

Labor Force and Supply Chains: Mutual Influence of Socio-Economic Factors (Republic of Kazakhstan)

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Abstract— The Economic development increasingly requires sustainable supply chains of goods and services at the regional, national and global levels. Labor markets are as important as building the supply chain infrastructure; unbalanced labor market negatively affects supply chains by making them experience significant difficulties in hiring personnel necessary to ensure supply-chain sustainability. In turn, the labor market and its balance are influenced by a number of factors which are not fully reflected in available studies. This confirms the relevance of the present research. The purpose of the study is to investigate factors affecting labor force in the supply chain. Based on the comparative, didactic and descriptive analysis of regional and national demographic and socio-economic indicators, labor market indicators of the Turkestan region of the Republic of Kazakhstan as an indicative region, the study of national and international legislation, practices and literature related to supply chains and the labor market, the following results were obtained. The region is dominated by agricultural and industrial supply chains with a significant prevalence of the former. Despite the enormous agro-industrial, transport, resource, mineral and raw material, climatic, educational and labor potential of the region, the development of the region, the creation of new and development of existing supply chains are significantly hampered by a number of reasons, including inefficient and low-productivity agriculture, technological backwardness, and immobility of material and technical resources. Common factors affecting the labor surplus of a region (country) have been identified in the study based on the example of the given region. The

major factors are a high natural and mechanical population growth rate; high growth rates of human resources that outstrip the growth rate of jobs; prevailing rural population; a deeper crisis in traditional industries and decreased enterprise demand for the labor force. The research methods and results will allow scientists and public officers to apply the information to design national and regional programs aimed at developing regions, creating regional, national and global supply chains, labor market development, including solving the problems of its imbalance and labor surplus.

Keywords—supply chains, regional development, labor market, employment, unemployment, socioeconomic factors, labor force, government programs.

1. Introduction

Labor resources consist of people aged 16 to 64, as well as all employed persons who are not included in this age band. The exception is unemployed disabled people and pensioners [1, 2]. People of working age make up over 82% of the employed [3]. The legal working age is set by countries based on a number of factors, including demographic and national characteristics, as well as the level of economic development [4]. For example, in Bolivia, children are allowed to work from the age of 10 [5], in Argentina [6] and France [7] - from 14 years old, in Austria [8], Canada [9] and China [10] - from 15 years old, in the United Kingdom [11], USA [12], Russian Federation [4] and Kazakhstan [13] - from 16 years old.

The retirement age in Japan is 60 years for both men and women [14], in Poland - 60 years (women) and 65 years (men) [15]; in Great Britain [16] and Sweden [17] - 65 years for women and men, in Ireland - 66 years, in the

USA - 67 years [18]. In Kazakhstan, the retirement age is 63 years for men and 58 years for women [19]. Although there is a dynamic decrease in the participation of the economically active population in agricultural supply chains in developed countries and an increase in developing countries, it has a significant impact on the formation and functioning of supply chains at all levels [20].

Supply chains include a variety of objects based on the type of product and the stage of the supply chain process. For example, agricultural supply chains have an extensive network structure, including both small and medium-sized enterprises, as well as transnational corporations involved in animal husbandry, agriculture and greenhouse farming, food packaging; production cooperatives; certification and inspection organizations, food production laboratories; consulting, trading, distribution and other export companies, as well as other enterprises and organizations depending on the specifics of the supply chain [21].

In the wake of rising urbanization, the need of cities for sustainable supply chains of basic goods and services from the regions is growing: urbanized and industrial areas benefit from the natural resources of rural regions while rural regions receive an income stream and retain jobs. It is advisable to invest in regional supply chains of goods and services even in the face of competition from more economical and cost-effective global supply chains [22].

The development of labor resources, one of the key factors determining supply chain effectiveness, is as important as the construction of the supply chain infrastructure: if the labor market is unbalanced, there are significant difficulties in hiring personnel with the necessary skills and knowledge for the effective functioning of the supply chain [23].

The construction and development of labor resources involves not only socio-economic, demographic and labor market indicators, but also the factors that affect the labor market and its balance.

The present study, conducted based on the example of the Turkestan region of the Republic of Kazakhstan as an indicative region, aims to determine the main factors affecting the labor resources involved in the supply chain. To achieve the goal of the study, it is necessary to solve the following tasks:

- to assess the regional labor market situation and the main areas of activity of economic sectors and supply chains;
- to determine and classify socio-economic factors

affecting labor reserves and to identify the main ones through the example of the indicative region.

2. Methods

The research is based on the following methods: a dialectic method for economic processes and phenomena, methods of grouping, classification, synthesis and analysis (economic, statistical, didactic, comparative and descriptive methods).

A number of sources were used to collect data and information, including:

- statistical data of the Ministry of National Economy of the Republic of Kazakhstan Statistics Committee available at the time of collection and analysis of information for the period from 2016 to 2018 [1];
- regulations and practices of foreign countries;
- previous research on labor resources and supply chains.

The study is also based on the regional and national indicators both of absolute and relative values, including:

- quantitative and demographic structure of the population;
- labor market indicators: able-bodied population, labor force, employed population, hired workers, self-employed population, unemployment rate, including long-term, female and youth unemployment, labor productivity;
- socio-economic indicators: the share of GRP in GDP, industrial production, investment in fixed assets, the innovation activity level, R&D costs, the number of SMEs and the number of their workers, total agricultural output and output by product range;
- the number of educational institutions (higher, technical and professional) and the number of students in each of them.

It should be noted that complete Kazakhstan statistics on the parameters used in the study at the time of data collection and analysis was mainly limited to 2017-2018.

3. Results

The region is dominated by agricultural and industrial supply chains with a significant prevalence of the former. In 2018, the share of agricultural output in GRP amounted to 51.1%, the share of industrial production - 48.9%.

Regional agricultural products in relation to the total agricultural production include cotton (100%), grapes (70%), cucurbits (64%), safflower (38%), fruit and berries (36%), vegetables (23%).

Labor productivity at gross value added is 1014,0 thousand tenges/person (470 thousand tenges/person in the country).

The population of the rural areas is 1.6 million people (80.4%), urban areas - 387,2 thousand people (19.6%).

In rural areas, there are 1197 thousand able-bodied people (64.7% of the region's population). From 2013 to 2017, the number of labor resources decreased from 1255.2 to 1197 thousand people, or by 4.6% (Table 1).

Table 1. Basic labor market indicators of the Turkestan region

Indicator	2013	2014	2015	2016	2017
Labor force, thousand people	1 255, 2	1 229, 9	1 195, 9	1 210, 0	1 197, 0
Share of labor force, %	70.9	68.6	65.8	66.3	64.7
Employed population, thousand people	1 185, 7	1 163, 2	1 132, 1	1 147, 2	1 134, 9
Hired workers, thousand people	631, 3	638, 2	638, 6	644, 5	652, 2
Self-employed population, thousand people	554, 5	525, 1	493, 4	502, 8	482, 6
Share of self-employed people in the total number of the employed population, %	46.8	45.1	43.6	43.8	42.5
Employed population	1 185, 7	1 163, 2	1 132, 1	1 147, 2	1 134, 9

In 2017, the highest employment rate was observed in trade - 217,8 thousand people, in agriculture - 186,2 thousand people and in education - 182,6 thousand people. There were 92,3 thousand people employed in construction; 85,1 thousand people - in transport, and 41,7 thousand people - in manufacturing.

From 2013 to 2017, the number of hired workers increased by 3.3%. During this period, the number of self-employed people decreased by 14.8%.

The percentage of the labor force in the total population is one of the lowest (64.7%) (Table 2).

Table 2. Basic labor market indicators of the Turkestan region in relation to the national data

	Labor force, thousand people					Share of the labor force, %				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
The Republic of Kazakhstan	9 041, 3	8 962, 0	8 877, 6	8 988, 8	9 027, 4	7 7, 7	7 0, 0	6 9, 7	7 0, 0	6 9, 7
The Turkestan region	1 255, 2	1 229, 9	1 195, 9	1 210, 0	1 197, 0	7 7, 7	6 8, 5	6 6, 8	6 6, 3	6 4, 7

The region is one of the most labor surplus regions in the country. It ranks second in terms of unemployment and the number of labor resources in rural areas and third in terms of long-term unemployment across the country (Figure 1).

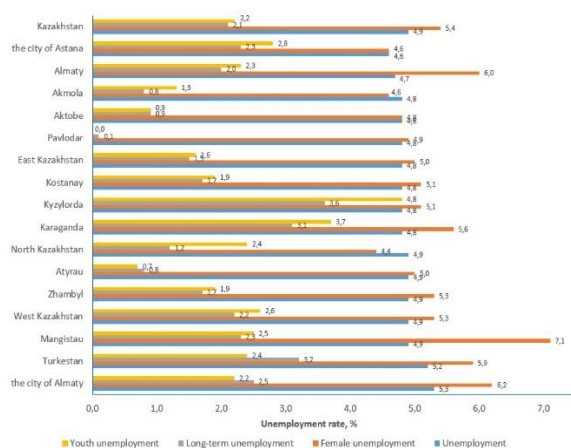


Figure 1. Kazakhstan unemployment rate for 2017 in the regional context

Most of the region's population lives in rural areas. Therefore, the number of labor resources in rural areas is greater (676,2 thousand people) than in cities (520,9 thousand people). From 2013 to 2017, there was a steady decline in rural employment: it decreased by 5.3%.

From 2013 to 2017, the number of labor resources in rural areas decreased from 771,1 thousand people up to 676,6 thousand people or by 14% (Table 3).

Table 3. Basic labor market indicators of the rural population in the Turkistan region

	2013	2014	2015	2016	2017
Labor force, thousand people	771,1	773,0	678,6	692,7	676,2
Employed population, thousand people	731,1	732,4	641,8	657,2	641,3
Employment rate of rural population, %	69.3	68.3	64.9	65.8	63.9
Hired workers, thousand people	338,5	368,2	328,9	329,8	334,9
Self-employed population, thousand people	392,5	364,2	313,0	327,3	306,4

Share of self-employed population in the total number of the employed population, %	53.7	49.7	48.8	49.8	47.8
Unemployed population, thousand people	40,0	40,6	36,8	35,5	34,9
Unemployment rate, %	5.2	5.3	5.4	5.1	5.2
Youth unemployment rate (15-28 years), %	2.5	2.0	4.2	3.7	4.2

Despite a five-year decrease in the rural unemployed population by 5,1 thousand people, the unemployment rate in relation to the employed population has not significantly been changed: in 2013 and in 2017, this indicator was 5.2%.

The share of self-employed population in the total number of the employed in the region is 42.5% while in rural areas this indicator is 47.8%. Despite a decrease in self-employed population in recent years (from 53.7% in 2013 to 47.8% in 2017), the number of the self-employed is one of the highest in the country.

In 2017, the region ranked third in the national ranking in terms of the number of able-bodied youth; the youth unemployment rate was 3.2% (4th place in the country). The region ranks third in terms of long-term youth unemployment: job searching takes up to 6-12 months (15.5% of unemployed youth) and 3-6 months (27%). About 40% of young people do not work in the specialty they were trained in and a significant number of rural youth leave for cities.

In 2017, 86% (176,9 thousand people) of young people worked in rural areas and 14% (28,9 thousand people) in the cities of the region. In 2018, self-employed youth aged 15-28 years accounted for 27.6% of the total number of the self-employed in the region (106,6 thousand people).

In the region, 62.8% of the self-employed work as individual entrepreneurs (registered and unregistered), 37.2% produce products in their own farm (for their domestic consumption and for sale).

The region has educational resources: there are 11 higher educational institutions (75 thousand students), 92 technical and vocational educational institutions (77 thousand students).

Iron and polymetallic ore deposits are found in the region; it ranks second and in terms of global uranium reserves following Australia, and third in terms of national deposits of phosphate and iron ores. Mineral resources of the region allow launching the production of construction materials: ornamental stones, refractory ceramic and bentonite clay, mineral paints, quartz sand, limestone, gypsum, travertine). In 2017, the region's GRP amounted to 5.9% of GDP; however this indicator is much higher in the industrially developed regions of Kazakhstan. It ranges from 6.2% to 21.8%.

The basic socio-economic indicators of the Turkestan region for 2017 are shown in Table 4.

Table 4. Basic socio-economic indicators of the Turkestan region

	Population, thousand people	GRP share in GDP, %	Industrial output, million tenges	Investment in fixed assets	Innovation activity level, %	R&D costs, million tenges	SMEs performance indicators	
							Number of SMEs	Number of the employed, people
The Republic of Kazakhstan	18507,9	100.0	22790209	8770572	9.6	92.732,5	1145994	3190133
The Turkestan region	1982,8	5.9	832,114	485,402	6.5	338,1	177,411	332,339

In 2017, the industrial enterprises of the region produced goods totaling 832 114 million tenges; the figure was 2-6.6 times higher in other regions.

In 2017, the level of innovative activity of enterprises in the region was 6.5%.

The proportion of legal entities registered in the region to their total number in the country amounted to 30.5%; the number of small enterprises per 1000 inhabitants (active enterprises) is 52.5. This is one of the highest national indicators.

The descriptive characteristics of the socio-economic

situation in the region are given in Table 5.

Table 5. Description of the socio-economic potential of the Turkestan region

Demographic potential	Population of the region (labor and consumer potential) 1 982 845 people (2018) High birth rate Labor surplus region Low urbanization rate Uneven population distribution across the region
Production potential	A large number of fixed assets for industrial production High depreciation of fixed assets
Investment potential	Investment infrastructure System of investment mechanisms High administrative support for potential investors Complexity of administrative procedures Lack of information on investment sites and industries
Transport and infrastructure potential	Extensive railway networks for the supply of raw materials to industrial enterprises and the export of products Gas supply in the region; an extensive network of electricity and heat supply to industrial enterprises Developed telecommunications network Poor air traffic High pace of new road construction The problem of meeting electricity demand, high wear of voltage transforming plants, low capacity of power lines
Innovation potential	Structures supporting R&D Opportunities for training R&D specialists Complete developments for the release of new products and the introduction of new technologies A small number of organizations engaged in research and development A small number of scientific personnel Poor technical base for innovation Poor participation of business and science in R&D activities

Based on the analysis data, the ranking of the socio-economic potential of the region among other regions of the country was compiled (Figure 2).

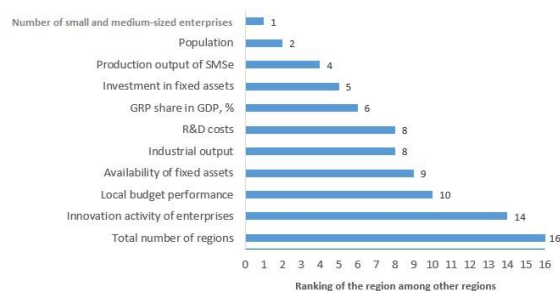


Figure 2. Ranking of the socio-economic potential of the region among other regions of the country

The factors affecting labor surplus were identified and classified in the study (Figure 3).

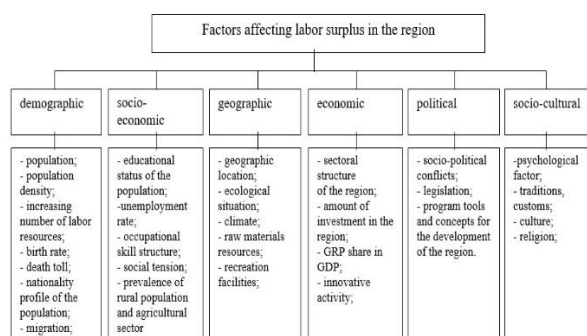


Figure 3. Factors affecting labor surplus

4. Discussion

A labor surplus region (country, market) can be defined as a region (country, market) which is characterized by a high natural and mechanical population growth [24]; high growth rates of labor resources that outstrip the growth rate of jobs [25]; the prevalence of rural population in the region [26]; a deepening crisis in traditional industries and a decrease in enterprise demand for the labor force [27]. The labor surplus of the region is also affected by the labor resources, young people, industrial structure, and educational level [28].

National and regional agricultural supply chains provide the population with the most important food products; the region has significant export potential and a favorable geographical location. It is located in the south of Kazakhstan and there are transit routes from Europe, Russia, and the CIS countries to other Central Asian countries; there is also Western Europe-Western China road corridor. A favorable warm climate promotes the cultivation of fruits and vegetables all year round.

Nevertheless, the seasonal production variability and high capital coefficient; low efficiency and poor implementation of R&D, immobility of material and technical resources used in the agricultural sector; high dependence on climatic conditions; constant risks associated with getting a stable income; price inelasticity of demand for a number of agricultural products and low profitability; serious time lags in the supply chain, the time lag between incurred charges and the receipt of products, and many other features lead to the non-competitiveness of agribusiness sectors and, as a result, significantly decrease their investment attractiveness, create the need for constant state intervention and support.

These factors trigger considerable tension in rural

areas, where the employment opportunities and range of vacancies are very limited, and the unemployment growth rate and duration are higher than in the city and exceed the socially acceptable level. Regional labor surplus is lower in countries with a different structure and organization of agriculture and supply chains, where the majority of the economically active rural population is engaged in agriculture and there are high rates of self-employment on family farms [27].

To solve regional labor market problems, there is a need for qualitative changes in the labor market structure. It is necessary to reduce the share of self-employed population and increase the share of people employed in the real economy sector through the implementation of large investment projects in the agricultural sector of the region and manufacturing industry. It is also advisable to focus on creating conditions for attracting new investments, the development of mass entrepreneurship, tourism, manufacturing, information and communication technologies and other promising economy sectors.

Industrial growth creates new supply chains and affects regional economic development level. This, in turn, reduces unemployment, increases investment in the manufacturing sector, and generates employment.

5. Conclusions

Based on the comparative, didactic and descriptive analysis of regional and national demographic and socio-economic indicators, labor market indicators, the study of national and international legislation, practices and literature related to supply chains and labor surplus, the tasks set have been completed, the goal of the study has been achieved, and the following results have been obtained.

The region is dominated by agricultural and industrial supply chains with a significant prevalence of the former. Despite the enormous agro-industrial, transport, resource, mineral and raw material, climatic, educational and labor potential of the region, the development of the region, the creation of new and development of existing supply chains are significantly hampered by a number of reasons, including inefficient and low-productivity agriculture, technological backwardness, and immobility of material and technical resources. As a result, the region is one of the most labor surplus regions in the country.

Common factors affecting the labor surplus of a region (country) have been identified in the study based on the example of the given region. The major factors are a high natural and mechanical population growth rate; high

growth rates of human resources that outstrip the growth rate of jobs; prevailing rural population; a deeper crisis in traditional industries and decreased enterprise demand for the labor force.

The research methods and results will allow scientists and public officers in the Republic of Kazakhstan and other countries to apply the information to design national and regional programs aimed at developing regions, creating regional, national and global supply chains, and labor market development.

References

- [1] Official website of the Ministry of National Economy of the Republic of Kazakhstan Statistics Committee, <https://stat.gov.kz>, Last access 14.04.2020.
- [2] Emmerson, C., Joyce, R., & Sturrock, D, "Working-age incapacity and disability benefits", Institute for Fiscal Studies, 2017.
- [3] Valletta, R., & Barlow, N, "The prime-age workforce and labor market polarization", FRBSF Economic Letter, Vol 21, 2018
- [4] Zubarev, N. Y, "Digitization of socio-economic development: the problem of choosing age limits in the complex economic evaluation of losses related to the population premature mortality", 1st International Scientific Conference "Modern Management Trends and the Digital Economy: from Regional Development to Global Economic Growth" (MTDE 2019), Atlantis Press, pp. 228-231, 2019.
- [5] Fontana, L. B., & Grugel, J, "Deviant and over-compliance: The domestic politics of child labor in Bolivia and Argentina", Human Rights Quarterly, Vol 39, No. 3, pp. 631-656, 2017.
- [6] Bronstein A, National Labour Law Profile: Republic of Argentina. International Labour Organization, https://www.ilo.org/ifpdial/information-resources/national-labour-law-profiles/WCMS_158890/lang-en/index.htm#banner, Last access 14.04.2020.
- [7] Boring N., Child Protection Law and Policy: France, The Law Library of Congress, Global Legal Research Directorate. LL File No. 2019-017406, <https://www.loc.gov/law/help/child-protection-law/index.php>, Last access 14.04.2020.
- [8] Astrov, V, *Labour Market Trends in Visegrád Countries: Implications for Austria* (No. 33), The Vienna Institute for International Economic Studies, 2019.
- [9] Kopinak, K., Ramírez, C. Q., & Hennebry, J, "Working conditions in border export industries and migration", Localized global economies on the northern borderlands of Mexico and Morocco, Palgrave Macmillan, Cham, pp. 115-151, 2019.
- [10] Naftali, O, "Rights of children and youth in China: protection, provision and participation", Handbook on Human Rights in China, Edward Elgar Publishing, pp. 273-299, 2019.
- [11] Flynn, M., & Schröder, H, "Age, work and pensions in the United Kingdom and Hong Kong: An institutional perspective", Economic and Industrial Democracy, pp. 1-21, 2018.
- [12] Kaufka Walts, K, "Child labor trafficking in the United States: A hidden crime", Social Inclusion, Vol 5, No. 2, pp. 59-68, 2017.
- [13] Akhmetov, A., & Mingali, G, *Labor law of the Republic of Kazakhstan*, Litres, 2019.
- [14] Sakurai, M., Ishizaki, M., Miura, K., Nakashima, M., Morikawa, Y., Kido, T., & Nakagawa, H, "Health status of workers approximately 60 years of age and the risk of early death after compulsory retirement: A cohort study", Journal of Occupational Health, Vol 62, No. 1, p. e12088, 2020.
- [15] Ćwirlej-Sozańska, A., Wilmowska-Pietruszyńska, A., Sozański, B., & Wiśniowska-Szurlej, A, "Assessment of disability and incidence of chronic diseases in employed and unemployed people aged 60–70 years living in Poland: a cross-sectional study", International Journal of Occupational Safety and Ergonomics, Vol 26, No. 1, pp. 210-218, 2020.
- [16] Holman, D., Foster, L., & Hess, M, "Inequalities in women's awareness of changes to the State Pension Age in England and the role of cognitive ability", Ageing & Society, Vol 40, No. 1, pp. 144-161, 2020.
- [17] Stensöta, H. O., & Bendz, A, "Public response to welfare policy retrenchment: The importance of trust in implementing agencies. The case of early retirement in Sweden 1999–2010", Social Policy & Administration, Vol 54, No. 1, pp. 102-118, 2020.
- [18] Léime, Á. N., & Street, D, "Working later in the USA and Ireland: implications for precariously and securely employed women", Ageing & Society, Vol 39, No. 10, pp. 2194-2218, 2019.
- [19] The Law of the Republic of Kazakhstan "On

- Pensions in the Republic of Kazakhstan”, No. 105-V,
https://online.zakon.kz/document/?doc_id=31408637, Last access 14.04.2020.
- [20] Gold, S., Kunz, N., & Reiner, G, “*Sustainable global agrifood supply chains: exploring the barriers*”, Journal of Industrial Ecology, Vol 21, No. 2, pp. 249-260, 2017.
- [21] Verdouw, C. N., Wolfert, J., Beulens, A. J. M., & Riialand, A, “*Virtualization of food supply chains with the internet of things*”, Journal of Food Engineering, Vol 176, pp. 128-136, 2016.
- [22] Gentry, B. S., Boyce, E., Martin, A., Webster, M., & Weston, R, “*Regional Supply Chains: Strengthening Urban-Rural Connections Around the Benefits from Natural Areas*”, Forestry & Environmental Studies Publications Series, Vol 52, 2017.
- [23] Puche, J., Ponte, B., Costas, J., Pino, R., & De la Fuente, D, “*Systemic approach to supply chain management through the viable system model and the theory of constraints*”, Production planning & control, Vol 27, No. 5, pp. 421-430, 2016.
- [24] Chen, L. X., Chew, Y. B., Lim, R. L. H., Tan, W. Y., & Twe, K. Y., *Macroeconomic Factors Affecting Unemployment Rate In China*, Doctoral dissertation, UTAR, 2017.
- [25] Tiwari, R., Harris, S., & Van den Akker, J, “*Indigenous unemployment in rural and regional Western Australia: Is there a way out?*”, Indigenous Policy Journal, Vol 29, No. 1, 2018.
- [26] Karaalp-Orhan, H. S., & Gülel, F. E, “*The Impact Of The Global Financial Crises On Regional Unemployment In Turkey*”, International Journal of Economic Perspectives, Vol 10, No. 1, 2016.
- [27] Jelic, S., Jovanovic, T., & Zivkovic, D, “*Unemployment Determinants in Rural Areas of Serbia in Transition Period*”, International Conference on Competitiveness of Agro-food and Environmental Economy Proceedings. The Bucharest University of Economic Studies, Vol 5, pp. 110-115, 2016.
- [28] Güçlü, M, “*Regional Unemployment Disparities in Turkey*”, Espera, Vol 20, No. 2, 2017.