

ASSESSMENT OF CONVERGENCE PROCESSES OF SOCIAL-ECONOMIC  
SECURITY INDICATORS IN LATVIAN MUNICIPALITIES

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**Abstract.** The aim of the research is to assess convergence processes of a social-economic security indicator in Latvian municipalities and its components in the period 2011 – 2015, calculated as an integral indicator on the basis of primary statistical indicators. The relevance of the research is determined by the fact that social-economic security establishes not only the sustainable economic development of the country as a whole, but also the state of protection from internal and external threats. Municipalities, implementing their autonomous functions, are primary guarantors of social-economic security of the people. The convergence of social-economic security of municipalities implies the process of their convergence in time according to the values of the level of social-economic security<sup>1</sup>.

**Keywords:** investment climate; investment potential; investment security; sustainability

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## 1. Introduction

The evolution of the concept of social-economic security should be considered, first of all, from the viewpoint of ideas about the security phenomenon at different stages in the formation of scientific and philosophical views. Therefore, when considering the category “security” in philosophical retrospect, we can observe the diversity of its content. However, there are also common features.

Security always has an application area, it is of a subject-object nature. If we consider security as an object, its subject at different stages in the formation of scientific ideas about this phenomenon at different times became a person, state, political system, welfare, or economic relations.

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Security is a multi-level concept. In a philosophical retrospect, it is considered at least at two levels: a micro-level or personal security and a macro-level or security of society, or a state (e. g. Masood et al., 2019; Moumen et al., 2019; Rezk et al., 2019; Fabus et al., 2019; Mikhaylov et al., 2018; Nikitina et al., 2018; Škufflić et al., 2018; Filipishyna et al., 2018; Kalyugina et al., 2018; Tvaronavicienė 2019). Since the second half of the 19th century, personal security, security of society and the state have not been considered separately: they are interrelated and interdependent. If any objective or subjective reasons pose a threat at a macro level, they also pose a threat at a micro level. At the same time, underestimating the importance of security at a micro level can act as a catalyst for a failure of security at a macro level. There is a lot of attention to the economic security at micro level (Abdullah et al., 2019, Cristiano Freitas Gomes et al., 2019; Olayinka A. Abiodun et al., 2019; Veli Sibiya., & Tumo Kele 2019; Schwarz 2018; Energy Transformation towards Sustainability, 2019).

Security is always related to the satisfaction of needs. Satisfaction, first of all, of social-economic needs – the needs for economic and social benefits, is important for the subject of our research. Security is always related to the absence of threats. Threats are classified according to the system of micro- and macro-levels, and depend on the system of political and economic structure of the state. Security always implies protection, that is, some kinds of forms and conditions that protect the object from destructive interference. Security is considered as the state of harmony, tranquility, and balance of the interacting parties.

The development of the concept “social-economic security” mainly happened at macro- and micro-levels. Representatives of old economic schools almost never dealt with a meso-level. Over time, the economic and social components of the research subject are increasingly becoming interpenetrating concepts: changes in one, certainly lead to dynamics in the other. Therefore, it does not seem rational to consider economic and social security separately. Due to versatile and multidimensional features of the phenomenon, in the world there is no generally accepted definition of social-economic security, although it is possible to identify some features that provide a general picture of what this phenomenon means.

First, social-economic security is a complex and dynamic concept. This complexity appears, on the one hand, because of a lot of economic, social, and financial processes this concept includes. On the other hand, the complexity is determined by the globalization processes and fast rates of economic processes and phenomena at both national and global levels.

Second, social-economic security should be interpreted as:

- a significant factor of national security that provides resources and a dynamic balance for other components of this system;
- one of the indicators of national, regional, and global security that is the purpose of every person, community, national state, etc.;
- a priority task of governments, regional, and international organizations that strive to provide and guarantee global security of an individual;
- a state of a national economy understood as a source and foundation for elimination of poverty, starvation, social and economic inequality between both individuals and regions within one country.

Third, social-economic security means protection of vitally important interests of a society, country, and citizens, as well as national values and way of living from external and internal threats.

Fourth, social-economic security is a fundamental human right. It is the condition when risks and threats are kept under control in order to protect individuals and communities.

Fifth, social-economic security is a resource necessary for everyday life of individuals and communities in order to achieve their personal or collective aspirations.

Sixth, social-economic security is the result of interaction between external and internal factors that promote the

processes of production, distribution, and consumption of goods and services produced by a national economy. Seventh, government and non-government organizations play an important role in the achievement of social-economic security at national as well as regional and global levels.

Analyzing the definitions of social-economic security, we can state that the existing definitions do not include a level differentiation, although it is obvious that the content of the concept of social-economic security at macro, meso, and micro levels will be different. The authors of the research believe that it would be useful to introduce a level differentiation of the concept “social-economic security” on the basis of the fact that goals, objectives, and, most significantly, indices or factors of this indicator will be different for subjects at different levels.

Therefore, on the basis of the outcomes of the analysis, it is possible to provide the following definition: *social-economic security of municipal administrative areas is a complex category which is based on the ability of a municipal government to establish mechanisms for implementation of its autonomous functions and spheres of activity, to ensure social-economic security on the basis of a sustainable growth of its indicators, as well as to contribute to a maximum satisfaction of the infrastructure needs of the residents and entrepreneurs on its territory* (Lavrinenko et al. 2016; Smirnovs et al. 2018; Ohotina et al. 2018a).

Therefore, it is particularly important to establish an adequate model of social-economic security which allows describing the state of economy at macro and meso levels, carrying out analysis and forecast, and as a result identifying the best possible priorities for the strategy of social-economic security in Latvian municipalities. State administration bodies also need the established model of social-economic security in order to support the decision-making process in the sphere of macroeconomic policy and development of measures for regulating market economy.

The methodological basis of the research are works of both western researchers and researchers from different countries in Central and Eastern Europe (Rehm and Schlesinger 2010; Hacker 2012; Buzan 2007; Tvaronavičienė 2018a, 2018b 2019, Tvaronavičienė et al. 2018; Senchagov 2002; Tambovcev 1995; Lavrinenko et al. 2016; Lavrinenko 2016 Ohotina et al. 2018b, Gagarina et al. 2019).

## 2. Design and the sample of the research

Social-economic security is a complex social-economic category; therefore, primary statistical indicators for the regions under study may be presented in the following way:

$$X = \begin{bmatrix} x_{11}, x_{12}, \dots, x_{1n} \\ \dots \\ x_{i1}, x_{i2}, \dots, x_{in} \\ \dots \\ x_{m1}, x_{m2}, \dots, x_{mn} \end{bmatrix}, \quad (1)$$

where  $m$  is a number of regions,  $n$  is a number of indicators which characterise social-economic security (Kosiedovskis, Lavrinenko 2014; Lavrinenko 2015).

Taking into account various units for measuring primary indicators, it is necessary to unify the data. The authors carry out the unification on the basis of the linear scaling principle, as a result of which the area of possible values is determined by the interval  $[0;10]$  by formula (Lavrinenko, Lavrinoviča 2013):

$$x'_{ij} = \frac{x_{ij} - x_{\min j}}{x_{\max j} - x_{\min j}} \cdot 10 \quad (2)$$

- by indicators-stimulants and

$$x'_{ij} = \frac{x_{\max j} - x_{ij}}{x_{\max j} - x_{\min j}} \cdot 10 \quad (3)$$

- by indicators-destimulants, where  $x'_{ij}$  — a unified value of the indicator “j” for a municipality “i”,  $x_{\min}$  and  $x_{\max}$  — the lowest (the worst) and the biggest (the best) value of the primary indicator in the period under study.

The structure of the overall indicator of social-economic security consists of 10 components which include the following primary statistical indices: general economic component F1 - total income of a municipality, total expense of a municipality, a number of economically active commercial communities per 1,000 inhabitants, a number of economically active self-employed individuals per 1,000 inhabitants, a number of economically active farm households per 1,000 inhabitants; investment component F2 – the EU funding per 1,000 inhabitants, a total sum of direct foreign investment, a number of projects per 1,000 inhabitants; industrial component F3 - income tax (a municipality’s share), a number of income tax payers at a place of a company registration, a collected sum of income tax per 1 inhabitant at a place of a company registered address, advertisement tax, tax on trade in public places, a number of registered companies, a number of liquidated companies; educational component F4 - municipality’s expense on education, a number of pre-school educational institutions, a number of general education institutions, a number of programmes implemented at vocational schools; infrastructure component F5 - a municipality’s expense on public maintenance of a territory, immovable property tax, general density of motorways; ecological component F6 - a municipality’s expense on environment protection; cultural and recreational component F7 - a municipality’s expense on leisure, culture, and religion, revenue from selling tickets, tax on gambling; employment component F8 - a level of unemployment, a number of employers, a number of income tax payers at an employee’s declared address, a collected sum of income tax per 1 inhabitant at an employee’s declared address, a share of long-term unemployed persons of the total number of unemployed persons; law enforcement F9 - a municipality’s expense on ensuring public order, a number of crimes per 1,000 inhabitants, a number of serious crimes per 1,000 inhabitants; insuring of social protection and healthcare F10 - a municipality’s expense on the social sphere, a number of households receiving housing benefits, a number of benefits on guaranteed level of income, a number of persons with a low income status (% out of total number of inhabitants), a share of inhabitants who receive social services (% out of total number of inhabitants), a municipality’s expense on medicine (Smirnovs et al. 2018).

Calculation of the indicator of social-economic security was carried out on the basis of the method of sums of the factors that characterise a municipality’s spheres of activity which in turn were calculated as a sum of unified statistical indicators included in every sphere:

$$X_i = \sum_{j=1}^5 F1_{ij} + \sum_{j=1}^3 F2_{ij} + \dots + \sum_{j=1}^6 F10_{ij} \quad (4)$$

where  $i = \overline{1,119}$ ,  $X_i$  – a complex assessment of social-economic security for a municipality i;  $F'_{ij}$  – the value of a factor of social-economic security characterizing every sphere of activity of a municipality (a component), where these factors are calculated as a sum of statistical indicators that characterize them (Smirnovs et al. 2018).

Concurrence of municipalities’ social-economic security implies the process of their converging according to the values of the level of social-economic security. Two concepts of convergence, interrelated but determining different effects, are mainly used:  $\beta$ -convergence (Baumol, 1986; Barro R.J., Sala-i-Martin X. 1992, p. 223 – 251) and  $\sigma$ -convergence (Sala-i-Martin 1996a, p.1325-1352; Sala-i-Martin 1996b, p.1019–1036; Islam 2003).

According to  $\beta$ -convergence, regions with low absolute values of the indicator under study at the initial period of time are characterised by on average a higher growth rate of this indicator during the process of integration. In order to evaluate  $\beta$ -convergence, growth-initial level regressions are used:

$$y_i = a + \beta \ln(x_{i-t}) + e, \quad (5)$$

where  $x_{i-t}$  – an indicator at the point of time preceding the current point of time  $t$  at  $T$  periods (as a rule, the initial period of integration),  $\beta$  – a coefficient to be evaluated,  $y_i$  – average growth rates in  $i$ - region over  $T$  periods, calculated as  $\ln(y_{it})/\ln(y_{i-t})$ ,  $e$  – a random deviation. The value of the  $\beta$  coefficient is an indicator of convergence. If  $\beta < 0$ , a high level of the indicator at the initial time period correlate with relatively lower growth rates (Čizo, et al., 2018).

Unlike  $\beta$ -convergence,  $\sigma$ -convergence presupposes the decrease with time in a standard deviation of the indicator's value which levels the discrepancy between regions. Another indicator that is often used when there is a trend in time series is the relation of a standard deviation to average (variation coefficient).  $\beta$ -convergence (i.e. a quicker growth of indicators in the states with lower values of this indicator at the initial period) does not necessarily lead to the decrease in inequality on the indicator under study, namely to  $\sigma$ -convergence (Barro, Sala-i-Martin 1991, 1992). It happens when a group of regions with the initially low absolute values of the indicator constantly changes places with the states with the initially higher absolute values of the indicator, although the overall level of gap between these regions is permanent (Sala-i-Martin, 1996a, Sala-i-Martin 1996b, Barro., Sala-I-Martin 1991, Barro, Sala-I-Martin, 1995).

The authors used the relative indicators of the variation: the coefficient of range ( $K_R$ ) and the coefficient of variation ( $V_\sigma$ ). Their calculation is as follows:

$$K_R = \frac{X_{\max} - X_{\min}}{\bar{x}}; \quad (6)$$

$$(V_\sigma) = \frac{\sigma}{\bar{x}}, \quad (7)$$

where  $\delta$  – a standard deviation,  $\bar{x}$  – an average value,  $X_{\max}$  and  $X_{\min}$  – the largest and smallest value of the characteristic in the selection (Čizo et al. 2018).

The increase of the coefficient of range and coefficient of variation directly signifies the enhancement of the characteristic in the population under study. Therefore, analysing dynamics of the coefficient of range, coefficient of variation, and the sign of the coefficient  $\beta$  in the growth-initial level regressions, it is possible to provide a qualitative characteristic of the process of growth of the existing differences in the sphere of social-economic security in Latvia's municipalities in the period 2011 - 2015.

### 3. Research results

In order to carry out a dynamic analysis of social-economic security of administrative areas in Latvia's municipalities, the results for 2011, which are shown on Figure 1 are taken as basic indicators. They are provisionally divided into quintiles. Territories with the best indicators of social-economic security are coloured white (quintile 5), territories with the worst indicators – black (quintile 1) (Smirnovs et al. 2018).

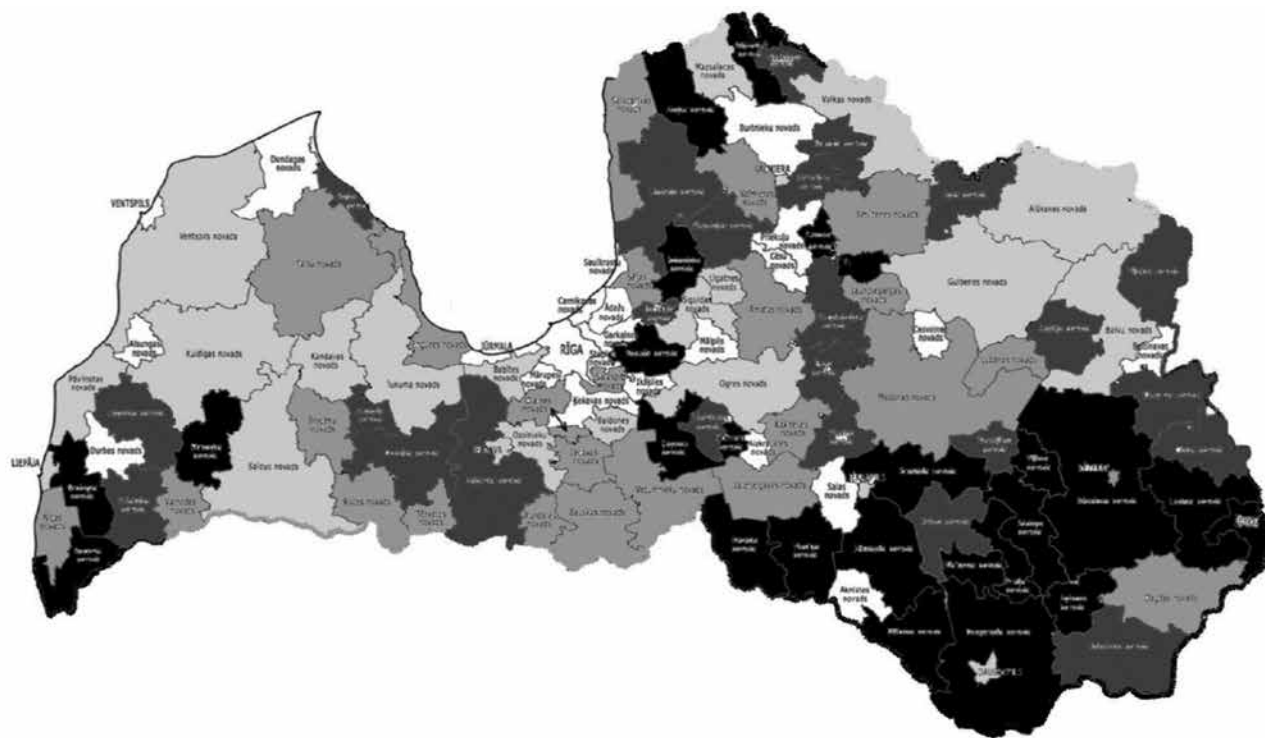


Figure 1. Social-economic security of Latvia’s municipal territories according to the data for 2011

Source: Smirnovs, Lavrinenko, Tumalavičius 2018

In order to carry out a dynamic analysis of social-economic security of administrative areas in Latvia’s municipalities, the results for 2015, which are shown on Figure 3 are taken as comparison indicators.

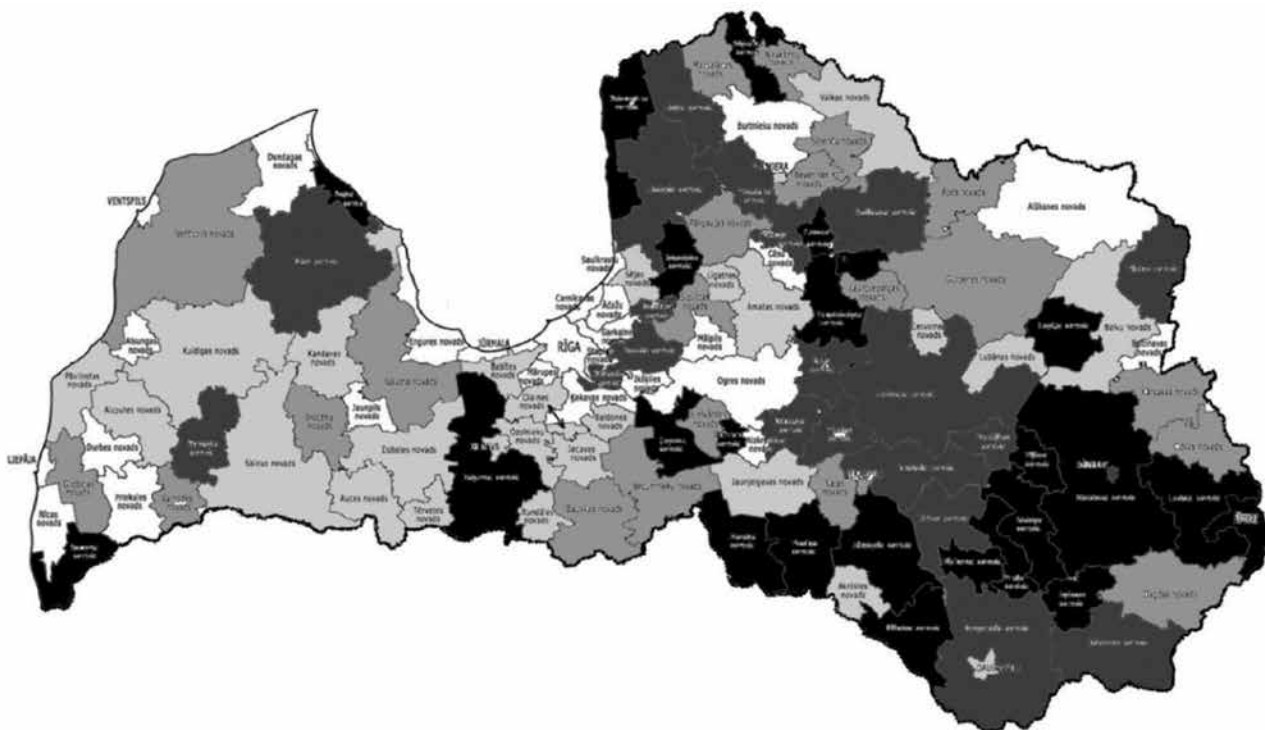


Figure 2. Social-economic security of Latvia’s municipal territories according to the data for 2015

Source: Smirnovs, Lavrinenko, Tumalavičius 2018

Summarizing the outcomes of the research carried out by A. Smirnovs (Smirnovs et al. 2018), it can be concluded that the level of social-economic security improved in the period 2011 - 2015, both in relation to their own indicators, and in relation to other municipalities' indicators in 16% of Latvian municipalities. The improvement of their own indicator of social-economic security and at the same time its deterioration in relation to other Latvian municipalities is observed in 15% of municipalities. The deterioration in relation to their own indicators while being ahead of other municipalities is observed in 36% of the total number of municipalities. The deterioration of their own indicators while increasingly lagging behind other municipalities is observed in 33% of municipalities (Smirnovs et al. 2018). However, despite the identified trends, the general trend in the dynamics of imbalances in social-economic security in Latvian municipalities during the period under study remains unclear. Using Barro regressions, coefficients of range and variations of indicators, it is possible to identify what processes of social-economic security and its components are happening in dynamics: convergence or divergence.

The values of the coefficients of variation of municipalities' social-economic security and its components from 2011 to 2015, which measure the range and show the dynamics of inequality are determined. If there is dispersion, the coefficient of variation or other statistical indicators of inequality decrease. It indicates the presence of convergence. Otherwise the indicators differ over time.

**Table 1.** Values of coefficients of variation of social-economic security indicators and its components in 2011 and 2015

	V $\sigma$ 2011	V $\sigma$ 2015	K <sub>r</sub> 2011	K <sub>r</sub> 2015
Social-economic security (%)	0.14	0.15	0.88	1.01
2011 g. = 100%	100	113	100	114
General economic F1 (%)	0.17	0.23	0.98	1.26
2011 g. = 100%	100	131	100	129
Investment F2 (%)	1.36	1.59	7.52	9.32
2011 g. = 100%	100	117	100	124
Industrial F3 (%)	0.69	0.71	4.46	5.78
2011 g. = 100%	100	103	100	130
Educational F4 (%)	0.56	0.68	3.73	4.48
2011 g. = 100%	100	122	100	120
Infrastructure F5 (%)	0.90	0.65	5.82	4.03
2011 g. = 100%	100	72	100	69
Ecological F6 (%)	2.27	2.11	19.54	15.34
2011 g. = 100%	100	93	100	79
Cultural and recreational F7 (%)	0.73	0.91	3.87	5.51
2011 g. = 100%	100	125	100	142
Employment F8 (%)	0.30	0.30	1.71	1.70
2011 g. = 100%	100	101	100	99
Law enforcement F9 (%)	0.16	0.18	1.18	1.26
2011 g. = 100%	100	115	100	107
Provision of social protection and healthcare F10 (%)	0.10	0.13	0.61	0.67
2011 g. = 100%	100	125	100	110

Source: Developed by the authors

The authors determined  $\sigma$ -convergence of the following indicators in Latvian municipalities in the period 2011 - 2015: the infrastructure component F5 – coefficient of variation decreased by 28%, coefficient of range by 31%; the ecological component F6 – coefficient of variation decreased by 7%, coefficient of range by 21%. It is too early yet to estimate  $\sigma$ -convergence according to the employment component F8. Therefore, in Latvian municipalities for 5 years there is divergence in most indicators, which negatively affects the dynamics of the overall indicator of socio-economic security: the coefficient of variation increased by 13%, the coefficient of range by 14% (Table 1).

When investigating  $\beta$ -convergence, it was found that the investment component F2, the production component F3, the infrastructure component F5, the ecological component F6, the cultural and recreational component F7, and the law enforcement component F9 have the coefficient  $\beta < 0$ . Other components have either  $\beta > 0$  or p-value of the model is more than 0.05 (Table 2).

**Table 2.** Values of coefficients of variation of social-economic security indicators and its components in 2011 and 2015

	coefficient $\beta$	p-value
Social-economic security (%)	-0.161	0.166
General economic F1 (%)	-0.183	0.051
Investment F2 (%)	-0.493	0.005
Industrial F3 (%)	-0.201	0.000
Educational F4 (%)	0.007	0.909
Infrastructure F5 (%)	-0.324	0.000
Ecological F6 (%)	-0.194	0.012
Cultural and recreational F7 (%)	-0.329	0.000
Employment F8 (%)	-0.012	0.619
Law enforcement F9 (%)	-0.366	0.001
Provision of social protection and healthcare F10 (%)	-0.117	0.173

Source: Developed by the authors

There were several situations determined:  $\beta$  – convergence and  $\sigma$ - convergence;  $\beta$  – convergence and  $\sigma$ - divergence;  $\beta$  –divergence and  $\sigma$ - divergence (Table 3). The first situation “ $\beta$  – convergence and  $\sigma$ - convergence” explains that a quicker growth of indicators occurs in the regions with lower values of these indicators at the initial period of time, which with time results in the decrease in the coefficient of variation and coefficient of range of indicators in a specific group of regions. The second situation “ $\beta$  – convergence and  $\sigma$ - divergence” is possible when a group of regions with initially low absolute values of the indicator constantly changes places with regions with initially higher absolute values of the indicator, although the general level of gap between these regions is permanent. The third situation “ $\beta$  –divergence and  $\sigma$ - divergence” is possible if the condition of faster growth of indicators in regions with lower values of these indicators at the initial period of time is not met, which cannot with time lead to the decrease in the coefficient of variation and the coefficient of range of indicators in a certain group of regions. Therefore,  $\beta$  – convergence is based on the Solow model and provides the answer to the question whether low-level regions will ever be able to catch up with high-level regions. The interrelation of these concepts is that  $\beta$  – convergence follows from  $\sigma$ - convergence, but there is no opposite consequence (Smirnovs et al. 2018).

**Table 3.**  $\beta$  – convergence and  $\sigma$ - convergence of social-economic security and its components in the period 2011 - 2015

	$\beta$ - convergence	$\sigma$ - convergence
Social-economic security (%)	no convergence	divergence
General economic F1 (%)	no convergence	divergence
Investment F2 (%)	convergence	divergence
Industrial F3 (%)	convergence	divergence
Educational F4 (%)	no convergence	divergence
Infrastructure F5 (%)	convergence	convergence
Ecological F6 (%)	convergence	convergence
Cultural and recreational F7 (%)	convergence	divergence
Employment F8 (%)	no convergence	divergence
Law enforcement F9 (%)	convergence	divergence
Provision of social protection and healthcare F10 (%)	no convergence	divergence

Source: Developed by the authors



Therefore, it has been found that there are growing disparities of social-economic security in Latvian municipalities in the period 2011 – 2015. The values of the coefficients  $\beta$ ,  $V\sigma$ ,  $K_r$  also characterize the growing disparities in the following components: general economic (F1), educational (F4), employment (F8), and provision of social protection and healthcare (F10).

Regarding the investment (F2), industrial (F3), cultural and recreational (F7), and law enforcement (F9) components, the level of disparities is not changing in a situation where a group of municipalities with initially low absolute values of the indicator is constantly changing places with municipalities with initially higher absolute values of the indicator.

The fall in disparities is determined in the infrastructure (F5), and environmental (F6) components, i.e. a faster growth of indicators occurs in municipalities with lower values of these indicators in the initial period of time, which leads with time to the decrease in the coefficient of variation and the coefficient of range of indicators in a certain group of regions.

## Conclusions

In the period from 2011 to 2015 in Latvia at the municipal level the disparities of the generalized indicator of socio-economic security increase, which is confirmed by the determined  $\beta$  - divergence and  $\sigma$ -divergence. The biggest disparities have been determined in general economic (F1), educational (F4), employment (F8), and provision of social protection and healthcare (F10) components. Perhaps, the key factor of the growing disparities is the decrease in the number of population in provincial municipalities because of the emigration of young people, high death and low birth rates, which in turn leads to the reduction in social and educational facilities: hospitals, educational institutions, etc. The decrease in disparities has been determined in infrastructure (F5) and ecological (F6) components. The convergence of these components might be explained by the use of the EU funds for the improvement of infrastructure and ecology, as well as by the fall in industrial activities, which also positively affects the ecology. However, this issue requires a more thorough and detailed further investigation.

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