Based on the data presented in Table 1, a cluster analysis was carried out, which made it possible to determine the regions of Uzbekistan that are homogeneous in terms of the characteristics of the trend-cyclical components of dynamics (parameters a_0, a_1, a_2, a_3, k).

However, the inclusion of the linear trend parameter in the cluster analysis is impractical, since its positive and negative values will cancel each other out when determining the average values of the cluster-forming variables. Therefore, the regions were subdivided into two groups: with an upward and downward linear trend (in Table 1, they are marked with the corresponding graphic symbols).

The established average values of cluster-forming variables make it possible to determine the calculated values of the rates of industrial production for the selected clusters of regions (Fig. 6).

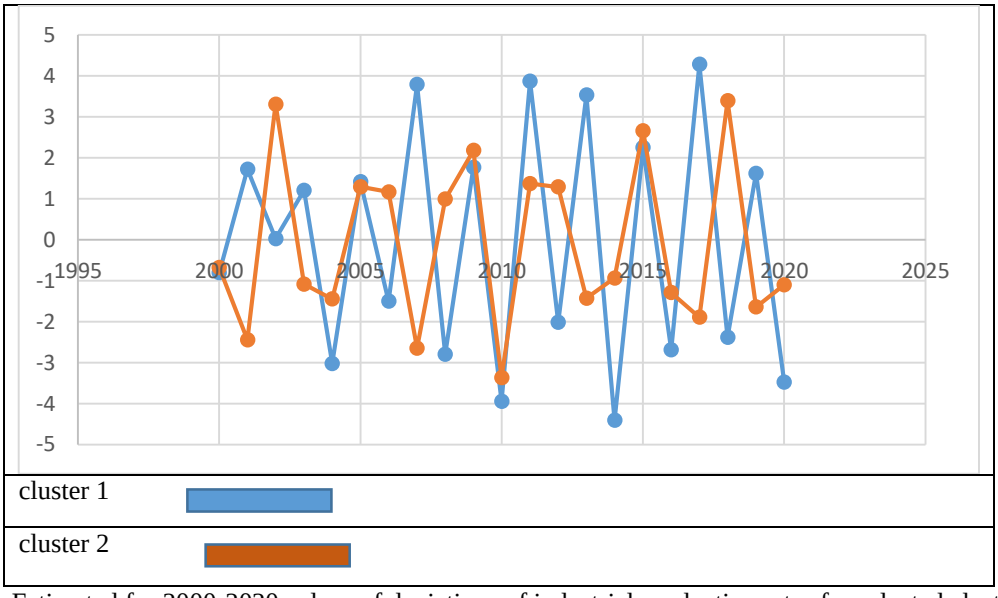


Fig. 6. Estimated for 2000-2020 values of deviations of industrial production rates for selected clusters of regions from the average annual level for 2000-2018,% - points.

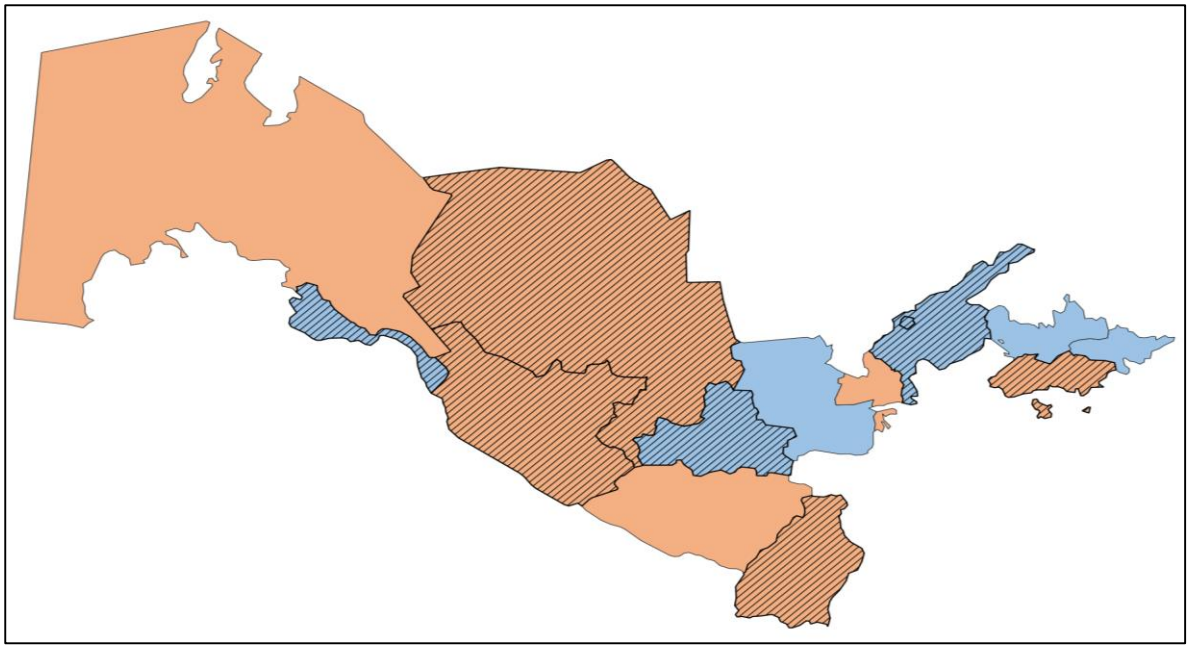


Fig. 7. Results of the final combination grouping of the regions of the Republic of Uzbekistan by the type of economic dynamics of industrial production.

Note 1: In this figure, the regions of the first cluster are marked in blue (Andijan, Jizzak, Namangan, Samarkand, Tashkent, Khorezm, Tashkent city); in brown - the regions of the second cluster (Republic of Karakalpakstan, Bukhara, Kashkadarya, Navoi, Surkhandarya, Syrdarya, Fergana).

*Note 2:*The shaded areas indicate regions with an upward type of economic growth: Bukhara, Navoi, Samarkand, Surkhandarya, Tashkent, Fergana, Khorezm, Tashkent city.

It should be noted that in the regions of the 1st cluster and in the regions of the 2nd cluster (Fig. 7), the forecast for the trend-cyclical model for 2020 gives a drop in the growth rates of industrial production relative to the average annual level, respectively, by 3.5 and 0.4% points. It follows from this that the situation of the coronavirus crisis coincided with a drop in industrial production in the regions of both groups due to the regular cyclicality.

Figure 7 shows the results of the final combination grouping of the regions of the Republic of Uzbekistan by the type of economic dynamics of industrial production.

5. DISCUSSSION OF RESULTS

Based on the results of evaluating the parameters of the dynamic models presented above, four types of regions have been identified that have the specifics of long-term dynamics of industrial production, determined by the features of the main trend (trend), the form of cyclicality and a combination of these components of dynamics. The composition of these regional distinguished types is presented below: 1st type: Samarkand, Tashkent, Khorezm, Tashkent; 2nd type: Andijan, Jizzak, Namangan, 3rd type: Bukhara, Navoi, Surkhandarya, 4th type: Republic of Karakalpakstan, Kashkadarya, Syrdarya, Fergana.

According to data on the growth rates of industrial production by type of economic activity for 2010-2018. it was found that the general situation of industrial growth in the regions significantly affects the situation in the production of textiles. The influencing factors in this case are the general technical and technological development, improvement of infrastructure, improvement of the quality of labor, changes in the market environment, due to general market factors of supply and demand for industrial products. Calculations of the paired correlation coefficients of the annual growth rates of industrial production by type of economic activity show that the greatest response of the volume of textile production to industrial growth in the region occurs with a lag of 4 years (Fig. 9).

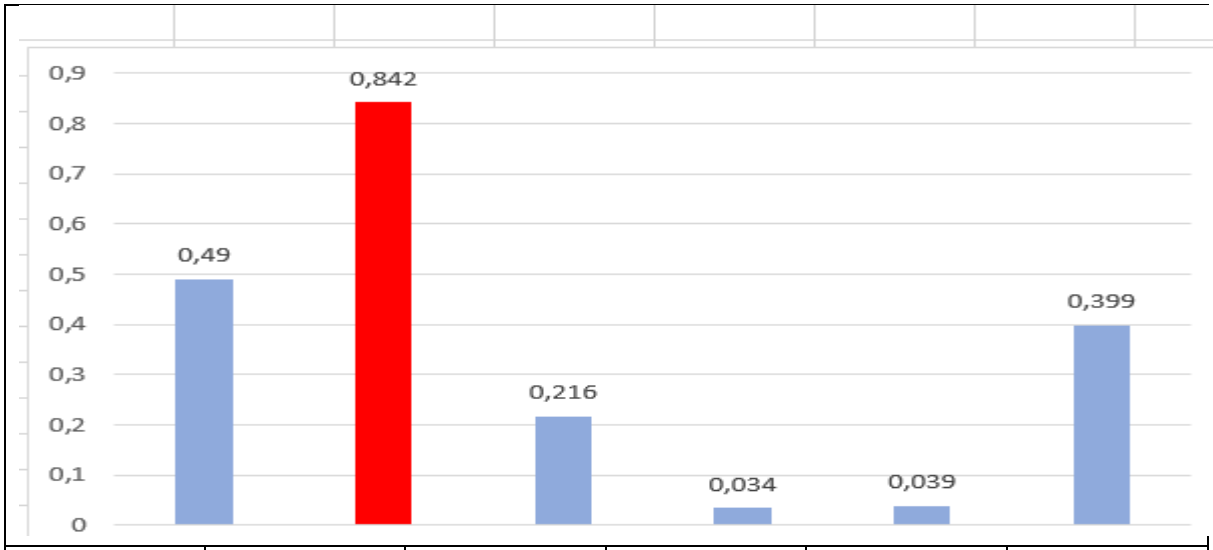


Fig.8. Paired correlation coefficients of the growth rates of industrial production in general and the production of textiles with lags of lagging influence, according to the data of the Republic of Uzbekistan for 2010-2018.

6. CONCLUSIONS

When studying the financial stability of textile enterprises in the territories of the Republic of Uzbekistan, it is necessary to consider the cyclical factor, because crisis events aggravate the financial situation of the enterprise. The conducted research made it possible to determine the progressive and cyclical development trends of industrial production in the regions of the Republic of Uzbekistan, as well as to divide the regions into groups according to the types of progressive and cyclical development. The obtained information is of great predictive value, as it allows forecasting the dynamics of the cycle at the regional level and, therefore, taking preventive measures to mitigate the consequences of the crisis for the industry in different regions of Uzbekistan. Thus, the proposed model can serve to improve the economic security of Uzbekistan.

Similar information was obtained for the textile industry of the regions of Uzbekistan, which allows to predict the decrease in production in the textile industry and take preventive measures. In addition, it was determined that the cyclical dynamics in the textile industry depends on the cycle phase in the industry as a whole: for the Republic of Uzbekistan, the delay between the cycle phase of the textile industry and the industrial period is 4 years on average. This situation can also be considered when developing anti-crisis measures in the textile industry, and this is important for ensuring the economic security of Uzbekistan.

In order to reduce internal risks and threats to the financial security of the enterprise, first of all, it is necessary to control the financial security of the enterprise. According to the author, a financial security service (service) should be established in large textile enterprises and they should be directly subordinated to the CEO.

In addition, an information system should be created for comprehensive and objective monitoring, including the identification and forecasting of internal and external threats that threaten the financial security of the enterprise. Based on the received information, it is necessary to develop a set of quick and long-term measures to combat negative factors, as well as to prevent and eliminate possible negative consequences of threats.

The performed calculations confirm the initial hypothesis about the need to consider the spatial and dynamic features of industrial production in general, which are determined by both general industrial factors of technological progress and specific regional factors of cyclicality in the dynamics of the ratio of supply and demand for industrial products, in studies of the financial stability of textile enterprises in the regions of the Republic of Uzbekistan.

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