

Social enterprises as a determinant of the reduction in regional long-term unemployment in Slovakia

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Abstract

This study examines the role of registered social enterprises as determinants of the reduction in regional long-term unemployment in Slovakia. The aim is to identify dynamic and potentially bidirectional relationships between long-term unemployment, social enterprises, and indicators of local entrepreneurial activity at the district (LAU 1) level. The empirical analysis is based on an unbalanced panel covering the period 2001–2024 and employs a Panel Vector Autoregression model to capture time-lagged interactions among the variables. The results indicate a strong persistence of long-term unemployment and suggest the existence of a negative relationship between social enterprises and unemployment, although this relationship is not fully robust across all model specifications. The Impulse Response Function analysis shows that the effect of registered social enterprises materializes with a time lag, with the most pronounced impact occurring after approximately three years and gradually diminishing thereafter. The findings also point to the presence of bidirectional relationships among the analysed variables.

JEL code: C33, J64, L31, R11

1 Introduction

Regional disparities in labour market outcomes remain one of the persistent features of European economies. Whilst some regions are characterised by low unemployment and dynamic economic activity, others continue to experience high levels of unemployment, weaker economic performance, and social exclusion. Particular attention has been devoted to long-term unemployment, which represents not only an economic challenge but also a significant social concern. Prolonged detachment from the labour market contributes to the erosion of skills and work habits, reduces employability, and may further reinforce regional inequalities. Long-term unemployment is one of the persistent structural problems of the labour market. Priesol (2021) points out that Slovakia was among the European Union countries with one of the highest rates of long-term unemployment. This issue remains relevant today and highlights the need for instruments that support the labour-market integration of disadvantaged population groups, including social enterprises.

In response to these challenges, increasing attention has been directed towards policy instruments capable of combining economic and social objectives (Sika, Vidová and Kordoš, 2025). Among these, social enterprises have emerged as a distinctive organisational form that pursues broader social goals alongside economic activities, including the employment of disadvantaged groups (Monteiro et al., 2022; Martinelli et al., 2022). As a result, social enterprises are frequently viewed as an important mechanism for promoting social inclusion and fostering inclusive regional development. In many countries, including Slovakia, they have become an integral component of labour market and social policies and have received growing support from public authorities.

Despite their increasing prominence, the role of social enterprises in regional development remains ambiguous. Conventional entrepreneurship is typically associated with economically successful regions

characterised by favourable conditions for investment, innovation, and job creation. Social enterprises, however, often emerge precisely in regions where labour market challenges are most severe and economic opportunities are limited (Oliński et al., 2024). Their presence may therefore reflect two distinct mechanisms. On the one hand, social enterprises may contribute to reducing unemployment by creating employment opportunities and facilitating the labour market integration of disadvantaged individuals. On the other hand, unemployment itself may create conditions that support the emergence of social enterprises. However, the empirical evidence is inconclusive. For example, Nándori (2020) identifies a positive relationship between unemployment and the share of employment-oriented social enterprises, but this relationship was not statistically significant. In this case, social enterprises would not represent a cause of improved labour market outcomes but rather a consequence of unfavourable regional conditions.

Distinguishing between these two perspectives has important implications for public policy. If social enterprises genuinely contribute to reducing unemployment, supporting their development may constitute an effective instrument of labour market and regional policy. If, however, they emerge primarily as a response to adverse labour market conditions, their presence may instead signal deeper structural problems within a region. Understanding the relationship between social enterprises and unemployment is therefore essential not only for evaluating the effectiveness of existing policy interventions but also for designing future social economy strategies.

Empirical evidence on this issue remains relatively limited. Most existing studies focus on the determinants of unemployment at the national or regional level or examine the role of entrepreneurial activity more broadly (Otoiu and Titan, 2012; Monteiro et al., 2022; Azolibe et al., 2025; Kakizhanova et al., 2026). Social enterprises, as a distinct form of economic organisation, remain comparatively underexplored, particularly in post-transition economies. Moreover, the dynamic relationship between labour market developments and social entrepreneurship has received only limited attention in the existing literature, while feedback mechanisms and time-lagged effects remain relatively underexplored (Kročil et al., 2019; Oliński et al., 2024).

This study therefore examines the role of social enterprises in regional long-term unemployment in Slovakia and investigates the dynamic relationships between unemployment, social enterprises, and indicators of local entrepreneurial activity. The analysis is based on district-level (LAU 1) panel data covering the period 2001–2024. To account for dynamic interactions, time-lagged effects, and potential endogeneity among the variables, the study employs a Panel Vector Autoregression (PVAR) framework complemented by Impulse Response Function analysis.

The study contributes to the existing literature in three ways. First, it focuses on the district level, allowing for a more detailed examination of regional disparities than is typically possible in national or higher-level regional analyses. Second, it investigates social enterprises as a distinct component of the social economy rather than treating them as part of broader entrepreneurial activity. Third, by employing

a dynamic econometric framework, it examines the potentially bidirectional relationship between social enterprises and long-term unemployment.

2 Literature review

Long-term unemployment is among the most serious socio-economic challenges facing contemporary economies. Unlike short-term unemployment, it creates persistent barriers to re-entering the labour market, thereby increasing the risk of social exclusion and economic marginalisation. Its concentration in particular regions therefore represents not only an individual employability problem but also a broader development challenge that may reinforce poverty, social exclusion, and spatial inequalities (Priesol, 2021; Flecker and Quinz, 2025). The persistence of long-term unemployment reflects the influence of broader economic, institutional, and structural factors, including investment, inflation, public expenditure, and overall economic performance. Despite the wide range of labour market policy instruments available, the reintegration of the long-term unemployed remains one of the most significant challenges for economic and social policy (Otoiu and Titan, 2012; Azolibe et al., 2025; Kakizhanova et al., 2026).

In response to the limited effectiveness of traditional labour market policies, increasing attention has been devoted to the social economy and, in particular, to social enterprises. In this context, social enterprises are organisations that use economic activity as a means of achieving social objectives, especially in areas where traditional market and public-sector mechanisms are unable to respond adequately to persistent social problems. The importance of this form of entrepreneurship becomes particularly evident during periods of crisis, when it can contribute to addressing unemployment, facilitating social adaptation, and supporting vulnerable groups, as demonstrated by the experience of Ukraine during the COVID-19 pandemic and the ongoing war (Hora et al., 2023). Unlike conventional enterprises, their primary objective is not profit maximisation but rather the resolution of specific societal challenges, such as social exclusion, poverty, regional marginalisation, and unemployment (Monteiro et al., 2022; Kročil et al., 2019).

One of the most frequently discussed functions of social enterprises is the labour market integration of disadvantaged population groups. The literature indicates that social enterprises create employment opportunities for individuals facing barriers to entry into the open labour market, including the long-term unemployed, persons with disabilities, people with mental disorders, young people without work experience, and other socially vulnerable groups (Kročil et al., 2019; Martinelli et al., 2022; Nándori, 2020). Their importance, however, does not lie solely in job creation. Several studies also emphasise their role in developing work habits, improving employability, building social ties, and strengthening social inclusion (Priesol, 2021; Martinelli et al., 2022). In the Slovak context, Priesol (2021) shows that social enterprises are explicitly designed to employ socially excluded communities and may contribute to reducing structural unemployment. Martinelli et al. (2022), for example, demonstrate that social enterprises can significantly support the labour market integration of people with severe mental illness, with positive effects not only on employment but also on quality of life and social functioning. Kročil et al. (2019) show that integration social enterprises can function as an instrument of active employment

policy, as they create job opportunities for groups particularly vulnerable in the labour market, especially persons with disabilities. Similar findings are reported by Lipták et al. (2024), who, using the example of the Hungarian Szimbiózis Foundation, show that social enterprises can improve the professional skills and employability of persons with disabilities. The authors also point to broader social benefits of social entrepreneurship, including reductions in local unemployment, public cost savings, and improvements in the quality of life of disadvantaged groups. Similar conclusions are also provided by research on social enterprises in Kazakhstan, which highlights their potential in employing vulnerable population groups, particularly young people without work experience, women, and persons with disabilities. In addition to job creation, these enterprises contribute to vocational training, retraining, and the reduction of social inequalities (Okutayeva, 2025). Similarly, Rakar and Uršič (2025), in the Slovenian context, emphasise the importance of social enterprises in employing persons with disabilities and argue that, with appropriate recognition and support, social enterprises can contribute to addressing key social and economic problems, including unemployment.

However, the significance of social enterprises extends beyond individual labour-market integration and also enters broader discussions in regional research on local responses to territorial disadvantage, persistent unemployment, and limited development opportunities. In recent years, increasing attention has therefore been paid to their role in supporting local and regional development, particularly in areas facing long-term economic and social problems. Unlike conventional enterprises, which base location decisions primarily on economic considerations, social enterprises often operate in regions characterised by lower economic performance, higher unemployment rates, and limited development opportunities (Oliński et al., 2024). Their activities therefore cannot be assessed solely through economic indicators but should also be considered in terms of their broader contribution to local communities, social innovation, and territorial development (Dhewanto et al., 2020; Monteiro et al., 2022; Catalá et al., 2025).

The literature indicates that social enterprises and related forms of community-based entrepreneurship can contribute to regional development in several ways. In addition to direct job creation, they support the use of local resources, the development of community ties, and the participation of residents in development activities. Dhewanto et al. (2020) emphasise that rural entrepreneurship based on the use of local resources can generate new economic activities and contribute to reducing unemployment and poverty in rural areas. Revida et al. (2023) complement this argument in the context of village-owned enterprises, highlighting the importance of participation, social capital, and community-embedded governance in the development of tourist villages. Particular attention in this context has been devoted to lagging regions. Oliński et al. (2024) analyse social enterprises in the Warmia and Mazury region in Poland, which is classified as a lagging EU region and is characterised by high unemployment and weak economic indicators. Their research shows that social enterprises in such regions may represent an instrument linking social objectives with market-oriented activities. Under these conditions, social enterprises may complement market and public mechanisms, particularly where persistent social needs and a lack of employment opportunities exist. Research from Hungary further suggests that social enterprises are more frequently concentrated in areas with higher unemployment, supporting the

assumption that their emergence may be shaped by existing labour market problems (Nándori, 2020). In the Slovak context, Sika et al. (2025) report that a significant share of registered social enterprises operates in the least developed districts, which points to their potential role in mitigating regional disparities. Similarly, research on regional development instruments in Hungary shows that support for entrepreneurial activity in lagging areas does not automatically lead to a clear reduction in unemployment, although it may positively affect the number and performance of enterprises. This suggests that the relationship between regional entrepreneurial activity and the labour market is complex and requires cautious empirical interpretation (Dániel, 2022). Enaifoghe (2026), in the context of South Africa, similarly emphasises that social entrepreneurship may contribute to addressing persistent socio-economic problems, such as unemployment, poverty, and inequality, through the creation of employment and income opportunities, community participation, and the strengthening of social cohesion in marginalised areas. These studies show that social enterprises may be relevant to regional research for two reasons. First, they often operate in territories where problems of unemployment, social exclusion, and limited economic opportunities accumulate. Second, their contribution may not be reflected only in the direct creation of jobs, but also in the strengthening of local capacities, social ties, and the labour-market integration of disadvantaged groups. The relationship between social enterprises and the regional labour market therefore cannot be reduced to a simple direct effect, but should be understood as part of broader territorially conditioned processes.

Despite the predominantly positive view of social entrepreneurship, the relationship between social enterprises and unemployment remains theoretically and empirically ambiguous. Most existing studies implicitly assume that social enterprises contribute to reducing unemployment through job creation and the labour market integration of disadvantaged groups. Such an interpretation is consistent with their declared social mission and with empirical evidence highlighting their positive effects on employment and social inclusion (Kročil et al., 2019; Martinelli et al., 2022). Within this perspective, social enterprises are primarily viewed as instruments for alleviating social and economic problems. However, this perspective may not fully capture the nature of the relationship under investigation. Many social enterprises emerge precisely in regions characterised by high unemployment, social exclusion, and limited economic opportunities. Their geographical concentration in less developed areas suggests that social entrepreneurship may not only influence labour market outcomes but may also arise as a response to existing labour market challenges. From this perspective, the growth in the number of social enterprises may itself be stimulated by adverse labour market conditions, increasing social needs, or public policies aimed at supporting disadvantaged regions (Nándori, 2020; Oliński et al., 2024; Sika et al., 2025). The relationship between social enterprises and unemployment therefore cannot automatically be regarded as unidirectional. On the one hand, social enterprises may create employment opportunities and facilitate the labour market integration of disadvantaged groups. On the other hand, unemployment itself may create conditions that encourage the emergence and development of social enterprises. In such circumstances, social enterprises become part of a region's adaptive response to adverse socio-economic conditions. Their existence may therefore reflect not only their capacity to influence labour market outcomes but also the ability of local communities, public institutions, and other actors to

respond to persistent social challenges. From a methodological perspective, this potential bidirectionality creates an important challenge. If social enterprises and unemployment influence each other simultaneously, traditional approaches based on one-directional relationships may fail to adequately capture the true nature of their interaction. The regional labour market can therefore be viewed as a dynamic system in which unemployment, social entrepreneurship, and broader entrepreneurial activity mutually influence one another. Despite the growing body of literature on social enterprises, empirical research examining their relationship with regional unemployment remains relatively limited. Existing studies have focused predominantly on individual social enterprises or case-study evidence, while the dynamic interactions between social entrepreneurship, long-term unemployment, and broader entrepreneurial activity at the regional level remain insufficiently explored. From the perspective of regional research, it is therefore important to examine not only whether social enterprises are related to the development of long-term unemployment, but also whether this relationship has a time-lagged or bidirectional character. Consequently, the analysis requires a dynamic approach capable of capturing not only direct effects but also feedback mechanisms and lagged responses among the variables.

3 Methodology

The aim of this study is to analyse the role of registered social enterprises in regional long-term unemployment in Slovakia and to identify dynamic and potentially bidirectional relationships between long-term unemployment, registered social enterprises, and indicators of local entrepreneurial activity. To this end, a Panel Vector Autoregression (PVAR) model is employed, allowing for the capture of time-lagged effects and mutual endogeneity among the variables.

From an economic perspective, it is important to consider that processes in the labour market and in the sphere of entrepreneurial activity occur with a certain time lag, as the response of economic agents to changes in the environment is not immediate. The emergence and development of social enterprises, as well as their potential impact on employment, are the result of gradual adaptive processes. At the same time, these relationships can be understood as part of a broader regional economic system in which unemployment does not merely represent an outcome of economic processes, but also a factor that shapes the behaviour of economic agents. In this context, social enterprises may arise as a response to unfavourable labour market conditions, rendering the relationship between them and unemployment endogenous and mutually interconnected. Such an approach makes it possible to capture not only the direct effects of individual variables, but also their role within a dynamic system in which causes and consequences are intertwined.

3.1 Data and Sample Selection

The empirical analysis is based on panel data at the level of local administrative units in Slovakia (LAU 1; equivalently NUTS 4), which allows for capturing regional disparities at a detailed district level. The

period under study covers the years 2001–2024, with the resulting dataset taking the form of an unbalanced panel due to limited data availability for certain variables and time periods.

The selection of variables was determined by data availability at this level of territorial disaggregation. At the LAU 1 level, only selected socio-economic indicators are available, which constitutes a natural limitation of the analysis, while at the same time ensuring consistency in comparisons across regions.

The data were obtained from official sources, specifically the Statistical Office of the Slovak Republic (2026) and the Ministry of Labour, Social Affairs and Family of the Slovak Republic (2026), and were subsequently processed into a panel structure.

Variables and their construction

Dependent variable:

- Long-term unemployment – the share of long-term unemployed persons in the economically active population in a given district

Key explanatory variable:

- Social enterprises – the number of social enterprises in a given district

Additional control variables represent economic activity and the business environment:

- Sole trader – entrepreneurs by legal form
- Legal entities by selected legal forms as at 31 December
- Self-employed persons by selected economic activities

These variables were normalised by population size to ensure comparability across regions of different sizes. The use of these indicators reflects an effort to capture local entrepreneurial activity as an important factor influencing the labour market.

3.2 Research design

The existing literature primarily focuses on the determinants of unemployment at an aggregated (national or regional NUTS 2/3) level (see Azolibe, Dimnwobi and Uzochukwu-Obi, 2025; Kakizhanova et al., 2026; Otoi and Titan, 2012), while micro-regional analyses at the district level remain relatively scarce. At the same time, the role of social enterprises as a specific instrument of the social economy in the context of long-term unemployment remains insufficiently explored, particularly in post-transition economies.

This study contributes to the literature by:

- analysing relationships at the LAU 1 (district) level;

- employing a PVAR approach to capture the dynamics of the analysed relationships. This methodological framework allows for the simultaneous modelling of time-lagged effects and mutual endogeneity among variables, with all variables treated as potentially endogenous (Nusyirwan et al., 2026). Unlike traditional regression approaches, PVAR does not require an a priori specification of causal relationships but enables their empirical identification through dynamic interactions over time. In the context of the regional labour market, it thus provides an appropriate tool for analysing complex relationships between long-term unemployment, social enterprises, and entrepreneurial activity;
- integrating a labour market variable (long-term unemployment) with indicators of local entrepreneurial activity (social enterprises, natural persons – entrepreneurs, legal entities, and sole traders), thereby enabling the analysis of their mutual dynamic and potentially bidirectional interactions at the regional level.

Based on the theoretical background and the aim of the study, the following research questions are formulated:

- **RQ1:** What is the relationship between social enterprises and long-term unemployment at the regional level in Slovakia?
- **RQ2:** Are there dynamic (time-lagged and bidirectional) relationships among the analysed variables?

The basic characteristics of the data were examined using descriptive statistics, presented in Appendix A (Table 2), which facilitates a better understanding of variability and regional differences in the analysed data.

Table 2
Descriptive statistics

N	<i>U_It</i>	<i>SE</i>	<i>ST</i>	<i>LE</i>	<i>SEI</i>
	1896	553	1263	1817	474
Mean	0.0284	5.1049	0.0003	0.0016	0.0011
SD	0.0236	6.7459	0.0044	0.0047	0.0043
Min	0.0011	0	-0.0503	-0.0859	-0.0187
Max	0.1284	44	0.01797	0.0466	0.0322
Source: own calculation					

Prior to model estimation, multicollinearity among the variables was tested using correlation analysis. The results did not indicate the presence of strong correlations that could adversely affect the stability of the model estimates. The results are reported in Appendix A (Fig. 2).

The stationarity of the panel data was tested using a Fisher-type panel unit root test. This test was selected due to its suitability for unbalanced panels and its flexibility in combining individual test results across cross-sectional units. Alternative tests (e.g. Levin–Lin–Chu or Im–Pesaran–Shin) were not employed due to their stricter assumptions regarding homogeneity or balanced panel structures, which were not met by the data. The results indicated the presence of a unit root in some variables, suggesting non-stationarity in levels. To ensure stationarity, first differencing was therefore applied to these variables (see Žihala et al., 2025).

The lag length was set to one period (lag 1) due to constraints arising from the structure of the panel data. Specifications with a higher number of lags led to over-parameterisation and an imbalance between the number of instruments and estimated parameters, resulting in instability of estimates and preventing reliable interpretation. For this reason, models with a single lag were adopted.

The robustness of the results was verified through stepwise model specification, in which variables were added incrementally (see Budová, Kmecová and Štiblárová, 2024; Štiblárová, 2024). This approach made it possible to assess the stability of relationships among variables and to eliminate the potential influence of a specific model configuration on the results. The findings proved to be qualitatively stable across different model specifications, supporting their robustness. Changes in lag length were of limited relevance given the structure of the data and were discussed separately.

3.3 Econometric model and Impulse response function (IRF)

A PVAR model was employed for the analysis, as it allows for modelling dynamic and interrelated relationships among the variables.

General form of the model:

$$Y_{it} = A_1 Y_{i,t-1} + \mu_i + \epsilon_{it}$$

1

where Y_{it} represents a vector of endogenous variables. The term μ_i captures unobserved heterogeneity across individual districts, while ϵ_{it} denotes the error term reflecting unexplained influences (Žihala et al., 2025).

The vector of variables Y_{it} is defined as follows:

$$Y_{it} = (U_{lt_{it}}, SE_{it}, ST_{it}, LE_{it}, SEI_{it})$$

2

where $U_{lt_{it}}$ denotes long-term unemployment, SE_{it} social enterprises, ST_{it} sole traders, LE_{it} legal entities, and SEI_{it} self-employed individuals (entrepreneurs).

Based on theoretical considerations (Pčolinská, 2021; Pilková et al., 2016), it can be assumed that a higher level of entrepreneurial activity, including social enterprises, is associated with a lower rate of long-term unemployment. However, given the specific nature of social enterprises, the opposite relationship cannot be ruled out, whereby higher unemployment may stimulate their emergence.

In addition, the temporal dimension of these relationships needs to be taken into account. In the short run, entrepreneurial activity and unemployment may increase simultaneously, reflecting adjustment processes in the labour market. In the long run, however, the development of entrepreneurial activity is expected to contribute to a reduction in unemployment (Dirgová and Grejtáková, 2015).

IRF

To interpret the dynamic relationships, the Impulse Response Function was employed, as it allows for analysing the response of one variable to an exogenous shock in another variable over time (Nusyirwan et al., 2026). The IRF represents a key tool for interpreting PVAR models, as it enables the observation not only of the immediate effect of a shock but also of its gradual propagation across subsequent periods. In this way, it provides insight into the temporal dynamics of relationships among variables, including the distinction between short-term and long-term effects. The interpretation of IRFs is based on the direction, magnitude, and duration of the response. While the sign of the response indicates the direction of the relationship, its magnitude reflects the intensity of the effect, and its time path allows for an assessment of persistence.

Given the objective of the study, particular attention was paid to the response of long-term unemployment to a shock in social enterprises. The IRF thus captures how unemployment evolves over time following a change in the number of social enterprises. The results are presented in graphical form, illustrating the response of unemployment to a unit shock in social enterprises along with confidence intervals, thereby accounting for estimation uncertainty.

4 Results

The results of the Panel Vector Autoregression model estimation indicate significant dynamics among the analysed variables, with lagged values playing an important role (see Table 1).

In the equation for long-term unemployment (U_{it}), a statistically significant positive effect of its own lagged value ($L1.U_{it}$) is consistently observed across all model specifications. This finding suggests strong persistence in long-term unemployment, meaning that regions with higher unemployment tend to maintain this characteristic in subsequent periods. The observed persistence is consistent with the phenomenon of hysteresis in the labour market, whereby long-term unemployment reduces employability (through skill loss and stigmatisation) and slows down re-entry into employment. This mechanism implies that one-off interventions have limited effects without continuous support.

The social enterprises variable ($L1.SE$) exhibits a negative and statistically significant coefficient across all specifications (with the exception of the most extended model, where the effect is only marginally significant). This result suggests that an increase in the number of social enterprises is associated with a reduction in long-term unemployment in the subsequent period. However, the gradual weakening of statistical significance in extended models indicates that this relationship is sensitive to the inclusion of additional variables. The negative relationship can be interpreted through the inclusive nature of social enterprises, which target disadvantaged groups and reduce barriers to labour market entry. The weakening of the effect in extended models suggests that part of this influence is mediated by the broader business environment (e.g. the availability of opportunities outside the social economy).

Extending the model to include indicators of entrepreneurial activity yields further insights. The variable representing sole traders ($L1.ST$) shows a positive and statistically significant relationship with unemployment, which may reflect the fact that higher entrepreneurial activity in the short term also occurs in regions with higher unemployment, or that it represents a response to unfavourable labour market conditions. This positive relationship may capture so-called “push entrepreneurship”, where individuals enter self-employment due to a lack of job opportunities. In the short run, the number of sole traders may therefore increase alongside unemployment.

In the case of legal entities ($L1.LE$), a negative effect on unemployment is observed, although it is less robust and depends on the specific model specification. This negative effect is consistent with the role of more capital-intensive firms in generating more stable employment. However, the inconsistency across models points to regional heterogeneity and sectoral structure, which may either dampen or amplify this channel. The variable representing self-employed individuals ($L1.SEI$) is not found to be statistically significant, suggesting its limited role in the dynamics of long-term unemployment over the analysed period. This insignificance may indicate that this form of entrepreneurship is more cyclical or supplementary in nature, with a weaker link to long-term unemployment compared to other forms of entrepreneurial activity.

The results also highlight the importance of feedback relationships within the system. In the equation for social enterprises (SE), lagged unemployment has a positive and statistically significant effect in most model specifications, indicating that higher unemployment may stimulate the emergence or development of social enterprises. This finding supports the assumption of bidirectional relationships among the analysed variables. The positive effect of lagged unemployment on social enterprises points to their reactive nature, as they emerge in response to local socio-economic pressures, often supported by public policies and subsidy schemes.

Table 1

PVAR model estimates: dynamic relationships between long-term unemployment, social enterprises, and entrepreneurial activity

U _{It}	(I.)	(II.)	(III.)	(IV.)
L1.U _{It}	0.6810 ^{***}	0.4541 ^{***}	0.3963 ^{**}	1.1650 [*]
	(< 0.001)	(< 0.001)	(0.006)	(0.026)
L1.SE	-0.0002 ^{***}	-0.0002 ^{***}	-0.0003 ^{***}	-0.0008 .
	(< 0.001)	(< 0.001)	(< 0.001)	(0.063)
L1_ST		0.5204 ^{***}	0.6567 ^{***}	1.0688 ^{***}
		(< 0.001)	(< 0.001)	(< 0.001)
L1_LE			-0.247 ^{**}	-0.7126 [*]
			(0.006)	(0.026)
L1_SEI				-0.0488
				(0.825)
SE				
L1. U _{It}	459.7453 ^{**}	357.5387 ^{**}	341.9125 ^{**}	394.2981
	(0.001)	(0.002)	(0.004)	(0.290)
L1. SE	0.7537 ^{***}	0.7390 ^{***}	0.7154 ^{***}	0.4325
	(< 0.001)	(< 0.001)	(< 0.001)	(0.115)
L1. ST		234.3944 ^{***}	271.2592 ^{***}	411.8852 [*]
		(< 0.001)	(< 0.001)	(0.024)
L1. LE			-66.7773	-467.8766 ^{**}
			(0.183)	(0.009)
Notes: Values reported above the parentheses represent the estimated coefficients, while values in parentheses denote p-values. The symbols ^{***}, ^{**}, [*], and . indicate statistical significance at the 0.1%, 1%, 5%, and 10% levels, respectively. The notation L1. denotes the one-period lagged value of a variable (lag 1). The variables are defined as follows: (U_{It}) – long-term unemployment, (SE) – social enterprises, (ST) – sole traders, (LE) – legal entities, and (SEI) – self-employed individuals (entrepreneurs). Models (1)–(4) represent progressively extended specifications. (N) denotes the number of observations used in each model.				
Source: own calculation				

U_It	(I.)	(II.)	(III.)	(IV.)
L1. SEI				89.7240 (0.552)
ST				
L1. U_It		0.1738** (0.0067)	0.1595 (0.158)	-0.0918 (0.127)
L1. SE		-0.0003*** (< 0.001)	-0.0004*** (< 0.001)	-0.00003 (0.468)
L1. ST		-0.1179 . (0.065)	-0.0839 (0.258)	0.0155 (0.908)
L1. LE			-0.0614 (0.552)	0.2571 . (0.079)
L1. SEI				-0.2032 . (0.069)
LE				
L1. U_It			-0.5313*** (< 0.001)	0.1518 (0.493)
L1. SE			0.0001 (0.236)	-0.0001 (0.330)
L1. ST			-0.2315** (0.001)	0.0317 (0.781)
L1. LE			-0.0655	0.5919**
Notes: Values reported above the parentheses represent the estimated coefficients, while values in parentheses denote p-values. The symbols ***, **, *, and . indicate statistical significance at the 0.1%, 1%, 5%, and 10% levels, respectively. The notation L1. denotes the one-period lagged value of a variable (lag 1). The variables are defined as follows: (U_It) – long-term unemployment, (SE) – social enterprises, (ST) – sole traders, (LE) – legal entities, and (SEI) – self-employed individuals (entrepreneurs). Models (1)–(4) represent progressively extended specifications. (N) denotes the number of observations used in each model.				
Source: own calculation				

U _{It}	(I.)	(II.)	(III.)	(IV.)
			(0.327)	(0.006)
L1. SEI				-0.1301
				(0.376)
SEI				
L1. U _{It}				0.0501
				(0.839)
L1. SE				0.0004**
				(0.0061)
L1. ST				-1.0696***
				(< 0.001)
L1. LE				0.3364 .
				(0.093)
L1. SEI				0.1405
				(0.338)
<i>N</i>	380	380	380	152
Notes: Values reported above the parentheses represent the estimated coefficients, while values in parentheses denote p-values. The symbols ***, **, *, and . indicate statistical significance at the 0.1%, 1%, 5%, and 10% levels, respectively. The notation L1. denotes the one-period lagged value of a variable (lag 1). The variables are defined as follows: (U _{It}) – long-term unemployment, (SE) – social enterprises, (ST) – sole traders, (LE) – legal entities, and (SEI) – self-employed individuals (entrepreneurs). Models (1)–(4) represent progressively extended specifications. (N) denotes the number of observations used in each model.				
Source: own calculation				

Although the estimates of the Panel Vector Autoregression model provide information on the direction and statistical significance of lagged relationships, they do not in themselves show how these effects evolve over time. To capture the temporal dynamics of these responses, the analysis is therefore complemented by the Impulse Response Function, which allows the effects of shocks to be traced across multiple periods.

IRF

Based on the Impulse Response Function, the response of long-term unemployment to a shock in social enterprises was analysed (see Fig. 1).

The IRF suggests that a positive shock in social enterprises leads to a reduction in long-term unemployment in the short run. The response is initially modest, then deepens, with the most pronounced negative effect occurring approximately three periods after the shock. In subsequent periods, the effect gradually weakens and converges back to its equilibrium level, indicating a temporary nature of the impact. The confidence intervals indicate that short-term effects are more stable, while estimation uncertainty increases over a longer horizon. For this reason, long-term responses should be interpreted with caution.

Source: own calculation

The findings suggest that social enterprises may contribute to reducing long-term unemployment in the short term, likely through the creation of employment opportunities for disadvantaged groups. However, the fact that the effect is not persistent indicates that their impact may be limited without the support of broader economic factors.

The results also reflect the complexity of regional labour markets, where changes in entrepreneurial activity and employment occur gradually and are influenced by multiple concurrent processes.

5 Discussion

The findings of this study contribute to the growing body of literature on social enterprises and regional labour market outcomes by providing evidence from a dynamic regional perspective. Consistent with previous studies, the results suggest that a higher number of social enterprises may be associated with more favourable developments in long-term unemployment at the district level. This finding is in line with the existing literature highlighting the potential role of social enterprises in supporting the labour market integration of disadvantaged groups and mitigating labour market challenges (Kročil et al., 2019; Martinelli et al., 2022; Lipták et al., 2024; Okutayeva et al., 2025). At the same time, however, it extends this discussion by situating social enterprises within the context of regional labour markets, where long-term unemployment, social disadvantage, and limited employment opportunities are often concentrated in specific territories.

At the same time, the findings extend the existing literature by pointing to the potentially bidirectional nature of the relationship between social enterprises and unemployment. While most previous studies have focused primarily on the role of social enterprises in addressing labour market challenges, our results suggest that higher unemployment may itself create conditions conducive to the emergence and development of social enterprises. This observation is consistent with studies highlighting the connection between social enterprises and economically disadvantaged regions characterised by higher unemployment rates (Nándori, 2020; Oliński et al., 2024; Sika et al., 2025). The findings therefore suggest

that social enterprises may represent not only a potential mechanism for mitigating labour market problems but also a response to their existence.

The results also underline the importance of broader entrepreneurial dynamics. The positive relationship between the number of sole traders and long-term unemployment suggests that not all forms of entrepreneurial activity are necessarily associated with favourable labour market conditions. This finding may reflect necessity-driven entrepreneurship, whereby individuals enter self-employment due to a lack of employment opportunities rather than in response to favourable economic conditions. Similar arguments have been advanced in the literature on regional labour markets and entrepreneurship in economically weaker regions (Dániel, 2022).

The impulse response analysis further indicates that changes in the number of social enterprises are reflected in long-term unemployment only gradually rather than immediately. The strongest response of unemployment emerges after a certain time lag, suggesting that the potential effects of social enterprises on regional labour market outcomes materialise progressively over time. This finding is consistent with the assumption that processes associated with social entrepreneurship, including the creation of employment opportunities, the development of work habits, the improvement of employability, and support for disadvantaged groups, require time before they become visible in aggregate regional labour market indicators. Social enterprises therefore cannot be interpreted as an immediate instrument for reducing long-term unemployment, but rather as a potential gradual mechanism of labour-market integration.

Overall, the findings suggest that the relationship between registered social enterprises and long-term unemployment cannot be interpreted in isolation. Social enterprises appear to form part of a broader regional system in which labour market challenges, the local entrepreneurial environment, institutional support, and public policies interact with one another. From the perspective of regional research, it is important that their role is not limited to individual labour-market integration, but may also be related to local responses to territorial disadvantage and persistent long-term unemployment. Their relationship with unemployment is therefore likely to be conditioned by regional economic circumstances, the structure of the local business environment, the availability of public support, and the absorptive capacity of local labour markets.

6 Conclusions

The aim of this study was to analyse the role of registered social enterprises in regional long-term unemployment in Slovakia and to identify dynamic relationships between long-term unemployment, registered social enterprises, and indicators of local entrepreneurial activity using a Panel Vector Autoregression model. The study thus contributes to regional research by examining social enterprises as part of local mechanisms of labour-market integration and broader processes of the regional labour market.

The results provide answers to the formulated research questions. Regarding the first research question (RQ1), the findings indicate that there is a relationship between social enterprises and long-term unemployment, which is negative in most specifications. This suggests that an increase in social enterprises may contribute to reducing long-term unemployment. However, this effect is sensitive to the inclusion of additional variables and is not fully robust across all model specifications.

The second research question (RQ2) is also confirmed, as the results point to the presence of dynamic and bidirectional relationships among the analysed variables. Long-term unemployment exhibits strong persistence and simultaneously influences the development of social enterprises, indicating the existence of feedback mechanisms within the regional labour market.

The Impulse Response Function further shows that the effect of social enterprises on unemployment materialises with a time lag, with the most pronounced impact occurring approximately three periods after the shock and gradually weakening thereafter. This finding suggests a predominantly short- to medium-term nature of the effect.

From a public policy perspective, the findings indicate that support for social enterprises may be relevant not only as part of social policy, but also as an element of territorially targeted labour-market policy and regional development. In districts with persistent long-term unemployment, social enterprises may represent one of the instruments supporting local labour-market integration, particularly where traditional market mechanisms are unable to sufficiently absorb disadvantaged population groups. At the same time, their effectiveness may depend on the continuity of support, its connection with other labour-market measures, the consideration of regional specificities, and the fact that social enterprises often emerge as a response to adverse labour-market conditions.

The study, however, has several limitations. First, the limited availability of data at the district level (LAU 1) constrained the selection of variables and resulted in the use of an unbalanced panel. Second, some results are sensitive to model specification, which requires caution in their interpretation. While the methodological approach employed allows for capturing dynamic relationships, it does not enable a clear identification of causal mechanisms.

Future research could focus on a deeper examination of regional differences, as the effects of social enterprises are conditioned by the broader economic and institutional context of individual regions. In regions with a more favourable economic structure and higher labour market absorption capacity, social enterprises may more effectively contribute to the integration of disadvantaged groups, whereas in less developed regions they may rather fulfil a stabilising or compensatory function. Differences in effects therefore reflect not only the presence of social enterprises themselves, but also the ability of the regional environment to translate their activity into sustainable employment outcomes.

Declarations

Funding

No funding was received for conducting this study.

Author Contribution

Jana Budová and Lenka Pčolinská contributed equally to the conception of the study, the formulation of the research framework, the development of the methodology, data preparation and processing, the empirical analysis, the interpretation of the results, and the writing of the manuscript. Both authors contributed equally to the critical revision of the text and approved the final version of the manuscript.

Data Availability

Publicly available data: The data on long-term unemployment are available from Páleník, M. (2026), *LAU1 dataset (2025.12)* [Data set], IZ Bratislava, through Zenodo: <https://doi.org/10.5281/zenodo.17549749>. Data on registered social enterprises are publicly available from the Register of Social Enterprises: <https://registre.socialnaekonomika.gov.sk/registrovane-sp>. Data on population, natural persons–entrepreneurs by legal form, legal entities by selected legal forms, and sole traders by selected economic activities are publicly available from the Statistical Office of the Slovak Republic through the DataCube database at: https://datacube.statistics.sk/#!/view/sk/vbd_dem/om7102rr/v_om7102rr_00_00_00_sk; https://datacube.statistics.sk/#!/view/sk/vbd_sk_win2/og3807rr/v_og3807rr_00_00_00_sk; https://datacube.statistics.sk/#!/view/sk/vbd_sk_win2/og3804rr/v_og3804rr_00_00_00_sk; and https://datacube.statistics.sk/#!/view/sk/vbd_sk_win2/og3801rr/v_og3801rr_00_00_00_sk.

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Figures

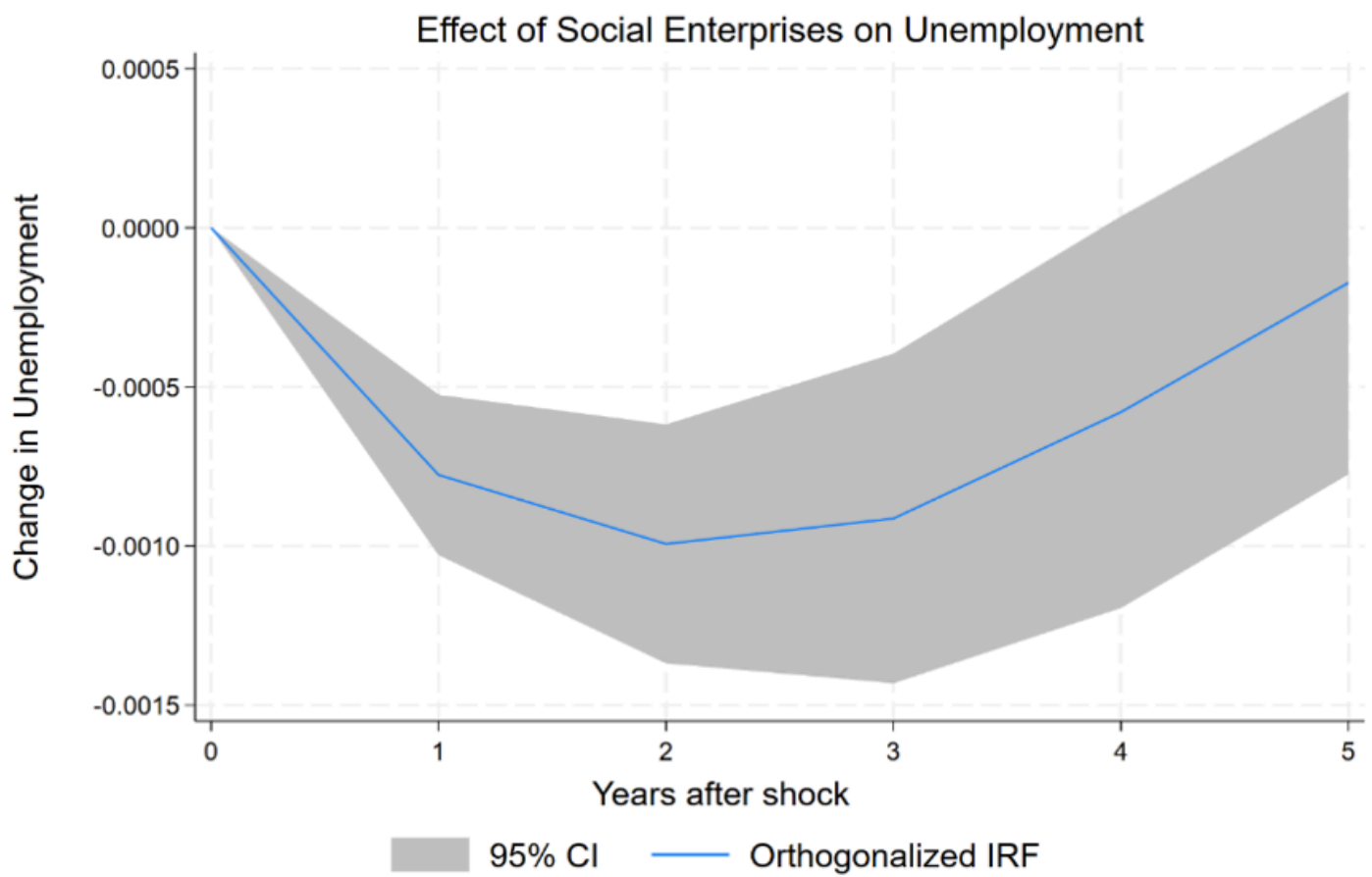


Figure 1

Response of long-term unemployment to a shock in social enterprises

Source: own calculation

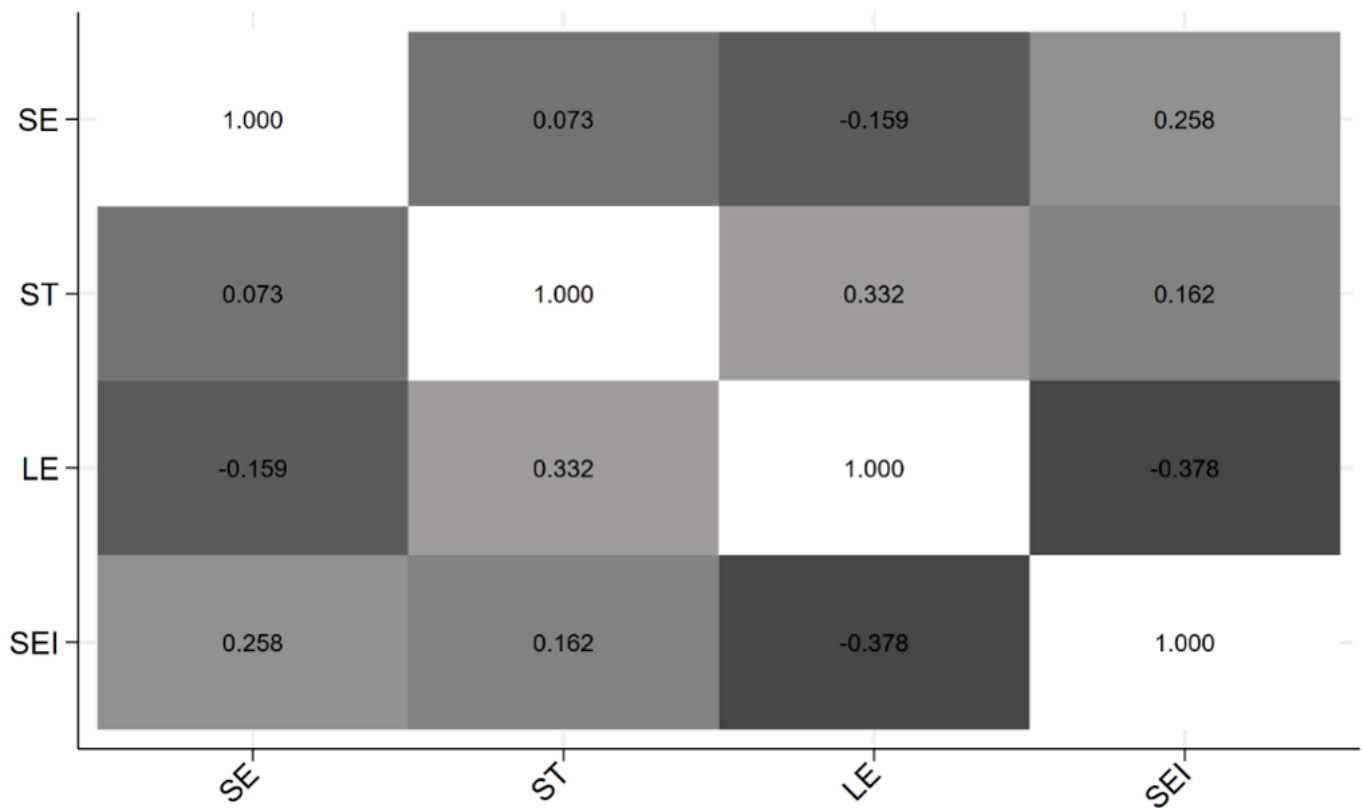


Figure 2

Correlation heatmap – assessment of multicollinearity

Source: own calculation

Supplementary Files

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- [AppendixA.png](#)