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REGIONAL UNEMPLOYMENT DYNAMICS IN TURKEY

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Abstract

Aim of the study is to investigate region specific causes of unemployment for Turkish 26 Nuts-2 regions between 2004-2017. We aim at contributing to the literature by analyzing (i) whether regional unemployment and sub-groups (with respect to gender, age, education) is driven by excessive labor supply or shortage of labor demand, (ii) which sub-groups have higher unemployment in regions. In terms of methodology, we employ descriptive and exploratory analyses, spatial tests and panel regressions. Our findings indicate three main results: First, there is a sizable difference in unemployment rates across regions and the dispersion is getting stronger over time. Second, there are extremely low and high unemployment rates in various sub-groups and regions. Third, changes in unemployment is mostly driven by changes in labor supply rather than demand. Among the 208 cases (26 regions x 8 sub-groups), in 154 cases, the major driver of unemployment is the excessive labor supply.

Keywords: Regional Unemployment, Labor Supply, Panel Data Regression
JEL classification: R11, R23, R12

1. Introduction

In the literature on unemployment, regional dimension has largely been ignored by scholars. Compared to country level studies, far little emphasis has been put on the regional unemployment problem.

However, it represents a quite important issue not only from a research point of view but also from a policy stand point. High unemployment in regions is likely to make these places even more depressed and hamper its potential for convergence to the developed regions. Moreover, labor base in these places become unutilized, discouraged and remain idle. So, the level of productivity is adversely affected. Another important problem is the unemployment disparities across regions. High level of dispersion might trigger massive migration from backward regions to the developed ones which might bring many social and economic problems as a side effect.

Majority of scholars working in this field, has focused on two main topics. The first topic is whether or not the regional unemployment rates will tend to converge each other. There are three main hypotheses developed in this field. The first one is the convergence hypothesis. It claims that given the wages and labor are totally flexible and economic shocks are transitory, each region will absorb shocks easily and adjust quickly to a unique long-run equilibrium (Baddaley, Martin and Tyler, 1998; Filiztekin, 2009; Gözgör, 2012). Hence, at the equilibrium each region will have same level of unemployment rate. In this context, labor mobility plays a role as a spatially equilibrating mechanism which is likely to move from regions which have high unemployment rate to the ones which have low unemployment rates, eliminating, consequently the unemployment differences. (Haris and Todoro, 1970; Treyz et al. 1993).

There are, however, two contrasting hypotheses, which claims the persistence of unemployment disparities. The first one predicts no convergence to an equilibrium due to labor market rigidities and imperfections and the second one predicts the convergence of regions to different equilibria due to structural local differences. (Wedder and Gallaway; 1996; Filiztekin, 2009; Gözgör , 2012; Baddaley, Martin and Tyler, 1998; Dixon and Thrilwall, 1976, Wandercamp, 1989; Armstrong and Taylor, 1993 ; Pehkonen and Tervo, 1998).

Second strand of studies in this field has focused on cross regional variation in unemployment and determinants behind. Differences in demographic structure, industrial composition, migration patterns, wage setting mechanisms and natural amenities are discussed as the most dominant determinants. (Filiztekin, 2009; Burridge and Gordon, 1981; Siegers, 1983; Holzer, 1993; Elhorst, 2003; Badinger and Url, 2002).

With regard to the purpose of our study, we argue that the existing literature falls short from explaining several aspects, particularly region specific causes of unemployment. There is a need for more detailed and in dept analyses of the following questions which have not yet been adequately covered i.Which subgroups (with respect to gender, age and education) display a higher unemployment rate? ii. Does the change in unemployment mostly due to excess labor demand or supply? iii. In which regions and sub-groups changes in labor demand/supply is more dominant?

We try to investigate the questions above for 26 Turkish Nut-2 regions and a period 2004-2017. In terms of methodology, we use several descriptive and explorative statistics, Kernel density estimates, Spatial dependence tests and panel data regressions.

Organization of the paper is as follows. In section 2, we provide a detailed account of the existing theoretical and empirical literature. In section 3, we implement our empirical analyses by using statistical methodologies. Finally, in section 4, we conclude our study.

2. Literature Review

The literature on regional unemployment problem has focused on two main topics; (i) Whether regional unemployment rates will converge to each other, (ii) Reasons of why some regions have higher unemployment rates than others. For both questions, we provide a discussion below including theoretical arguments and empirical findings.

2.1. Literature on the Regional Unemployment Convergence

2.1.1. Theoretical Arguments

Three main hypotheses have been developed on the tendency of regional unemployment rates to convergence.

Hypothesis 1. Equilibrium and Convergence

In the general functioning of local labor markets, labor demand and supply interact via a wage setting mechanism. Equilibrium rate of unemployment is determined by these market forces (Filiztekin, 2009; Gözgör, 2012, Baddaley, Martin and Tyler, 1998)). If shocks to labor market are transitory, fluctuations will only be temporary and around natural unemployment rate. Given that the wages and labor are totally flexible and economic shocks are transitory, each region will absorb shocks easily and adjust quickly to an equilibrium (Filiztekin, 2009; Gözgör, 2012, Baddaley, Martin and Tyler ,1998)

Under these conditions, labor mobility plays a role as a spatially equilibrating mechanism. Such that labor is likely to move from regions which have high unemployment rate to the ones which have low unemployment rates (Haris and Todoro, 1970; Treyz et al., 1993). Hence, each region will converge to a unique long-run steady state equilibrium at which unemployment disparities across regions will totally be eliminated. This view is in line with the Classical/Neo-Classical perspective. (Filiztekin, 2009; Gözgör, 2012; Baddaley, Martin and Tyler,1998)

Hypothesis 2. Equilibrium but no convergence

Under this hypothesis, it is claimed that even though the labor and wages are completely flexible, each region might approach to a different long run equilibrium and unemployment rate. (Wedder and Gallaway; 1996; Filiztekin, 2009; Gözgör, 2012; Baddaley, Martin and Tyler,1998). This might occur due to the cross-regional differences in land endowments, infrastructure, amenities, industrial mix, sectoral composition and other structural characteristics. (Wedder and Gallaway; 1996; Filiztekin, 2009; Gözgör , 2012; Baddaley,

Martin and Tyler,1998). If the hypothesis is correct, persistent spatial differences in unemployment can be observed.

Hypothesis 3. Disequilibrium and no convergence (Hysteresis Hypothesis)

When wages are rigid and labor is not flexible, shocks to employment may not easily be absorbed by regions. Hence, adjustment process to the equilibrium can hardly take place (Wandercamp, 1989, Filiztekin, 2009; Armstrong and Taylor, 1993). In such case, economic shocks become persistent which is in line with Keynesian view that claims persistent impact of shocks (Gözgör, 2012). Hence, regions may not converge to an equilibrium. Main reasons behind this case might be the obstacles against the free flow of labor (due to old age, low skills, moving costs, labor market frictions, family ties, etc) and rigidity of wages driven by protective labor market legislation. (Baddaley, Martin and Tyler, 1998; Dixon and Thrilwall, 1976, Wandercamp, 1989, Filiztekin, 2009; Armstrong and Taylor, 1993). Under this hypothesis, regions do not approach to an equilibrium and it persists sizable differences across regional unemployment rates.

2.1.2. Empirical Findings

A number of empirical studies have tested the hypotheses above. In terms of methodology, majority of the researcher have relied on time series/panel data techniques such as simple ADF or panel unit root tests developed by Levin, Lin, Chu (2002), Breitung (2000) and Im, Pesaran and Shin (2003)

Majority of the studies have found non-convergent regional unemployment rates. It has rather been found that the unemployment disparities tend to persist. Hence, the findings are in line with 2nd and 3rd hypotheses. Some examples of these regional studies are Pissarides and MacMaster (1990) for UK, Decressin and Fatas (1995), Overman and Puga (2002), Baddaley, Martin and Tyler, (1998), Beyer and Stemmer (2016) for EU regions, Blanchard and Katz (1992) for US, Lanzafame (2012) for Italy, Jimeno and Bentolila (1998) and Bande and Karanassou (2006) for Spain. Similarly, Pehkonen and Tervo (1998) have confirmed the validity of the 2nd hypotheses and concluded that there are persistent equilibrium unemployment rates across Finnish regions between 1963-1993.

By contrast, there is a far fewer number of studies that have found converging unemployment rates across regions and declining disparities. Some examples of these studies are Leon-Ledesma (2002) for US, Chang et al. (2007) for Taiwan and Smyt (2003) for Australia.

2.2. Literature on the determinants of Regional Unemployment

2.2.1. Theoretical Arguments

Why do some regions have higher unemployment rate? is another important question. There is a diverse set of determinants that put forward in the literature. The rationale behind these determinants are summarized briefly below.

Labor Market Fundamentals; Labor Supply, Demand and Wages

Increase in labor supply is supposed to increase the unemployment rate as it occurs excessive number of workers available compared to the vacant jobs. Labor supply is generally measured by the growth rate or share of active population (between 15-64 age) in empirical studies.

When firms demand labor more, it is expected to be generated available jobs more and, hence, unemployment rate will decline. Typical variable adopted in empirical papers is the employment growth either at current year or in last 5 years. (Filiztekin, 2009)

Changes in wages have a detrimental effect on employment both from labor demand and supply point of view. From a supply-side perspective, any increase in wages will create an excess labor supply, that in turn, will increase the unemployment rate. Similarly, from a demand side stand point, any increase in wages will reduce the labor demand and employment. Thus, it will increase the unemployment rate. (Elhorst, 1993; Badinger and Url, 2002).

These labor market fundamentals are applied as an Accounting Identity Model to distinguish the impact of labor demand and supply by Gordon and Lamont (1982) and Gordon (1988) such as:

Unemployment= Labor Supply (PW x L + NC) – Labor Demand (E)

PW: Working age population, L: Labor Participation Rate, NC: Inward Commuting, E: Employment

The equation above states that unemployment occurs as a difference between labor supply and demand. Labor supply or demand can be more dominant and the equation should be well analyzed.

Local Area Characteristics

There is a large number of region specific variables that has been considered as the determinant of unemployment rates which can affect both labor demand, supply and wages. To start with, education attainment and human capital represent the variables indicating the level of skills and human base quality. Individuals with higher education and human capital face less risk of being laid off. It is, moreover, less likely to experience miss-match and frictional problems and, thus, unemployment is expected to be lower in regions with high education. (Filiztekin, 2009; Burridge and Gordon, 1981; Siegers, 1983; Holzer, 1993; Elhorst, 2003)

Sectoral composition (industrial mix) of regions, the degree of specialization and transformation of industrial structure are also quite important determinants. Declining industries are known to bring higher unemployment (Martin, 1997; Filiztekin, 2009; Elhorst, 2003). For instance, regions that transform rapidly from agriculture based economic activities to industry or high tech sectors are likely to experience high unemployment rates as workers in agriculture sector has totally different skills than the qualifications needed in high tech sectors.

Market potential is supposed to reduce unemployment as firms prefer operating in these areas which there is a large potential of customers (Elhorst, 1995 ; Molho, 1995; Isserman et al., 1986). Hence, it is generated more the job opportunities in big market areas. It is generally measured by GDP, population or population density.

As another determinant, migration is argued to have two sided effect. First, as a region receives more in migration, labor supply directly increases. In turn, this induces the unemployment. Alternatively, If the immigrants are qualified and talented, labor demand is expected to increase more compared to labor supply since the region becomes more attractive for companies. (Chalmers and Greenwood, 1985; Ghatak et al. 1996). The net change in unemployment depends on which impact is more dominant.

Finally, natural amenity is a crucial variable for the attraction of high skilled workers in the region that increases the labor demand and reduce unemployment rate. However, if labor excessively flows into these regions, then, it creates an excess labor supply and unemployment rises (Burridge and Gordon, 1981; Layard et al. 1991; Vedder and Gallaway, 1996)

2.2.2. Empirical Findings (E)

The determinants that are discussed above are tested in various empirical papers. To start with wages, although theoretically rising wages should increase unemployment, empirically an inverse relationship has been found by scholars (Murphy, 1985; Burridge and Gordon, 1981; Hofler and Murphy, 1989; Badinger and Url, 2002)

Regarding industrial structure variables, there are quite mixed results in the literature. For instance, while Summers (1986), Blackley (1989) and Patrick and Rickman (1995) have found that specialization in manufacturing increases the unemployment, Jones and Manning (1992) and Elhorst (1995) have found a controversial impact. In line with latter findings, Badinger and Url (2002) has found that productivity growth in manufacturing has created a permanent substitution of labor with capital and, hence, increasing impact on unemployment. The same ambiguity of findings exists also for specialization in agriculture sector as Malizia and Ke (1993) and Taylor and Bradley (1997) have totally controversial findings.

As another determinant, migration has also quite distinguished effects. On the one hand, Bilger, Genosko and Hirte (1991) and Veen and Evers (1983) have shown that net in migration has a detrimental effect on unemployment, while, on the other hand, it has an

increasing effect as found in Chalmers and Greenwood (1985) and Hofler and Murphy (1989).

2.3. Literature on Turkey (F)

In this field, there is a very limited number of studies on Turkey. There are few exceptional papers. The first one is implemented by Filiztekin (2009). The paper analyzes the extent of the imbalances across regions and the determinants of such variation in unemployment. It analyzes provincial unemployment rates for the years 1980 and 2000. He finds that aggregate unemployment has been rising in Turkey, both at the urban and rural areas. However, the dispersion of the unemployment is very sizable (particularly in urban areas) and the imbalances are getting even more serious recently. In terms of cross regional determinants, young population share, primary school graduation rate, employment growth minus active population growth are found to be factors that are positively associated with low rates of unemployment in provinces. Controversially, population density is a determinant that rises provincial unemployment.

Another study is implemented by Akçagün , Ocal and Yildirim (2013). They analyze the heterogeneity of regional unemployment rate in Turkey between 2004-2011. It has been found a high level of heterogeneity in unemployment both across regions and sectors. Moreover, by using SUR methodology, they found that regional unemployment rates tend to converge in services sector, persists in industry and diverge in agriculture sector. Similarly, Temel, Tansel and Güngör (2005) have found a similar finding on regional and sectoral unemployment convergence.

Finally, Gözgör (2012) who analyzes the unemployment convergence across 26 regions between 2004-2011, found a persistence and non-convergent unemployment rates.

Turkey is a relevant field of study since it includes remarkable regional differences. (Karahasan, 2015; Oktay and Gözgör, 2013; Duran, 2015a; Duran2015b, Duran 2016a, Duran 2016b)

2.4. Contribution to the Literature

In the above summarized literature, cross regional determinants and regional unemployment convergence has been thoroughly analyzed. However, far little attention has been paid on the detailed reasons for region specific rise in unemployment rates.

For instance, in regions, which subgroups (with respect to gender, age and education) display a higher unemployment rate? Does labor supply or demand matter more in the evolution of unemployment rate? In which regions, changes in demand/supply is more dominant? In which sub-groups, changes in demand or supply is more dominant?

All these questions are important and might shed light on the regional specific unemployment problem.

3. Empirical Analysis

In this section, we pursue our empirical analyses by dividing the section into three main research questions below.

3.1. Does regional unemployment rates converge?

An initial step in our empirical analyses is to implement a convergence analyses. However, since the time period of analyses (2004-2017) falls short, it becomes not possible to apply traditional time series convergence techniques (such as panel unit root etc). Instead of this, we rely more on descriptive analyses and distributional dynamics of the regional unemployment rates.

Table 1 below documents basic statistics of regional unemployment rate for the years 2004 and 2017. At a glance, it seems that cross regional mean of unemployment rate seems to persist (while it is 10.2 % in 2004 and it becomes 10.0 % in 2017). In other words, the unemployment problem remains more/less same at the aggregate level. However, its dispersion across regions is getting more pronounced over the years. Such that while it ranges between 1.8 % (TRA2- Ağrı, Iğdır,Ardahan,Kars) and 19.2 % (TRB1-Malatya,Elazığ,

Tunceli, Bingöl) in 2004, it ranges between 3.6 (TR-90 Tranzon,Rize, Giresun,Artvin, Ordu,Gümüşhane) % and 26.9 % (TRC3-Şırnak, Mardin,Batman,Siirt) in 2017. Consistently, from 2004 to 2017, standard deviation, skewedness and kurtosis of the distribution is increasing which points to a more heterogeneous distribution of unemployment rates across regions. According to Jarque-Bera test applied for each year, the distribution of unemployment is shown to have a normal distribution in 2004, but the normality is rejected for 2017.

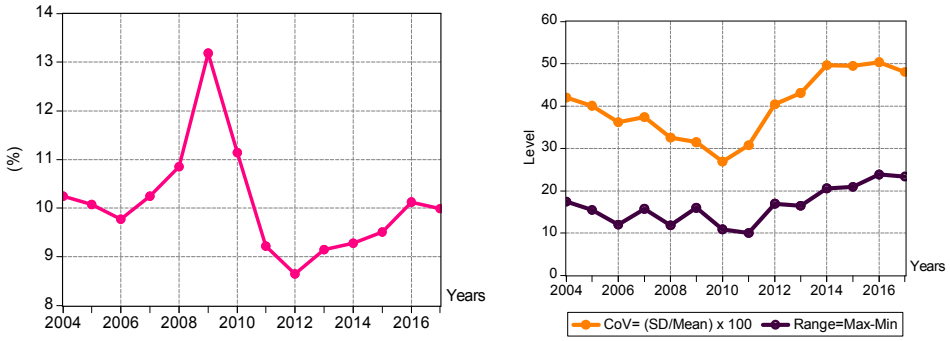
Table 1. Descriptive Statistics

Indicator	2004	2017
Mean	10,2	10,0
Maximum	19,2	26,9
Minimum	1,8	3,6
Range (Max-Min)	17,4	23,3
SD	4,3	4,8
Skewness	0,2	1,6
Kurtosis	2,4	6,9
Jarque-Bera	0,5	26,9
Jaruqe Bera Probability	0,8	0,0

To investigate in dept the tendency of regional unemployment rates to converge each other, we provide two consecutive figures below. Figure 1 (1.2) demonstrates the evolution of cross regional coefficient of variation and range over time. It seems that from 2004 to 2010 regional unemployment rates tend to converge and dispersion declines. However, after 2011, both coefficient of variation and range increases. Hence, overall, there is no tendency to converge but the regional unemployment disparities rather increase over time.

As a second related graph (in figure 2), the Kernel density estimation have been estimated for 2004 and 2017 years. It is clearly seen that initially the distribution of unemployment across regions is normal, unimodal and homogenous. However, in 2017, the distribution becomes more heterogeneous and bi-modal which is a result in line with non-convergent but diverging regional unemployment rates.

Figure 1. Unemployment rate over time cross-regional average



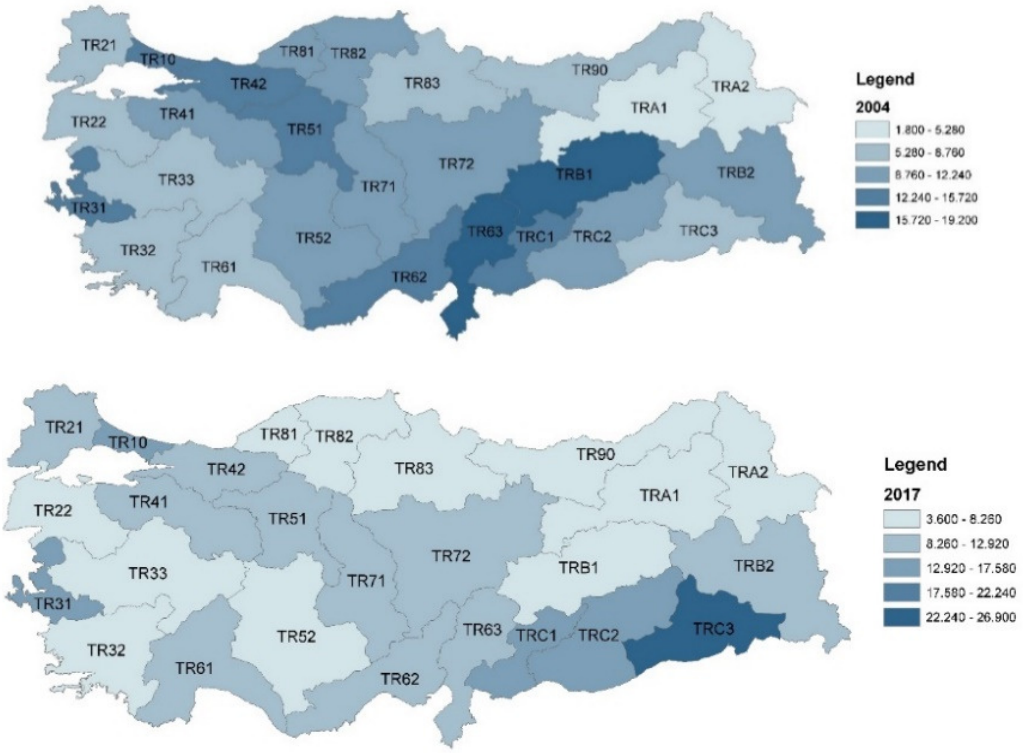
1.1 Cross-regional average **1.2** Cross Regional Dispersion

Figure 2. Kernel distribution of unemployment rates

3.2. Which regions and subgroups have higher unemployment rates?

To shed light on this issue, first, the geographical distribution of regional unemployment rates is displayed in maps. (Figure 3). At a glance, it is observed that from 2004 to 2017, pattern of unemployment has considerably changed. While, in 2004, industrial zones and metropolitan cities have the highest unemployment, in 2017, Southeast region has become dominantly a high unemployment region. Northeastern parts and Blacksea coastal regions have remained consistently as low unemployment regions.

Figure 3. Geographical Distribution of Unemployment Rates



As another important point, we document in the Table 2 the region and sub-group specific rate of unemployment. Sub-groups are determined on the basis of gender, age and education groups. In age groups, 15-24 years represent young group, 24-35 years mid-young group and 35-54 years mid old group. In terms of education, lower degree than high school represents low education group, high school graduates represent middle level educated group and university graduates represent highly educated group. It is a helpful analysis to explore the region specific sources of unemployment. Several implications can be drawn; i. on average, female unemployment rate (10.8) is slightly higher than male unemployment rate (9.7%). Among the age groups, highest unemployment rate is observed for youngest cohort (19 %) where lowest unemployment for the mid-old group (7%). Among the education groups, middle level educated group has the highest unemployment rate (12.8 %) compared to low (9%) and high education (10.7 %) group. ii. There are extremely low and high unemployment rates in various sub-groups and regions. For instance, lowest unemployment rate is observed for TR90 region and mid-old group (3%) whereas highest unemployment rate is observed for TRC3 and youngest group (28.5 %).

The evolution of unemployment for different sub-groups have been analyzed in Table 3. Percentage changes of unemployment over the period 2004-2017 is calculated. In Table 3, while gray color represents increasing trend of unemployment, the pink color represents a decreasing trend. It is observed that a very diverse set of tendencies is observed. Firstly, at the aggregate level male, young, low and middle level educed groups' unemployment rate has been rising while female, middle age and highly educated groups' have been increasing. There is a considerable variation across regions and subgroups in the magnitude and direction of unemployment change. There are some extreme cases. For instance, the group that has fastest increase in unemployment occurs in region TRC3, female group (36 %) while the

decline in unemployment occurs fastest in region TRB1, youngest group (26 %). Other detailed region and group specific dynamics can be observed in Table 3.

Table 2. Regional unemployment rates

Regions	Total	Male	Female	15-24 ages (young)	25-34 ages (mid-young)	35-54 ages (mid-old)	Low_edu	Mid_edu	High_edu
TR10	12,5	11,2	15,7	20,1	11,1	10,3	12,9	12,7	11,0
TR21	8,5	6,8	12,5	18,3	8,7	6,5	7,7	9,8	9,2
TR22	6,4	5,7	7,9	15,1	8,2	4,3	5,0	9,2	9,3
TR31	14,1	12,0	18,7	25,1	14,2	10,4	13,8	16,4	12,4
TR32	8,6	7,6	10,6	16,9	10,3	6,2	7,6	11,4	10,4
TR33	6,5	6,4	6,5	14,6	7,8	4,2	5,4	9,6	8,8
TR41	8,8	7,9	11,3	16,8	9,4	6,2	8,2	9,9	9,6
TR42	11,5	10,2	14,6	22,5	11,5	8,2	11,0	12,7	12,2
TR51	11,9	9,8	17,2	25,2	12,0	7,7	12,5	13,1	9,8
TR52	7,9	7,2	10,0	16,0	8,5	5,0	6,9	11,6	8,9
TR61	9,0	8,0	10,9	17,6	10,3	6,6	8,1	11,9	9,7
TR62	14,1	12,5	18,3	23,8	16,1	9,6	12,6	18,3	14,7
TR63	14,1	14,0	14,4	23,6	15,9	10,5	13,9	17,1	14,4
TR71	10,0	9,8	10,1	20,9	11,6	6,3	9,0	14,7	10,4
TR72	10,8	10,0	13,2	22,0	12,0	6,9	9,8	14,2	11,6
TR81	7,8	8,2	7,3	20,2	10,6	4,5	6,2	12,8	12,5
TR82	6,7	6,0	8,1	15,0	9,0	4,4	5,8	10,8	8,6
TR83	6,8	6,7	7,0	13,5	9,4	4,5	5,7	11,3	10,7
TR90	5,8	6,5	4,8	18,3	8,8	3,0	4,4	10,4	9,9
TRA1	5,8	7,0	3,2	11,6	7,8	3,4	5,3	8,8	7,5
TRA2	6,0	7,3	3,0	11,1	7,2	3,7	6,4	8,4	6,0
TRB1	11,9	11,7	12,2	25,0	14,4	7,0	11,2	16,2	14,6
TRB2	11,7	13,1	6,0	18,2	13,9	7,4	13,1	15,7	10,2
TRC1	13,5	13,8	10,6	19,9	14,0	10,7	14,3	12,8	10,8
TRC2	13,8	15,0	7,8	17,8	14,9	11,6	15,1	13,9	10,4
TRC3	18,3	18,2	18,5	28,2	18,7	13,0	19,7	18,2	14,2
Mean	***10,1***	***9,7***	***10,8***	***19,1***	***11,4***	***7,0***	***9,7***	***12,8***	***10,7***
Max	***18,3***	***18,2***	***18,7***	***28,2***	***18,7***	***13,0***	***19,7***	***18,3***	***14,7***
Min	***5,8***	***5,7***	***3,0***	***11,1***	***7,2***	***3,0***	***4,4***	***8,4***	***6,0***
Range	***12,5***	***12,5***	***15,6***	***17,2***	***11,5***	***9,9***	***15,3***	***9,8***	***8,7***
SD	***3,3***	***3,3***	***4,6***	***4,4***	***3,0***	***2,8***	***4,0***	***2,9***	***2,2***
Cov	***0,3***	***0,3***	***0,4***	***0,2***	***0,3***	***0,4***	***0,4***	***0,2***	***0,2***

Table 3. Change in unemployment rates (2004-2017)

	male	female	young	mid-young	mid-old	low edu	mid edu	high edu
TR10	-0,12	3,61	3,93	0,96	1,91	1,21	1,65	2,66
TR21	0,11	4,76	2,61	0,50	3,51	2,10	-0,27	2,23
TR22	-1,74	2,44	0,00	-0,22	-0,57	0,10	-4,04	-5,22
TR31	-2,66	-1,18	-0,48	-1,21	-0,27	-1,32	-1,67	-3,55
TR32	-0,77	-0,69	0,11	0,99	-0,73	-1,29	-3,58	0,24
TR33	-3,41	2,72	-4,12	-1,54	0,92	-1,10	-5,56	-3,72
TR41	-0,13	1,71	2,40	2,08	0,78	1,30	-2,67	-1,01
TR42	-3,84	2,72	-7,67	0,76	-0,26	-2,26	-3,27	-0,26
TR51	-3,30	-8,35	-9,81	-0,75	-1,62	-3,69	-6,74	-0,20
TR52	-3,84	0,17	-7,08	-1,94	-1,86	-2,49	-8,53	-3,76
TR61	3,40	8,60	7,10	5,63	4,72	4,76	5,10	5,04
TR62	-4,80	-4,79	-6,29	-4,07	-3,10	-3,55	-9,41	-5,53
TR63	-7,33	-2,67	-7,42	-6,49	-3,76	-7,18	-8,23	0,35
TR71	-3,01	11,99	3,54	1,21	2,58	1,11	-7,08	2,92
TR72	-0,32	7,76	1,13	4,04	2,65	1,35	-0,45	4,07
TR81	-7,73	1,18	-6,03	-6,94	-0,01	-4,25	-9,83	-4,86
TR82	-6,57	-6,27	-14,72	-5,40	-1,32	-5,98	-10,76	-2,02
TR83	-1,00	3,24	1,36	-0,56	2,06	1,39	-5,17	-4,53
TR90	-5,04	-1,24	-3,01	-4,19	-0,84	-2,53	-11,58	-4,78
TRA1	1,12	3,98	7,38	2,03	2,79	1,23	0,49	0,86
TRA2	3,87	3,11	6,28	3,29	3,40	3,17	0,62	9,52
TRB1	-13,92	-8,73	-26,92	-9,03	-4,52	-14,74	-15,08	-9,78
TRB2	1,80	7,92	-4,58	3,66	5,93	0,65	1,37	7,62
TRC1	-1,80	9,55	7,50	0,85	-4,65	-1,93	1,01	7,74
TRC2	2,14	4,20	2,31	0,77	2,03	0,95	4,27	5,16
TRC3	17,18	36,19	31,20	18,94	15,55	21,50	16,65	12,25
Mean	-1,61	3,15	-0,82	0,13	0,97	-0,44	-3,18	0,44
Number of Increasing regions	7	18	13	15	14	12	8	14
Number of decreasing regions	19	8	13	11	12	14	18	12

3.3. Does labor supply or demand matters for regional unemployment change?

To investigate this issue, we use unemployment accounting identity model (as introduced in literature review part) used by. Gordon and Lamont (1982) and Gordon (1988). It refers to the following identity:

Unemployment= Labor Supply – Labor Demand *(1)*

ΔUnemployment= ΔLabor Supply – ΔLabor Demand *(2)*

Where Δ denotes the change over the period 2004-2017. Labor supply is measured by the number of people in labor force, labor demand is measured to by total number of employed people.

The equations above states that unemployment occurs as a difference between labor supply and demand. Labor supply or demand may be dominant and the equation should be well analyzed.

we first develop a measure that shows the relative importance of labor supply with respect to demand for the evolution of unemployment.

Relative Importance of Labor Supply= Absolute Change in Labor Supply/Absolute Change in Labor Demand *(3)*

If the resulting ratio is above 1, it means the change in unemployment is more dominantly driven by increase/decrease in labor supply. In contrast, if it is below 1, labor demand is more dominant. The results are summarized in Table 4 below.

There are several important results. First, there are 19 regions, the change in unemployment is labor supply driven whereas only 7 is demand driven. Second, in terms of gender groups, change in female unemployment is supply driven (24 regions) compared to the male unemployment (14 regions). In terms of age, middle age old group is the most supply driven age group (23 regions) followed by middle age young (19 regions) and young groups (16 regions). Finally, with respect to education groups, in highly educated group, the evolution of unemployment is labor supply driven (26 regions) followed by middle level educated (15 regions) and least educated group (17 regions). Hence, in Turkey, rise/decline in regional unemployment is mostly triggered by increase in labor supply.

As a sum, we analyzed 26 regions and 8 sub-groups. Hence, we used a data for 208 (26 x 8) observations. Out of 208, 154 of the cases is labor supply driven which corresponds to 74 % of the data. Hence, one may consequently argue that the changes in unemployment in Turkey is mostly caused by changes in labor supply. In other words, unemployment problem is mainly an excessive labor supply problem.

To complement our results, we develop a panel regression model and test, in this way, the relative impact of labor supply or demand:

$$\ln \Delta uneployment_{i,t} = \beta_0 + \beta_1 \ln \Delta labor\ supply_{i,t} + \beta_2 \ln \Delta labor\ demand_{i,t} + \exists_{i,t}$$

In order to capture the region fixed and time fixed effects, we add necessary dummies to the model.

The model is estimated for each sub-group and by referring to whole period and only after the global economic crisis in 2008-2009. For the sake of robustness, we applied several spatial dependence tests to the model which has return no significant bias due to spatial autocorrelation (Table 5).

The results of the regression analyses are presented in Tables 6 and 7. In all of them, regardless of which sub-group has been employed and regardless of whether the period of analyses refers to entire or only post crisis time, labor supply has robustly a greater and significant impact compared to the labor demand. Consistent with expectations, the labor demand has always a negative coefficient whereas labor supply has a positive and significant coefficient.

Hence, one may safely argue that in Turkey, the main dynamic behind the unemployment is due to labor supply reasons, both in increase or decrease of unemployment.

4. Conclusions and Policy Implications

In this study, we tried to pursue an empirical analysis to shed light on region specific and detailed causes of unemployment in Turkish regions for a period 2004-2017. Our statistical analyses indicate three main results.

First, there is a sizable difference in unemployment rates across regions and the dispersion is getting stronger over time. Hence, there is no tendency to converge but the regional unemployment rates rather tend to diverge. Second, among the subgroups, on average, female unemployment rate (10.8) is higher than male unemployment rate (9.7%). With regard to the unemployment in age groups, highest unemployment rate is observed for youngest cohort (19 %) where lowest unemployment for the middle aged old (35-54 age) group (7%). Regarding the education groups, middle level educated group has the highest unemployment rate (12.8 %) followed by low (9%) and highly educated (10.7 %) group. ii. There are extremely low and high unemployment rates in various sub-groups and regions. For instance, lowest unemployment rate is observed for TR90 region (middle age old group (3%)) whereas highest unemployment rate is observed for TRC3 (youngest group (28.5 %)).

Table 4. Absolute Change in labor supply/ Absolute Change in labor demand

Spatial Dependence Tests	Test Statistics	P-Value
Lagrange Multiplier Error	0,974	0,324
Lagrange Multiplier Lag	0,330	0,856
Robust Lagrange Multiplier Error	1,776	0,183
Robuts Lagrange Multiplier Lag	0,835	0,361

Table 5. Spatial Dependence tests

BÖLGE KODU	Total	Male	Female	Young	Mid-Young	Mid-old	Low Edu	Mid Edu	High Edu
TR10	1,20	1,13	1,27	1,59	1,18	1,15	1,21	1,22	1,18
TR21	1,14	1,07	1,28	1,63	1,11	1,15	1,18	1,10	1,12
TR22	1,04	0,90	1,21	1,15	1,07	1,02	1,04	1,00	1,04
TR31	1,12	1,03	1,22	0,50	1,11	1,12	1,04	1,16	1,13
TR32	1,05	1,03	1,08	1,25	1,21	1,03	0,91	1,03	1,12
TR33	0,97	0,75	1,19	1,47	0,94	1,09	1,59	0,97	1,08
TR41	1,12	1,09	1,19	0,20	1,34	1,09	1,47	1,04	1,11
TR42	1,09	1,02	1,20	1,08	1,17	1,08	1,08	1,06	1,14
TR51	1,05	1,02	1,08	0,57	1,11	1,06	1,02	0,92	1,12
TR52	0,98	0,92	1,08	0,92	1,00	0,99	0,96	0,85	1,06
TR61	1,28	1,21	1,39	1,71	1,46	1,18	1,33	1,30	1,19
TR62	1,01	0,90	1,12	0,99	0,79	1,03	0,94	0,92	1,13
TR63	1,01	0,91	1,15	0,93	0,89	1,03	0,92	0,99	1,19
TR71	1,17	0,95	1,68	0,25	1,22	1,16	1,29	1,04	1,21
TR72	1,20	1,09	1,32	1,43	1,31	1,13	1,17	1,17	1,21
TR81	0,80	0,59	1,14	1,64	1,59	1,06	0,36	0,61	1,08
TR82	0,96	0,84	1,03	0,40	0,89	1,02	0,94	0,75	1,09
TR83	0,71	0,73	0,72	1,11	1,17	1,19	0,93	0,00	1,08
TR90	2,71	0,08	1,15	1,26	1,45	0,98	1,28	0,73	1,04
TRA1	0,87	NA	0,90	0,98	0,95	1,28	0,98	1,10	1,09
TRA2	1,26	1,34	1,14	1,40	1,20	1,24	1,25	1,11	1,17
TRB1	0,83	0,65	1,04	0,00	0,70	0,98	0,75	0,59	1,08
TRB2	1,19	1,22	1,15	1,12	1,25	1,28	1,16	1,26	1,26
TRC1	1,17	1,09	1,28	1,88	1,23	1,05	1,10	1,20	1,28
TRC2	1,19	1,21	1,15	1,24	1,18	1,16	1,16	1,32	1,22
TRC3	3,53	2,54	3,75	5,71	3,43	1,85	4,00	2,20	1,37
Supply Dominant Cases	19	14	24	16	19	23	17	15	26
Demand Dominant Cases	7	11	2	10	6	3	9	10	0

Third, changes in unemployment is mostly driven by changes in labor supply rather than labor demand regardless of which sub-groups and time period analyzed. We confirm this result both by using descriptive statistics and inferential panel data regression analyses. We found that out of 26 regions, there are 19 regions in which dominant unemployment dynamic is the changes in labor supply. For all subgroups, there are more labor supply driven cases than the labor demand driven cases. Among the 208 cases (26 regions x 8 sub-groups), in 154 cases, the major driver of unemployment is the change in labor supply.

These results have important policy implications. Migration policies should be revised. Once, migration takes place from underdeveloped regions to the developed ones, this creates an excess labor supply. The labor market frictions might increase since the skills and talents of migrants can hardly meet the needs of employers in developed areas. Hence, excessive labor supply and miss-match problem is a very important cause of unemployment. Another

important policy implication regards the transformation from an agricultural based economic structure to an industrialized and service based economy. As the agriculture loses its share in rural regions, massive agricultural labor become unemployed and tend to move towards industrialized and metropolitan cities. Hence, in order to come over such a problem, policies regarding agriculture sector, its modernization and stimulation should be maintained. By following relevant policies, excess labor supply can be cured and it can provide a solution for regional unemployment problem

Table 6. Regression Analysis Results

Variables	Total	Male	Female	Young	Mid-young	Mid-Old	Low Edu	Mid Edu	High Edu
Labor_supply	8,646	8,500	9,460	5,303	8,188	11,991	8,135	7,795	9,660
Labor_demand	-7,793	-7,787	-8,337	-4,279	-7,090	-11,363	-7,370	-6,757	-8,604
constant	0,004	0,002	-0,001	0,004	-0,001	0,018	0,002	-0,002	-0,005
Regional Fixed Effect Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Regional Time Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	338	338	338	338	338	338	338	338	338
R-Squared	0,86	0,86	0,73	0,92	0,9	0,81	0,82	0,92	0,91
Histogram Normality Test	1192***	1610***	1601***	316***	626***	293***	422***	414***	1546***

Table 7. Regression Analysis Results (post crisis)

Variables	Total	Male	Female	Young	Mid-young	Mid-Old	Low Edu	Mid Edu	High Edu
Labor_supply	8,413	8,072	9,901	5,284	7,998	11,483	7,892	7,585	9,456
Labor_demand	-7,585	-7,400	-8,715	-4,269	-6,869	-10,823	-7,179	-6,555	-8,395
constant	0,003	0,002	-0,003	0,003	0,000	0,012	0,002	-0,001	-0,004
Regional Fixed Effect Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Regional Time Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	338	338	338	338	338	338	338	338	338
R-Squared	0,85	0,86	0,72	0,91	0,89	0,78	0,81	0,91	0,9
Histogram Normality Test	3049***	7260***	1960***	811***	1363***	1101***	1379***	1013***	2503***

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Appendix 1. Region Codes and Provinces

Code of the Region	Provinces in the region
TR10	Istanbul
TR21	Tekirdag, Edirne, Kirklareli
TR22	Balikesir, Çanakkale
TR31	Izmir
TR32	Aydin, Denizli, Mugla
TR33	Manisa, Afyon, Kütahya, Usak
TR41	Bursa, Eskisehir, Bilecik
TR42	Kocaeli, Sakarya, Düzce, Bolu, Yalova
TR51	Ankara
TR52	Konya, Karaman
TR61	Antalya, Isparta, Burdur
TR62	Adana, Mersin

Code of the Region	Provinces in the region
TR63	Hatay, Kahramanmaras, Osmaniye
TR71	Kirikkale, Aksaray, Nigde, Nevsehir, Kirsehir
TR72	Kayseri, Sivas, Yozgat
TR81	Zonguldak, Karabük, Bartin
TR82	Kastamonu, Çankiri,Sinop
TR83	Samsun, Tokat, Çorum, Amasya
TR90	Trabzon, Ordu, Giresun, Rize, Artvin, Gümüshane
TRA1	Erzurum, Erzincan, Bayburt
TRA2	Agri, Kars, Igdir, Ardahan
TRB1	Malatya, Elazig, Bingöl, Tunceli
TRB2	Van, Mus, Bitlis, Hakkari
TRC1	Gaziantep, Adiyaman, Kilis
TRC2	Sanliurfa, Diyarbakir
TRC3	Mardin, Batman, Sirnak, Siirt

THE IMPACT OF THE ECONOMIC CRISIS IN THE PROCESS OF CONVERGENCE OF THE GREEK REGIONS

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Abstract
In this paper, the impact of the economic crisis on the convergence of the Greek region's economy to the European average is examined. In particular, it is being considered the condition of absolute β-convergence using the econometric model of Barro and Sala-i-Martin. The dependent variable was represented by the average value of Gross Domestic Product (GDP) per capita in Purchasing Power Standards (PPS). Additionally the hypothesis of the σ-convergence of the regions of the EU and Greece is being considered, based on the coefficient of variation weighted by population. The results of both absolute β-convergence and σ-convergence suggest a declining trend of convergence and persistence of inequalities for the regions of the EU, following the outbreak of 2008 economic crisis. Regarding the regions of Greece, the results indicate, on the one hand, their deviation from the average income of the regions of the EU and, on the other, a significant increase in the regional disparities in the period 2000-2016.

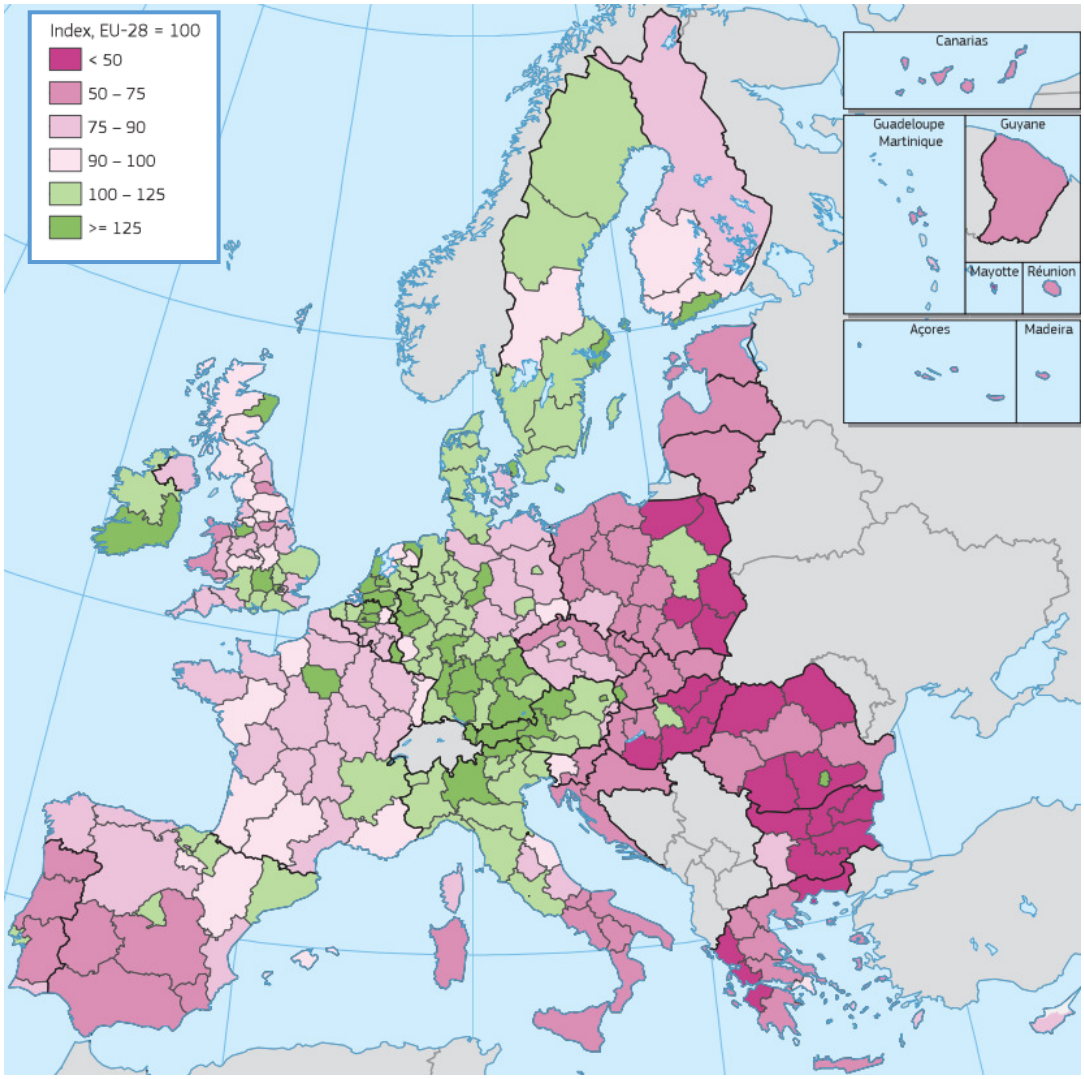
Keywords: Convergence, Disparities, Economic Crisis, Regions
JEL classification: O41, R11, R12

1. Introduction

European economic integration, which began in 1957 with the Treaty of Rome and the creation of the European Economic Community, has always been accompanied by the idea of social cohesion among its member states. Cohesion was to be achieved mainly through the promotion of growth-enhancing conditions and the reduction of disparities between the levels of development of the various European regions.

Addressing disparities in development is a key priority in all planned policies at all spatial levels (Lammarino et al., 2017; Lopez-Bazo et al., 2014). The negative impact of the economic crisis that occurred in 2008 continues to date in many regions. According to the 7th Report on Economic, Social and Territorial Cohesion (European Commission, 2017), more than one in four EU residents live in regions with Gross Domestic Product per capita in Purchasing Power Standards (GDP per capita in PPS) below 75% of the European average. Most of these regions are located in the eastern and southern Member States of the EU (Figure 1).

Figure 1: GDP per capita in PPS of the European Union regions in 2015

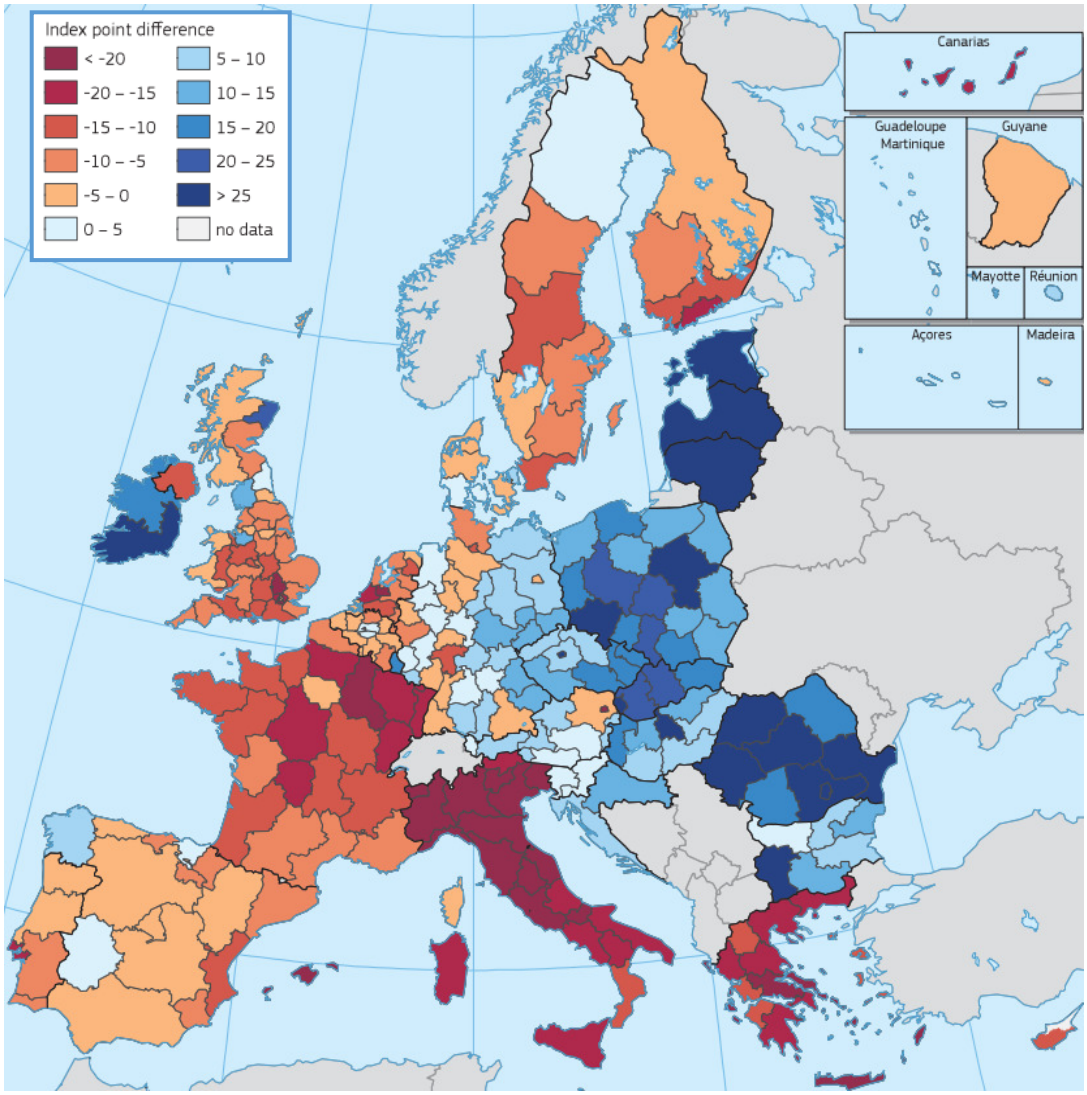


Source: European Commission (2017)

From 2000 to 2015 the regions of the eastern EU member states recorded a significant increase in GDP per capita in PPS (Figure 2). Its increase from 56% to 136% in regions of Romania and from 38% to 76% in regions of Bulgaria is indicative of the situation. This increase is estimated to be largely attributable to the substantial financial support given to the new eastern European Members States in the form of structural funds. It should be noted that Estonia (EE), Lithuania (LT), Latvia (LV), Poland (PL), Slovakia (SK), Hungary (HU) and the Czech Republic (CZ) are financially supported with resources coming from the European Regional Development Fund (ERDF) ranging from €1,427 per resident for Estonia (EE) to €1,058 per resident for Poland (PL). Also, Poland (PL) receives around €89 billion for the period 2014-2020, almost twice as much as €44 billion, which is allocated to the next member in line, Italy (European Parliament, 2016a; 2016b; 2015).

On the contrary, in the southern EU regions (Greece, Italy, Portugal, Spain) the situation has deteriorated considerably where there has been a reduction in GDP per capita in PPS which exceeded 20% in many cases. It is worrisome that the aforementioned deterioration concerning the southern regions of the EU coexists with a continuous increase in financial resources allocated to regional development policies (Hurst et al., 2000; Puga, 2001; European Commission, 2010, Koudoumakis and Botzoris, 2015).

Figure 2: Change of GDP per capita in PPS of regions of the European Union



Source: European Commission (2017)

2. The process of convergence

In general, convergence defines the evolution of a variable towards a present value. In the theory of economic and regional development, convergence (also sometimes known as the catch-up effect) can be defined as the process of poorer economies to grow with faster rates than richer economies.

As β-convergence is characterized the process in which the poor regions grow faster than the rich ones, in order to achieve a similar level of per capita GDP. As a result, a process of capital transfer from the richest economies to the poorest ones will take place creating the conditions needed for the convergence to long-term equilibrium of the GDP per capita of all economies (Barro and Sala-i-Martin, 1992; Sala-i-Martin, 1996a). The concept of β-convergence is based on the neoclassical growth theory of which a basic assumption is that factors of production are subject to diminishing return (Solow, 1956; Koopmans, 1965). The β-convergence is categorised into absolute convergence when all regions are assumed to converge (in terms of GDP per capita and growth rate) to the same steady state, and conditional convergence, when the regions with the same initial conditions achieve the same GDP per capita in the long run. The steady state may depend on the specific characteristics of each region. The value of the parameter β is calculated from the slop in the growth regression and represents the convergence rate, viz the rate that each region approaches their steady state. A well-known term of the concept of β-convergence is the "half-life", which expresses the time span until disparities are halved. Usual values of the parameter β are around 2% (Abreu et al., 2005b, p. 390; Monfort, 2008).

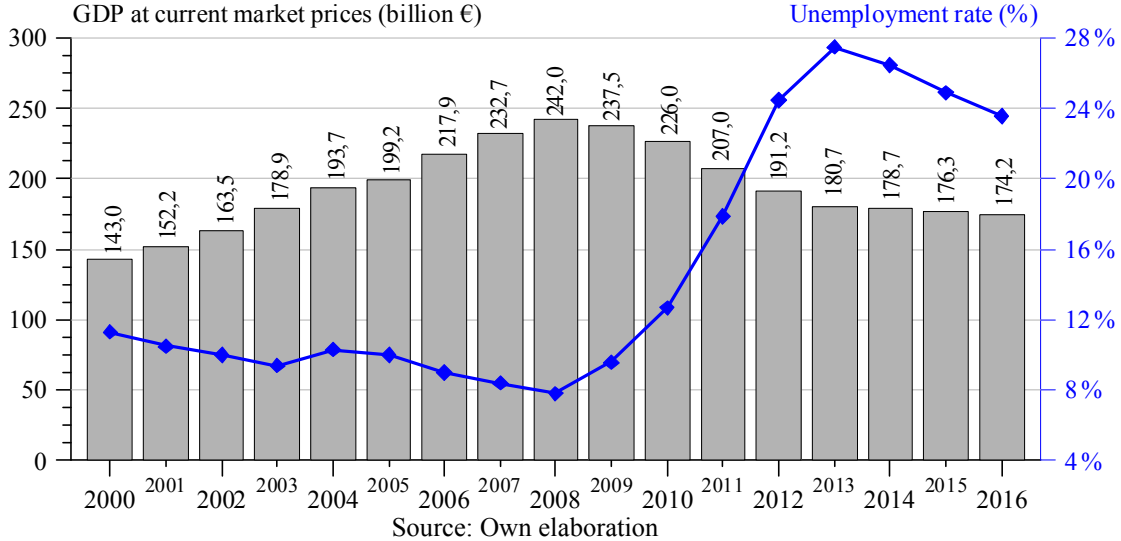
Besides the β-convergence, the σ-convergence describes the reduction of the dispersion of income levels across economies. While β-convergence focuses on catching-up process, σ-convergence refers just to the reduction of disparities among under study regions in time. Although σ-convergence only occurs if β-convergence takes place, β-convergence is necessary but not sufficient for σ-convergence (Sala-i-Martin, 1996b; Eckey and Türck, 2005). Friedman (1992) and Quah (1993) suggest that σ-convergence is more revealing of the reality than β-convergence because it speaks directly as to whether the distribution of income across economies is becoming more equitable, without relying on the estimation of a particular model (Young et al., 2008).

3. The economic crisis in Greece and the impact on GDP and unemployment rate

The term "economic crisis" is used in Greece not only for its economic point of view but also for political and social ones. The Greek economic crisis (also known as the Greek Depression) started in late 2009, triggered by the turmoil of the Great Recession of 2007-2008 and inherent structural weaknesses of the Greek economy. The crisis reached the populace as a series of sudden reforms and austerity measures that led to a loss of income and sometimes of property.

The Greek economic crisis seriously affected the economy of the country. Between the years 2008-2016, the Gross Domestic Product (GDP) at current market prices of Greece was reduced by 28% (Figure 3), compared to -8% in Spain, -6% in Portugal, -4% in Italy and -6% in the EU-28 countries. Unemployment increased in Greece from 7.8% in 2008 to 27.5% in 2013 (Figure 3), in Spain from 8.2% in 2007 to 26.1% in 2013, in Portugal from 7.7% in 2008 to 16.4% in 2013, in Italy from 6.1% in 2007 to 12.7% in 2014 and in the EU-28 countries from 7.0% in 2008 to 10.9% in 2013. Unemployment of the youth was significantly affected in Greece after the year 2008 reaching up to 50% (58.3% in 2013).

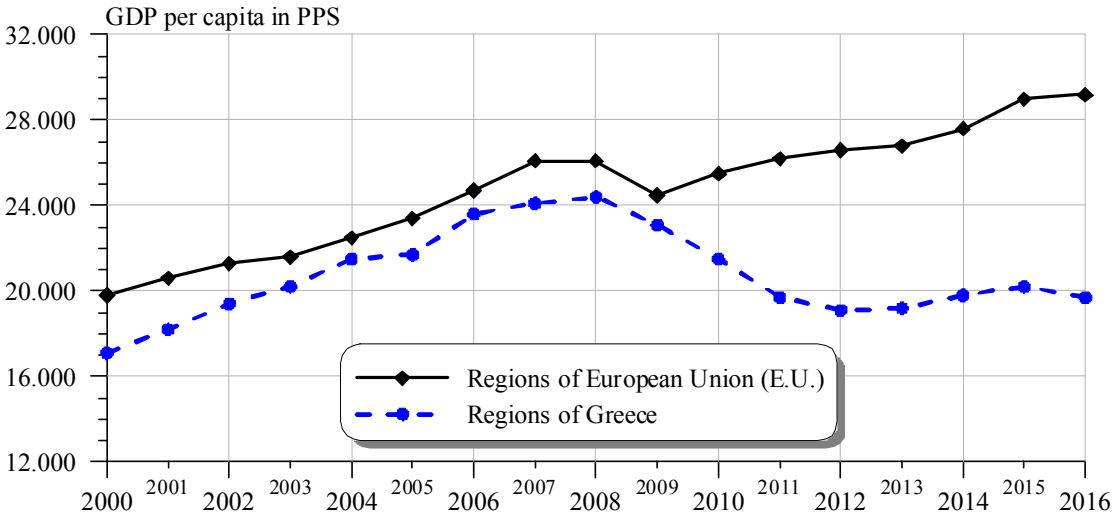
Figure 3: Evolution of Greek GDP and unemployment rate



Source: Own elaboration

The evolution over time of the average GDP per capita in PPS of the regions of the EU and Greece, Figure 4, reflects the convergence dynamics developed in the period 2000-2008 and the significant deviation in the period 2008-2016. It also demonstrates that while the regions of the EU recover from the economic crisis that occurred in 2008, its impact on the income of the residents of the regions of Greece continues to this day.

Figure 4: Change in GDP per capita in PPS of regions of the European Union and Greece



Source: Own elaboration

4. The economic crisis in Greece and the impact on convergence

To further explore the problem, the hypothesis of absolute β-convergence between the regions of the EU and Greece, is examined, using the econometric model of Barro and Sala-i-Martin (1992), which is expressed by the equation:

$$\frac{1}{T}\cdot\log\frac{Y_{i,T}}{Y_{i,0}}=\alpha+\beta\cdot\log Y_{i,0}+\varepsilon_i \qquad (1)$$

Equation (1) demonstrates that the average economic growth of GDP per capita in PPS ($Y_{i,T}$ and $Y_{i,0}$) over a period of T years is equal to constant α added to a linear combination of the initial GDP per capita in PPS ($Y_{i,0}$) and the error of the equation (ε_i). Symbol i stands for the spatial units examined which are regions in the present research and β is the estimated coefficient of the equation.

Convergence is achieved when coefficient β gets a negative and statistically significant value in the estimation of the model. Absolute β-convergence suggests that there is a systematic tendency for economies with lower GDP per capita levels to grow faster than those with higher levels and yet both result in equilibrium achieved at the same point in the long run.

This paper examined the condition of absolute β-convergence with panel data, taking into account both the cross-sectional and temporal dimensions of the data. The dependent variable was represented by the average value of GDP per capita in PPS in the EU. The results deriving from the solution of the econometric convergence model for the regions of the EU and Greece are presented in Table 1 for the period 2000-2016 as a whole, as well as for the periods 2000-2008 and 2008-2016.

Table 1. Results of an econometric model of absolute convergence

Spatial unit	β-coefficient	Annual rate of convergence	Half-life (in years)
		period 2000-2016	
Regions of the European Union (EU)	-0.088***	5.4%	13
Regions of Greece	0.0035***		
		period 2000-2008	
Regions of the European Union (EU)	-0.189***	8.5%	6
Regions of Greece	-0.305***	15.4%	4
		period 2008-2016	
Regions of the European Union (EU)	-0.041***	3.6%	19
Regions of Greece	0.380***		

Note: ***, denote statistical significance p<0.01.

Source: Own elaboration

For the period 2000-2016, the evaluation of the results confirms the existence of a trend of convergence of the regions of the EU, a negative and statistically significant value of coefficient β, and for the same period, a trend of divergence of the regions of Greece, a positive and statistically significant value of coefficient β. The annual convergence speed of the EU regions is calculated using the Equation (2) of Sala-i-Martin (1996a) and is found equal to 5.4%.

$$b = \frac{-\ln(1+T\cdot\beta)}{T} \qquad (2)$$

The time τ required to halve the growth gap between the richest and the poorest regions of the EU, defined as half-life, is calculated using the Equation (3) of Sala-i-Martin (1996a) to be 13 years.

$$\tau = \frac{-\ln(2)}{\ln(1+b)} \qquad (3)$$

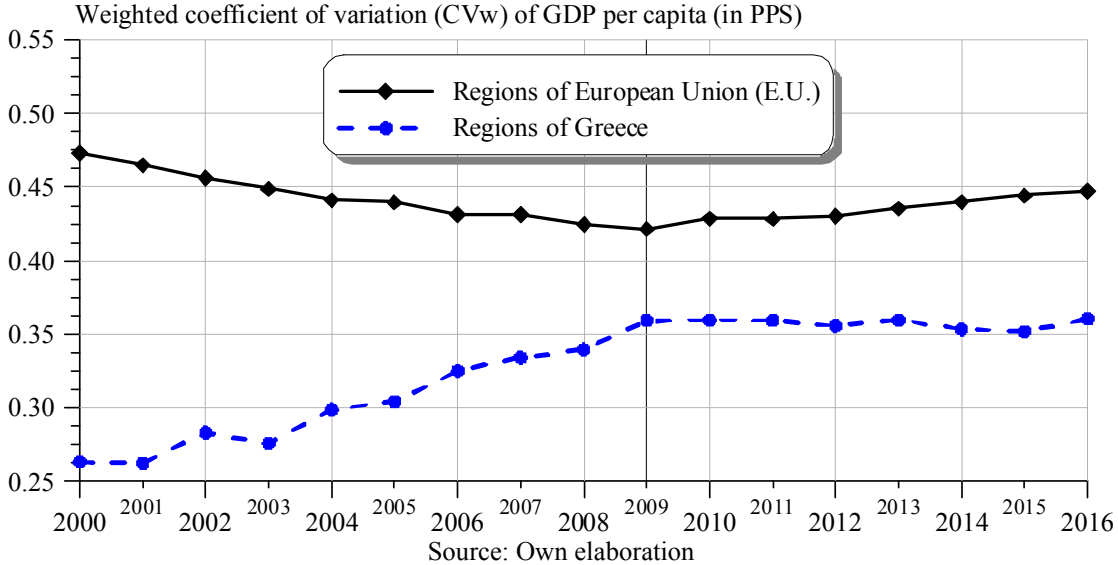
There is also a decrease in the annual rate of convergence of the EU regions from 8.5% in the period 2000-2008 to 3.6% in the period 2008-2016. Similarly, regarding the Greek regions, the significant convergence dynamics developed in the period 2000-2008 are reversed into a significant divergence trend for the period 2008-2016.

Additionally, the hypothesis of the σ-convergence of the regions of the EU and Greece is being considered. It is noted that σ-convergence examines the evolution of income distribution over time while β-convergence examines income mobility within the distribution. Thus, these two notions of convergence are considered complementary and according to the literature they should be considered together (Sala-i-Martin, 1996a).

The σ-convergence is observed in the case of a gradual decrease in the dispersion of GDP per capita in PPS of the economies under consideration. The present research employs the coefficient of variation weighed by population, which is defined as the quotient of the standard deviation with the mean value, as a measure of dispersion. The coefficient of variation expresses the standard deviation as a percentage of the mean value and thus it is a dimensionless quantity. Therefore, it is not affected by the value of the arithmetic mean.

The evolution of the weighted coefficient of variation (CVw) tends to reduce the inequalities of the regions of the EU by around 11% for the period 2000-2009, as shown in Figure 5. At the same time, the slightly upward trend presenting an increase of 4% over the period 2009-2016, confirms the claims in the literature (Friedman, 1992; Quah, 1993) according to which β-convergence is a necessary condition but not a sufficient one in our case, since the economic crisis of 2008 being a disturbance, appears to be able to increase the income dispersion of the spatial units under consideration, even if they converge at common point of a long-term equilibrium.

Figure 5: Change in the weighted Coefficient of Variation (CVw) of regions of the European Union and Greece



Source: Own elaboration

Similar results are presented in the 7th Report on Economic, Social and Territorial Cohesion of the European Commission (European Commission, 2017) according to which, before the economic crisis inequalities in GDP per capita shrink within the EU. The fluctuation rate is reduced by 12% over the period 2000-2008, while during the years of the crisis, from 2008 to 2014, regional disparities are slightly increased by 4%, remaining below the level they reached in 2000.

As far as the EU member states are concerned, the calculation of absolute β-convergence for the period 1995-2010, showed (Petrakos et al., 2011) the converge at an annual rate of 3.13% and half-life was found equal to 22 years. They are also reporting a trend for EU member states toward σ-convergence by reducing the dispersion of GDP per capita.

On the other hand, the inequalities of the regions of Greece in the same period (2000-2009) are significantly increased by approximately 29%, suggesting an unbalanced growth for the period 2000-2009, while the consequent steady course of the weighted coefficient of variation (CVw) till 2016 validates the claims of many researchers (Kuznets, 1955; Williamson, 1965; Capello, 2007), who argue that regional disparities follow economic cycles in the sense that they grow in times of intense grow and decliner remain stable in times of recession.

5. Conclusion

This paper shows that the dynamic path of convergence of the economy of the Greek regions that was developed in the period 2000-2008 has been fully reversed following the outbreak of the 2008 economic crisis. This tendency to deviate from the European average continues to this day. The significant impact of the economic crisis on the convergence of the economy of the Greek regions is estimated to be due, as evidenced by the significant increase in regional disparities in the period 2000-2008, to the unbalanced growth observed in the period 2000-2008. As far as the regions of the European Union (EU) is concerned, the results of both absolute β-convergence and σ-convergence suggest a declining trend of convergence and persistence of inequalities for the regions of the EU, following the outbreak of the 2008 economic crisis.

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ECONOMIC TRENDS OF THE YOUTH LABOR MARKET IN UZBEKISTAN

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Abstract
The relevance of the study, confirmed by the growing scientific interest in the topic of youth employment in the labor market, is increasing in the context of the new paradigm of innovative development of the national economy in Uzbekistan. The feasibility of studying the economic aspects of the youth labor market development is determined by the high birth rate and the growing unmet demand of the population for educational services. It is obvious that the problem of ensuring the affordability of quality higher education as the main factor in the employment of young people in Uzbekistan is complicated and multidimensional. It is important to explore trends, formulate ways to develop the youth labor market and create a system for monitoring the compliance of the educational market offer with the employers' demands in the labor market. This article is aimed at assessing the current realities, predicting the prospects for the foreseeable future, justifying the ways and specific measures to create irreversible conditions for the convergence of science, education and the real economy in the labor market of Uzbekistan.

Keywords: Unemployment, labor market, youth, education, employment
JEL classification: J00, J01, J08, J2, J20, J4, J40, J6, J60, J7, J70, J8, J80

1. Introduction

This problem has been researched by the authors for a long time, and therefore, real tangible results have been obtained. In addition to the developing obvious trends such as gender disproportions, an insufficient level of skills acquired in colleges and lyceums, insufficient job offers and the absence of adequate organizational and economic conditions and guarantees for the self-realization of young persons, there are also hidden ones, including low competitiveness of young people compared to other age groups, the increased number of young people refusing to work on principle or young people employed in the shadow sector of the economy due to lack of vocational education, underdeveloped regional markets and, as a result, overcrowded labor markets of few megacities, imperfect retraining, reskilling and occupational mentorship. Since the measures to eliminate these problems should be comprehensive, systemic work is needed to improve the methodology for researching the youth labor market, identify macroeconomic dependencies and consequences, and develop youth labor policies at the regional and corporate levels, and in small business.

The general idea of the development of the national economic system in Uzbekistan is formed by five strategic priorities – state and public construction reform, judicial reform, development and liberalization of the economy and social sphere, security assurance and constructive foreign policy. All these spheres create conditions for systemic and comprehensive solutions to the identified problems; they are integrated and clearly manifested in the development of educational system and youth labor market. It is important to understand that Uzbekistan's development strategy is aimed at creating conditions for human development, consistently molds the young people's patriotic and professional consciousness, understanding the importance and the need for continuous self-development and self-improvement, willingness to labor productivity.

Moving from the general to the specific, analyzing strategic objectives of the educational system and the labor market in the context of general trends and challenges, the authors draw a disappointing conclusion: young people lost the work values, which led to a decrease in the occupational prestige of a number of professions needful to society, not to mention their

transformation under the impact of digital technologies. The general question of labor market development is that the dynamics of the economy development makes quite high demands on the professionals at all levels – their professional competence, occupational culture, levels of occupational adaptation and creative initiative. There is much concern about the problem of conformity of school leavers and university graduates with the general requirements.

Numerous private aspects concern young professionals who are at the initial stage of their careers. These are regulatory, organizational, socio-economic and personal problems, for example, specific problems of graduates' employment, their most complete professional and personal fulfillment are often linked to their individual mindsets. Under the influence of contemporary subcultural patterns many graduates, aiming at the unjustified payment criteria for their work and quickly getting the prestigious job positions without having an adequate level of general cultural and professional competencies run into various difficulties and become a significant braking factor in business development. Thus, private problems become general and systemic ones.

Multiplicity of individual cases and methods for their identification and classification complicate the problem. Absence of demand for graduates may vary widely depending on the social, sectoral or regional statuses, which indicates the complexity and magnitude of the problem. Accordingly, the problem of creating a mechanism for the youth labor market development requires the participation of government, private sector and civil society.

The hypothesis put forward by the authors is based on the results of a broad sociological study of youth labor market in Uzbekistan, revealing the nature of general and specific problems, and determining the methods of their solutions and current trends in the development of the labor science methodology on the basis of the acquired empirical experience.

Formulation of the problem: The problem of developing the youth labor market is more relevant than ever against the background of the demographic processes in Uzbekistan. The novelty of the studied problem is determined by the historical conditions of the national economy development in Uzbekistan over the past 27 years. At the present stage the country has achieved an unprecedented rate of demographic growth. According to official data, since 2004 there has been an annual increase in population. In the period 2016-2018 the steady population growth is equal to 1.5% per year. The population increase rate amounts to 1271 people per day. As of the beginning of 2018, children under 15 years of age made 26.5% of the population of Uzbekistan, with 68.8% of people aged 15-65 and 4.7% of persons over 65 years old. From the standpoint of these data, the economy should not experience a shortage of skilled labor, since the literacy rate among young people is 99.9%, and 100.0% among the older generation (Statistics digest, 2018)

The development of Uzbekistan's economy is also characterized by high growth rates of up to 8.0% per year. At the same time there are unexplored problems of school, college and university graduates' employment, and the youth labor market remains unexplored and therefore regulated insufficiently. The authors have set the problem to assess the youth labor market situation, identify and systematize the existing trends and propose solutions that meet the current strategic priorities of the development of the Republic of Uzbekistan. The urgency and complexity of solving the problem is determined by the lack of empirical evidence and methodological coverage.

2. Literature review

The labor science genesis and evolution are an integral part of the development of economics. The basis of the modern methodology for the youth labor market research was formed by the ideas of the leaders of all economic schools studying the issues of market economy. The current stage of development of the youth labor market analysis is characterized by a wide spectrum of research, the possibility of exchanging information at the international level and the unification of research methods, which is caused by the global nature of the youth employment problem. This is evidenced by the data of the International Labor Organization, stating the relationship of youth employment with global economic growth and achievement of the Millennium Development Goals, declared by the UN. The global significance of the problem is underlined by the actual growth of international youth unemployment. In 2017, 5.6% of the population of the planet were unemployed, the

unemployment rate exceeded 192 million people, and by 2019 it will reach 193.6 million people (Statistics digest, 2018). Since the beginning of the 21st century, the number of young unemployed in the world has reached 88 million persons, 13.0% of young people (15-25 years of age) in the world have no jobs, implying a decrease in this indicator (Statistics digest, 2018).

A study of a large body of scientific literature on the problems of the modern labor market showed a high scientific interest in the factors of the labor market internationalization – the international trade growth, the formation of new information and financial systems, the establishment of supranational and national institutions, and the emergence of cryptocurrencies (Abdurakhmanov and Zokirova, 2013; Commander et al., 1995; Kibanov and Dmitrieva, 2017). The factor of deepening technological specialization at the level of countries and regions under the influence of transnational corporations creating channels for the distribution of human resources (firms and their branches) is recognized as significant (Abdurakhmanov and Zokirova, 2014; Borjas, 2013; Commander and Tolstopyatenko, 1997). The researchers emphasize that these trends, influencing the structure of the global labor market, create conditions for rapprochement of countries, a deeper understanding of mental and cultural differences, and form new value systems and standards of workers' behavior (Ehrenberg, and Smith, 2012; Holopova and Bogdanova, 2014).

Information technology development is viewed through the prism of new opportunities for managing labor and working time. Scholars state the emergence of the newest criteria for the social division of labor – highly paid informational labor for high-value production, low-paid labor for high-volume production, raw material producers' labor based on natural resources, and devalued labor of extra producers (Bezrukov, 2018).

Numerous research works are devoted to studying international experience in the development of the institute of social responsibility as an objective condition for ensuring the protection of the rights of social partners – employees and employers. Social partnership development is regulated through state mechanisms for supporting small business, encouraging innovative activities, creating educational infrastructure, improving legislation, etc. (Simchenko et al., 2018).

The problems of the labor market development in the Republic of Uzbekistan are dealt by:

- The Center for Economic Research (CER) which was established in 1999 with the assistance of the Government of the Republic of Uzbekistan and the United Nations Development Program (UNDP). In terms of solving the youth labor market problems, research on the development of pre-school education, demographic processes and effective labor market policies is of interest in the context of sustainable development of Uzbekistan;
- The Institute of Forecasting and Macroeconomic Research which was established in accordance with the Presidential Decree No. PP-3752 dated May 29, 2018 and conducts research on trends and forecasts of socio-economic and innovative development of the regions of the Republic of Uzbekistan;
- The "Scientific Foundations and Problems of Economic Development of Uzbekistan" Scientific Research Center (CEDR) under the Tashkent State Economic University, which was established in accordance with the Resolution No. PP-1927 of the President of the Republic of Uzbekistan dated February 28, 2013. The Demography and Labor Market Sector conducts fundamental and applied studies of demographic processes in Uzbekistan's regions, and analyzes the labor potential and labor market level, the degree of balance in the availability of labor resources and jobs created;
- The Population and Labor Economics Scientific School under G.V. Plekhanov Russian University of Economics, headed by the author of this article – Academician of the Academy of Sciences of the Republic of Uzbekistan K.Kh. Abdurakhmanov. Strategic research areas are the development of new approaches to ensuring the working population employment, improvement of the human capital investment efficiency and the study of demographic trends in the Republic of Uzbekistan;
- Center for Economic Development (CED), a non-profit non-governmental organization which provides research services in the field of economic development and economic policy, in particular, the social sphere and the labor market, including sectoral studies and industry insights;

- Izhtimoiy Fikr Center for Public Opinion Research, focusing on the study, generalization and analysis of public opinion, basic and applied research in the field of improving the methodological foundations of the public opinion study and the organization of scientific forums. Under the general leadership of Academician of the Academy of Sciences of the Republic of Uzbekistan R.A. Ubaidullaeva the Center conducted a sociological survey on the theme "Uzbekistan's Youth: life values, morality, social guidelines" in 2016;

In 2018, the Ministry of Employment and Labor Relations of the Republic of Uzbekistan conducted a large-scale study of 9.000 households in terms of the actual share of the informal employment sector in Uzbekistan and the actual unemployment rate among the economically active population. In addition, the Ministry launched pilot projects on the vocational guidance of high school students in the regions.

The comprehensive studies conducted in the country formed the basis of promising decisions and strategic programs developed by the Government, new legislative acts, the Employment Promotion Concept and the State Program on implementing the Action Strategy for five priority areas of development of the Republic of Uzbekistan in 2017- 2021 during the "Year of Supporting Active Entrepreneurship, Innovative Ideas and Technologies" (Presidential Decree No. UP-5308, 2018).

The "Yoshlar-kelajagimiz" (Youth is our Future) state program is aimed at ensuring youth employment by promoting and supporting youth business initiatives, start-ups, ideas and projects, training unoccupied youth in high-demand occupations and business skills (Presidential Decree No. UP-5466, 2018). Provision is made for preferential loans and property leasing at a rate of 7.0% per annum for youth business initiatives, issuing loan guarantees (up to 50.0% of the loan amount), participation in projects at the rate not exceeding 50% of their value (with subsequent sale of the fund share within five years). "Yoshlar mehnat guzari" (Center for Youth Employment) complexes will be established in labor-abundant areas to create sites for trade and consumer services and small manufacturing facilities.

The employment promotion concept defines the current areas of basic and applied research of the youth labor market in Uzbekistan. There is a clear tendency to separate the problems of the youth and women's labor markets into a separate area of research. At the same time, today the main problem of economic science in Uzbekistan is the imperfection of the domestic methodological framework, the non-systemic nature of research, the lack of scientific debate on the problems of the youth labor market, which makes it impossible for the scientific community to develop and improve the economic science methodology. In this sense, practical decisions and measures of state regulation are ahead of scientific research. Within this context, in the authors' opinion, the relevant objects for basic and applied research include:

- socio-economic reasons for youth unemployment and the disparity between supply and demand in the youth labor market;
- the role of public-private partnerships in ensuring effective coordination and integration of the educational system and the youth labor market;
- the causes and impact of informal employment, precarization and flexibility of social and labor relations on the economy, as well as the reasons for the imbalance between unemployment benefits and income taxes;
- development of regional labor markets, growing shortage of qualified personnel for basic sectors of the economy;
- adaptation of modern marketing research technologies to the youth segment of the labor market in Uzbekistan;
- improvement of labor legislation in the field of youth employment, mitigation of employment conditions, promotion of mentorship and young workers' adaptation tools;
- methods for popularization of lowly occupations required by economics; creating the conditions for a successful career choice and job hunting.

The problems of youth unemployment are analyzed in many modern scientific publications; however, all the authors note that in practice there are no programs for promoting youth employment or they are implemented ineffectively, which ultimately affects the quality of life of the population group under study (Rofe, 2010; Rubery and Wilkinson, 1994; Layard and Richter, 1995). Despite the significant number of scientific papers on youth

employment and unemployment, many of their theoretical and methodological aspects are studied insufficiently (Karmanova et.al, 2013; Kvint, 2009). The problems of determining the essence, role and place of the youth labor market in the system of social and labor relations remain debatable.

The issues of youth unemployment are widely discussed, the need for their solution is obvious, but from a practical viewpoint, they require further study

3. Methods

- The methods of statistical observation, summaries and grouping are used in this study. According to the coverage of units in the aggregate, the following types of statistical observational studies are distinguished:

- Complete observation implies acquisition of information about all population units. It is characterized by high material and labor costs, and inefficiently quick delivery of up-to-date information. It is used in taking the population censuses, data collection and reporting for large and medium-sized enterprises of various forms of ownership.

- Incomplete observation is based on the principle of random selection of units of the studied population, with all types of units in the aggregate, represented in the sample as a whole. It has a number of advantages over complete observation relating to reduction of time and money costs. This type of observation is used in the given study.

- Statistical information may be acquired by the following methods:

- - Direct statistical observation, when the evaluators themselves establish the fact to be recorded by direct measurement, weighting, and counting.

- - Documentary observation which is based on the use of various kinds of accounting documents. It includes a reporting method of observation, when enterprises submit statistical reports on their activities on a strictly mandatory basis.

- - Survey which implies obtaining the required information directly from the respondent. This method of sampling inquiry is used in the given study.

- - Summarizing which consists of the following steps: selection of grouping attributes; determination of the group formation order; development of a statistical indicators system for the characterization of individual groups and the aggregate as a whole; development of layouts for statistical tables to present the summary of the results. Most often, simple summary reports do not satisfy the researcher, since they provide too general ideas about the phenomenon under study. Therefore, statistical material is subject to grouping.

Grouping is a method for subdividing the entire considered set of data into groups that are homogeneous according to the characteristics being studied, for example, grouping the population by sex and age. Grouping provides the basis for subsequent data summary and analysis. An essential feature according to which data sets are grouped is called a grouping attribute or a basis for grouping. Grouping is carried out to study the structure of the data set or the relationships between its individual elements. It is possible to identify the effect of individual units on average totals by means of grouping, for example, grouping of the unemployed by the level of education to create new jobs more effectively.

4. Findings

The structural and dynamic characteristics of Uzbekistan's modern youth labor market identified by the authors are the key results of the study. Based on the analysis of the existing imbalances, the long-term goals and objectives are formulated for the systemic basic and applied research, as well as the development trends of the youth labor market.

The research findings have shown that the real youth labor market tends to increase the gap between supply and demand, the quality and content of vocational education and the need for personnel in the real economy, the number of working and unemployed youth, and the

levels of regional market development. Thus, according to the data of the conducted survey, the educational level of respondents was quite high, since they were graduates of academic lyceums, colleges and universities: 64.0% of lyceum graduates and 7.0% of college graduates were enrolled in universities, 71.0% of college graduates preferred to find a job and are currently employed. Accordingly, every third lyceum graduate and every fourth college graduate received the status of the unemployed. Notably, the majority of the respondents are young men (56.0%).

Most respondents (43.0%) had incomplete higher education by virtue of age composition. The share of persons with higher education was 30.0%. There are few young people with incomplete secondary education (3.0%) among the respondents. The remaining 24.0% of the respondents graduated from lyceums and colleges. Many young people surveyed (20.0%) majored in engineering, 15.0% of respondents being doctors and medical workers, 14% – accountants and economists, 12.0% – managers, 11.0% – service sector workers, 10.0% – teachers, 8.0% – lawyers and 10.0% of respondents got qualification certificates for certain trades. It is easier to find a job having education; therefore, the majority of low-skilled or unskilled workers are unemployed. Subsequently, the employment rate of those with qualifications was twice as high as compared to low-skilled workers.

Among the employed respondents, 40.0% do not work in the specialty they had trained in, 28.0% are dissatisfied, and find the work to be poorly paid, but interesting; 12.0% of respondents, on the contrary, are satisfied with wages, but consider their work uninteresting, 14.0% do not like the work schedule, 7.0% consider the work to be good, but note poor teamwork; 30.0% are afraid to be made redundant; 5.0% consider their jobs to be bad in all respects, 42.0% do not quit due to good remuneration. However, 23.0% of young people are satisfied with the work schedule, and 5.0% of respondents understand that they will not find better job.

The research of the degree of young people's satisfaction with their job resulted in the conclusion: in general, those who have found their place on the labor market are not completely satisfied with the situation; underlining low salary and small opportunities for career advancement as the drawbacks. Young people are mostly afraid of losing their jobs for one reason or another (41.0%), 40.0% of respondents do not think about the possibility of losing their jobs, and only 19.0% are not at all afraid of losing their jobs and have a sense of confidence.

The research of the attitude of young people to the possibility of continuing education led to an interesting conclusion. The majority of the respondents (55.0%) think that in modern conditions it is necessary to have a higher education. A part of the respondents obtain a second higher education or continue their studies under Master degree or Doctoral Program. To improve competitiveness in the labor market, young people are trying to improve their educational level in courses, seminars and trainings, learn foreign languages and master new computer programs. The market responds with growing competition among commercial educational centers.

A study of the ways of job hunting has demonstrated the ineffectiveness of centers for employment promotion and social protection of the population. The majority of young people (35.0%) were employed through acquaintances; 20.0% of respondents applied directly to enterprises; and 7.0% answered vacancy advertisements and visited job fairs held in the regions. Only 8.0% of young people appealed to employment promotion and social protection centers, and 21.0% used all employment options.

The research revealed that the current labor market in Uzbekistan is characterized by gender imbalances, which manifests itself in the level of wages. Male graduates are paid higher wages than females. This fact confirms the general pattern characteristic of the labor market in Uzbekistan – women are displaced into low-paid sectors of the economy. The highest wages were reported by young men engaged in the automotive engineering, construction and financial sectors. The terms and ways of finding a job for girls and boys are practically similar, averaging between one and three months.

Life in Transition III survey (LITS, 2016) of the European Bank for Reconstruction and Development (EBRD) confirms the existence of a gap in levels of economic activity between men and women in Uzbekistan. Thus, according to experts, 33.1% of women of working age were economically active, i.e. had a job and/or were actively looking for it, while economic

inclusion of men made 73.9% of the population.

The relatively low economic inclusion of women observed in Uzbekistan also determines the low female employment rate. Thus, table 1 shows that in urban areas, women's economic inclusion and employment rate is almost twice lower than men's labor force participation rate, and more than twice in rural areas. For comparison, the average world level of women's economic inclusion was 50.0% over the past 5 years, which means that about half of female working age population were either employed or actively looking for work. For example, over the past 5 years the average level of women's economic inclusion was about 65.0%.

In Uzbekistan, in 2016 men's higher education enrolment was 10.6%, while women's education enrolment was 6.5%.

The low enrollment in kindergartens and nursery schools is an important factor that decreases women's employment; this prevents women from releasing the time spent on childcare for economic inclusion. Whereas in 1991, the preschool enrollment rate in the republic was 55.0%, by 1999 this figure had dropped to 25.0%, in 2004 – to 19.3%, and in 2013 – to 14.4%. At the end of 2018, in Uzbekistan kindergartens were able to accept 581,000 children in total, which made only 23.3% of the total number of children aged 2-7 years old (Statistics digest, 2018).

Table 1. Levels of economic activity and employment in the rural and urban areas in Uzbekistan, %

	Economic activity		Employment	
	Male	Female	Male	Female
Rural areas	74.2	27.5	62.8	22.3
Urban areas	73.5	38.7	61.3	34.5

Source: LITS, 2016. Percentage indicators are weighted average based on sample inclusion probabilities

It should be noted that the low level of children's enrollment in preschool institutions and their weak facilities and resources were the main reasons for adopting Presidential Decree No. 5198 "On measures for improving management of the preschool education" and Presidential Resolution No. 3305 "About the organization of the activities of the Ministry of Preschool Education of the Republic of Uzbekistan" on September 30, 2017.

Chronically low level of women's economic inclusion, gender inequality in employment can lead to maintaining an excessively high level of fertility and low-income families due to the fact that predominantly only men will ensure their maintenance and female labor potential will be insufficiently employed in the economy.

Unemployment among educated youth, among graduates of higher educational institutions is a problematic trend. It triggers much concern because it is a vicious result that contradicts the assumption and evidences that higher education and vocational training lead to increased productivity and employment opportunities for young people.

The study of the conditions of young professionals' hiring revealed a number of objective characteristics that predetermine the cautious attitude towards them on the part of employers. Young employees often find themselves in the "experience trap" when they lack work experience that they could report in their job applications only because they were not able to get a job. Also a form of employment is a separate issue for graduates. The tendency of informal employment is traced. Such work is very beneficial to the employers; they have the opportunity to avoid the additional costs that are associated with taxation. For the employees, this job is unprofitable and unpromising; this will affect their pension benefits, as a result.

In current conditions, it is necessary to assist students and graduates in adapting to the labor market in a period of high competition and financial instability, as well as to improve the quality of students' education. In the course of promoting employment, we consider it necessary to monitor job vacancies for students and graduates on an ongoing basis, to conduct vocational guidance work at schools and universities with younger students, which will enable to identify occupational aptitude at an early stage of personal development and will have a beneficial effect on the number of talented students and young professionals. It is necessary to create conditions that motivate employers to participate in youth employment promotion programs and acquisition of practical skills by young people. It is possible, for example, to compile a rating of employers, to assess their HR-brand from the viewpoint of

youth, to draw up recommendations for improving their own HR-brand.

Despite a slight decline in the unemployment rate, youth participation in the labor force is also declining. This means that the increase in the number of jobs is only part of the ongoing reforms in Uzbekistan (ILOSTAT, 2018). Under the influence of reforms in Uzbekistan's economy, the employment situation has recently begun to slowly improve. In some regions, there is even a decrease in unemployment to medium levels, including among young employees.

The problem of informal employment is becoming especially acute. The World Bank estimates showed that in 2013 in the republic 42.0% of the working age people worked informally (World Bank and GIZ, 2017). In 2016, 26.1% of men aged 18 to 64 were employed in the informal sector, whereas this figure was 12.5% for women (LITS, 2016). Construction, a sector with a more complex and burdensome tax system, is leading in the level of informal employment, where 70.0% of people do not have registration with tax and/or social security agencies. More than half of these people, namely, 58.2% of 70.0% are employed in day-long (20.3%), seasonal (33.8%) and temporary jobs (4.1%). Informal employment is significantly higher among young people aged 15-24.

5. Discussion

The conducted research showed positive trends in the labor market development in Uzbekistan and the contradictions caused by economic growth, analyzed and systemized reasons for youth unemployment:

- in the field of education, quality and affordability are improving, educational programs and standards are being refined, competition among higher educational institutions is growing, new foreign universities and private schools are emerging, teachers' salaries are being indexed and increased;
- in the field of employment, the investment activity growth results in the economy as a whole and the creation of new jobs, as well as the development of the recruitment services segment using the Internet;
- gender differences are being erased in remuneration and distribution of paid administrative functions, youth and female business activities are encouraged by the state;
- requirements for the young professionals' competence are increased: awareness of new technologies, ability to innovate, expand the scope of activities, readiness for constant self-learning, ability to use complex decision-making procedures, willingness to take risks, communication skills, a high degree of flexibility, ability to work with various motivation systems, knowledge of people to choose employees, people management skills, etc.;
- the number of economically active population has totaled 14,357.3 thousand people (76.9% of all labor resources) and increased by 2,754.2 thousand people over the ten-year time period.

Table 2 contains summary of the analysis of the youth labor market problems persisting in Uzbekistan.

Table 2. Problems of the youth labor market in Uzbekistan

Problem	Cause	Solution	Expected effect
Difficulties of socio-professional self-determination of youth. Wrong career choice	Transformation of the socio-cultural conditions of formation under the influence of globalization and digital economy development	Comprehensive measures to reform all levels of the national educational system. Improvement of PPP system	Formation of a modern educational system and human capital development
Lack of professional experience and practical skills of adaptation and self-development in graduates.	Quality problems in education. Inefficient selection of applicants.	Creation of a system of orders to train professionals for specific regions, industries and companies. Involvement of leading practitioners and government officials in the educational process.	Achieved balance of supply and demand in the labor market, increased youth employment

Problem	Cause	Solution	Expected effect
Increase in the number of unemployed youth and informal employment	The imbalance of taxes and incomes, unaffordability of higher education	Education quality and affordability improvement, tax policy improvement	Shrank shadow economy
Employment outside the area of expertise as specified in the (College/Degree) Certificate	Disparities between the supply of educational services and the demand for occupations in the labor market	Creation and development of a competitive environment in the field of education	Increased mobility and competitiveness of young professionals
Low productivity of young employees	Imperfection of social partnership mechanisms	Improvement of the regulatory environment for recruiting and hiring	Creation of professional personnel reserve for the innovative development of the economy

However, the official statistics of the facts confirming the growth of the youth labor market is not accompanied by data revealing the reasons for obvious imbalances. There are difficulties in assessing the effectiveness of the labor market mechanisms, because of fragmented published statistics, relying on it is difficult to build trends for individual indicators and to conduct an independent assessment. For example, stating that with a general unemployment rate of 5.0%, the youth unemployment rate was about 19.2%, the author had to limit himself to qualitative conclusions based on his own observations.

Employment and labor laws and regulations need to be improved as well. It is necessary to bring the system of Uzbekistan's youth labor market concepts in line with international standards. Employees with a civil contract concluded do not have equal rights as those employed under an employment contract. The trade unions are not initiative in the regulation of wages, which does not ensure labor-related incentives for workers.

This situation results in contradictions arising in the labor market of higher education graduates:

- between the social attitudes and occupational guidance of young people and the needs of enterprises, organizations and companies in the workforce;
- between the task of improving the efficiency of young professionals' training and the existing system of university training;
- between the theoretical training of graduates and the lack of the necessary skills for the practical use of the knowledge gained;
- between the life and professional plans of graduates and the real opportunities for their implementation;
- between the interests of the development of a separate enterprise and the interests of the society.

The following causes of youth unemployment are typical for Uzbekistan:

- high demographic pressure on the labor market;
- insufficient supply of new jobs in the labor market of Uzbekistan;
- an insufficient level of cognitive and non-cognitive skills obtained by young people in colleges and lyceums, which are important for the formation of professional competencies;
- low youth labor productivity due to insufficient work experience;
- an insufficient level of competencies in young persons who have graduated from vocational schools due to the ineffective selection of applicants and the low quality of education;
- underdeveloped mechanisms of social partnership in ensuring the integration of theory and practice at educational institutions, as well as the subsequent employment of graduates;
- wrong occupational choice in the absence of an effective system of vocational

guidance for young people;
- lack of compliance of training quota structures and the recruitment needs of the economy;
- traditionally low higher education enrollment rate for many years.

The following employment promotion measures are proposed to improve the current situation in the youth labor market:

1. Legislation improvement in the field of employment regulation:

- to improve the structure and legal framework of the state employment agencies;
- to improve the organization and functions of local employment service offices; to ensure their financial independence and the maximum approximation of the conditions and tasks of the functioning to the labor market trends;
- to introduce modern forms of outsourcing, crowdsourcing, public-private partnerships (PPP) in the work of labor agencies, including the outsourcing of labor force sample surveys;
- to develop a system of personnel training and retraining for employment services using a competency-based approach.

2. Information support improvement for decisions in the field of employment regulation at the macroeconomic level;

- to organize and carry out the population census at a high organizational level;
- to improve the methodology for statistical analysis of the youth labor market on the basis of advanced foreign experience with regard to the labor market specifics in Uzbekistan;
- to ensure effective interaction between the units of the Ministry of Economy, Ministry of Employment and Labor Relations, State Committee on Statistics, Ministry of Higher and Secondary Specialized Education in the issues of forming statistics on supply and demand in the labor market, accounting for job reallocation
- to develop an information infrastructure for conducting scientific research on trends and problems in the development of the youth labor market in Uzbekistan.

3. Provision of sustainable youth employment through the implementation of targeted measures:

- to allocate lump sum subsidies to employers for vocational training and advanced training of young employees;
- to create integrated databases of vacancies for young people;
- to develop the system of training, retraining and advanced training at the sectoral and regional levels based on public-private partnerships;
- to form a system of vocational guidance and socialization of school students and adolescents;
- to deepen the integration of the educational system and production at the colleges and universities;
- to ensure transition to international quality standards and rating assessments of the educational process;
- to increase the affordability of higher education by developing a competitive environment through increased number of private and foreign universities, created branches of leading universities in the regions of the country and abroad.

4. Regulation of labor migration:

- to create infrastructure for monitoring and regulating migration flows
- to control recruitment, selection, training and sending of migrants,
- to create attractive conditions for money transfer by banks,
- to ensure reintegration of returning migrants in the labor market of Uzbekistan,
- to provide consulting, employment and other services.

5. Reduction of the informal employment level:

- to improve tax policy,
- to modify methods for forming databases and analyzing the level and structure of informal employment in the economy.

6. Conclusions

The conducted research has revealed the essence of the trends in the development of the modern youth labor market in Uzbekistan. Due to the identified causes, an unfavorable

situation develops in this market, which requires taking a number of compensation measures by the state. First of all, these measures should be manifested in the ongoing youth policy. It should be aimed at creating regulatory, economic and organizational environment and guarantees for self-realization of a young person. The development of young initiatives will contribute to maintaining social harmony in the society and focus on the achievement of individual goals of the economy, politics, moral and cultural development of young people. The following results of the youth employment promotion measures are expected:

1) **In education**

- Improvement and modernization of new educational standards according to the labor market demands;
- Deepened relationship between theory and practice in educational processes;
- Education quality improvement;
- University brand enhancement by increasing the demand for its graduates in the labor market.

2) **In youth environment**

- Improved quality of life of young people
- Increased youth mobility and adaptability to modern labor market conditions
- Ensured decrease in the unemployment rate among college and university graduates
- Increased competitiveness of students and graduates

3) **Among employers**

- Popularization of successful companies and brands among graduates
- Employers' rating upgrade to attract young people;
- Employers' participation in the educational system improvement
- Guaranteed employment within the gained specialty with the provision of professional and personal growth of young professionals

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OPTIMAL PORTFOLIO SELECTION WITH VALUE AT RISK CRITERION IN SELECTED TEHRAN STOCK EXCHANGE COMPANIES (PSO AND MPSO APPROACHES)

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Abstract

The optimal portfolio selection problem has always been the most important issue in the modern economy. In this Study, It has been shown that how an investment with n risky share can achieve the certain profits with less risk that spread between stocks. Such a portfolio, it is called an efficient portfolio and it is necessary to find solving the optimization problem. Hence, the Improved Particle Swarm Optimization algorithm is used. The value of Portfolio and its risk are applied as the parameters in optimizing aim and criterion value exposed to contingent risk. Three intended applications have been indicated to the portfolio. In the next stage ,to evaluate and validate the method and to estimate the value of the portfolio in the next days and hold the series of the stock prices ,within a specified period, to predict the price and The Autoregressive method algorithms is used for modeling of the time-series. Practical result achieved for solving the portfolio optimization problem in Tehran Stock Exchange for the next day, by choosing the basket which includes 20 companies among the 30 most active industry indicates the performance and high capability of the algorithms and used in solving constrained optimization and appropriate weighted portfolios.

Keywords: Portfolio Selection, Conditional Value at Risk, Particle Swarm Optimization algorithm, Price and Return Forecasting

JEL classification: C22, G12, G24

1. Introduction

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Today the connection between engineering and economics mathematics has become one of the famous fields in academic research. In this area, portfolio optimization problem has always been the most important problem in modern economy and because of its widely used and difficult calculation; it has still been the focus point of many researchers. Portfolio is the proper combination of stocks or other assets that are bought by an investor. In the other word, portfolio optimization is the selection of best financial assets combination, in a way that its return is maximized and its risk is minimized. So, the primary variables in risk management are risk, return and the pay off between them.

In portfolio selection theory, some of the risk`s measures, add some difficulty to the problem and make it non-convex or non-differentiable. Moreover, the constraints in model

make the feasible area as a non-convex area. Because of the complicated problem, optimization tools are limited to the group of tools that can obtain proper simplicity. These constraints in the model are the reasons of evolutionary algorithms usage and their extensions (Tehrani, Siri, 2009).

Modern portfolio theory aims to allocate assets by maximizing the expected risk premium per unit of risk. In a mean variance framework risk is defined in terms of the possible variation of expected portfolio returns. The focus on standard deviation as the appropriate measure for risk implies that investors weigh the probability of negative returns equally against positive returns.

However it is a stylized fact that the distribution of many financial return series is non-normal, with skewness and kurtosis pervasive. Furthermore there is ample evidence that agents often treat losses and gains asymmetrically. There is a wealth of experimental evidence for loss aversion <see, for example, Kahne-man et al., 1990). The choice therefore of mean variance ancient portfolios is likely to give rise to a nescient strategy for optimizing expected returns for financial assets whilst minimizing risk. It would therefore be more desirable to focus on a measure for risk that is able to incorporate any non-normality in the return distributions of financial assets. Indeed risk measures such as semi- variance were originally constructed in order to measure the negative tail of the distribution separately. Typically mainstream finance rests on the assumption of normality, so that move away from the assumption of normally distributed returns is not particularly favored; one drawback often stated is the loss in the possibility of moving between discrete and continuous time frameworks. However it is precisely this simplifying approach, whereby any deviations from the square root of time rule are ignored, which needs to be incorporated into current finance theory. The ability to focus on additional moments in the return distribution with the possibility of allowing for skewed or leptokurtic distributions enables additional risk factors along with the use of standard deviation) to be included into the optimal portfolio selection problem.

There are several reasons why we consider downside risk and shortfall constraints in optimal portfolio selection. First, there is an extensive literature on safety-first investors who minimize the chance of disaster, introduced by Roy (1952), Telser (1955), Baumol (1963), and Levy and Sarnat(1972). Safety-first investor uses a downside risk measure which is a function of Value-at-Risk (VaR).Roy (1952) indicates that most investors are principally concerned with avoiding a possible disaster and that the principle of safety plays a crucial role in the decision-making process. In other words, the idea of a disaster exists and a risk adverse safety-first investor will seek to reduce the chance of such a catastrophe occurring as far as possible. Second, we believe optimal portfolio selection under limited downside risk to be a practical problem. Even if agents are endowed with standard concave utility functions such that to a first- order approximation they would be mean-variance optimizers, practical circumstances such as short-sale and liquidity constraints as well as some loss constraints such as maximum drawdown commonly used by portfolio managers often impose restrictions that elicit asymmetric treatment of upside potential and downside risk. Third, the mean-variance portfolio theory developed by Markowitz (1952a, 1959) critically relies on two assumptions. Either the investors have a quadratic utility or the asset returns are jointly normally distributed (see Levy and Markowitz (1979), Chamberlain (1983) and Berk (1997)). Both assumptions are not required, just one or the other: (i) If an investor has quadratic preferences, she cares only about the mean and variance of returns; and the skewness and kurtosis of returns have no effect on expected utility, i.e., she will not care, for example, about extreme losses. (ii) Mean-variance optimization can be justified if the asset returns are jointly normally distributed since the mean and variance will completely describe the distribution. However, the empirical distribution of asset returns is typically skewed, peaked around the mode, and has fat-tails, implying that extreme events occur much more frequently than predicted by the normal distribution. Therefore, the traditional measures of market risk (e.g., variance or standard deviation) are not appropriate to approximate the maximum likely loss that a firm can expect to lose, especially under highly volatile periods

So, the purpose of present paper is to find portfolio x with favorable minimum risk. To find this portfolio, it is required to solve portfolio optimization problem. At first, an efficient criterion is introduced to measure risk and then, three applicable constraints are considered for

portfolio. Next, optimization algorithms are used to solve portfolio problem. Also, in this paper, solving this problem for the next day is considered, and risk, return and capital value parameters are calculated for the next day.

2. Review of Literature

In general, portfolio theory can be divided into modern and post-modern groups. Modern portfolio theory was introduce in an article by the name of (portfolio selection) by harry Markowitz in 1952. Thirty eight years later, Markowitz, Merton Miller and Sharpe won noble prize for (extended portfolio selection theory) in 1990. In 1952, he explained portfolio theory by Mean-Variance model. Some years later, this theory became the base of other theory. In a way that, risk became quantitative criterion for the first time. Before Markowitz, for evaluating portfolio performance investors focused just on one of the criteria. But Markowitz, explained the model in details and offered investors portfolio diversification in order to change stocks risk and return with portfolio risk and return criteria (Markowitz, 1952).

In post-modern portfolio theory, that introduced by Ram, Fergosen, Kaplan and Sigel in 1994, portfolio optimization and investors behavior was explained by return and downside risk. Down side risk is introduced as a risk measurement index, it means, the probability of minus return volatility in the future. In modern theory, risk in introduced as a volatility around the mean of return and is calculated by variance. Variance is considered as a balanced risk criterion, however in booming market, duo to investor`s short term goals, seek to gain positive fluctuation and just negative fluctuation is considered as a risk. So in this situation and according to investor`s risk aversion, investors are more risk averse than to find higher return. In other word, risk is not balanced and severely tends to downside risk. This theory, recognize the risk that is related to investor`s expected return. Other results that are better than expected return are not considered as a risk.

The advent of Value at Risk criterion as one of the accepted methods for quantifying market risk is the most important stage in risk management revolution. The word 'VaR' was introduced in a report by group of thirty in 1993. In that report 'VaR' was introduced as one of the branches of capital risk management. That report contributed a lot and emphasized on importance of risk measurement for tracing aim. Afterward, VaR became the most famous assessment economic risk method and as a risk measurer is widely used for tracing aim. Especially when G.P Morgan introduced the risk metrics in 1994. Today, value at risk is the most famous and applicable risk measurement method. This method is an intuitive method with capability of calculation and easy to understand to measure extended portfolio risk. This criterion can be introduced as a maximum loss in a specific time horizon with a confidence interval in a usual market situation. Although value at risk is a usual risk criterion, but it has undesirable mathematic features. So, Artzener and et al in 1992 introduced the idea similarity as a set of risk measurement feature in relation with the tail of distribution function. Conditional Value at Risk is one of the most important risk measurer that is introduced by Rakefeller and uryaseff in 2000. CVaR has shown better feature than VaR and it can tell us that if the condition is unfavorable, how much loss do we expected (Artzener, Delbaen 1992).

To use natural selection process simulation for solving optimization problem is referred to 1930s and in 1960s the study of Fugle, Halen and Shefel has built the basis of evolutionary algorithms. Evolutionary algorithms are meta-heuristic stochastic optimization methods based on population that are referred to Darvin evolution theory in 1846. Evolutionary algorithms start with random initial population then the fitness of any member is evaluated by objective function. These algorithms in several divisions, are recognized as intelligent optimization methods and evolutionary calculation. The advantage of these algorithms is that they can search the optimal point without derivative of cost function. Genetic algorithm and Particle Swarm algorithm are the example of these algorithms.

Yin and Wang in 2006 used PSO algorithm in nonlinear source allocation problem and compare the efficiency of this algorithm with GA. Finally, they concluded that PSO algorithm is more efficient than GA. Kura in 2009 used PSO algorithm in constrained portfolio optimization. In that paper he used weekly stocks prices of a few companies and drew efficient frontier. Finally, he concluded that, PSO algorithm was really successful in portfolio optimization. In Iran, Abdolalizadeh and Eshghi (1382) study portfolio optimization by GA.

Khaluzadeh and Amiri (1385) despite the classical models that are based on variance and used for optimizing portfolio, he used value at risk as a portfolio risk criterion. Raie and Alibeigi (1389) in a study used PSO algorithm in portfolio optimization based on mean-variance model. In this study we use PSO algorithm in Markowitz model with the assumption of available data and add constraints in three different levels. In past years, PSO algorithm has been used for several research and application fields, and it is indicated that in several examples, PSO algorithm has better, faster and cheaper results than other methods (Kamali, 2014). This algorithm despite GA, does not have mutation and crossover operator. The other reasons that make PSO algorithm so exceptional and attractive is that, this algorithm need very few parameters for setting. A version of algorithm with few parameters can be used in several applications (Raie and Alibeigi, 1389). In Heidari thesis (1391) the superiority of PSO algorithm to GA and other algorithms in solving portfolio problem is indicated.

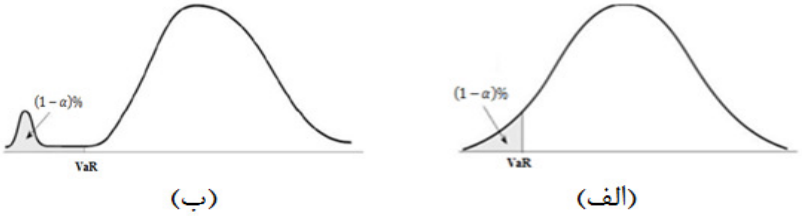
3. Constrained Portfolio Optimization Problem

To understand this problem consider a set of limited capital i = 1,2,…,n that can be any financial capital, stocks and bonds. At the moment, the most important institution performance evaluation is rate of stocks return. To put it simply, the profit that can be gained in an investing is return that is in specific time duration and according to its beginning and end of period prices. Assume that R_i is the return of stock S_i and R` = ($R_1$, $R_2$, …,$R_n$) is the transposed profit vector of stocks $S_1$, $S_2$, …, $S_n$ and vertical vector $x_i$ is indicated the amount of invested money in stock $S_i$. $x \epsilon R^n$ also $R^*$ is a favorable investors` profit and σ_{ij} is a covariance between two stocks. Markowitz mean-variance model is:

$$\begin{aligned} &minimize && \sum_{i=1}^{n}\sum_{j=1}^{n} x_i x_j \sigma_{ij} \\ &subject\ to && \begin{cases} \sum_{i=1}^{n} R_i x_i = R^* \\ \sum_{i=1}^{n} x_i = 1 \quad , x_i \geq 0 \end{cases} \end{aligned} \qquad [1]$$

In Markowitz model, with increase in assets, calculation volume increased too much. Covariance criterion can be an acceptable criterion for financial assets that have normal distributions and traded in efficient market. Otherwise, it isn`t a proper risk criterion. Down side risk measures is divided into two parts, semi measure of risk and risk measures based on percentile. Value at risk and conditional value at risk are the most famous in the risk measures based on percentile division. VaR is a decreased risk measure and can indicate the worst loss in usual market condition in a specific time duration and confidence level. In (figure 1-A) although value at risk is a usual risk criterion but it has unfavorable mathematic features. CVaR, as a risk criterion has been shown better features than VaR. This method indicates that if the condition is not favorable, how much loss we expect to tolerate. In other word, it says the amount of loss in n-days' time period in a condition that we are in $1-\alpha$ percent in left bulge part of probability distribution curve figure 1-B)(Khaluzadeh & Amiri, 1385).

Figure1: probability distribution curve of asset return A-VaR criterion & B-CVaR criterion



(ب) (الف)

Suppose that *f(x, y)* is the risk related to decision vector $x \epsilon X \subseteq R^n$ and random vector $y \epsilon R^m$. For simplicity, first we assume that *y* follows a continuous distribution and its density

function is *p(0)*. Also we assume that for any *x*, $E(|f(x,y)|) < \infty$. For $x \in X$ probability of $f(x,y)$ is not more than α threshold:

$$\varphi(x,\alpha) = \int_{f(x,y)\leq\alpha} p(y)dy \qquad [2]$$

For given confidence level of β and *x* value at risk is:

$$VaR_\beta(x) = min\{\alpha \in R: \varphi(x,\alpha) \geq \beta\}$$

$$CVaR_\beta(x) = \frac{1}{1-\beta}\int_{f(x,y)\geq VaR_\beta(x)} f(x,y)p(y)dy \qquad [3]$$

Rakefeller and uryasef (2000) has shown that CVaR calculation can be solved by determined function minimization with respect to α (Rockefeller, Uryasev 2003).

$$F_\beta(x,\alpha) = \alpha + \frac{1}{1-\beta}\int_{y\in R^m}(f(x,y)-\alpha)^+ p(y)dy \qquad [4]$$

Because in calculation, the most difficult part of CVaR optimization is to calculate the integral of multi variables and unsmooth function. To solve this problem we can use estimation. Mont Carlo simulation is one of the most efficient methods for calculating high dimensional integral. Rockefeller and urease (2000) through these methods can estimate $F_\beta(x,\alpha)$ in a way that $y_{[k]}$ shows k-the produced sample by random sampling with respect to *y* and *s* shows the number of samples (Ogryczak, Sliwinski 2010).

$$F_\beta(x,\alpha) = \alpha + \frac{1}{s(1-\beta)}\sum_{k=1}^{s}\left(f(x,y_{[k]})-\alpha\right)^+$$

$$CVaR_\beta(x) = min_{\alpha\in R}F_\beta(x,\alpha) \qquad [5]$$

Now, with respect to considered risk criterion, Markowitz model can be reformed by adding three applicable constrained. The first constrained is the sum of all stocks weight that must be equal to one. Next constraint is upper and lower bound. If we want to exert the number of chosen asset constraint for investing, the model should be like the bellow model and is called Cardinality Constrained Portfolio Selection.

$$minimize \quad \lambda[\mathcal{R}(x)] - (1-\lambda)\left[\sum_{i=1}^{n} z_i R_i x_i\right]$$

$$subject\ to \quad \begin{cases} \sum_{i=1}^{n} z_i = K \\ \sum_{i=1}^{n} x_i = 1 \\ \varepsilon_i z_i \leq x_i \leq \delta_i z_i \\ z_i = [0,1] \quad i = 1,\dots,n \\ x_i \geq 0 \quad i = 1,\dots,n \end{cases} \qquad [6]$$

Despite the first model (1) that is unconstrained portfolio based on variance as a risk criterion, in this study, we have *R(x)*, CVaR as a risk criterion. λ is a parameter that can be changed in [0,1] limitation and with respect to investor point of view the specific value can be chosen. For example, if $\lambda = 0$ all amount of weight coefficient is allocated to return. And if $\lambda = 1$, all amount of weight coefficient is allocated to the risk and without respect to return the least risk portfolio is chosen. If λ is determined between 0 and 1, both risk and return are

considered to determined portfolios (Mozafari, Taffazoli 2013). Z_i parameter is the decision variable for investing in any stock. If z_i is equal to one, it means stock i can be in the portfolio. The total number of all stock is related to the third constraint that is k number and ε_i and δ_i are upper and lower bounds. There is no effective and efficient algorithm in mathematic programming to have exact solution. So, meat-heuristic algorithm is chosen to get the optimized weight of stocks (Xu, Zhang 2010).

4. Modified Particle Swarm Algorithm

The use of PSO algorithm in some problem has shown that, PSO algorithm gets to premature convergence and this result in inability in solving multiple peaks problems. To remove this problem, we can modify the algorithm with a little change. *w* is the inertia coefficient that has the most important role in algorithm`s performance. This coefficient makes a balance between local and global search. Little amount of *w* result in premature convergence whereas high amount avoid convergence. Usually, in implementation of PSO algorithm, *w* must be adjusted during training process. One of the way to adjust *w* is linear decrease of this amount (He, Wen 2003). A better way that has better result, is modeling *w* inertia coefficient. In this way, inertia coefficient is according to distance between particle of one generation and the best location that has been experienced by all particles. The amount of *w* is:

$$w = w_o(1 - \frac{dist_i}{max\ \_dist})$$

$$dist_i = \sqrt{\sum_{d=1}^{D}(gbest_d - x_{i,d})^2}$$

$$max\ \_dist = \underset{i}{argmax}(dist_i)$$

In formula above, w_0 is a random number in [0.5, 1] and $dist_i$ is a Euclidean distance between i-th particle and *gbest* the best location has been experienced by all. The problem has D dimension and *max_dist* is the furthest distance between a particle and *gbest* in each generation. The modeling of inertia coefficient cause to guide the furthest particle to the best location and finally, converge in optimize point. To reach to this optimized point and avoidance of premature convergence, we should assure of the particle motion in the next level. To reach to this aim, the location updating equation should be reformed as this:

$$x_{i,d}[t] = (1 - \rho).x_{i,d}[t-1] + v_{i,d}[t]$$

In formula above, ρ is a random number with uniform distribution in [-0.25, 0.25]. So, by adding this part to equation, particles get more mobility, even when they have low speed (Suresh, Ghosh, Kundu 2008) and (Wang, Wang 2010).

5. Modeling and Prediction of Stocks Price

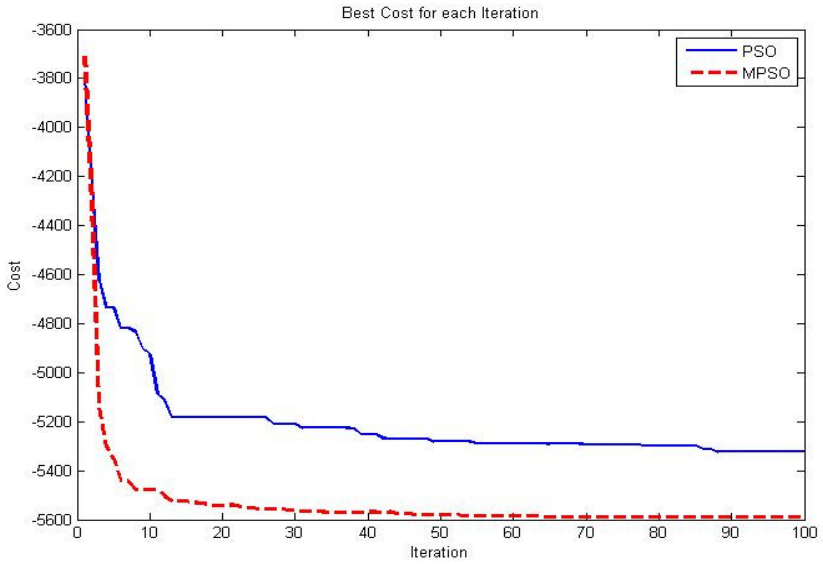
Nowadays, one of the important favorable subjects of economist and financial analyst, is to determine price volatility trends. And now, there a lot of point of views about this subject. In this situation and with respect to unavailable precise information about effective factors on market volatility, predicting these changes is not easy at all. And based on this subject, efficient market theory has been mentioned. This theory mentions that, stock price volatility by this public and available information is unpredictable. In effect, this theory is based on random walk theory. To mention a theory against above theory means the predictability of stocks prices (khaluzadeh & Khakisedigh, 1377). Since the middle of 1970s and specific from 1980, new and extended attempt for predictability of stocks price by new mathematical method, long time series and professional tools started. A lot of test on prices and stock`s index in countries like England, United States, Canada, Germany and Japan has done in order to show fix structure of stocks price. Since 1997, in this field in Iran and in Tehran Stock Exchange some study has started. By using chaos theory that is powerful tool for analysis and process of stocks prices information, the related time series process will be distinguished from

a random time series. And it is on the (R/S) basis or can be mention, the alteration of fluctuation source of time series of stock price, shows the consecutive nature of stock price (Khaluzadeh & Amiri, 1385). The purpose of this section, is to solve constrained portfolio problem by the mentioned algorithm for next day. So, in order to estimate risk and return parameters or estimate capital value for next day, price prediction methods are used. To do this, spatial and efficient algorithms can be used for predicting the next day of available stocks prices with specific time period. Then, we can repeat optimization problem for new time series and estimate the value of portfolio with its risk for the next day.

6. Empirical Results

In this study, portfolio problem is solved by historical data 700 days of 30 active industries. The time period is from Aug 18, 2008 to Sep 4, 2015. 20 companies are chosen for portfolio and through meta-heuristic algorithms the optimized stock`s weight are gained. The first constraint is, investing in 15 companies of 20. The upper bound is 0.3 and lower bound is 0.01 for any weight. In formula number [6] the risk and return coefficient is 0.5. As much as the risk decreases and the value of portfolio increases, the cost function will decrease. So, the purpose is to minimize cost function. First, with available price series in the time period, we get the weight of optimized portfolio by two PSO and MPSO algorithms. The software we use in this study is MATLAB. The figure below shows the way that cost function of two algorithms passed. It seems the cost function in MPSO algorithm is lower.

Figure2: cost function in each iteration for PSO & MPSO algorithms



In below table shows, calculated portfolio value, risk and cost function for the two algorithms.

Table1: comparison of final result for two algorithms

comparison	cost	portfolio value	risk
PSO	-5323.945	10324.177	5000.321
MPSO	-5588.964	12388.727	6799.762

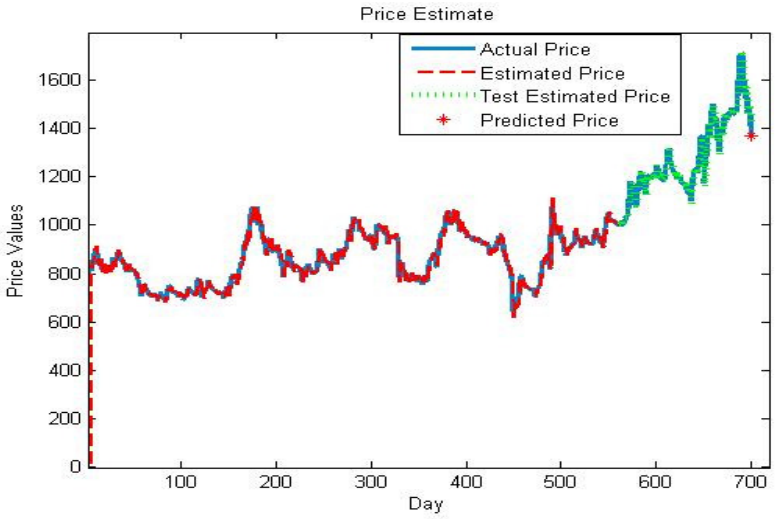
Also, below table shows, the weight that is got by two algorithms in constrained portfolio problem.

Table2: the weight allocated to any company in portfolio

	company name	weights by PSO	weights by MPSO
1	Takin Co	0.0522	0.0123
2	Bu-Ali Investment	0	0
3	Transfo Iran	0.0176	0.01
4	Jaberebn Hayan Darou	0.0511	0.0141
5	Isfahan Folad	0.0274	0.0116
6	Fars Khozestan	0	0
7	Saipa	0	0
8	Service Anformatic	0.2997	0.2997
9	Behshar Toseeh	0	0.0104
10	Sina Bank	0.0106	0
11	Ghadir Investment	0.1599	0.1249
12	Building Iran	0.0246	0
13	Roy Iran	0.0202	0.01
14	Ama	0.0114	0.0112
15	Yasa Iran	0.1399	0.2934
16	Traktor	0.0241	0.0119
17	Iran Chini	0.0213	0.0105
18	Mokhaberat Iran	0	0.0105
19	Abadan Petroloshimi	0.1298	0.158
20	Hafari Shomal	0.01	0.0111
21	sum	1	1

In the next level, in order to calculate and estimate the value of optimized portfolio and risk for the next day, we should predict the prices. In order to do this, AR(10) is used and the parameters of this model are estimated by RLS method. The prediction of this model is based on a step forward method. In this model, 80 percent of data are used as a training data and other 20 percent are used as a test data. For example, in this figure a time series is showed and the price of day 701 is predicted by price of 700 days.

Figure4: estimation and prediction of a next step prices by RLS method



In order to be assuring of the estimation accuracy, we predict the price of days 650-700 and make a comparison between the real price and predicted price. To show the error of prediction, standard deviation is used. The error of estimation is the absolute difference of estimated prices and real prices as below:

Table 3: the absolute standard deviation of estimation error for 50 days price by RLS method

company name	absolute standard deviation	company name	absolute standard deviation
Takin Co	126	Ghadir Investment	95
Bu-Ali Investment	19	Building Iran	81
Transfo Iran	84	Roy Iran	73
Jaberebn Hayan Darou	138	Ama	239
Isfahan Folad	122	Yasa Iran	317
Fars Khozestan	96	Traktor	89
Saipa	46	Iran Chini	164
Service Anformatic	132	Mokhaberat Iran	67
Behshar Toseeh	109	Abadan Petroloshimi	202
Sina Bank	53	Hafari Shomal	98

To show the applicability of this method, this process has been done for all the stocks. In other word, we optimized portfolio with 50 predicted and real data by MPSO algorithm. In this table, is indicated that there is little difference between real and predicted cost function, portfolio value and risk. The optimized results are got from 100 iteration of algorithm.

Table 4: comparison between real and predicted data by MPSO algorithm in CCPS problem

comparison data	cost	portfolio value	risk
average of exact data	-5610.215	12903.803	7293.587
average of exact data	-5620.821	12881.341	7260.518
error standard deviation	21.7	214.4	217.5

7. Summery and Conclusion

The optimal portfolio selection problem has always been the most important issue in the modern economy. In this Study, It has been shown that how an investment with n risky share can achieve the certain profits with less risk that spread between stocks. Such a portfolio, it is called an efficient portfolio and it is necessary to find solving the optimization problem. Hence, the Improved Particle Swarm Optimization algorithm is used. The value of Portfolio and its risk are applied as the parameters in optimizing aim and criterion value exposed to contingent risk. Three intended applications have been indicated to the portfolio. In the next stage ,to evaluate and validate the method and to estimate the value of the portfolio in the next days and hold the series of the stock prices ,within a specified period, to predict the price and The Autoregressive method algorithms is used for modeling of the time-series. Practical result achieved for solving the portfolio optimization problem in Tehran Stock Exchange for the next day, by choosing the basket which includes 20 companies among the 30 most active industry indicates the performance and high capability of the algorithms and used in solving constrained optimization and appropriate weighted portfolios.

In present paper, the particle swarm algorithm and its modified version are used to optimize constrained portfolio. The results mention that MPSO is more efficient than PSO algorithm. Then, in order to make this study more applicable AR(10) model and RLS method are used to predict stocks price time series for the next day. Also, portfolio value and risk are predicted and compared with the result of real data. In order to make this result more reliable, we repeat this process and get the results for ten days. The results indicate that there is a little difference between the results of real and predicted data and this fact shows the high capability of this method in predicting optimized portfolio.

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EVALUATING THE INVESTMENT ATTRACTIVENESS OF A REGION BASED ON THE BALANCED SCORECARD APPROACH

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Abstract

This article discusses how the investment attractiveness of a region's economic system (case study of Arkhangelsk Region) can be evaluated usingA the balanced scorecard developed and disclosed herein by the authors. It seeks to provide a rationale for the relevance and applicability of the balanced scorecard as a tool for identifying local investment-related challenges. The article further explains the importance of developing a sound mechanism for aligning the interests of the key stakeholders of investment process (private investors, local community, and public bodies). This mechanism should employ a balanced estimate of a region's investment attractiveness which, in its turn, should rely on the target user groups' informational needs. Having analyzed the basic methodologies being used by the investigators of the region's investment attractiveness, we became convinced that the issue needs a more balanced representation and have therefore developed the balanced scorecard, accompanied by the user guide which is intended for the governmental authorities in charge of the measures to enhance the investment attractiveness locally. The analysis of the balanced scorecard has shown that it proves a useful tool for evaluating a region's investment attractiveness and identifying its investment-related challenges and growth opportunities. In performing our study, we were governed by the current theories of institutional economics, region's economy, and the theory of investment, the latter viewing the investment attractiveness through the prism of investment efforts. The results and conclusions of this study may serve as the basis for elaborating the region-level investment promotion strategies.

Keywords: investment potential, investment risks, investment climate, investment policy, investment attractiveness, investment efforts, core drivers, region's economic system, balanced scorecard, balanced estimate

JEL classification: D92, L50, L52, L90

1. Introduction

A sound regional investment policy – the one which is able to ensure the sustainable investment climate in every Russian region as a prerequisite of growth – should be seen as a core element for a wholistic, statutory investment regulation framework. The relevance of such framework lies in the specific nature of Russia's federalism and historical background.

Our analysis of the efforts being channeled by Arkhangelsk Region (inclusive of Nenets Autonomous Area) towards investment promotion and facilitation, has revealed a discrepancy: on the one hand, the investment flows being received by the area's real economy are insufficient, its investment strategy is badly underperforming, and on the one hand, the area's investment potential is found to be high, its citizens' savings growing and underused, and the investment resources available to institutions and private donors. This finding has enabled a conclusion that the key stakeholders in the local investment processes seem to display little economic concern and that there is the need for greater interaction between the local government and the local business community.

Further, our analysis of the trends being experienced by Arkhangelsk's investment opportunities, that employed the aforementioned balanced scorecard, has enabled another conclusion – that the region-level investment framework for sustainable growth can only be

achieved in condition that the central government exercises more regulatory control, no matter how favorable the investment climate may be on a national scale. That said, the distribution in Arkhangelsk Region of the interindustry investment flows looks disproportionate, as was shown by our study into the structural composition and dynamics of the local investment processes. This is due to a series of chaotic changes that had disrupted the area's investment potential and can now lead to even greater disbalance in its economic growth.

Given the growing role of the private investing, the national regulatory policy for the investment activities in the Russian regions should be re-oriented from mere distribution of the government investments towards ways to enhance the regions' image in the eyes of private investors.

The challenges identified above need to be addressed from a new theoretical and methodological standpoint, especially when it comes to further studies into regions' investment attractiveness. The main advantage of the methods being used in the evaluation of local investment attractiveness is that they allow to build ample background knowledge necessary for ranking a given number of regions according to their investment attractiveness. However, while we recognize the benefits of the current methodologies, we have to admit that they are poor tools for exploring the investment attractiveness in one particular region after it has delivered its investment strategy. The overall investment performance, that the current methodologies offer a mechanism for measuring of, is defined not only by the specific factor levels as may be achieved by a given region, but also by the trends occurring nationwide: the dynamics of the investment attractiveness in any region should be analyzed in the context of the average investment performance in Russia. Measured by the current methodologies, a region's level of investment attractiveness appears contingent on the investment attractiveness available in the rest of the regions – a point that causes the current methodologies to produce judgements lacking objectivity. Moreover, the criteria for measuring a region's investment potential that many of the economic studies operate, fail to meet the criteria that are expected to be accounted for, by various user categories (i.e. stakeholders of the investment process).

The limitations as given above have highlighted the need for an updated methodology – the one that would rely on a set of criteria totally different from that relevant of other regions and that would meet the informational needs of all of the stakeholders of the investment process. We deem that the investment potential evaluation methodology developed by us does meet this description as being able to produce an objective picture for a given region based on the balanced scorecard (BSC) approach. Our evaluation methodology is designed, among other things, to assist the regional decision-makers in shaping knowledge-based strategies for enhancing regional investment attractiveness.

2. Research methodology and methods

Our study into the investment potential of the regional economic sectors, a key issue crucial to the economic growth on a macroregional scale, employs a whole series of theories and practical research outcomes. In developing our tool for evaluating the region's investment attractiveness, we were governed by the conclusions made by Russian and the authors of international studies into ways to attract investments (from the international studies, we excerpted the practices that looked adjustable to the Russian economic situation).

Epistemiologically, the problem of the regional investment potential originates from the economic theory. The studies into it have started rather recently. In the 1930s, B. Ohlin and E. Heckscher came up with the rationale for liberalization of the inter-regional transfer of capital, while in the 1940s Lösch defined the capital mobility as a prerequisite for long-term international trade involving. In the 1950s, Nobel Prize in Economic Sciences winner W. Leontief developed, as part of his research into the structural basis of the international trade, the input-output model used in the analysis of multi-regional and intranational relations. The issues of the regional investment potential were further explored by Ph. Kotler, B. Toyne, H. Henzler, P. Walters, and a number of other contributors to the economic theory, who operated in their research of the then investment processes in different parts of the world the concepts of investment attractiveness, investment climate, and investment risks. As to the Russian researchers of the investment processes occurring in the Russian regions, worthy of

mentioning are the works by the Soviet adherers to economic theory such as A. Aganbegyan, K. Valtukh, T. Khachaturov, A. Probst, R. Schnipper, among others, who were the first to substantiate why regional economies should be accounted for when analyzing the efficiency of capital investment.

Among the keynote domestic publications that have shed more light on regions' investment attractiveness are those by I. Grishina, G. Marchenko, I. Royzman, A. Folomiev, A. Shakhnazarov, among others, who were the first in Russia to address investment processes using the holistic approach.

Based on our analysis of the methods available for evaluating a region's investment potential/opportunities, we have outlined the four basic approaches. The first of them (the narrowest of the four) uses the data generated by the analysis of macroeconomic performance; investment markets; consumption-accumulation ratio; and investment legislation. It evaluates the investment potential using mainly the operating asset profitability index, which is a measure of the ratio between profit and total cost of operating assets. What sets this narrow approach at advantage is the relative simplicity of its calculation model, the versatility that makes it suitable for analyzing the economic systems of all levels investment-wise, and the fact that it meets investors' key goal of profit generation. At the same time, this approach is not without flaws as it fails to take account of the interrelation between the investment- and the resource-relating factors that are known to influence a region's economic growth. Nor does this approach consider the dependence of the investment potential on the focus the economy places on innovation. Neglected is also the balance of interests among stakeholders of the investment process.

The second approach, a factor-based one, looks at factors that determine the investment attractiveness in a given region. To estimate the overall investment performance, this approach uses a sum total of the weighted average estimates of all of the factors in question (the factors varying from study to study). Among the advantages of this approach is that in measuring the key performance factors it uses the official statistics, thereby arriving to more objective judgements; that it takes into account the possible interactions between the factors crucial to the overall level of the region's investment attractiveness; and that it allows for case-specific estimations.

The third approach allows benchmarking the region's investment potential against its target level and with respect to investment risks and investment legislation. Even though the measured ratings of the factors that are crucial to the investment potential do allow for clustering regions according to their level of investment potential and investment risks, which in itself is, undoubtedly, important, they are not indicative of the extent to which one region may differ from another investment-wise even within one cluster. Alongside with benchmarking (rating), the evaluation of the investment potential of one particular region should employ a more objective estimate.

The fourth approach distinguishes itself by the fact that it addresses the investment potential in a multi-pronged way, relying on the relation between the investment activities and the investment attractiveness of the entire economic system. The advantage of this approach consists in careful selection of the evaluation method and in addressing the investment potential as a derivative of investment activity portfolio and time lag.

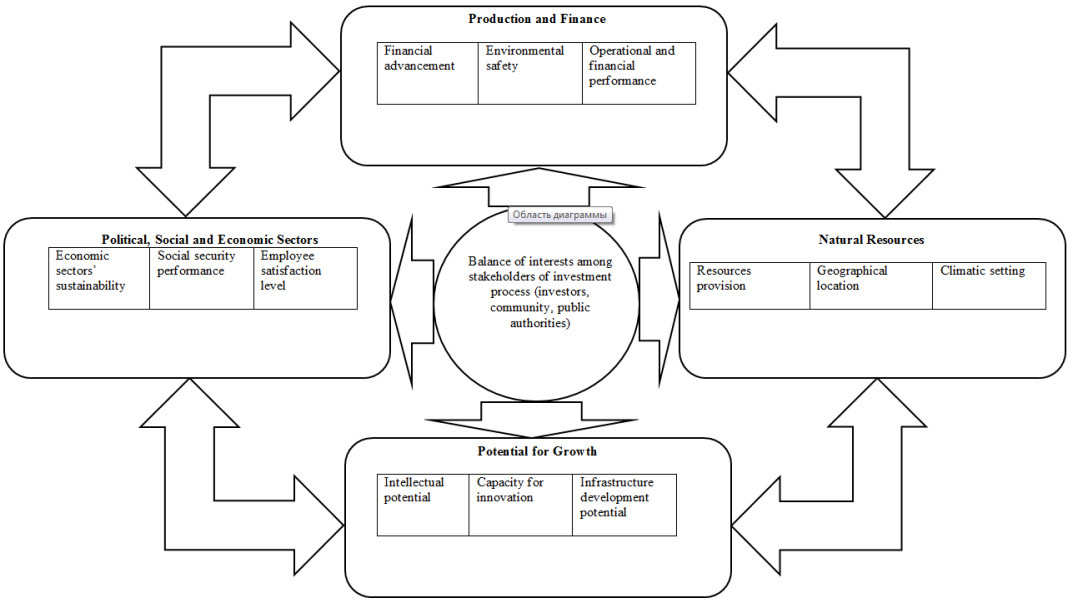
Our survey of the methodologies to explore the investment attractiveness of different regions' economic systems, has identified a series of methodological gaps. They explain the need in revising the ways of evaluating regional investment processes, as well as our own effort to develop the BSC-based model for evaluating regions' investment attractiveness.

In the 1990s, as an attempt to provide a model for measuring corporate performance, R. Kaplan and D. Norton developed the concept of the balanced scorecard (BSC), which is used by the present-day studies as a strategic management and appraisal framework, and an information communication tool. In our study, we turn to BSC as a tool to provide a balanced estimate of the investment attractiveness of a given region.

Despite the fact that BSC is widely used in corporate performance management, there are currently no practices of applying it to measuring the investment attractiveness. Also, the balanced scorecard model has so far never been used in any regional survey, for which reason of relevance are the studies seeking to design hands-on models for evaluating regions' investment attractiveness.

Our BSC-based concept statement is as follows: any evaluation finding should be to the satisfaction of all of the stakeholders of the investment process.

Figure 1. The balanced scorecard: a region's investment attractiveness components.



Central to our evaluation method is the balanced scorecard. There are four components we deem to be essential to the investment attractiveness of Arkhangelsk Region. They are Production and Finance, Development, Natural Resources, and Political and Economic Sectors.

The resultant BSC (please see Figure 1) revolves around a series of interdependent core and sector-specific factors, selected based on the criteria of "maximum representativity and importance for investment attractiveness", and quantifiability.

The evaluation of the investment attractiveness involves benchmarking the measured performance indicators against the target levels. For the purposes of this study, the target performance levels have been set based on the findings of our survey of the investment activities and opportunities in the regions comprising the North-West Federal District.

The final stage of the evaluation suggests determining the overall investment attractiveness coefficient. In order to consolidate the disaggregate factor values, we used the average formula with multiple criteria. But, unlike all other regional economic studies, in determining the value for each separate performance indicator, instead of the mean averages for Russia we made use of the specific performance indicators. By doing so, we tried to avoid the influence of the mean average factorial values calculated for Russia, on the region-level investment attractiveness figures. Otherwise, the region's investment attractiveness level becomes dependent on the investment intensity of the entire country, as well as on investment trends occurring in other regions.

As a result, we have achieved an overall score matrix enabling to provide an estimate of the region's investment attractiveness and identify investment challenges and growth opportunities.

3. Balanced scorecard-based analysis of Arkhangelsk Region's potential to enhance its investment attractiveness

This study has been intended by its author to be an empirical research into the economic sectors of Arkhangelsk Region. Its empirical and informational background encompasses the statutory and regulatory enactments pertaining to investment activities; the official data of the Russian Federation's Service for National Statistics; the research outcomes published in printed periodicals, monographies, and their on-line versions; and the topic-specific studies into the economic sectors of Arkhangelsk Region.

This study involved the development of the balanced scorecard for Arkhangelsk Region that was used as a tool to evaluate Arkhangelsk Region's investment attractiveness over the period from 2007 to 2014 (Table 1).

Set out below are the findings of our analysis of Arkhangelsk Region's potential to enhance its investment attractiveness.

The analysis has shown that Arkhangelsk Region's investment attractiveness has increased in 2014 by 3.4% as compared to 2007.

Among the factors found to have negatively affected Arkhangelsk Region's investment attractiveness is financial performance: the number of the profit-making companies has decreased in 2014 by 5% as compared to 2007.

Table 1. Arkhangelsk Region's investment attractiveness: overall score (2007 to 2014)

BSC component	**Overall score**							
Year	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Production and Finance								
1. Financial advancement	0.73	0.59	0.59	0.62	0.59	0.63	0.61	0.60
2. Environmental safety	0.68	0.74	0.66	0.61	0.69	0.69	0.69	0.71
3. Operational and financial performance	0.26	0.05	0.79	0.64	0.27	-0.02	0.16	0.32
Component score	0.53	0.42	0.69	0.62	0.49	0.39	0.45	0.52
Potential for Growth								
1. Intellectual potential	0.60	0.65	0.65	0.63	0.63	0.75	0.75	0.75
2. Capacity for innovation	0.63	0.74	0.41	0.48	0.52	0.51	0.41	0.34
3. Infrastructure development potential	0.52	0.52	0.53	0.53	0.53	0.73	0.75	0.76
Component score	0.61	0.69	0.46	0.51	0.54	0.58	0.51	0.46
Natural Resourcesя								
1. Resources provision	0.75	0.77	0.82	0.92	0.87	0.81	0.81	0.85
2. Geographical location	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
3. Climatic setting	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
Component score	0.64	0.65	0.69	0.76	0.78	0.74	0.74	0.77
Political, Social and Economic Sectors								
1. Economic sectors' sustainability	0.43	0.41	0.46	0.48	0.50	0.45	0.50	0.49
2. Social security	0.45	0.46	0.47	0.48	0.47	0.48	0.49	0.50
3. Employee satisfaction level	0.98	0.92	0.87	0.99	1.05	1.02	0.97	0.99
Component score	0.59	0.57	0.58	0.63	0.65	0.62	0.63	0.63
Score total	**0.58**	**0.56**	**0.60**	**0.62**	**0.60**	**0.57**	**0.58**	**0.60**

Source: author's research..

In total accounts payable, the share of the outstanding accounts has increased 1.7 times, whereas Arkhangelsk Region's budget expenditure-profit ratio has reduced by 16%, almost equaling the target value (0.91), which is certainly is a positive aspect. At the same time, a 1.2-fold decrease in the overall financial performance and it fluctuations over the period under analysis, are indicative of Arkhangelsk Region's unstable financial standing and seen as the biggest obstacle inhibiting its investment attractiveness. Since 2010, there has been a steady decrease in the operating and financial performance, with a 5-fold reduction in the ROI of employees and almost a 3-fold reduction in the return on assets and products/services, the wear of fixed assets still being high (44%). Within the 'Production and Finance' component, the operating and financial performance has the lowest score (0.32). Notably, the environmental safety is on the increase, which is due to the increased afforestation measures and relatively stable allocations to environmental protection.

As can be seen from the chart representing the key performance indicators for "operational and financial performance" of Arkhangelsk Region (Appendix 1), there are major deviations from the target levels in return on assets and employees; wear of fixed assets; overdue accounts payable; allocations to environmental protection in the total fixed investment, which explains why the "operational and financial performance" scores so (0,52) low. Closest to the standard level are the budget profit-expenditure ratio (0.91) and the afforestation value (0.98).

It will be observed that the performance in "Political, Social and Economic Sectors" has increased 1.1 times (as compared to 2007). This is primarily due to the (9%) growth in economic sector's sustainability: the GRP per capita has increased 1.4 times. The transparency of the economy index has increased 1.1 times in relation to the aspect of ownership, and 1.2 times in relation to the rather low but stable entrepreneurial development (0.11), which evidences the need in measures to speed up the formation of the institutions of the market economy. The "social security" performance has been found to have a negative effect on the investment attractiveness due to the following statistics: the overall disease incidence in Arkhangelsk Region exceeds its target level by 10 times, while crime rate per 1,000 residents – by 2.4 times. That the increased employee satisfaction level is attained is mainly due to the increased funding allocations to the social sector (a 31% increase); a 6% increase in the number of residents living above the minimum subsistence level; near-the-target-level unemployment rate and production growth rate; and the relatively high rate at which the average pay was rising.

Our analysis of the "Political, Social and Economic Sector" key performance indicators (Appendix 3) enables a conclusion that the GRP; the balance between production growth rate, average pay rise, and occupational safety; and the population living above minimum wage almost achieve their target levels. At the same time, a slight deviation from the target levels is shown by inflation, entrepreneurial development, and the transparency of the economy.

On the balanced scorecard for Arkhangelsk Region's investment attractiveness, the highest score was attained by "Natural Resources" (0.72), regardless of a rather low "climatic setting" score (0.43). What causes the positive effect on Arkhangelsk Region's investment attractiveness is, in the first place, the availability of raw materials, with hydrocarbons, mineral resources, and forest stock near their target levels (0.92-0.98). A 13% increase in "resources provision" has been caused by a 2-fold increase in the availability to Arkhangelsk Region of own funds, as well as a relatively large size of gainfully employed population.

Our analysis of the "Natural Resources" key performance indicators (Appendix 2) has identified major deviations from the target levels in the availability to local businesses of own funds (0.68); population's economic activity rate (0.69); and climate favorableness (0.43). Near the target level is the extent of mineral resource provision.

"Growth" presents an alarming concern. Its performance has reduced by 21% since 2007 in response to a 34% reduction in the "capacity for innovation", even though the "intellectual potential" and "infrastructure development" have been showing a slight increase. Major deviation from the target level is being shown by R&D and know-how expenditure.

For quite many years, high on Arkhangelsk Region's agenda is the issue of fixed assets renewal. The coefficient of fixed assets renewal is found to have decreased 2.5 times, the equipment being 44% worn out. With the equipment as worn out as this, Arkhangelsk Region will not be able to produce any competitive products for the global market. Know-how development has been showing a slight increase but generally remains at a low level, being inhibited by factors such as high cost of new technologies; excessive economic risks; lack of governmental funding support; lack of qualified personnel; uncertainly about whether intellectual property will generate any income. It will also be observed that marketed commodities investment capacity has decreased 3.3 times, which is indicative of weaker investment attractiveness.

Our analysis of the "Growth" key performance indicators (Appendix 4) has found that major deviations from the target levels are shown by R&D expenditure; expenditure on know-how; coefficient of fixed assets renewal; infrastructure development; and IT utilization coefficient.

Generally, the analysis has shown that the components of Arkhangelsk Region's investment attractiveness that deviate from their target (criteria-based) levels most, are two – "Production and Finance" and "Growth" (twice lower that their target levels) (Appendix 5).

The disturbing tendencies, as can be judged by some of the components' scores, do inhibit Arkhangelsk Region's investment attractiveness, especially within "Production and Finance" and "Growth" – the two components crucial to the economic growth.

Designed as an attempt to test the applicability of the Balanced Scorecard to measuring a region's investment attractiveness, this evaluation has produced the data that is expedient to use when developing the strategies for enhancing regions' investment attractiveness.

4. Final remarks

In the study of the economic relations that emerge between regional authorities and businesses as a result of the investment activities, the approach suggested herein by the author constitutes the first step.

The evaluation of a region's investment attractiveness is a prerequisite for shaping the investment market and the emergence of the opportunities investors may choose to seize.

By evaluating a region's investment attractiveness using a more nuanced approach, it is possible to identify investment bottlenecks and the priorities for regional investment policy with regard to enhancing the region's investment attractiveness and achieving a more balanced economic growth, which in its turn would make government regulation of investment affairs more knowledge-based at the macro-level (where regions are benchmarked and investment regulation is delivered) and the meso-level (where the regional decision-making on how to achieve a balanced economic system takes place).

The practical relevance of the findings of this study is demonstrated by their use in the evaluation of Arkhangelsk Region's investment attractiveness. The fact that this study made use of the national statistics adds to its findings' expediency to be used by the authorities of the regions other than Arkhangelsk.

Viewed as a tool for implementing an investment policy, the attained BSC for evaluating a region's investment attractiveness may serve the basis for the decision-making on measures to regulate investment processes in the regions.

The testing of the BSC model has enabled a conclusion that it represents a hands-on tool for identifying the investment bottlenecks and arriving at a knowledge-based investment policy.

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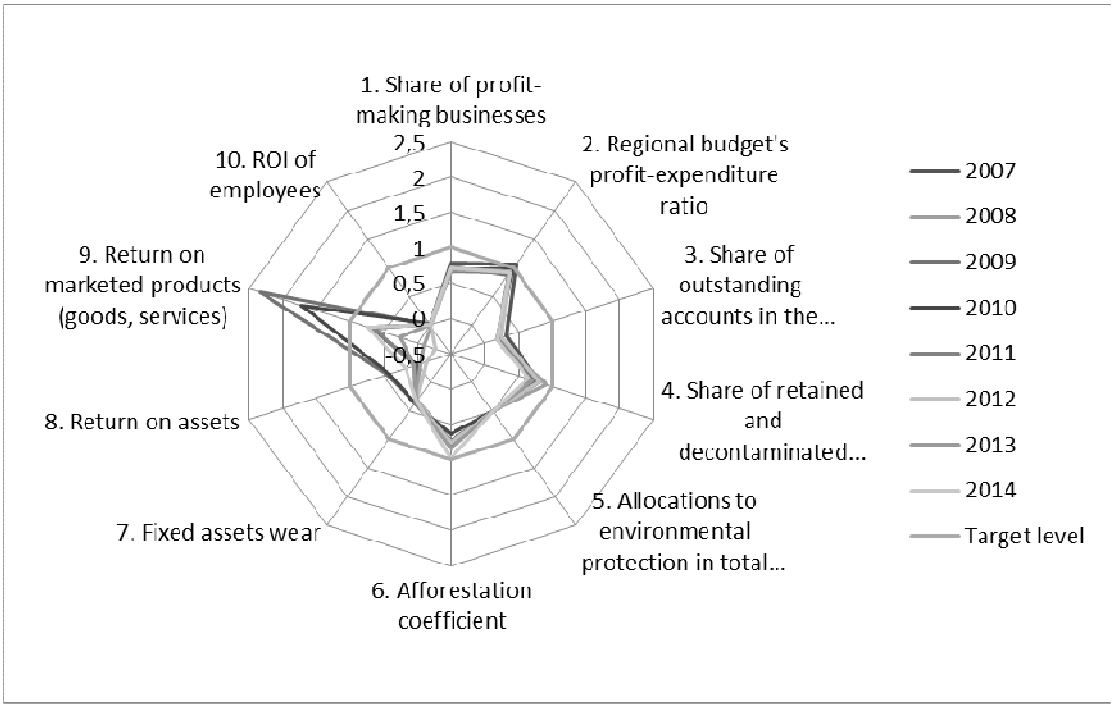
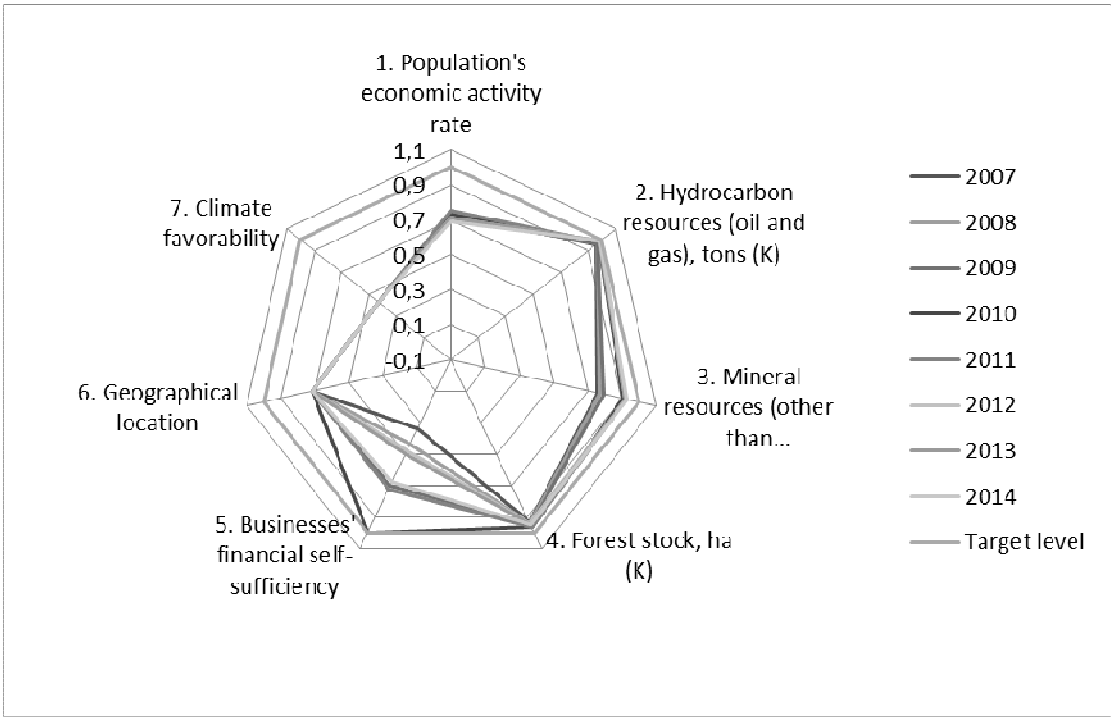
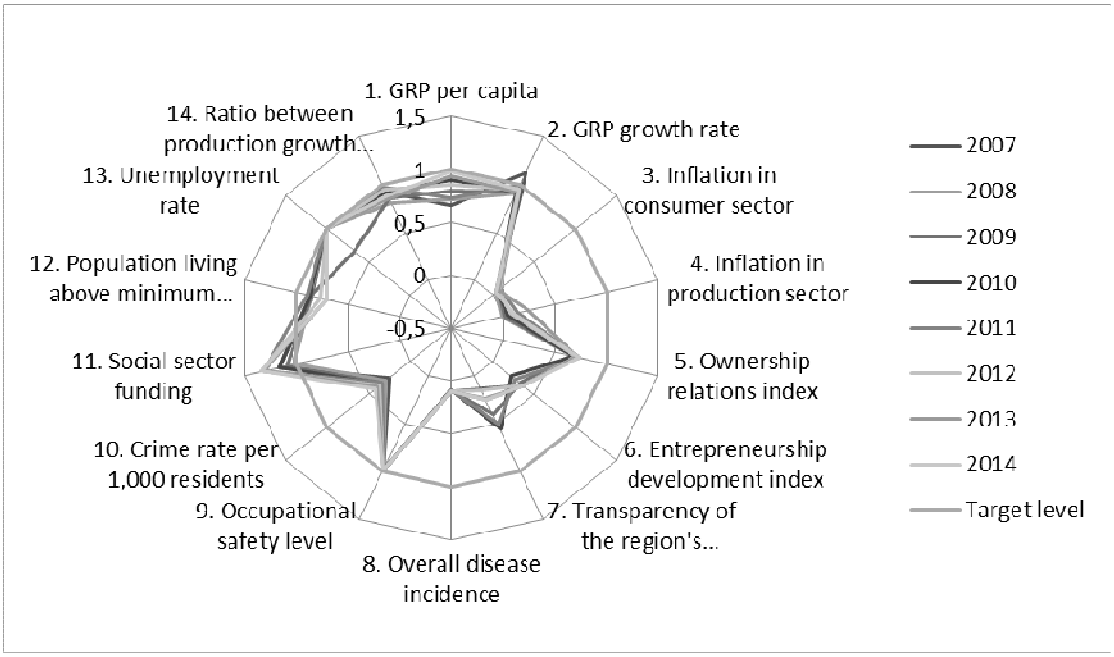
Appendix 1. Balanced Scorecard for Arkhangelsk Region's investment potential: Key performance indicators for Production and Finance.



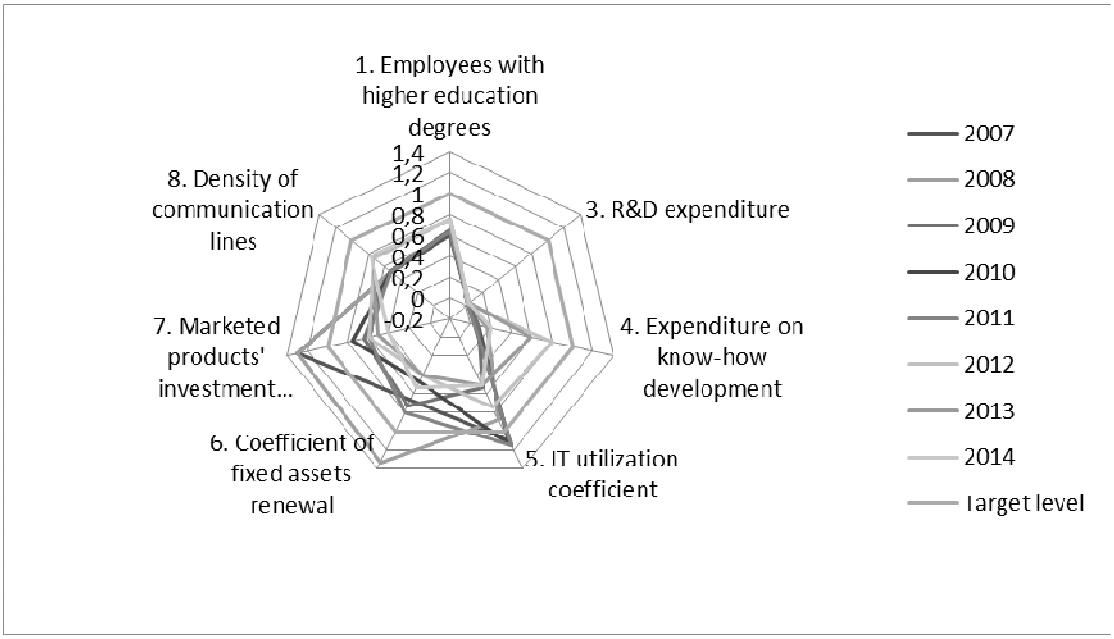
Appendix 2. Balanced Scorecard for Arkhangelsk Region's investment potential: Key performance indicators for Natural Resources.



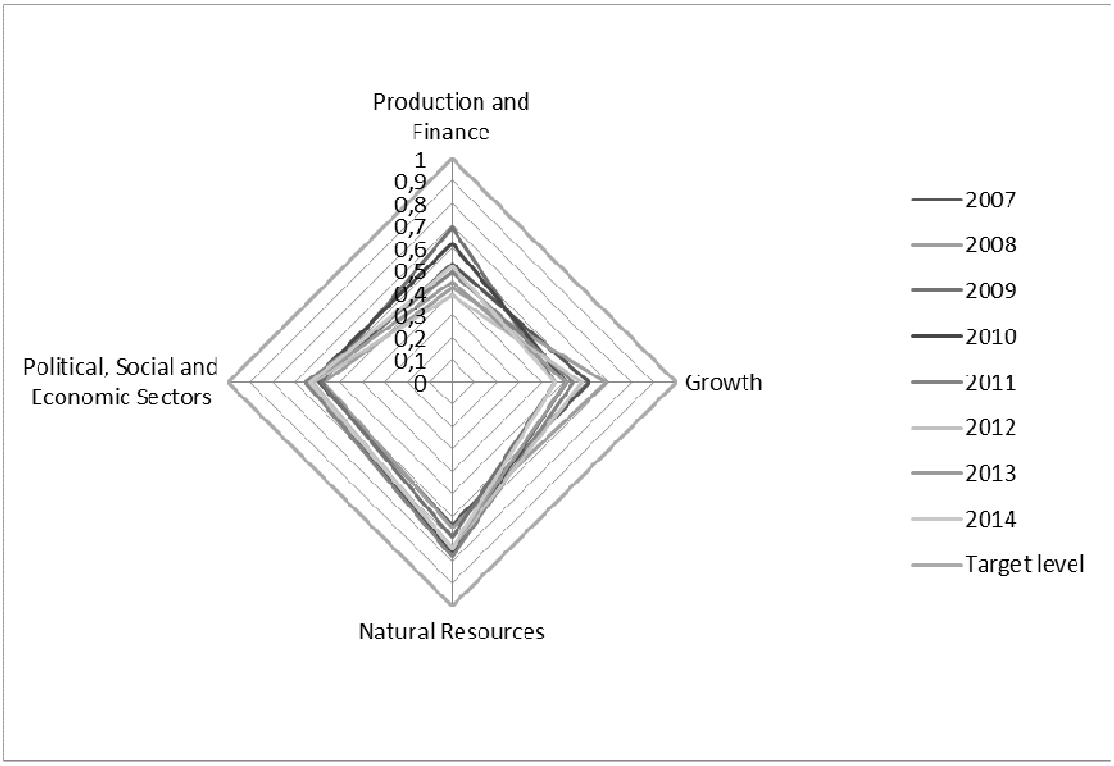
Appendix 3. Balanced Scorecard for Arkhangelsk Region's investment potential: Key performance indicators for Political, Social and Economic Sectors.



Appendix 4. Balanced Scorecard for Arkhangelsk Region's investment potential: Key performance indicators for Growth.



Appendix 5. Arkhangelsk Region's investment attractiveness over the period from 2007 to 2014: An overall profile.



ESTIMATE OF AN AVERAGE SITUATION OF REGIONS IN VALUE CHAINS

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Abstract
The article considers an indicator that reflects an average position of industries and regions in value chains. It shows high differentiation of territorial distribution of its values in Russian economy. It determines a strong correlation between GRP per capita and an upstreamness index in the economy of Russian regions. The paper compares obtained results with the data on US economy.

Keywords: region, upstreamness, value chains, GRP
JEL classification: O18

1. Introduction

The market reforms carried out in Russia have resulted in the decreased length of technological chains in the economy by 2–3 process stages. Revenues of the state, companies and population are reduced and consumer demand and investment opportunities are decreased due to lost value added. Profit-taking at the stage of raw materials extraction and semi-finished products manufacture leads to depression in manufacture of final products, degradation of machinery production and decline in domestic demand for basic and applied science, research and development, scientific and technological progress, deterioration of a material and technical base of education and health care, and lower qualification of personnel – the country falls into a spiral of backwardness and decomposition (Gubanov, 2017). In this regard, the extension of value added chains (VAC) in the national economy is one of the most important directions of modern economic policy (Gubanov, 2017; Ilyin, Povarova, 2014; Mikulsky, 2017). At the same time, the implementation of such a policy is impossible without an analysis of the current situation of regional economies (the importance of a regional level is related to the management aspect of economic policy implementation; regional authorities are its important subject) in the existing VAC, which is the purpose of this study.

2. Research methods

The indicator called upstreamness is used in English literature to characterize an average position of a certain industry in the VAC. Its value for an *i*-industry reflects a weighted average number of production stages to the final demand of industries, in which the *i*-product is a component (Kuznetsov, Sedalishchev, 2018).

If we consider a region's economy as a set of industries, than the use of this indicator, with a share of industries in the economy being taken into account, characterizes a region's position in the VAC.

For the first time the method of calculating upstreamness was proposed in (Antràs, Chor, Fally, Hillberry, 2012). We consider the logic of its construction briefly. In a closed economy for each industry $i\epsilon\{1,2,...,N\}$, the gross output value (Y_i) is the sum of its use as a final product (F_i) and its use as an intermediate imput to other industries (Z_i):

$$Y_i = F_i + Z_i = \sum_{j=1}^{N} d_{ij} Y_j \quad , \qquad (1)$$

where d_{ij} is a quantity of an *i*-product required to produce one unit of a j-product .

Iterating this identity (1), we can express an *i*-industry's gross output as an infinite sequence of terms, reflecting the use of this industry's products in the VAC:

$$Y_i = F_i + \sum_{j=1}^{N} d_{ij} F_j + \sum_{j=1}^{N}\sum_{k=1}^{N} d_{ik} d_{kj} F_j + \sum_{j=1}^{N}\sum_{k=1}^{N}\sum_{l=1}^{N} d_{il} d_{lk} d_{kj} F_j + ... \qquad (2)$$

To calculate the average position of an industry's output in the VCA – a measure of upstreamness– the authors (Antràs, Chor, Fally, Hillberry, 2012) suggest to multiply each term in the formula (2) by the distance from final use plus one and divide by gross output of an industry Y_i:

$$U_{1i} = 1 \times \frac{F_i}{Y_i} + 2 \times \frac{\sum_{j=1}^{N} d_{ij} F_j}{Y_i} + 3 \times \frac{\sum_{j=1}^{N}\sum_{k=1}^{N} d_{ik} d_{kj} F_j}{Y_i} + 4 \times \frac{\sum_{j=1}^{N}\sum_{k=1}^{N}\sum_{l=1}^{N} d_{il} d_{lk} d_{kj} F_j}{Y_i} + \ldots \quad (3)$$

As can be seen from the formula (3), the minimum value of the indicator for a certain industry is 1. This indicator value can be observed if the entire output of an *i*-industry goes to final consumption (Kuznetsov, Sedalishchev, 2018).

The practical use of the formula (3) is complicated by infinite summation of the elements. Therefore, in the same paper (Antràs, Chor, Fally, Hillberry, 2012) the alternative version of upstreamness calculation is proposed, which gives similar results (i.e. $U_{1i} = U_{2i}$):

$$U_{2i} = 1 + \sum_{j=1}^{N} \frac{d_{ij} Y_j}{Y_i} U_{2j} \quad (4)$$

The matrix form of the equality record is usually used (4):

$$U_2 = \left[I - \Delta\right]^{-1} 1, \quad (5)$$

where I is a single matrix; Δ is a matrix, in which the element (i,j) is $d_{ij}Y_j/Y_i$; 1 is a single vector.

In the case of an open economy, upstreamness is calculated similarly by the formula (5), but with export (X_i), import (M_i) and changes in savings (L_i) in an *i*-industry being taken into account:

$$Y_i = \sum_{j=1}^{N} d_{ij} Y_j + X_i - M_i + L_i \quad . \quad (6)$$

The calculation of upstreamness according to this method was carried out by economy sectors of USA (Antràs, Chor, Fally, Hillberry, 2012), China (Chen, 2017; Ju, Yu, 2015), Poland (Hagemejer, Tyrowicz, 2017), Asia (Ito, Vézina, 2016.) and globally (Miller, Temurshoev, 2017; Beladi, Chakrabarti, Hollas, 2017). The estimation of this indicator for Russian economy branches was made by D. Kuznetsov and V. Sedalishchev (Kuznetsov, Sedalishchev, 2018).

We propose calculation of the weighted average upstreamness index for the economy (R), defined as a sum of products of upstreamness industry indicators (U_{2i}) and specific weights of industries in the gross output of an economy (w_i):

$$R = \sum_{i=1}^{N} U_{2i} \times w_i \quad . \quad (7)$$

When interpreting the results, we should take into account the following: the higher value of an upstreamness indicator indicates that an enterprise, industry, region or country produces goods that are on average more distant from final consumption, but does not allow to say that a firm, industry, region or country deals with technologically less complex stages of production (Kuznetsov, Sedalishchev, 2018). The proximity of a production stage to a consumer is not generally associated with a greater technological complexity of a production stage (Kuznetsov, Sedalishchev, 2018).

To calculate an upstreamness index for the Russian economy, we used the latest available data of the Federal State Statistic Service input – output tables in the context of 126 industries. These branches were further aggregated to 26 according to their weights in gross output. The nomenclature of industries for analysis was determined by the available data on the sectoral structure of gross output and gross value added of regional economies, presented in the statistics digest "Regions of Russia". It is important to note that indicator values depend on a number of industries in the data detail: the more industries are drilled down, the more stages of production to final consumption can be observed. Therefore, at the initial stage it is important to take the most disaggregated data, because the values of the upstreamness measure can be in a wide range within the aggregated industries. For example, in the

production of electrical equipment, electronic and optical equipment (DL for OKVED), the indicator values are in a range from 1.349 (medical products, including surgical equipment**,** ortho-pedagogical devices) to 3.420 (wires and cables isolated).

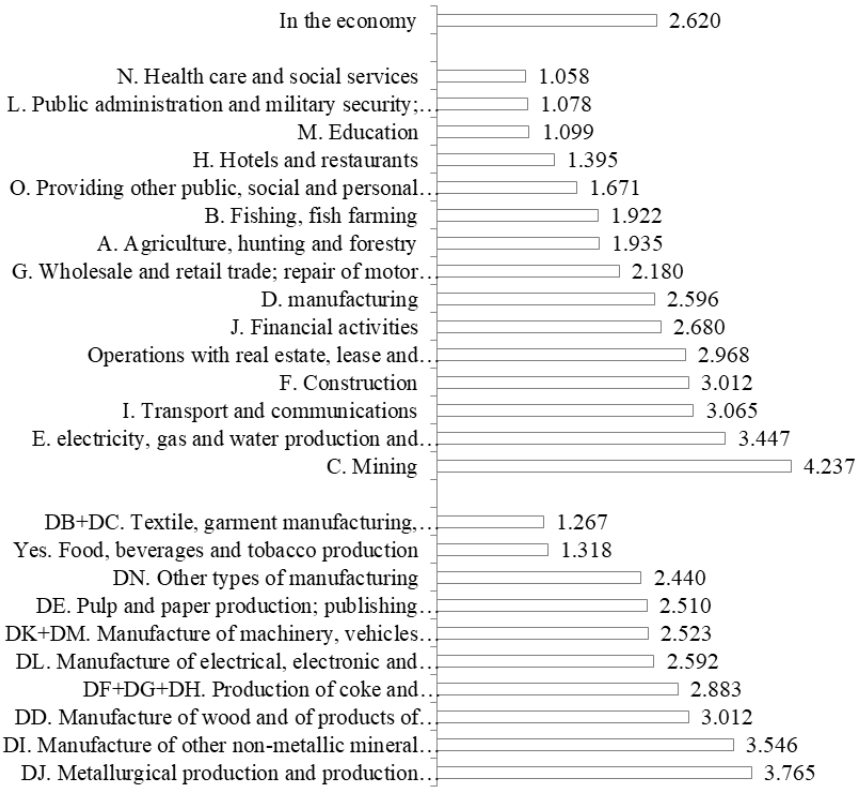
Due to the fact that the input – output tables are not developed at the regional level, the assumption of similarity of average technological processes in the same industries in the whole country and some regions was used to calculate indicators for the regions; the all-Russian upstreamness indicators for the economy sectors were taken.

To compare the achieved results with those of the United States, the data of the input – output tables and data on the structure of GRP production by states published by the U.S. Bureau of Economic Analysis (U.S. BEA) were used. Industries were aggregated to a nomenclature similar to the Russian one.

3. Results

The obtained values of the upstreamness index indicate significant difference in the position of Russian industries in the VAC. The minimum value for aggregated industries in 2015 was 1, the maximum – 4.237 (Figure 1). The industries where output is almost entirely spent on final consumption include healthcare (1.058), education (1.078) and public administration (1.099). A pronounced distance from final consumption is typical for mining (4.237), production and distribution of electricity, gas and water (3.447). Manufacturing industries are located approximately in the middle of the VAC. Among them there are least intermediate industries, such as light (1.267) and food (1.318) industries, and the most intermediate, such as metallurgy (3.765) and production of other non-metallic mineral products (3.546). This distribution of industries is generally consistent with a priori perceptions of the industry's position in the VAC.

Figure 1: Upstreamness index by Russian economy industries (kinds of economic activities) in 2015



Source: calculated on the basis of data of Federal State Statistics Service input – output tables

There is a feature of the upstreamness index that should be noted here. It correctly reflects ranking for industries, one of which is the preferred supplier of products for the other [4]. This is clearly manifested at a disaggregated level. We can consider values of the upstreamness measure of the printed production chain (Table 1) as an illustrative example. It is estimated

that the forestry (3.761) and timber (3.671) industries are considered to be less finite than the pulp and paper (2.634) industries, which in turn are further away from the final consumer than the paper (2.030) and book (1.946) industries. This kind of regularities can be traced for other technologically related sectors of the economy. This feature is extremely important for the practical use of the upstreamness index when building VAC.

Table 1.Upstreamness index of industries of the printed products manufacture chain in 2015

Product name	Value
Books, newspapers and other materials, printed and recorded media	1.946
Paper and cardboard products	2.030
Cellulose, paper and cardboard	2.634
Longitudinally sawn, planed or impregnated timber	3.671
Products of forestry, logging and related services	3.761

Source: calculated on the basis of data of Federal State Statistics Service input – output tables

A wide range of upstreamness industry indicators and different branches of specialization of Russian regions have led to a significant territorial differentiation of upstreamness values. The lowest values are recorded in the republics of Ingushetia (1.970), Tuva (1.985), North Ossetia-Alania (2.036), Altai (2.057), Kalmykia (2.098), Adygea (2.174), Dagestan (2.184), Crimea (2.209), Chechnya (2.030), Karachay-Cherkessia (2.092), Kabardino-Balkaria (2.115), Kamchatka Krai (2.135) and Stavropol Krai (2.207), the city of Sevastopol (2.014), where industry is poorly developed, the economy structure is dominated by agriculture, food industry, trade, healthcare, education and public administration sector (Table 2). The highest upstreamness values are typical for resource-producing regions – Nenets (3.744), Khanty-Mansi (3.705), Yamal-Nenets (3.508), Chukotka (3.111) autonomous okrugs, Sakhalin (3.464) and Orenburg (3.046) oblasts, republics of Sakha (3.217) and Komi (3.059). The upstreamness values in regions specializing in manufacturing industry (The share of gross value added generated by manufacturing exceeds 30% of GRP) are in the range from 2.37 to 2.76. For the Omsk Oblast the indicator value is 2.372, the Kaluga Oblast – 2.375, the Vladimir Oblast – 2.383, the Lipetsk Oblast – 2.418, the Tula Oblast –2.423, the Nizhny Novgorod –2.434, the Novgorod Oblast – 2.435, the Sverdlovsk Oblast – 2.444, the Chelyabinsk Oblast – 2.461, the Vologda Oblast – 2.476, Krasnoyarsk Krai – 2.754.

Table 2. Upstreamness indicator for Russian regions economy in 2015

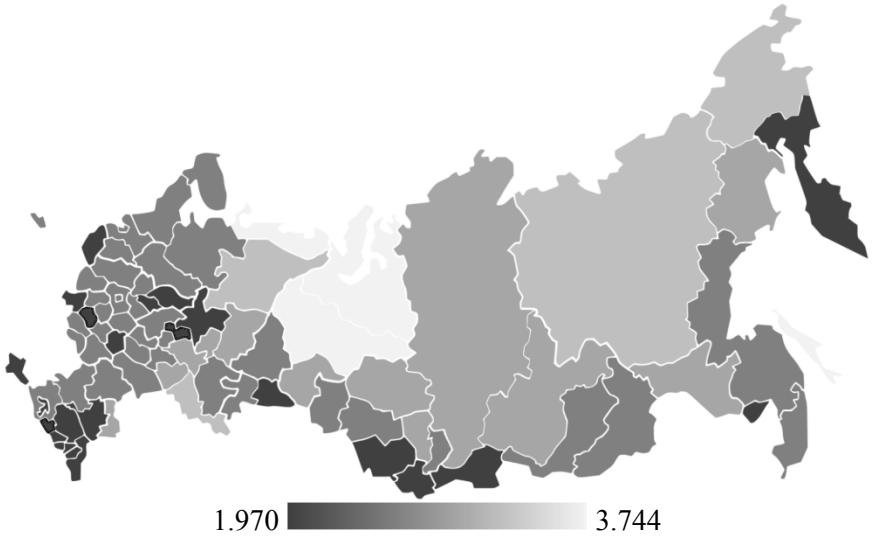
Territory	Value	Territory	Value
Republic of Ingushetia	1.970	Saint-Petersburg	2.435
Republic of Tuva	1.985	Republic of Karelia	2.437
Sevastopol	2.014	Volgograd Oblast	2.441
Republic of Chechnya	2.030	Khabarovsk Krai	2.443
Republic of North Ossetia-Alania	2.036	Sverdlovsk Oblast	2.444
Republic of Altai	2.057	Moscow	2.453
Republic of Karachay-Cherkessia	2.092	Republic of Bashkortostan	2.455
Republic of Kalmykia	2.098	Chelyabinsk Oblast	2.461
Republic of Kabardino-Balkaria	2.115	Novosibirsk Oblast	2.464
Kamchatka Krai	2.135	Zabaikalsky Krai	2.470
Republic of Adygea	2.174	Vologda Oblast	2.476
Republic of Dagestan	2.184	Kursk Oblast	2.496
Stavropol Krai	2.207	Belgorod Oblast	2.510
Republic of Crimea	2.209	Leningrad Oblast	2.550
Ivanovo Oblast	2.238	Murmansk Oblast	2.575
Pskov Oblast	2.251	Republic of Khakassia	2.617
Orel Oblast	2.256	Amur Oblast	2.685
Bryansk Oblast	2.264	Perm Oblast	2.719
Jewish Avtonomous Oblast	2.266	Samara Oblast	2.744
Altai Krai	2.272	Krasnoyarsk Oblast	2.754
Kirov Oblast	2.276	Tyumen Oblast (without JSC)	2.762
Kurgan Oblast	2.284	Astrakhan Oblast	2.783

Territory	Value	Territory	Value
Republic of Mari El	2.299	Magadan Oblast	2.786
Tambov Oblast	2.312	Udmurt Republic	2.796
Kostroma Oblast	2.317	Republic of Tatarstan	2.821
Republic of Buryatia	2.330	Kemerovo Oblast	2.843
Ryazan Oblast	2.331	Arkhangelsk Oblast (with JSC)	2.846
Republic of Mordovia	2.332	Irkutsk Oblast	2.852
Republic of Chuvashia	2.333	Tomsk Oblast	2.936
Penza Oblast	2.338	Orenburg Oblast	3.046
Arkhangelsk Oblast (without JSC)	2.360	Komi Republic	3.059
Rostov Oblast	2.363	Chukotka Autonomous Okrug	3.111
Primorsky Krai	2.369	Sakha (Yakutia) Republic	3.217
Omsk Oblast	2.372	Sakhalin Oblast	3.464
Kaluga Oblast	2.375	Tyumen Oblast (with JSC)	3.501
Voronezh Oblast	2.377	Yamalo-Nenets Autonomous Okrug	3.508
Krasnodar Oblast	2.381	Khanty-Mansiysk AO-Yugra	3.705
Vladimir Oblast	2.383	Nenets Autonomous Okrug	3.744
Saratov Oblast	2.384		
Smolensk Oblast	2.388	North Caucasian Federal District	2.150
Moscow Oblast	2.401	Southern FD	2.412
Ulyanovsk Oblast	2.414	Central Federal District	2.429
Tver Oblast	2.415	Northwestern Federal District	2.542
Kaliningrad Oblast	2.416	Volga Federal District	2.624
Lipetsk Oblast	2.418	Siberian Federal District	2.644
Tula Oblast	2.423	Far Eastern Federal District	2.859
Yaroslavl Oblast	2.431	Ural Federal District	3.133
Nizhny Novgorod Oblast	2.434		
Novgorod Oblast	2.435	Russian Federation	2.620

Source: calculated on the basis of Federal State Statistics Service data.

The geographical distribution of regional upstreamness indicators across the country is shown in Figure 2. We can identify a decrease in their values from the North to the South and from the East to the West and focus on crowded places as a final consumer.

Figure 2: Upstreamness indicator for Russian regions economy in 2015



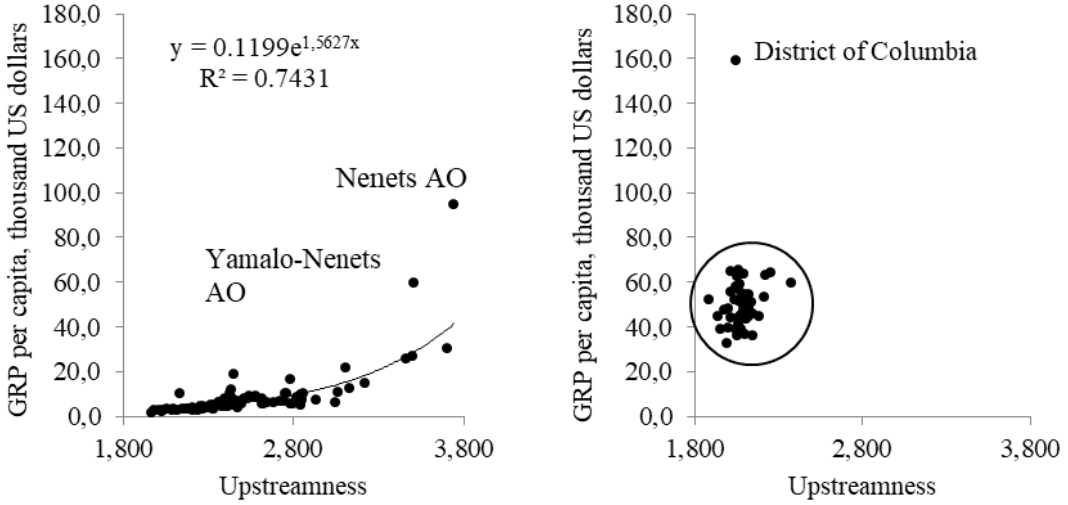
Source: calculated on the basis of Federal State Statistics Service data

As for Russian regions, there is a strong positive correlation between an upstreamness value of their economy and a volume of GRP per capita – high upstreamness values correspond to high values of GRP per capita (Figure 3a). That is, in the Russian economy there is a paradoxical situation when the farther the region in the VAC from the end

consumer, the more intermediate product it produces, the higher the gross income of its economy. The reasons for this lie in structural changes in the regions' economy caused by the current economic model: the growth is largely determined by results of export-import activity and external environment. The greatest benefit goes to exporters of products of low added value; products of own high value added (primarily engineering) are not required in the economy.

For comparison, Figure 3b illustrates the situation in the US economy. In the absence of strong differentiation between states, there is no correlation between a volume of GRP per capita and an upstreamness value. By GRP per capita in 2015 (excluding Columbia County) the gap between the maximum (67.6 thousand US dollars in North Dakota) and minimal (31.7 thousand US dollars in Mississippi) value was 2.1 times (4.9 times for Columbia County). By upstreamness the gap between the maximum (2.376 in Wyoming) and the minimum (1,886 in Hawaii) value was 1.3 times. In Russia, respectively, it amounted to 15.2 (excluding autonomous okrugs of Arkhangelsk and Tyumen oblasts; with their account it is 54.5 times) by GRP per capita and 1.9 times by upstreamness value.

Figure 3: Correlation between GRP per capita and an upstreamness indicator for economies of regions in Russia (a) and the USA (b) in 2015

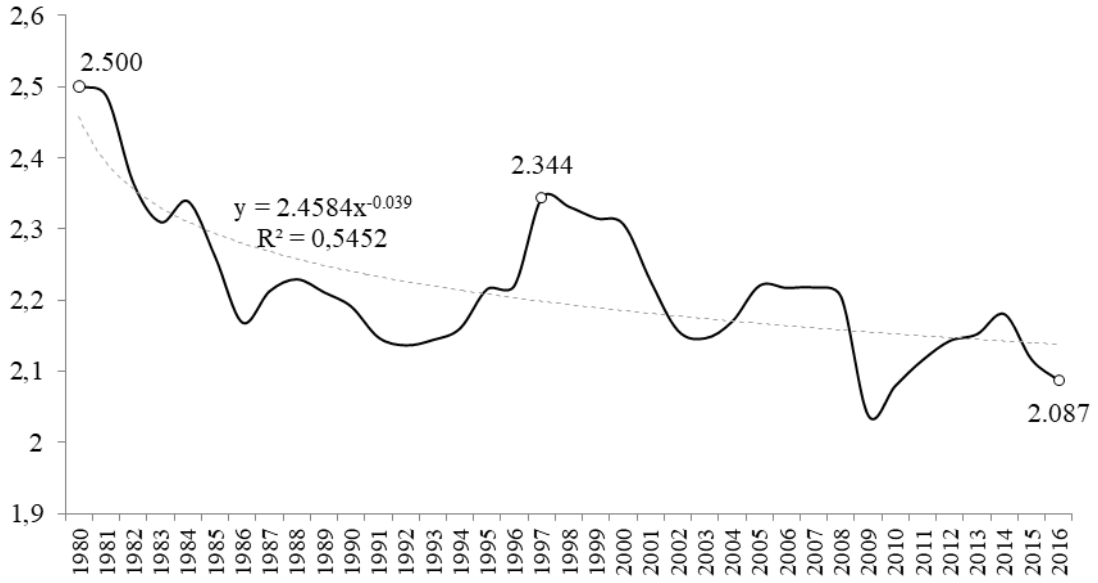


Note: For better clarity the scales on both charts are the same; GRP of Russian regions is recalculated in dollars at the average annual rate of 2015

Source: calculated on the basis of Federal State Statistics Service and .the U. S. BEA

However, the structural changes in US economy (the analysis and justification of the causes of which are beyond the scope of this article) lead to a systematic decrease in the upstreamness index (Figure 4). This is the trend of the last 20 years of their economy development.

Figure 4: Dynamics of the upstreamness index in the US economy in 1980–2016



Source: calculated on the basis of the U.S. BEA input – output tables

4. Conclusion

In terms of growing interest in the processes of building long value chains in the Russian economy there is a need to have an indicator that can quantitatively characterize processes of regional fragmentation of production. In this paper we consider and calculate the upstreamness index, which characterizes an average position of industries and regions in the VAC. The high differentiation of territorial distribution of its values in the Russian economy is shown. On the basis of empirical data the strong correlation between GRP per capita and upstreamness in the economy of Russian regions is substantiated.

Further research will involve methodological and analytical support of the use of this indicator in the practice of public administration. It is necessary to analyze relations between regions' economic development, their place in the VAC, budget financing, a level and quality of life of population, cost of science and technology, assessment of dynamics of these indicators, and compare acquired results with data on developed countries. It is important to consider clustering of regions by branches of specialization and upstreamness index values, as well as develop state policy directions on extension of national value chains. To improve the accuracy of upstreamness indicator assessment, it is reasonable to develop tools for obtaining and using disaggregated data on a production structure of regions and municipalities. In addition, since the development of regional input-output tables is unlikely to be expected in the near future, it is desired to work out methods for regionalization of all-Russian indicators in order to enhance the accuracy of calculations.

5. Acknowledgments

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IS THERE A CAUSALITY RELATIONSHIP BETWEEN LOCAL TAX REVENUE AND REGIONAL ECONOMIC GROWTH? A PANEL DATA EVIDENCE FROM INDONESIA

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Abstract

The main objective of the study is to investigate the causal relationship of economic growth, local tax revenue, and local retribution revenue in Indonesia. A panel data set of 24 provinces over the period of 2003-2015, and then, Pedroni's and Kao's Co-integration test, Panel Vector Error Correction Model (PVECM) and Granger causality test were applied to analyze the relationship between the variables. The finding of the study indicates that in the long run, there would be a negative relationship between local tax revenue and regional economic growth and a positive and significant relationship between local tax revenue and local retribution revenue. Granger causality test proved that there is bi-directional causality between local tax revenues and economic growth, and uni-directional causality running from local retribution revenue to economic growth and local tax revenue.

Keywords: Local tax revenue, local retribution revenue, economic growth, and Panel Vector Error Correction Model

JEL classification: H71, O4

1. Introduction

Research on the role of tax revenue for economic development has been an interesting topic of economic researchers (Cerqueti & Coppier, 2011; Kafkalas et al., 2014). For the context of local government, the revenue aside from being the main source of government revenues can also affect the economic activities like production, consumption, and distribution, and which in turn impacts on economic growth (Yang, 2016; Olayungbo & Olayemi, 2018). The tax revenue is the main source of government revenue and is very important for economic growth (Raifu & Raheem, 2018).

For the case of a regional economy in Indonesia, the local tax revenues make the biggest contribution to total local government revenue after other kinds of local revenues is like the local retribution, profit sharing of the local government-owned enterprises, and everything else legal local revenue (Ruliana, 2015). The local tax commonly collected by the local government and sourced from within the local area. Furthermore, the local retribution is non-tax local revenues defined as receipts directly and significantly from the payer. The local retribution is mandatory payments of the resident to for the local government due to certain services provided by the government (Harahap et al., 2017).

So far, local governments in Indonesia have been trying to increase the local tax and retribution revenues. In accordance with the differences of potency and sources of the two kinds of revenue, the realization of revenues of the region is also different, respectively. Following the differences, the economic growth of each region in Indonesia is relatively

different from each other (Amri, 2018). On the one side, there are regions with high economic growth even above the national average, while on the other side there are also regions with lower economic growth (Indonesian Bureau of Statistics, 2018). If the economic growth is related to the local government revenues which are allocated to the development financing of the local area, an empirical study on the impact of these two types of local government revenues on regional economic growth in Indonesia importantly to be investigated.

The research studies on the relationship between economic growth and tax revenue have been carried out by many previous researchers. But, the results of their empirical studies are still paradoxical and inconsistent with one another. Tax revenue has a negative impact on growth (Holcombe & Lacombe, 2004; Mark et al., 2000; Reed, 2008). The negative impact of taxes is due to the impact of taxes directly reducing people's income. The results of the empirical study conducted by Romero-Avila & Strauch (2008) also found that taxes have a negative impact on economic growth.

In contrast to the findings of the study above, a number of other researchers prove the existence of a unidirectional relationship between tax and economic growth. Tax revenue is significantly related to economic growth (Ojong et al., 2016). Increased tax revenues encourage an increase in government revenues which then impacts economic growth (Suárez Serrato & Zidar, 2018). An empirical study conducted by Puonti (2016) also concluded that increasing tax revenues to fund government spending had a positive impact on growth. In line with Puounti's findings, the study conducted by Ofoegbu et al. (2016) also provides empirical evidence that there is a positive and significant relationship between tax revenue and economic growth. The recent research on the relationship between the two variables was proved by Chang (2017) that regional tax revenues have an impact on the regional economy.

The results of other studies regarding the relationship between economic growth and tax revenue make the relationship between the two variables confusing. Such as empirical research conducted by Caballero & López (2012) and Samaniego (2014) for the case of Mexico economy provides empirical evidence that taxes have a negative impact on economic growth using OLS data panel models, and have a positive effect on fixed and random effects models. In addition, a number of other studies also prove that the relationship between economic growth and local taxation is inverted U-shape (Aghion et al., 2016; & Loganathan et al., 2017).

Given the findings of the previous research are still presenting asymmetric and confusing information about the causality relationship between these variables, this study re-examines the causality relationship between the local government revenue and regional economic growth for the case of the Indonesian economy. In contrast to the previous studies, our study included the local retribution revenue as one of the regional revenues. Furthermore, in terms of data analysis approach, we examine the long-run and short-run relations and analyze the direction of causality between these variables. So that, the research findings are able to present empirical evidence in detail about the extent of the impact of local tax and retribution revenue that can affect economic growth for the case of a regional economy in Indonesia.

Systematically, this study organized into five sections. The second section is a literature review focused on a number of results of empirical studies relating to the causal relationship between taxes and regional retribution and economic growth. The third section describes the research method, consisting of data used, data sources and analysis model which are utilized to analyze the relationships between variables. Then the fourth section is the result and discussion, and lastly, the fifth section highlights the conclusions and suggestions.

2. Data and Research Methods

The operationalized data of the study is a panel data set of 24 provinces from Indonesia, sourced from statistical reports published by The Indonesian Central Bureau of Statistics. The data is time series data during the period 2003-2015. The economic growth is measured by yearly per capita gross regional domestic product at the constant price of 2000. Furthermore, both local tax revenues and local retribution revenues are measured by the per capita revenue of the two kinds of local government revenues by the unit of IDR1000 per capita, respectively.

The first stage in our empirical study is to test the stationarity of data. In this respect, we used the Levine–Lin–Chu (LLC) method (Levine, Lin, & Chu, 2002) and the I'm–Pesaran–

Shin (IPS) method (Im, Pesaran, & Shin, 2003) to determine the order of integration to see where the time series variable achieve stationarity. Both the LLC and IPS methods were employed on the principles of the conventional Augmented Dickey-Fuller (ADF) test. The LLC method checks the heterogeneity of intercepts across members of the panel, while the IPS method explores the heterogeneity in the intercepts, as well as in the slope coefficients. Both tests were applied by averaging individual ADF t-statistics across cross-section units.

The second stage in the method of the analysis is a cointegration test. The concept of cointegration, introduced by Granger (1969), is relevant to the problem of determining the long-run relationship between the variables. The basic idea that underpins cointegration is simple. If the difference between two non-stationary series is itself stationary, then the two series are cointegrated. If two or more series cointegrated, it is possible to interpret the variables in these series as being in a long-run equilibrium relationship (Engle & Granger, 1987). By contrast, a lack of cointegration suggests that the variables have no long-run relationship.

Furthermore, in the third stage, the econometric means of a panel vector error correction model (PVECM) is utilized to analyze the causality relationship between the economic growth, local tax revenue, and local retribution revenue. The econometric model combines the traditional VAR approach putting all the variables in the system as endogenous (Grossmann et al., 2014). Prior to the implementation of the PVECM as data analysis approach, we determine the optimal lag length by using the criterion of Schwarz information. Econometrically, the PVECM model applicated to examine the causality relationship among the regional economic growth, local tax revenue, and local retribution revenue formulated as follow:

$$\Delta lPI_{it} = \alpha_0 + \sum_{j=1}^{n} \beta_{1j} \Delta lPI_{i,t-j} + \sum_{j=1}^{n} \beta_{2j} \Delta lTR_{i,t-j} + \sum_{j=1}^{n} \beta_{2j} \Delta lRR_{i,t-j} + \gamma e_{i,t-1} + \mu_{it}$$

$$\Delta lTR_{it} = \alpha_0 + \sum_{j=1}^{n} \beta_{1j} \Delta lTR_{i,t-j} + \sum_{j=1}^{n} \beta_{2j} \Delta lPI_{i,t-j} + \sum_{j=1}^{n} \beta_{2j} \Delta lRR_{i,t-j} + \gamma e_{t-1} + \varepsilon_{it}$$

$$\Delta lRR_{it} = \alpha_0 + \sum_{j=1}^{n} \beta_{1j} \Delta lRR_{i,t-j} + \sum_{j=1}^{n} \beta_{2j} \Delta lPI_{i,t-j} + \sum_{j=1}^{n} \beta_{3j} \Delta lTR_{i,t-j} + \gamma e_{t-1} + \epsilon_{it}$$

where Δ*l*PI is the first difference of the logarithm of per capita income per capita, as the proxy of regional economic growth, ΔlTR is the first difference of the logarithm of the local tax revenue per capita, and ΔlRR is the first difference of the logarithm of local retribution revenue per capita.

The model above can avoid loss of short-run information. The short-run deviations towards long-term equilibrium directly adjusted to long-run equilibrium. Therefore, the error term allows the imbalance proportion of the next period can be corrected. The term of error correction model (ECM) is represented by the coefficient of γ if the variables are cointegrated one another.

3. THE RESULT AND DISCUSSION

3.1. The descriptive statistics of the variables

The local tax revenue and local retribution revenues of local government in Indonesia are relatively different from each other. On the one side, there is a number of regions noted as the higher- local tax and retribution revenue province. In contrast, on another side, there are also a number of regions noted as the lower-local tax and retribution revenue province. Furthermore, per capita gross regional domestic product (as a proxy for regional economic growth) is also a relatively different one another. Table 1 shows the descriptive statistics and correlation matrix of the variables.

Table 1. Descriptive Statistics and Correlation Matrix

	Local Tax	Local Retribution Revenue	Gross Regional Domestic

	Revenue (IDR1000 per capita)	(IDR1000 per capita)	Product (IDR1000 per capita)
Descriptive Statistics			
Mean	218,177.90	6,517.44	8,084.63
Median	178,156.20	4,235.90	7,123.60
Std. Dev.	179,215.10	7,148.03	4,578.46
Skewness	3.17	2.87	2.34
Kurtosis	17.45	14.51	8.65
Correlation Matrix			
Tax Revenue	1		
Retribution Revenue	0.004	1	
Per capita Income	0.746	-0.206	1

Sources: Secondary Data (Processed), 2018.

Table 1 above shows that local tax revenues positively related to economic growth, indicated by a correlation coefficient of 0.746. The direction of the relationship between the local tax revenue and local retribution revenue is also positive, but it relatively weak with a correlation coefficient of 0.004. Furthermore, the local retribution revenue negatively related to economic growth with a correlation coefficient of -0.206.

3.2 The result of unit root test

As explained earlier, the unit root test which is used to determine the stationary of the data pertains to six methods. The methods are namely, LLC, IPS, ADF-Fisher, ADF-Choi, PP-Fisher, and PP-Choi. The statistical test result of the unit root test panel test as shown in Table 2, respectively.

Table 2. The Result of Panel Unit Root Test

No	Variabel	Methods	Individual Intercept				Intercept & Trend			
			Level		First Difference		Level		First Difference	
			T-stat	Prob	T-stat	Prob	T-stat	Prob	T-stat	Prob
1	*l*PI	Levin, Lin & Chu	-2.382	0.009	-3.279	0.000	-2.771	0.003	-8.956	0.000
		Im, Pesaran & Shin	4.166	1.000	-0.969	0.166	0.820	0.794	0.098	0.539
		ADF - Fisher X^2	24.360	0.998	56.578	0.185	39.260	0.812	52.685	0.297
		ADF - Choi Z-stat	4.829	1.000	-1.405	0.080	1.1936	0.884	0.452	0.674
		PP – Fisher	48.334	0.459	78.631	0.004	30.732	0.975	79.562	0.003
		PP – Choi	5.779	1.000	-2.684	0.004	4.757	1.000	-1.351	0.088
2	*l*TR	Levin, Lin & Chu	-1.663	0.048	-9.351	0.000	-3.946	0.000	-11.499	0.000
		Im, Pesaran & Shin	3.371	0.999	-5.317	0.000	0.105	0.542	-1.985	0.023
		ADF - Fisher X^2	16.678	1.000	122.509	0.000	46.318	0.542	95.798	0.000
		ADF - Choi Z-stat	4.092	1.000	-6.449	0.000	-0.262	0.397	-4.431	0.000
		PP – Fisher	35.262	0.914	243.981	0.000	123.220	0.000	236.352	0.000
		PP – Choi	3.285	0.999	-11.571	0.000	-5.261	0.000	-10.844	0.000
3	*l*RR	Levin, Lin & Chu	-4.1823	0.000	-6.962	0.000	-7.308	0.000	-4.711	0.000
		Im, Pesaran & Shin	-0.856	0.196	-3.862	0.000	-0.799	0.212	-0.431	0.333
		ADF - Fisher X^2	60.456	0.107	97.207	0.000	63.758	0.064	58.275	0.147
		ADF - Choi Z-stat	-0.739	0.229	-4.694	0.000	-1.674	0.047	-1.467	0.071
		PP – Fisher	71.706	0.015	173.921	0.000	83.314	0.001	154.650	0.000
		PP – Choi	-0.982	0.163	-8.337	0.000	-1.322	0.093	-7.165	0.000

Source: Own calculation by E-views software

Note: * indicate the significant at 95% level, and ** indicate the significant at 99% level.

Table 2 above shows that at the level, most of the panel unit root test method produces p-value >.05. This indicates that the data has not achieved a stationary at the level. Furthermore, at the first difference, most of the p-value <.05, both using individual intercept and intercept and trend approaches. Thus, it can be interpreted that the data have achieved a stationary at the first difference.

3.2. The result of co-integtation test

Since the three data have reached stationary at the first difference, then we can do a cointegration test to detect the existence of a long-run equilibrium relationship between economic growth, local tax revenue, and local retribution revenue. In this respect, the cointegration test uses Pedroni's Residual-Based Cointegration Test, Kao's Residual Cointegration Test and Johansen Fisher Panel Cointegration Test.

Pedroni (1999) recommend seven statistical tests to ascertain the existence of panel cointegration. The statistical methods divided into two approaches. The first approach pertains to panel v-statistic, panel rho-statistic, panel PP-statistic, and panel ADF-statistics. The all statistical test is termed "within-dimension" (Panel test). The second approach pertains to group rho-statistic, group PP-statistic, and group ADF-statistic are termed "between-dimension" (group test). The null hypothesis proposed that the is no cointegration between economic growth, local tax revenue, and local retribution revenue, while the alternative hypothesis is that the all variables are cointegrated. The result Pedroni's cointegration test as shown in Table 3.

Table 3. The Result fo Pedroni's Residual-Based Cointegration Test

Panel Cointegration Statistics (Within-Dimension)				
Test Statistics	Statistical Values			
	Intercept		Intercept and Trend	
	Statistic	p-value	Statistic	p-value
Panel v-Statistic	1.203	0.114	0.401	0.344
Panel rho-Statistic	0.006	0.502	1.904	0.972
Panel PP-Statistic	-5.707	0.000	-10.161	0.000
Panel ADF-Statistic	-3.516	0.000	-4.692	0.000
Group Mean Panel Cointegration Statistics (Between-Dimension)				
Test Statistics	Statistical Values			
	Intercept		Intercept and Trend	
	Statistic	p-value	Statistic	p-value
Group rho-Statistic	2.039	0.979	4.103	1.000
Group PP-Statistic	-12.267	0.000	-14.683	0.000
Group ADF-Statistic	-5.252	0.000	-6.319	0.000

Note: Ho: no cointegration; p-value < 0.05 indicate the rejection of null hypothesis at 95% confidence interval.

Table 3 above shows the results of Pedroni (1999) 's panel cointegration tests that some of p-value are greater than 0.05, especially for the panel - rho and group - rho statistics. On the contrary, some of the p-values for the PP Panel, ADF Panel, PP Group, and ADF-Statistics Group are smaller than 0.05. Thus, it can be interpreted that there is strong evidence that proves the existence of long-run cointegration relationships among the three variables.

Furthermore, acceptance or rejection of the hypothesis with Kao's Residual Panel Cointegration Test also based on p-value. The provision of the test is if the p-value <0.05 indicate that there is cointegration among the three variables. Otherwise, the p-value> 0.05 means the variables have no cointegrated. The result of Kao's residual panel cointegration test in Table 4.

Table 4. The Result of Kao's Residual Panel Cointegration Test

Null Hypothesis	T-Statistic	P-value
No cointegration	-3.567***	0.000
Residual Variance	0.019	
HAC variance	0.015	

Note: *** Indicates the rejection of null hypothesis at 1% level of significant.

Table 4 provides the results of Kao (1999) panel cointegration test. The statistical result of the test shows that the p-value of 0.000 <0.05. Therefore, the null hypothesis rejected and this thing indicates that the long-run relationship exists between regional economic growth, local tax revenue, and local retribution revenue. In other words, there is strong evidence pointing out the three variables are co-integrated in the long-run. (OK)

Finally, Johansen Fisher panel cointegration test employed to determine the number of co-integration equation. The result of the test as shown in table 5. (OK)

Table 5. Johansen Fisher Panel Cointegration Test

Null Hypothesis	Alternative Hypothesis	Fisher Stat.* (from trace test)	Fisher Stat.* (from max-eigen test)

		Trace test	Prob	Max-eigen test	Prob
r = 0	r ≠ 0	257.9	0.0000	257.9	0.0000
r ≤ 1	r > 1	179.8	0.0000	172.0	0.0000
r ≤ 2	r > 2	58.53	0.0006	58.53	0.0006

Note: * Probabilities are computed using asymptotic Chi-square distribution

Base on the tabel below, can conclude that at least there are two co integration equation. Hence, we have to employee panel vector error correction model (PVECM) as means of the data analysis.

3.3. The Result of the lag length criteria

The tests used were determined based on informational criteria - *the Akaike information criterion (AIC), Hannan-Quinn (HQ), and Schwarz information criterion (SC)*, taking into consideration that if the number of lags is too small then the model does not capture all the information while if there are too many lags then the degree of freedom are wasted. Different information criteria suggest different optimal lag lengths for the VAR model, as shown in Table 5. The standard information criteria of Hannan-Quinn (HQ) and Akaike information criterion shows an optimal lag length of 3 and 7, respectively. Information criteria of Schwarz information criterion shows an optimal lag length of 7. In this respect, the information criteria based on Schwarz information criterion.

Table 5. Result of VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-151.9627	NA	0.014860	4.304518	4.399379	4.342283
1	230.1912	721.8462	4.68e-07	-6.060866	-5.681422	-5.909809
2	265.5138	63.77697	2.26e-07	-6.792051	-6.128023*	-6.527699
3	279.7810	24.57122	1.96e-07	-6.938360	-5.989750	-6.560716*
4	288.0970	13.62897	2.01e-07	-6.919360	-5.686166	-6.428422
5	301.5435	20.91692	1.79e-07	-7.042876	-5.525099	-6.438645
6	309.3573	11.50356	1.88e-07	-7.009925	-5.207564	-6.292400
7	330.2954	29.08072*	1.38e-07*	-7.341539*	-5.254595	-6.510721

Note: * indicates lag order selected by the criterion; LR: sequential modified LR test statistic; (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; and HQ: Hannan-Quinn information criterion.

Since the variables achieved stationarity after first differencing and Schwarz information criterion shows an optimal lag length of 7, we use lag length of 7 in using panel *vector error correction model.* The result of using econometrics method comprised of two parts covering short-term and long-term effects as described in the following sections.

3.4. The Result of Panel Vector Error Correlation Model (PVECM)

Taking into account the variables studied can either have short- or long-run effects, this study utilized a PVECM to disaggregate these effects. The other reason for the usage of the econometric model is that it allows us to distinguish the long and short-run impacts of the three variables. The output of data processing using software E-views categorized into two parts. The first part shows short and long-run relationships between variables. Then the second part deals with dynamic models informing the short-run causality effects. The following is the output E-views parts describing both long and short-run relationships between variables.

Tabel 6. The parts of PVECM representing the short-run and long-run relations.

Cointegrating Eq:	**CointEq1**	**CointEq2**
DLPI(-1)	1.000000	0.000000
DLRR(-1)	0.000000	1.000000

DLTR(-1)	**3.793783**	**-3.233395**	
	(1.19010)	(0.94141)	
	[3.18780]	**[-3.43463]**	
C	**-56.28918**	**32.14376**	
Error Correction:	**D(DLPI)**	**D(DLRR)**	**D(DLTR)**
CointEq1	4.11E-05	-0.105149	-0.017830
	(0.00129)	(0.08989)	(0.01058)
	[0.03191]	[-1.16981]	[-1.68561]
CointEq2	0.000898	-0.198479	0.009813
	(0.00156)	(0.10875)	(0.01280)
	[0.57622]	**[-1.82514]**	[0.76679]

Standard errors in ( ) & t-statistics in [ ]

whereby: DLPI is the first difference of the logarithm of income per capita, as the proxy of regional economic growth, DLTR is the first difference of the logarithm of the local tax revenue per capita, and DLRR is the first difference of the logarithm of local retribution revenue per capita.

The result of VECM provides empirical evidence deal with the long run relationship between the variables. There are two co-integration equations representing the long run equilibrium relations of the variables. Each of the equation as follow:

$$\Delta lPI = 56.289 - 3.794\Delta lTR_{t-1} \quad (1)$$
$$[-3.187]^*$$

$$\Delta lRR = -32.144 + 3.233\Delta lTR_{t-1} \quad (2)$$
$$[3.435]^*$$

The first equation represents the long run equilibrium relationship between economic growth and local tax revenue. The local tax revenue has a negative and significant relationship with economic growth in the long-run. This thing is showed by the estimated coefficient of the variable amount of -3.794 (t statistic = -3.187). The existence of the long run between the two variables is consistent with the empirical finding of Canicio & Zachary (2014) for the case of Zimbabwe economy concluding that there is a long run relationship between the two variables.

The existence of a negative relationship between economic growth and local tax revenue in the long run, due to the taxes can affect economic activities such as consumption and distribution and allocation of resources which in turn have a destructive impact on economic growth (McNabb & LeMay-Boucher, 2014). This finding is also consistent with the results of empirical research conducted by Ahmad et al. (2016) in Pakistan that in the long run, tax revenues have negative and significant effects on economic growth. One percent increase in total taxes, economic growth would be decreased by -1.25 percent. Previously, empirical studies conducted by Dackehag & Hansson (2012) for the case of 25 rich OECD countries also confirmed the existence of a negative relationship between the two variables.

However, the results of this study contradict the empirical finding of Mehrara & Farahani (2016) concluding that a more tax will be beneficial to a better economic condition. These findings are also not in line with the results of the study by Chang (2017) for the case of the Chinese economy and Arowoshege et al. (2017) for the case of the Nigerian economy which also proves that taxes can increase economic growth.

The second equation represents a long-term relationship between local tax revenue and local retribution revenue. In the long run, the relationship between the two variables is positive. The increasing local tax revenue is related to the increase in local government revenues sourced from local retribution. The existence of a positive relationship between the two variables indicates that the ability of taxpayers to pay tax is parallel with their ability to pay retribution.

The error correction part as in the VECM result above represents a short-term relationship between variables. CointEq1 relates to economic growth with local tax revenue evincing the estimated coefficient is positive. This thing can be interpreted that in the short-run, if economic growth lies above the long-run equilibrium, then local tax revenues will increase in the next period. The positive relationship explicitly informs that the ability of taxpayers to pay taxes related to the economic growth. The higher the economic growth, the higher the ability

of taxpayers to pay taxes. This thing causes a positive relationship between the two variables in the short-run.

CointEq2 relates to local retribution revenue with local tax revenue which shows the coefficient marked negative. In the short term, if the local tax revenue lies above the long-run equilibrium, then in the next period the local retribution revenue will decrease. This due to the most of local tax revenue comes from road motorcycle tax. The increase of the tax has implicated to the lower desire of the community to own the road motorcycle. In turn, the condition has a negative impact on the revenue of parking retribution. This thing causes a negative relationship between the two kinds of local government revenue in the short-run.

3.5. The Short-run effect between the variables

In related to the short-run effect of the three variables, the results of PVECM indicate that economic growth in a certain year positively and significantly influenced by economic growth before. The local retribution revenue has an insignificant and negative effect on economic growth at the 1-period time horizon, but it has a positive and significant effect on the 3-period time horizon. Furthermore, the local tax revenue has a negative and significant effect on the economic growth at the 1-2 and 4-5 period time horizon. In detail, the short-run effects of the variables as seen in Table 7.

Table 7. The Short-run effect among the variables

Exogenous Variable	Endogenous Variable								
	ΔlPI			ΔlRR			ΔlTR		
	Coefficient	Standard errors	t-statistics	Coefficient	Standard errors	t-statistics	Coefficient	Standard errors	t-statistics
ΔlPI(-1)	**0.905**	**0.232**	**3.896**	-5.148	16.199	-0.318	0.875	1.906	0.459
ΔlPI(-2)	-0.194	0.250	-0.777	0.666	17.469	0.038	-0.197	2.056	-0.096
ΔlPI(-3)	0.011	0.170	0.062	-6.099	11.872	-0.514	1.075	1.397	0.769
ΔlPI(-4)	**0.332**	**0.165**	**2.015**	-6.627	11.488	-0.577	-1.056	1.352	-0.781
ΔlPI(-5)	-0.098	0.118	-0.831	5.656	8.263	0.685	0.867	0.972	0.892
ΔlPI(-6)	0.299	0.132	2.278	13.646	9.177	1.486	-2.549	1.080	**-2.361**
ΔlPI(-7)	**-0.819**	**0.140**	**-5.839**	-7.974	9.793	-0.814	-1.417	1.152	-1.229
ΔlRR(-1)	-0.002	0.003	-0.737	-0.196	0.211	-0.931	0.020	0.025	0.833
ΔlRR(-2)	0.004	0.003	1.632	-0.018	0.184	-0.096	0.043	0.023	1.985
ΔlRR(-3)	**0.004**	**0.002**	**2.100**	0.131	0.126	1.040	0.023	0.015	1.534
ΔlRR(-4)	-0.002	0.002	-0.769	0.282	0.146	1.927	-0.027	0.017	-1.550
ΔlRR(-5)	-0.002	0.003	-0.796	-0.059	0.209	-0.284	-0.017	0.025	-0.679
ΔlRR(-6)	0.000	0.003	0.115	-0.506	0.199	**-2.537**	-0.029	0.023	-1.233
ΔlRR(-7)	0.006	0.003	1.709	-0.406	0.233	-1.745	-0.014	0.027	-0.499
ΔlTR(-1)	**-0.045**	**0.027**	**-1.696**	-1.113	1.869	-0.595	0.235	0.220	1.069
ΔlTR(-2)	**-0.002**	**0.016**	**-0.097**	-0.391	1.126	-0.347	-0.151	0.133	-1.139
ΔlTR(-3)	0.013	0.012	1.031	-0.046	0.847	-0.054	-0.009	0.099	-0.100
ΔlTR(-4)	**-0.029**	**0.018**	**-1.675**	0.681	1.223	0.556	0.081	0.144	0.566
ΔlTR(-5)	**-0.000**	**0.017**	**-0.047**	0.068	1.205	0.056	0.060	0.142	0.426
ΔlTR(-6)	**-0.018**	**0.027**	**-0.649**	-1.851	1.886	-0.982	0.357	0.222	1.609
ΔlTR(-7)	0.012	0.013	0.900	0.627	0.925	0.678	0.150	0.109	1.382
C	0.029	0.011	2.707	1.084	0.744	1.457	0.148	0.087	1.687
	R-squared : 0.901 Adj. R-squared : 0.806 Sum sq. resids : 0.000 S.E. equation : 0.006 F-statistic : 9.535 Akaike AIC : -6.952 Schwarz SC : -6.017			R-squared : 0.609 Adj. R-squared : 0.234 Sum sq. resids S.E. : 4.811 equation : 0.448 F-statistic : 1.625 Akaike AIC : 1.538 Schwarz SC : 2.473			R-squared : 0.778 Adj. R-squared : 0.565 Sum sq. resids S.E. : 0.067 equation : 0.053 F-statistic : 3.654 Akaike AIC : -2.742 Schwarz SC : -1.806		
Akaike information criterion : -7.941437 ; Schwarz criterion: -4.900736									

Source: Own calculation by E-views software

As shown in Table 7, the estimated coefficient of the local tax revenue to the economic growth shows a negative sign but not significant. That thing indicates that the increase in local tax revenue does not significantly impact the decline in economic growth. This finding is not in line with the results of the study of Eugene & Abigail (2016) for the Nigerian economic

case which concluded that taxes have a significant influence on economic growth. In addition, this finding also contradicts to the result of the empirical study conducted by Sackey & Ejoh (2014) and Egbunike et al. (2018) who found the existence of the positive impact of tax revenue on economic growth.

However, the existence of a negative estimate coefficient of local tax revenue towards economic growth as shown in Table 7 above supports the results of the study of Mark et al (2000), Holcombe & Lacombe (2004), and Reed (2008) which provide the empirical evidence on the negative relationship between the two variables. The results of the empirical study conducted by Romero-Avila & Strauch (2008) also found that taxes have a negative impact on economic growth. The negative impact of the tax on growth is due to the impact of taxes directly reducing real income in a community.

3.6. Variance Decomposition Analysis (VDA)

One way to determine how important the different exogenous shocks are in explaining the dependent variables is to calculate the fractions of the forecast error variance of these variables attributable to the respective orthogonal shocks. The variance decomposition analysis to assess the dynamic interactions between the variables (economic growth, local tax revenue, and local retribution revenue). The analysis would provide the statistical information related to the contribution of the variables in explaining their forecast error variance (either one or two variable).

The variations in economic growth (PI) explain around 90.33 percent of its forecast error variance at the 5-period horizon. This thing indicates that increasing has been the most important thing to explain economic growth. The VDA result also informs that local retribution revenue (RR) and local tax revenue (TR) contributes up to 0.51 percent and 9.16 percent of the forecast error-variance of economic growth for the same period horizon, respectively. The results of the variance decomposition as in Table 8.

Table 8. The result of the Variance Decomposition of The Variables

Period	Variance Decomposition of ΔlPI			Variance Decomposition of ΔlRR			Variance Decomposition of ΔlTR		
	ΔlPI	ΔlRR	ΔlTR	ΔlPI	ΔlRR	ΔlTR	ΔlPI	ΔlRR	ΔlTR
1	100.000	0.000	0.000	0.465	99.535	0.000	2.744	0.233	97.023
2	96.760	0.244	2.995	1.056	98.206	0.738	1.598	4.250	94.152
3	93.316	0.148	6.535	2.068	97.089	0.842	1.088	15.722	83.190
4	91.461	0.533	8.006	5.027	94.241	0.732	1.231	25.183	73.586
5	90.332	0.509	9.158	11.222	87.085	1.693	1.272	25.587	73.141
6	89.158	0.353	10.489	15.868	80.919	3.212	1.177	24.463	74.360
7	87.807	0.279	11.913	16.328	80.491	3.181	2.497	20.400	77.103
8	85.424	0.630	13.946	16.655	79.949	3.397	6.481	16.110	77.409
9	82.558	1.083	16.358	17.222	77.889	4.889	10.476	13.652	75.871
10	80.391	1.233	18.376	17.126	76.169	6.705	13.298	12.426	74.276

Note: ΔlPI denotes the first difference of the logarithm of per capita income; ΔlRR denotes the first difference the logarithm of per capita local retribution revenue; and ΔlTR denotes the first difference of the logarithm of per capita local tax revenue.

The variation of local tax revenue (TR) explains around 73.14 percent of its forecast error variance at the 5-period horizon. At the same period horizon, the contribution of economic growth and local retribution revenue on the local tax revenue is 1,27 percent and 25,58 percent, respectively. Accordingly, the two variables have a very little contribution in explaining the variance of local tax revenue.

3.7. The result of Granger causality test

In order to test the causality relationship between the variables, we utilized VECM Granger Causality/Block Exogeneity Wald Tests. The result of the test indicates that there is a unidirectional causality running from local retribution revenue to local tax revenue and economic growth. Bidirectional causality exists between local tax revenue and economic growth. The result of VAR Granger Causality/Block Exogeneity Wald Tests as in Table 9 below.

Tabel 9. VAR Granger Causality/Block Exogeneity Wald Tests

Dependent Variable	Independent Variable		
	ΔlPI	ΔlRR	ΔlTR
ΔlPI	-	(14.789) [0.038]*	(25.724) [0.000]**
ΔlRR	(5.707) [0.574]	-	(1.599) [0.979]
ΔlTR	(16.996) [0.017] *	(17.207) [0.016] *	-

Note: Δ is the first difference operator, the values in parentheses ( ) are chi-square, the values in bracket [ ] are p-values. * indicate the significant at 95% level, and ** indicate significant at 99% level.

Based on the results of the Granger causality test above, can be seen that there is a two-way causality relationship between local tax revenue and economic growth. The increased economic growth reflects the increase of local tax capacity indicating the ability of people to pay taxes also increases. For example, the findings of Tosun and Abizadeh (2005) concluded that economic growth, measured by gross domestic product (GDP) per capita, has a significant effect on the tax revenue. Research findings of Loganathan et al. (2017) also confirm that higher growth has a positive and significant impact on tax revenue. On the other side, the increase in tax revenue indicates the higher ability of local government to fund infrastructure development activities in the regions. In turn, the conditions encourage economic activity and economic growth in the community. This thing causes the bi-directional causality between economic growth to local tax revenues. The finding support to the empirical finding of Roşoiu (2015) for the case of Romanian economy and Loganathan et al. (2017) for the case of emerging Asian Countries concluding that there is bidirectional causality between local tax revenue and economic growth. This finding is also in line with the empirical finding of Birhanu (2016) who found that there a two-way causality between the two variables.

However, this finding contradicts the results of the study of Anastassiou & Dritsaki (2005) which confirms that the causality relationship between the two variables is one-way causality from tax revenue to economic growth. Taha et al. (2011) also prove that there is a unidirectional relationship between economic growth and tax revenue. Other research as done by Abomaye-Nimenibo et al. (2018) in Nigeria which provides empirical evidence that there is no causal relationship between economic growth and tax revenue. This result is also different from the findings of Canicio & Zachary (2014) for the case of Zimbabwe economy clearly showed that there was an independent relationship between economic growth and tax revenue.

4. Conclusions and Suggestion

This study aimed to analyze the effect of the local tax and retribution revenue on regional economic growth in Indonesia. Using a panel data set of 24 provinces in Indonesia, the data was analyzed using Pedroni's and Kao's co-integration test, PVECM, and Granger causality test. The study proves the existence of a long-term relationship between the three variables. In the long run, the local tax revenue was negatively and significantly related to economic growth. Conversely, in the short-run, the relationship between the two variables was positive and insignificant. Furthermore, the relationship between local tax and retribution revenue is negative in the long-run, and positive insignificantly in the short-run. The results of the Granger causality test indicated there is a two-way causality relationship between local tax revenue and economic growth, and one-way causality running from the local retribution revenue to local tax revenue and economic growth.

Referring to the conclusions described above, the findings of the study implies that the government's efforts to encourage local economic growth should consider local tax rates. On the one hand, local taxes revenue had been the main source of local government revenue to finance development that oriented towards increasing economic activity, but on another hand, in the long run, local taxes revenue has a negative relation with economic growth. Therefore, the local government in Indonesia should be able to determine an optimal rate of the local

taxes which can minimize the negative impact of taxes on the economic activities of the community.

Furthermore, the future researcher interested in investigating the effect of local tax revenue on economic growth should specify the tax revenues based on the kinds of local tax. Thus, the information related to the causal relationship between each kind of tax revenue and local economic growth will be detected in detail..

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AGGLOMERATION PROCESSES ON THE RUSSIAN EUROPEAN NORTH: VOLOGDA REGION EXPERIENCE

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Abstract
The article presents the key features of the development of urban agglomerations at presents. There are shown the agglomeration processes features which are currently taking place in the Vologda region. It is justified that the monocentric Vologda agglomeration is being formed in the region. This is based on the research of the scientific literature, the main strategic documents and the use of the existing methodological tools. The tightness of the connection between the core and the reference territories has been proved on the basis of an analysis of key trends in the socioeconomic development of these municipalities in 1991-2016. On the basis of conducted sociological surveys of the inhabitants of Vologda and adjacent municipal districts, as well as heads of these municipalities, there were identified socio-economic, industrial, cultural and other links of these territories. There were identified the key challenges and threats for the further development of agglomeration processes and substantiated the priority directions for managing the development of the Vologda agglomeration.

Keywords: city, urban agglomeration, sociological survey
JEL classification: R12

1. Introduction

While tracing the evolution of the settlement forms it should be noted that at the present time new forms are emerging to replace urban and rural settlements, which are usually formed as a result of the rapprochement of several settlements in the process of their growth. Such formulations in modern economic literature are generally defined as agglomerations.

The accumulated socio-economic potential of a large city (the core) in ag-glomerations is inevitably projected onto nearby settlements which in this case are transformed into their "socio-economic satellites." In turn, the satellites provide the nucleus with various resources expanding its potential. Proceeding from this, it can be noted that the distinctive feature of the agglomeration is the functional complementarity of urban and rural settlements located in the zone of its existence, i.e. we are talking about mutually beneficial cooperation and cooperation.

In the scientific literature (Artobolevsky S.S., 2007; Volchkova I.V., Minaev N.N., 2014; Lola A.M., 2013; Zubarevich N.V., 2007; Uchida, H., Nelson, A. 2010; Marquart E., Isupova S., 2009) and regulatory legal acts there are many definitions of this phenomenon. The term “Agglomeration” (from the Latin agglomero – to attach), researchers usually consider in terms of two approaches:

- in the geographical sense: as a close cluster (group) of cities and other populated areas, united by industrial, social, labor and cultural-household connections, infrastructure facilities, the general use of inter-settlement territories and resources;
- in the administrative sense: a management structure formed on the basis of a voluntary decision of neighboring municipalities with the aim of effectively managing joint development, implementing intermunicipal projects.

Urban agglomerations, which are rapidly developing around the world, and which often consist of dozens, and sometimes hundreds of settlements, including rural settlements, are closely connected with each other (Kozlova, O.A., Makarova M.N., 2014; Kurushina, E.V., Petrov, M.B., 2018). At the same time, foreign experience indicates the presence of significant effects for the territory from the development of agglomerations. According to the study PwC conducted in 2017 economic growth in agglomerations occurs by 0.3 pp. faster than in the whole country. Household incomes in agglomerations increased by 4.7 thousand

US dollars more than average household income in the country over the period from 2001 to 2016. The nuclei in most cases showed even better dynamics than the agglomeration as a whole.

Agglomerations are more attractive for residents, as they create more jobs. The population increase in them is 0.5 pp. faster than in the whole country. The agglomerations are more attractive in terms of working conditions than the country, which is expressed in a higher increase in employed per 1000 people (more by 20 employed). The labor market here is more balanced - it is easier to find workers of scarce specialties than the national average.

According to PwC's projections the share of the largest agglomerations in world GDP will increase from 38% to 43% by 2030. The average annual growth rate will be by 1 pp. ahead of the world average growth rate (3.7% vs. 2.9%).

Russian practice also demonstrates the competitive advantages of these territories. In particular, the Moscow agglomeration is considerably ahead of Russia in 11 out of 13 indicators (only the agglomeration of Beijing has higher indicators - 12 out of 13), including: GDP growth (by 1.4 pp.), population 1.2 pp.) and migration (8 migrants per 1,000 people) ("The effect of scale. First global ranking of agglomerations" / PwC Russia).

In this regard, the creation of favorable conditions for the development of urban agglomerations and highly urbanized areas as poles of accelerated socioeconomic development is currently assigned as one of the main activities of the Government of the Russian Federation until 2018 (approved by the Government of the Russian Federation on May 14, 2015). In 2018, it is planned to adopt the Concept of the Spatial Development Strategy of the Russian Federation for the period until 2030, where a significant role will be assigned to urban agglomerations.

At the same time, it is extremely important conducting not only scientific but also practical study of the prerequisites for the formation of agglomerations, the identification of the nature and strength of the links of these territories. The core of which is not the largest cities (more than 500 thousand people) and "millionaires" (more than 1 million people) but large (with a population of more than 300 thousand) and medium-sized cities, because in these entities there are already several other processes in their power integration processes. These circumstances determined the relevance of this article.

2. Research methods

Currently, agglomeration processes are quite active in the European North of Russia. Here, a network of cities is formed, which act as a kind of "support frames" for the development of adjacent territories, concentrating in themselves a significant production, financial, personnel and other potential. The study of agglomeration processes in the Vologda region is of great practical interest, which acts as a "bridge head" in the development of the European North of Russia, as it is a region that integrates these territories along the "North-South" line.

The study of trends in the transformation of space in the region suggests that the agglomeration processes in the region are currently intensifying. However, discussions between scientists and practitioners still do not subside on the subject composition of these agglomerations. What is the configuration of the emerging agglomeration? There are two fundamentally different points of view.

1. The Vologda-Cherepovets agglomeration (polycentric) (nucleus: Vologda and Cherepovets; agglomeration zone: Vologda, Gryazovets, Sokolsky, Cherepovets, Sheksninsky, Kadui districts, Figure 1).

2. Vologda agglomeration (monocentric) (core: Vologda, agglomeration zone: Vologda, Gryazovets, Sokolsky districts) and Cherepovets (monocentric) (core: Cherepovets, agglomeration zone: Cherepovetsky, Sheksna and Kadui districts, Figure 2).

The analysis of the scientific literature, normative and legal documents, as well as the research conducted by us, testifies to the formation of two independent monocentric agglomerations in the region: Vologda and Cherepovets.

So, the well-known Russian urban scientist (Lola A.M., 2013) allocates 146 agglomerations in Russia, including Vologda and Cherepovets.

In the draft Concept of the Strategy of Spatial Development of the Russian Federation for the period up to 2030, developed by the Ministry of Economic Development of the Russian

Federation in 2016, two agglomerations were singled out in the Vologda Region: Vologda and Cherepovetskaya.

Figure 1: The Vologda-Cherepovets agglomeration (polycentric) *

* Composition: 2 cores (Vologda and Cherepovets), agglomeration zone: Vologda, Gryazovets, Sokolsky, Cherepovets, Sheksninsky, Kaduysky districts.

Figure 2: The Vologda agglomeration (monocentric) **

** Composition: core: Vologda, agglomeration zone: Vologda, Gryazovets, Sokolsky Districts

In the Strategy of Social and Economic Development of the Vologda Oblast until 2030 (approved by the Decree of the Government of the Vologda Region of October 17, 2016 No. 920), one of the tasks within the framework of the priority "formation of the efficiency area" is the formation of two "three-tier" agglomerations: Vologda , Sokol, Gryazovets) and Cherepovets (Cherepovets, Sheksna, Kadui).

It should be noted that in his studies, N. Zubarevich (2017) and S. Artobolevsky (2007) critically treated the idea of a regional government in the mid-2000s. regarding the support of the development of the Vologda-Cherepovets agglomeration, considering that there is no objective agglomeration process in these territories for this, and the two nuclei do not have stable links with each other.

In favor of the formation of two independent agglomerations testifies a retrospective analysis. In particular, it should be noted the historically developed industrial-consumer and trade relations between Vologda and the settlements of the Vologda, Sokol and Gryazovets regions since the 16th century. The commercial development of Vologda certainly influenced the growth of settlements throughout the province, especially those close to it. In particular, the fact that Vologda became a large warehouse point as a result of trade relations between

Russia and England played a significant role in the revitalization and expansion of the city of Kadnikov after 1569.

To study the development degree of these links, we use the existing methodological tool for assessing agglomeration processes in science.

At the present time in the domestic scientific literature (in particular, in the re-search of G. Lappo, P. Polian, 2007; Puzanov, A., Popov A., 2017) including on the basis of the study of foreign sources, were developed a whole series of methodological ap-proaches and criteria for separating the boundaries of urban agglomerations.

The results of our analysis and calculations for this tool indicate that at present agglomeration links are being formed between Vologda and Vologda, Gryazovets, and Sokol districts (Table 1).

Table 1. The conformity of the Vologda agglomeration with the criteria for agglomerations in a number of methods

Criteria	Methodology IGRAN[1] (G. Lappo, P. Polyana)	Methodology CNIIPgrad[2] (F. Listengurt)	Unified methodology (P. Polyan, N. Naimark)	**The Vologda agglomeration**
1. Population size of the core	No less than 250 thousand people	No less than 100 thousand people	No less than 250 thousand people	320,7 thousand people
2. Temporary accessibility from the outskirts to the center (taking into account the average speed of 60 km / h)	No more than 1,5 hours	No more than 2 hours	No more than 1,5 hours	2 hours (Biryakovo settlement of Sokol district - 121 km)
3. The number of urban settlements in the agglomeration zone	No less than 5	No less than 3	No less than 4	4 units (Gryazovets, village Vokhtoga, Sokol, town of Kadnikov)
4. Population of satellite cities	No less than 50 thousand people	–	–	56,7 thousand people
5. Proportion of population of urban settlements of the agglomeration zone in the total number of urban population	–	No less than 10 %	–	16,3%
6. The coefficient of agglomeration development	No less than 1	No less than 0,1	No less than 1	1,5 (type: least developed agglomerations)

Source: compiled by the author based on an analysis of the literature

Conformity of the Vologda agglomeration with the criteria for agglomerations in a number of one of the key indicators is the agglomeration development factor, which is defined as follows (1):

$$K_a = P \cdot (M \cdot m + N \cdot n), \qquad (1)$$

where P - the population of the agglomeration (million people); M is the number of cities in the metropolitan area; N - number of urban-type settlements in agglomeration; m is the

[1] Institute of Geography, Russian Academy of Sciences

[2] Central Scientific Research and Design Institute of The Ministry of Construction and Housing and Communal Services of Russian Federation

proportion of the urban population in the agglomeration population; n - the proportion of the population of urban-type settlements in the population of the agglomeration.

The classes of agglomeration development according to the methodology of the Institute of Geography of the Russian Academy of Sciences are determined on the basis of the value of the development factor:

1) more than 50 are the most developed;
2) 10 to 50 - highly developed;
3) from 5 to 10 - developed;
4) from 2.5 to 5 - underdeveloped;
5) less than 2.5 - least developed;

For the Vologda agglomeration the following value was obtained: $K_a = 1,5$.

Thus, the calculations carried out for a number of methods indicate that the Vologda agglomeration, according to the presented classification, currently belongs to the category of monocentric, least developed and emerging, but it meets all the criteria for the separation and delimitation of agglomerations, as indicated above, which in fact testifies to The presence of agglomeration effects in the territories under consideration.

For an objective study of the specifics, problems and prospects for the formation of the Vologda agglomeration, it is advisable to analyze the key long-term trends in the socio-economic development of the territories, and to reveal the general patterns of development of these municipalities. Analysis of the conditions and possibilities for the formation of the Vologda agglomeration should involve research not only on the materials of official statistics, but also on the active use of empirical data obtained during sociological surveys. In this regard, it is extremely important to conduct a sociological survey among the residents of the municipal formation "City of Vologda" and the municipalities forming part of the Vologda agglomeration formed (Vologda, Gryazovets, Sokol districts), heads of these municipalities regarding the specifics, problems and prospects for the formation of integration ties[3].

3. Results

The conducted analysis of social and economic development of the Vologda city, Vologda, Gryazovets and Sokol districts in 1991-2016. allowed to identify a number of key trends in the development of these territories:

- The increase in the number of permanent residents for the period under review was observed only in the city of Vologda (by 19,800 people or by 7%), while in the whole region and in the regions in question, on the contrary, it was recorded a decrease (in the region - by 13% 11% in the Vologda region, 28% in the Gryazovets district, and 24% in the Sokolsky district). At the same time, it should be noted that a single vector of development for Vologda and the Vologda region has been observed in this area in recent years (population growth of these territories). It was formed, including due to the migration here (primarily to Vologda) of the population from the Gryazovets and Sokol districts;

- In the period under review, the industry in Vologda was developing at a higher rate (growth in the prices of industrial production in 1991 amounted to almost 76%) and the

[3] To solve this problem, in October 2017, a sociological survey was carried out among residents of the municipal districts forming part of the Vologda agglomeration (Vologda, Gryazovets, and Sokol districts). The sample size of the survey is 300 people aged 18 years and over (100 people in each district). The sample is purposeful, quota. Representation of the sampling efficiency of ensuring the observance of proportions between the urban and rural population, the sex-age structure of the adult population of the districts.

When conducting a survey of the inhabitants of Vologda, the total population was 248929 people. The sample size is 800 people. The distribution of respondents by sex and age corresponds to the general population of Vologda (according to sex and age indicators of statistical collections). The sampling error is not higher than 4%.

When polling heads of municipalities, the questionnaires were sent to the heads of the Vologda, Gryazovets and Sokol districts, Vologda, as well as the heads of all the settlements that make up these regions (a total of 33 respondents). A similar questionnaire was sent out also in all other municipalities of the Vologda region. The number of samples and completed questionnaires allows you to make a sample error of no more than 4-5%. The heads gave assessments of the situation based on the results of the last calendar year (2016). The results are presented in% of the number of respondents who answered the question.

Vologda region (an increase of 5.1 times); while in the Gryazovets and Sokol districts there was a decline of 49.4% and 26.3%, respectively. This indicates significant changes in the industrial production of the study areas: some degradation of industrial potential in the Gryazovets and Sokol districts and its concentration in the core of the agglomeration and the Vologda region;

- In agriculture, there was a general reduction in the acreage of crops in all types of farms: in the Sokol district by almost 59%, Gryazovets by 26.3%. At the same time, the least of all is the destructive data Vologda region (a decrease of 6.5%). At the same time, despite the reduction in crop areas, it was possible to increase the gross harvest of grain and leguminous crops (an increase of 8%, and in the Vologda region - 32%) due to increased crop yields. The processes of intensification are also characteristic of dairy and beef cattle breeding;

- there was an increase in the pace of housing construction in the Vologda agglomeration. Thus, for the period under study in Vologda district, the volume of housing stock increased by almost 83%, in Vologda - by 69%. Quite good dynamics shows the sector in the Gryazovets area. At the same time, the growth rates of agglomeration housing exceeded the values for the whole region. At the same time, the level of its improvement was higher than the average for the region. So, in 2016 about 68% of housing was provided with water supply (against 61%), sewerage - 64% (55%), and centralized heating - 61% (50.6%);

- The sphere of trade of Vologda is now more oriented towards the inhabitants of the Vologda region adjacent to the city. In turn, residents of the city also purchase part of the products in the Vologda region during their regular trips to dachas, recreation in the district, etc.

Agglomeration processes are also manifested in the concentration of population, production and economic activity in these territories. In particular, in 2016 years. the Vologda agglomeration accounted for about 14% of the oblast's total industrial output (3.5 pp. growth since 1991), 43% of the cattle population in the region (by 13 pp.), 34% of the acreage of crops (by 9.5 pp.), 30% of meat production (by 5.3 pp.), about a third of the region's tourist flow (Table 2).

Table 2. The share of the territories of the Vologda agglomeration in the general regional values of key social and economic indicators, %

Index	2000	2005	2008	2010	2013	2014	2015	2016	2016 to 2000, +/-
Number of permanent rural population	18,9	19,4	19,1	20,6	21,5	21,5	21,7	21,8	+2,9
Volume of industrial products	10,5	11,4	11,2	10,5	11,4	13,6	14,5	14,1	+3,5
Crop area of agriculture	24,9	30,5	31,9	33,2	34,0	33,9	35,1	34,4	+9,5
Livestock number of cattle	29,8	36,6	39,7	40,9	41,7	43,2	43,0	42,7	+12,9
Production of meat	24,8	29,4	31,6	34,6	29,7	27,9	30,1	30,1	+5,3
Tourist flow	n/a	n/a	24,8	24,9	33,2	35,4	33,2	34,9	+10,1*
* - 2016 to 2008 year									

Source: calculated on the basis of data of Federal State Statistics

One of the facts testifying to the presence of agglomeration links between the study areas and the regional center is the active movement of the population in these directions. So, according to the polls conducted by VolRC RAS, 31.6% of Vologda residents visit the regional center every day and 10.2% of the Sokol district, and once a week - 22.4 and 13.3% of their residents, respectively. Among the key objectives of these trips is the purchase of personal consumption products in the city (on average in the regions - 57.3%), visits to relatives (30%), cultural and sports events (24%). Every fourth inhabitant of the Vologda region has a permanent job in the regional center (Table 3).

Table 3. The objectives of the visit to Vologda by residents of districts, % of the number of respondents

Purpose	Vologda District	Gryazovets District	Sokolsky District	Average on areas
I purchase products for personal consumption	65	59	48	57,3
I visit relatives, acquaintances	44	13	33	30
I attend cultural and sporting events	29	21	21	23,7
I have a permanent job here	25	4	4	11
I visit a sanatorium, recreation centers or tourist sites	7	8	17	10,7
I have my own dacha, land, a country house or an apartment	9	2	2	4,3

Source: calculated on the basis of data of Federal State Statistics

The residents of the regional center also note the presence of links with the districts. The closest interaction of Vologda is with the Vologda region: on average, 42% of the respondents in the city have a dacha, a plot of land, a country house; every third resident visits relatives, about 30% - goes there for fishing, hunting and picking berries. Every fifth resident works in the organizations of the Vologda region. Among the purposes of the visit of the Gryazovets and Sokol districts, leisure activities (fishing, hunting, etc.) prevail, as well as visits to relatives.

There is a desire of people to change their place of permanent residence within the Vologda agglomeration. Thus, the lower quality of life in the districts leads to the fact that a significant part of the population wants to move to the regional center (22% in the Sokol district, 20% in the Vologda region). The main reasons for the change of residence(100% of those who responded in Sokolsky and Gryazovets districts) and increased access to reception and quality of social and personal services (in Sokolsky and Gryazovets districts - 100%, in Vologda - 25%) is the employment in the city for new, more highly paid work. For residents of the Sokol district, there is a tendency to move in connection with the desire to improve the quality of housing conditions (100% of respondents). The availability of sufficiently developed connections between the territories of the Vologda agglomeration is evidenced by the surveys of the heads of these municipalities conducted by the VolRC RAS. It should be noted that, on average, the agglomeration has more chapters than the regional average, which indicate some form of intermunicipal ties. At the same time, the interaction of these territories takes place in the forms of pendulum migration (47.8%), industrial and economic relations between enterprises, organizations from neighboring municipalities (34.8%), agreements with local self-government bodies (30.4%), maintenance and infrastructure development (17.4%), etc. Thus, the analysis showed the presence and further development of close production, cooperative, cultural, recreational and other links of the territories under consideration.

4. Conclusion

In general, the results of the comprehensive analysis show that at present the emerging Vologda agglomeration has a number of strengths that will contribute to its development in the medium and long term.

First of all, they include its advantageous economic and geographical position (location in the North-West of Russia at the intersection of the most important transport communications). The city of Vologda, which is the core of the metropolitan area, is a well-developed transport hub and has a number of prerequisites for becoming one of the largest logistics centers in the European North of Russia, which will serve the production needs of not only the subjects of this region, but also the Arctic zone of Russia (Table 4).

The development of agglomeration is also shown by the growth of the total population in the territory due to natural population growth in Vologda and the migration increase (Vologda region).

In general, according to the territories in 1991-2016 in the city of Vologda there was an increase in the number of inhabitants by 6.6%, and by regions the population processes decline were not as rapid as in the whole region.

The active cultural life of the region was concentrated within the agglomeration. This was greatly facilitated by the status of the city of Vologda as the administrative center of the Vologda region, the cultural capital of the Russian North, the "capital" of Russian lace, oil, and flax. This circumstance leads to an increase in the tourist flow of these territories.

The relatively diversified structure of the real sector of the city's economy will also have a multiplier effect on the development of agglomeration areas, in which industry, construction, transport, tourism, etc. are combined in a harmonious proportion. Formation and further development on the territory of clusters (dairy, tourist, wooden housing construction, IT cluster).

Table 4. SWOT-analysis of the creation and development of the Vologda agglomeration

Strengths	**Weaknesses**
– advantageous economic and geographical position: location in the North-West of Russia at the intersection of the most important transport communications; – growth of the total population in the agglomeration area due to natural population growth in Vologda and migration increase (Vologda region); – the status of the city of Vologda as the administrative center of the Vologda region, the cultural capital of the Russian North, the "capital" of Russian lace, oil, flax; – a relatively diversified structure of the real sector of the city's economy, in which industry, construction, transport, tourism combine in a harmonious proportion. – formed network of educational, scientific institutions and innovative infrastructure; – established active urban communities, relatively high level of human capital development; – presence and formation on the territory of innovative clusters (dairy, tourist, wooden housing construction, IT-cluster).	– poor diversification of the economies of agglomeration areas due to a general decline in investment activity; – fragmented agglomeration stakeholders; – lack of full intermunicipal interaction; – the absence of a unified, mutually connected project for the development of Vologda and the adjacent districts.
Opportunities	**Threats**
– the formation of the regulatory and legal support for the functioning of the agglomeration on the territory of the country; – capitalization of existing brands of the territory; – increasing the diversity of supply of goods and services for the population based on the use of the effect of agglomeration; – participation in federal and regional programs and projects for agglomeration development.	– dependence of directions and size of financial, investment flows on decisions of higher levels of government; – an increase in the price of land, the rent of industrial and residential premises, the cost of labor; – Increase in the importance of the role of agglomerations-competitors (Cherepovets agglomeration); – congestion of the transport system, increase of anthropogenic impact on the environment; – reduction of qualitative migration inflow into agglomeration.

Source: compiled by the author

In the city of Vologda there is a sufficiently developed network of educational, scientific institutions and innovative infrastructure. These circumstances are one of the key factors for the further development of the human and social capital of these territories.

Despite the identified advantages, at present there are a number of weaknesses and "bottlenecks" in the development of the Vologda agglomeration, which require "stripping". In particular, the economy of agglomeration areas is characterized by a weak diversification, aggravated, including, due to a general decline in investment activity in these territories.

Along with this, there is a need to understand and interrelate the interests of the main stakeholders in agglomeration (city authorities, districts, settlements, business community of these territories, the population, etc.), and to establish a full-fledged intermunicipal interaction, which is currently at the stage of formation. The development of this interaction also requires the formation of a unified, mutually connected project for the development of Vologda and the surrounding regions.

Further development of the Vologda agglomeration is facilitated by a number of factors of the external nature. Thus, at present, the vector in the direction of creating and developing large urban agglomerations is recognized as a priority at the highest echelons of power. In the light of this, the normative and legal support for the functioning of the agglomeration on the territory of the country takes place.

The creation of favorable conditions for the urban agglomerations development and highly urbanized areas as poles of accelerated socioeconomic development is enshrined as one of the main activities of the Government of the Russian Federation for the period until 2018 (approved by the Government of the Russian Federation on May 14, 2015). In 2018, it is planned to adopt the Concept of the Spatial Development Strategy of the Russian Federation for the period until 2030. In the Strategy of Social and Economic Development of the Vologda Region until 2030 (approved by the Decree of the Government of the Vologda Region of October 17, 2016 No. 920), the formation and development of the Vologda agglomeration is also one of the priorities of the spatial development of the region. In view of this, the participation of the Vologda agglomeration in federal and regional programs and projects is seen as promising, and financing is attracted for the implementation of priority intermunicipal projects.

One of the key opportunities for the development of the Vologda agglomeration is the further capitalization of existing brands of the territory; increase the diversity of supply of goods and services for the population on the basis of the use of the effect of agglomeration (primarily for residents of districts).

The most important task at the same time is the formation of a system for managing these processes, the development of the Strategy for the development of the Vologda agglomeration, and the attraction of funding for the implementation of projects and activities for its further development. The analysis showed that at present there are certain opportunities for participation of the Vologda agglomeration in federal and regional programs and the project (federal project "Safe and qualitative roads", regional project "Agglomeration of Vologda", a possible special federal program / subprogram "Development of urban agglomerations in the Russian Federation" in the future).

Accordingly, to start a purposeful management of the processes of formation and development of the Vologda agglomeration, it is expedient to implement the following measures:

1. To sign the Agreement on the intention of creation of the Vologda agglomeration
2. To sign the Agreement on the intention of creation and joint development of the Vologda agglomeration between municipalities that are part of the agglomeration.
3. Form the Coordinating Council for the development of the Vologda agglomeration.
4. Develop joint agglomeration, intermunicipal projects, which can later be declared in federal or regional agglomeration development projects. The most priority directions for these projects can be the following:

- Conducting a single town-planning policy, coordinated development of transport infrastructure in agglomeration municipalities,
- Trade and formation of a single market for the production,
- Development of culture, tourism and recreation,

- Joint use and development of communal infrastructure in the territory agglomeration, including through the establishment of inter-municipal organizations

- The creation of a transport and logistics hub in a non-agglomeration area - experience in solving issues and problems of local importance, etc.

The implementation of these directions will create favorable prerequisites for the formation and enhancement of the effectiveness of the system for managing the development of the Vologda agglomeration.

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GOVERNMENT EXPENDITURES COMPOSITION AND GROWTH IN EU15: A DYNAMIC HETEROGENEOUS APPROACH

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Abstract
The goal of this paper is to investigate the long-run effect of government size and composition on growth in EU15 countries during 1995-2014. Unlike previous studies, this paper employs a more adequate and sophisticated econometric technique which allows the joint occurrence of dynamics and parameter heterogeneity as well as addresses the problem of unobserved common factors. The obtained results indicate that high aggregate spending levels are an impediment for growth in developed economies, while the single most important government expenditure item is education. In quantitative terms the impact of education expenditures is, however, significantly lower than that found by other papers.

Keywords: government size, expenditures composition, GDP growth, heterogeneity, unobserved common effects, EU15
JEL classification: C23, H1, H50, O4

1. Introduction

For decades there has been an intense debate on whether or not a large government sector hinders economic performance. Existing literature suggests that it is rather difficult to identify an unambiguous connection between economic performance, generally measured by GDP growth rates, and the extent of government involvement in the economy, generally measured by government expenditure shares in GDP. Much of the current dissatisfaction with the alleged large government size stems from concerns about the long-term sustainability of public finances. The global financial crisis of 2008/09 has put the issue of government size in the economy at the centre of political debate.

Whatever the causes of this global crisis, the reaction of many developed economies' governments has been to step in to offset substantially shrunken private-sector demand, and to rescue potentially insolvent financial institutions and other companies that were judged too important to fail. Consequently, due to bail-outs, fiscal stimuli, tax cuts and recession many countries have witnessed a significant increase in the share of government in the economy coupled with large government deficits and debts. Concerned with these unfavourable fiscal positions, as well as with possible adverse effects of government size on economic growth, many economists and policy makers vigorously insist on downsizing the government sector. They insist on rigorous checks of government programs, strict lending proposals, balanced budgets, and even suggest imposing ceilings of government expenditure shares in GDP. But which component of government expenditure should be cut? The answer lies in, among other, the contribution of these components to economic growth (Devarajan et al., 1996). Economic literature is, hence, increasingly paying attention to the impact of the composition of government expenditures on long-term economic growth, and recommendations to change the composition of public outlays towards items considered as productive are gaining more and more importance.

Against this background, the main purpose of this paper is to contribute to the empirical literature on growth effects of government size and composition in EU15 by employing sophisticated empirical methods, particularly suited for tackling some important

methodological issues which impair the findings of previous empirical studies. Namely, a consistent estimation of the relationship between economic growth and government sector size and structure requires that all; dynamics, parameter heterogeneity and unobserved common factors are allowed for in the model. Since the evolution of economic growth is likely to be a dynamic process, necessity to introduce dynamics in the model is apparent. Apart for dynamics, a special attention should be paid to heterogeneity between countries as well as common shocks and their harmful effect on identifying the aforementioned relationship. The problem of "parameter heterogeneity" results from the fact that different countries differ from each other in many respects, such as their political-economic systems, their respective cultures, history, geographical features and so on. Additionally, in today's globalised world countries are cross-correlated due to their economic and financial integration and/or common macroeconomic shocks. Ignoring these issues leads to inconsistent estimates, size distortions of conventional tests of significance and incorrect results.

The rest of this paper proceeds as follows. Section 2 reviews the relevant empirical literature, Section 3 introduces our empirical approach and presents the data, Section 4 gives the results of the basic growth model exploring the effects of government size and composition on economic growth, while Section 5 concludes.

2. Literature review

Kneller et al. (1999) investigate a set of 22 OECD countries during 1970-1995. After taking full account of the implicit financing assumptions related with the government budget constraint, they find that a one percentage point increase in productive expenditures raises GDP growth rate by 0.27 percentage points, while a one percentage point increase in distortionary taxes decreases growth by 0.41 percentage points. This is true in case the above changes are financed by some combination of non-distortionary taxes and non-productive expenditures.

Nijkamp and Poot (2004) undertake meta-analysis to investigate the effect of fiscal policies on long-run growth. Their sample includes 93 papers that have been published between 1983 and 1998 in refereed journals, and pay special attention to five areas of government policy: general government consumption, tax rates, defence, education expenditures and public infrastructure. They find that spending on education and infrastructure is associated with higher GDP growth.

Baldacci et al. (2004) use a system of equations and investigate direct and indirect channels between social spending, human capital and economic growth. In their empirical specification they analyse 120 developing countries during the period 1975-2000, and focus primarily on the impact of education and health spending by the government on growth. They argue that since education and health (as key pillars of human capital) are interlinked they should be analysed together, taking into account feedback effects. They find that both types of spending have a significant and positive direct impact on economic growth; more precisely, a one percentage point increase in education spending is associated with an increase in growth of 1.4 percentage points in 15 years, while the same increase in health spending raises annual per capita GDP growth by 0.5 percentage points.

Bose et al. (2007) explore the impact of disaggregated government expenditures on growth in 30 developing economies over the two decades: 1970-1979, and 1980-1989. They find that education is the key sector for growth; whereby a one percentage point increase in central government investment in education (as percentage of GDP) is found to be associated with an increase in real GDP per capita of 1.5 percentage points.

Sanz (2011) explores the link between 10 components of government spending and government size during the period 1970-2007 in 25 OECD countries. Starting from a premise that a government size reduction does not necessarily lead to a proportionate reduction in all its components Sanz (2011) sets out to investigate which components are cut first. Using a pooled mean group (PMG) approach he finds that reductions in overall government expenditures increase the share of education and transport and communication. On the other hand, social welfare spending reduces its share in aggregate government spending in times of budgetary cuts. Finally, economic affairs, defence, housing and cultural affairs are affected the most when faced with fiscal adjustments.

Acosta-Ormaechea and Morozumi (2013) investigate how government expenditures compositional changes affect long-run growth. Their analysis of 56 low-, medium- and high-income countries during the period 1970-2010 reveals that only education has statistically significant growth-enhancing effects. This is quantitatively important mainly in the case a rise in spending on education is financed by a proportionate fall in spending on health or social protection. More precisely, a one percentage point increase in education spending is found to lead to 0.22 percentage points increase in annual growth if it is offset by a one percentage point fall in social protection spending, and 0.31 increase in annual growth if it is offset by a one percentage point fall in health spending.

Afonso and Jalles (2014) analyse fiscal composition-growth nexus in a set of 155 developed and developing countries during the period 1970-2008. They find that total government expenditures have statistically significant negative effect on growth, while the impact of revenues is insignificant. As regards functional decomposition, government spending on education and health are found to be growth enhancing, while expenditures on social security and welfare growth retarding.

Gemmell et al. (2016) investigate the influence of total government expenditures as well as of government expenditures composition on long-run GDP levels in (17) OECD countries. Using a pooled mean group (PMG) approach, and analysing the period 1972-2008, they find that, firstly, total government expenditures affect GDP negatively when financed by budget deficits. As for expenditures composition, they find that, under the assumption that total spending remains unchanged, increases in the share of transport and communication and education in GDP (offset by pro-rata reduction in other types of spending) lead to increases in GDP per capita in the long-run. Precisely, a one percentage point increase in the share of transport and communication in GDP is associated with an increase in GDP per capita of 2.2%. Similarly, a one percentage point increase in the share of education in GDP is associated with an increase in GDP per capita of 2%.

The above literature review suggests that the impact of government expenditures and its composition has been extensively investigated. However, the presented literature suffers from several methodological weaknesses. None of the studies reviewed, apart from Sanz (2011) and Gemmell et al. (2016), takes into account a problem known in the econometric literature as "parameter heterogeneity". The problem results from the fact that different countries differ from each other in many aspects, and if not corrected for, this problem can lead to inconsistent estimates, thus leading to incorrect results. Moreover, none of the reviewed studies takes account of unobserved common factors which may arise from global macroeconomic shocks and/or omitted variables. Ignoring these issues leads to inconsistent estimates and incorrect results.

We, however, adopt an empirical specification which allows for both heterogeneity and unobservable determinants in the government expenditures-growth relationship. Our approach, discussed in more detail in the methodological part of this paper, straightforwardly addresses these issues; hence improving the quality of the analysis and reliability of findings.

3. Methodological approach and data

The main goal of this paper is to establish the direction of the impact of government size on growth in a set of 15 developed EU countries during the period 1995-2014, and then to analyse which government expenditure items are growth enhancing and which are growth retarding. Following Ditzen (2016) a starting point is dynamic panel data model with heterogeneous coefficients:

$$y_{it} = \beta_{0i} + \beta_{1i} y_{it-1} + x_{it}\beta_{2i} + u_{it} \quad (1)$$

$$u_{it} = g_i f_t + e_{it}$$

whereby unobserved common factors (with country-specific factor loadings, g_i) are captured via f_t, x_{it} is a vector of explanatory variables and β_{2i} the coefficient vector. The error e_{it} is *iid* and the heterogeneous coefficients are randomly distributed around a common mean.

Empirically we estimate equation (1) using dynamic common correlated effects estimator (DCCE). At this point let us just note that equation (1) can be empirically estimated in several ways – via mean group estimator (MG), pooled mean group estimator (PMG) and/or pooled dynamic common correlated effects estimator (PDCCE). Our preferred specification is, as stated above, DCCE, because it accounts for both; heterogeneity and unobserved common factors. Other specifications either assume some degree of (PMG) or full homogeneity (PDCCE) of the countries in the sample, or do not account for unobserved common factors (MG and PMG). Hence, we will use them to draw comparative conclusions only. Namely, the assumption behind the mean group and pooled mean group estimation is that the disturbances in equations are independently distributed across countries and years. However, it is to be expected that countries are cross-correlated due to international integration and/or common macroeconomic shocks. Ignoring these cross-correlations results in inefficient parameter estimates and may lead to size distortions of conventional tests of significance. In order to solve this issue Pesaran (2006) proposed the common correlated effects (CCE) estimator, which is invariant to the (unknown but finite) number of unobserved common factors and allows estimation and inference in panel data models where the unobserved common factors are correlated with regressors (Pesaran, 2006). In this approach standard panel regressors are augmented with the (weighted) cross section averages of the dependent variable and individual specific regressors. CCE model, thus, accounts for unobserved common factors between units. In order to make it dynamic, a lag of the dependent variable should be added. However, in this case endogeneity occurs and adding solely contemporaneous cross-sectional averages is not sufficient any longer to achieve consistency. Chudik and Pesaran (2015) show that consistency is gained if lags of the cross sectional averages are added. DCCE is, therefore, given as:

$$y_{it} = \beta_{0i} + \beta_{1i} y_{it-1} + x_{it}\beta_{2i} + \sum_{s=t}^{t-pT} d_i z_{is} + e_{it} \quad (2)$$

where z_{is} is a vector that includes cross-sectional means at time *s*.

In order to empirically investigate government expenditure-growth relationship we start with a standard neoclassical production function of the Cobb-Douglas type augmented with government expenditure term. More precisely, y_{it} represents the difference in log GDP (*rgdpo*), while vector x_{it} consists of physical capital (*ck*), population growth rate (*ngd*) and government expenditures (*g_in_gdp*). Later on, we replace the overall government expenditures variable with one of the ten expenditure shares in turn, thus estimating growth effects of General public services (*pubserv*), Defence (*def*), Economic affairs (*ecaffairs*), Health (*health*), Education (*edu*), Social protection (*socprotection*), Public order and safety (*order*), Environment protection (*envir*), Housing and community amenities (*house*) and Recreation, culture and religion (*recreation*). A model thus formulated suggests that an increase in one of the expenditure components happens at the expense of the remaining nine components, i.e. that it is offset by a fall in other types of spending, while the overall spending remains unchanged.

3.1. Data description

Table 1 describes variables used in terms of definition, construction and data source. The available data is annual and the time period covered is from 1995 to 2014. The cross-sectional dimension of the panel includes 15 EU countries.

Table 1 Definitions and sources of the variables

Variable	Indicator(s)	Source
rgdpo	Output-side real GDP at chained PPPs (in mil. 2011US$)	PWT 9.0
ck	Capital stock at current PPPs (in mil. 2011US$)	PWT 9.0
ngd	Rate of growth of population (*n*) + technology growth (*g*) + rate of	PWT 9.0

Variable	Indicator(s)	Source
	capital depreciation (*d*) assuming d=0.05 and g=0.018	
g_in_gdp	Total nominal general government expenditure (% of GDP)	Eurostat
pubserv	Percentage of expenditures on General public services in total general government expenditures	Eurostat
def	Percentage of expenditures on Defence in total general government expenditures	Eurostat
order	Percentage of expenditures on Public order and safety in total general government expenditures	Eurostat
ecaffairs	Percentage of expenditures on Economic affairs in total general government expenditures	Eurostat
house	Percentage of expenditures on Housing and community amenities in total general government expenditures	Eurostat
health	Percentage of expenditures on Health in total general government expenditures	Eurostat
envir	Percentage of expenditures on Environment protection in total general government expenditures	Eurostat
recreation	Percentage of expenditures on Recreation, culture and religion in total general government expenditures	Eurostat
edu	Percentage of expenditures on Education in total general government expenditures	Eurostat
socprotection	Percentage of expenditures on Social protection in total general government expenditures	Eurostat

4. Results

We start by carrying out cross-sectional dependence test (CD) (Pesaran, 2004) for each variable. As indicated before, countries might be cross-correlated due to a number of factors, such as: economic and financial integration of countries, common macroeconomic shocks and/or omitted variables. Ignoring these cross-correlations would lead to inefficient parameter estimates and size distortions of conventional tests of significance. The results of CD-test are unreported but available upon request, and indicate the existence of cross-sectional dependence.

A starting point is the assessment of the impact of overall government expenditures on growth. The results are given in Table 2. All the results are obtained through Stata command *xtdcce2* written by Ditzen (2016), whereby equations are estimated by OLS.

Table 2 Baseline specification

	DCCE
	D.log_rgdpo
L.log_rgdpo	-0.732***
	(0.145)
log_ck	0.348***
	(0.0808)
log_ngd	0.251
	(0.278)
log_g_in_gdp	-0.297***
	(0.0885)
_cons	5.268*
	(2.756)
N	314
CD	-0.231

Source: author's calculations

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The results given in Table 2 are in line with expectations. Lagged dependent variable is found to exert a negative impact on growth, thus suggesting the existence of conditional convergence. The coefficient on capital variable is significant and positive, while the one on population variable is insignificant. As for our variable of interest - government size, the results indicate that it exerts a negative influence on GDP growth. This means that, ceteris

paribus, larger government is associated, on average, with lower rates of growth. To illustrate the size of the estimated effect, increasing shares of government expenditures in GDP by 1% lowers annual growth by approximately 0.003 percentage points or 0.115%, whereas increasing shares of government expenditure in GDP by 1 percentage point decrease growth by 0.006 percentage points. In other specifications (results are given in Table 4 in the Appendix) the results are the same in terms of coefficient significances (apart from PDCCE where only the impact of government size is found to be significant), while their sizes differ.

We next turn to investigating the impact of government expenditures components (functional distribution) on growth, by replacing the overall government expenditures variable with one of the ten expenditure shares in turn.

Table 3 Dynamic common correlated effects estimation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
DCCE	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo
L.log_rgdpo	-0.562***	-0.552***	-0.543***	-0.515***	-0.637***	-0.515***	-0.471***	-0.672***	-0.497***	-0.551***
	(0.111)	(0.141)	(0.108)	(0.101)	(0.114)	(0.126)	(0.113)	(0.152)	(0.125)	(0.173)
log_ck	0.155***	-0.0150	0.260***	0.0958	0.208**	0.193**	0.167	-0.126	0.186*	0.161*
	(0.0547)	(0.0951)	(0.0903)	(0.0831)	(0.0836)	(0.0920)	(0.110)	(0.290)	(0.102)	(0.0841)
log_ngd	-0.143	-0.0502	0.539	0.170	-0.364	-0.217	-0.225	0.243	0.0283	0.323
	(0.383)	(0.616)	(0.328)	(0.430)	(0.437)	(0.443)	(0.425)	(0.567)	(0.444)	(0.522)
log_edu	0.161*									
	(0.0852)						--			
log_def		-0.0281								
		(0.0369)								
log_pubserv			0.0959							
			(0.0659)							
log_health				0.0854						
				(0.0945)						
log_order					0.00572					
					(0.114)					
log_envir						0.000714				
						(0.0499)				
log_house							-0.0159			
							(0.0263)			
log_recreation								0.0930*		
								(0.0500)		
log_socprotection									-0.435	
									(0.293)	
log_ecaffairs										-0.0325
										(0.0256)
_cons	2.575*	4.428	3.105	4.589**	2.392	3.559**	2.702	7.842	6.499*	5.541
	(1.389)	(2.742)	(2.231)	(1.830)	(1.951)	(1.523)	(1.711)	(4.833)	(3.590)	(3.863)
N	271	271	271	271	271	271	271	271	271	271
CD	2.965	2.100	1.994	2.860	1.699	1.785	1.823	2.778	2.302	3.051

Source: author's calculations

Standard errors in parentheses * p < 0.10, ** p < 0.05, *** p < 0.01

The results in Table 3 suggest that only Education (edu) and Recreation, culture and religion (recreation) have positive and statistically significant growth effects. Our results are comparable to previous studies in that we, like most of them, find education expenditures to be significant in their impact on growth. Quantitatively, our results suggest that an increase in government education expenditures by 1% (compensated by a decrease in other types of expenditures) leads to an increase in GDP growth of 0.0016 percentage points, while an increase by 1 percentage point leads to an increase in GDP growth of 0.0133 percentage points. This is significantly lower than findings of Acosta-Ormaechea and Morozumi (2013), who find this impact to be between 0.22-0.31 percentage points in 56 countries of various levels of development. Given that mean growth rate in our sample is 2.62% this result suggests that a 1 percentage point increase in government education expenditures in EU15 increases GDP growth by 0.51% annually. Gemmell et al. (2016), on the other hand, find that a one percentage point increase in education in 17 OECD countries is associated with an increase in GDP per capita of 2%. Baldacci et al. (2004) find that the resulting increase in growth would be 1.4 percentage points in 15 years, while our results suggest that the effect on growth after 15 years would be only 0.19 percentage points. Overall, our results suggest a lot lower effect of education expenditures than previously found.

As for Recreation, culture and religion (recreation), our results suggest that an increase in this type of expenditures by 1% leads to an increase in GDP growth of 0.00093 percentage points. Other papers typically do not find this component to be significant in its impact on growth; Kneller et al. (1999) classify it (theoretically) as either unproductive or unclassified expenditures.

As indicated earlier we also apply MG, PMG and PDCCE estimators to draw comparative conclusions. The results are given in Tables 5-7 in the Appendix. When MG estimator is used (Table 5), which assumes complete heterogeneity of countries but takes no account of common shocks, only Public order and safety (order) exerts statistically significant and positive effect on growth. If we assume that the impact of government expenditures types should be the same across countries in the long run (and heterogeneous only in the short-run), i.e. if we apply PMG estimator (Table 6), then neither type of government expenditures is found to be statistically significant. Pooled version of DCCE model (PDCCE), which accounts for unobserved common factors but assumes homogeneity of the coefficients, finds Defence (def), General public services (pubserv) and Health (health) to be significant in their impact on growth, and of positive, positive and negative signs, respectively. Overall, our results show that different estimators give very different results, hence it is important to account for both; heterogeneity and common factors. Addressing these issues leads to an improved quality of the analysis and reliability of findings.

5. Conclusion

The relationship between government size and growth is one of the mostly debated topics in economics and the global financial crisis of 2008/09 has put it back on the agenda. Despite recent advances in the field of public sector economics, there is still much more to be learnt and much more work to be done to improve our understanding of the nature and growth effects of the size of government in the economy, and more importantly, of its structure. This paper aims to contribute to the literature by examining how strong growth rates respond to government expenditure changes and which expenditure items have the strongest impact, after accounting for dynamics, heterogeneity and common factors.

While the early studies in this field are rather inconclusive, recent studies mostly suggest that there is a negative relationship between total government size and growth in developed economies. The main findings of our study lie within that strand of the empirical literature - we find that in developed (15) EU countries, ceteris paribus, larger government sector is associated, on average, with lower rates of growth. Moreover, our findings suggest that government expenditures on education are one of the two expenditures items (together with expenditures on Recreation, culture and religion), which have statistically significant and positive growth effect. To arrive at precise estimates of the growth effects of government size from a methodological point of view, in comparison to other studies, our paper advances particularly in terms of addressing the issue of parameter heterogeneity and unobserved common factors. Namely, majority of studies in this field use models which impose cross-country parameter homogeneity. The failure to account for parameter heterogeneity in a dynamic panel model, however, can produce inconsistent and potentially very misleading estimates of the average values of the parameters (Pesaran and Smith, 1995). Additionally, it is to be expected that countries are cross-correlated due to international linkages and world-wide common shocks that influence all cross-sectional units. Likely sources of these dependencies might be changes in technology and/or oil prices, which affect GDP growth, but to different degrees across countries. Neglecting these dependencies generates inefficient parameter estimates.

In this paper we, therefore, employ dynamic common correlated effects estimator, which is particularly adequate given our sample characteristics, as it allows heterogeneity across countries and accounts for unobserved common factors. Our results suggest that an increase in government education expenditures by 1% (compensated by a decrease in other types of expenditures) leads to an increase in GDP growth of 0.0016 percentage points. An increase in government education expenditures by 1 percentage point, on the other hand, leads to an increase in GDP growth of 0.0133 percentage points or 0.51%. In quantitative terms this is significantly lower than findings of some other papers (see, for example, Acosta-Ormaechea and Morozumi, 2013; Baldacci et al., 2004 and Gemmell et al., 2016). Comparison of our preferred specification with those that constrain (all or some) coefficients to be the same across countries (PMG and PDCCE) or do not account for unobserved common factors (MG and PMG) suggests that these give fundamentally different results.

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Appendix

Table 4 Baseline specification with estimators MG, PMG and PDCCE

	(1) MG	(2) PMG	(3) PDCCE
	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo
L.log_rgdpo	-0.397***	-0.207***	-0.0164
	(0.0463)	(0.0490)	(0.0147)
LD.log_rgdpo		-0.00877	
		(0.0930)	
log_ck	0.194***	0.0928***	0.0150
	(0.0296)	(0.0284)	(0.0153)
log_ngd	-0.00154	-0.157*	-0.0305
	(0.202)	(0.0936)	(0.0340)
log_g_in_gdp	-0.407***	-0.184**	-0.0502*
	(0.0784)	(0.0732)	(0.0299)
D.log_ck		0.415***	
		(0.0803)	
D.log_ngd		0.418	
		(0.345)	
D.log_g_in_gdp		-0.189**	
		(0.0840)	
_cons	4.008***	2.371	0.136
	(0.856)	(1.747)	(0.164)
N	323	308	314
CD	8.859	0.884	2.081

Source: author's calculations

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5 Mean group estimation

MG	(1) D.log_rgdpo	(2) D.log_rgdpo	(3) D.log_rgdpo	(4) D.log_rgdpo	(5) D.log_rgdpo	(6) D.log_rgdpo	(7) D.log_rgdpo	(8) D.log_rgdpo	(9) D.log_rgdpo	(10) D.log_rgdpo
L.log_rgdpo	-0.408***	-0.398***	-0.396***	-0.485***	-0.465***	-0.418***	-0.447***	-0.539***	-0.332***	-0.332***
	(0.0971)	(0.118)	(0.120)	(0.127)	(0.138)	(0.0717)	(0.106)	(0.184)	(0.0958)	(0.0957)
log_ck	0.103**	0.0383	0.114*	0.106***	0.0613	0.105**	0.0761	0.0807	0.0805**	0.0443
	(0.0410)	(0.0544)	(0.0603)	(0.0346)	(0.0540)	(0.0516)	(0.0612)	(0.0681)	(0.0399)	(0.0508)
log_ngd	0.252	0.171	0.617	0.483	0.351	0.0666	0.180	0.632	0.231	0.309
	(0.508)	(0.676)	(0.653)	(0.661)	(0.764)	(0.460)	(0.594)	(0.990)	(0.552)	(0.582)
log_edu	0.132									
	(0.0957)									
log_def		-0.0301								
		(0.0333)								
log_pubserv			0.0590							
			(0.0758)							
log_health				0.114						
				(0.0897)						
log_order					0.157**					
					(0.0674)					
log_envir						0.0594				
						(0.0492)				
log_house							-0.0387			
							(0.0284)			
log_recreation								0.0453		
								(0.0638)		
log_socprotection									-0.240	
									(0.172)	
log_ecaffairs										-0.0149
										(0.0243)
_cons	4.079	4.860	5.029	5.788*	5.669	3.951**	5.008*	7.222	4.596*	4.454
	(2.729)	(3.213)	(3.618)	(3.447)	(3.802)	(1.851)	(2.890)	(5.317)	(2.746)	(2.988)
N	280	280	280	280	280	280	280	280	280	280
CD	16.30	16.83	15.63	17.16	16.78	14.77	16.43	17.21	16.79	15.74

Source: author's calculations

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6 Pooled mean group estimation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
PMG	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo	D.log_rgdpo
L.log_rgdpo	-0.343***	-0.350***	-0.224***	-0.296***	-0.310***	-0.294***	-0.265***	-0.253***	-0.270***	-0.264***
	(0.0798)	(0.0822)	(0.0798)	(0.0714)	(0.0898)	(0.0779)	(0.0717)	(0.0669)	(0.0681)	(0.0688)
log_ck	0.116***	0.0935***	0.0651*	0.0776**	0.0955**	0.0950**	0.0630*	0.0803**	0.0863**	0.0737**
	(0.0400)	(0.0338)	(0.0350)	(0.0330)	(0.0370)	(0.0360)	(0.0358)	(0.0336)	(0.0363)	(0.0345)
log_ngd	-0.0535	-0.205	-0.165	-0.170	-0.151	-0.158	-0.138	-0.0855	-0.0556	-0.123
	(0.150)	(0.152)	(0.145)	(0.148)	(0.160)	(0.161)	(0.148)	(0.145)	(0.156)	(0.154)
LD.log_rgdpo	0.0143	-0.109	0.00474	0.0217	-0.00806	0.0206	-0.0695	0.117	0.00485	0.0634
	(0.0930)	(0.0966)	(0.0865)	(0.0852)	(0.0814)	(0.0953)	(0.115)	(0.188)	(0.0975)	(0.0977)
D.log_ck	0.318***	0.272***	0.350***	0.323**	0.329***	0.351***	0.402***	0.441***	0.478**	0.404***
	(0.0866)	(0.0831)	(0.0953)	(0.125)	(0.0809)	(0.107)	(0.106)	(0.164)	(0.192)	(0.120)
D.log_ngd	0.0999	0.00585	0.312	0.254	0.250	0.0998	0.217	-0.0580	0.0354	0.116
	(0.268)	(0.295)	(0.295)	(0.235)	(0.210)	(0.255)	(0.264)	(0.254)	(0.219)	(0.227)
log_edu	0.195									
	(0.154)									
D.log_edu	-0.220***									
	(0.0740)									
log_def		-0.0531								
		(0.0427)								
D.log_def		0.0283								
		(0.0433)								
log_pubserv			0.0124							
			(0.0597)							
D.log_pubserv			-0.0304							
			(0.0731)							
log_health				0.0340						
				(0.0665)						
D.log_health				-0.124						
				(0.105)						
log_order					0.0431					
					(0.118)					
D.log_order					-0.0271					
					(0.0459)					
log_envir						0.0176				
						(0.0408)				
D.log_envir						-0.0121				
						(0.0281)				
log_house							-0.0358			
							(0.0268)			
D.log_house							0.0194*			
							(0.0115)			
log_recreation								0.00879		
								(0.0450)		
D.log_recreation								0.0410		
								(0.0340)		
log_socprotection									-0.00463	
									(0.125)	
D.log_socprotection									-0.190***	
									(0.0610)	
log_ecaffairs										-0.0103
										(0.0403)
D.log_ecaffairs										0.0434
										(0.0338)
_cons	2.080*	5.032**	1.144	1.517	1.035	1.350	4.625***	3.628*	0.446	1.715
	(1.159)	(2.051)	(1.024)	(1.068)	(0.900)	(0.815)	(1.294)	(1.944)	(1.065)	(1.177)
N	265	265	265	265	265	265	265	265	265	265
CD	3.114	3.359	3.351	3.575	4.165	1.998	1.924	2.936	2.390	3.550

Source: author's calculations

Standard errors in parentheses $^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

Table 7 Pooled dynamic common correlated effects estimation

PDCCE	(1) D.log_rgdpo	(2) D.log_rgdpo	(3) D.log_rgdpo	(4) D.log_rgdpo	(5) D.log_rgdpo	(6) D.log_rgdpo	(7) D.log_rgdpo	(8) D.log_rgdpo	(9) D.log_rgdpo	(10) D.log_rgdpo
L.log_rgdpo	0.00294	-0.0111	0.00311	-0.00669	0.00443	0.00451	0.00172	0.00274	0.00635	0.00447
	(0.0168)	(0.0184)	(0.0160)	(0.0172)	(0.0167)	(0.0166)	(0.0168)	(0.0166)	(0.0166)	(0.0170)
log_ck	-0.00545	0.00307	-0.00285	0.00880	-0.00509	-0.00601	-0.00256	-0.00511	-0.00949	-0.00603
	(0.0174)	(0.0178)	(0.0167)	(0.0184)	(0.0180)	(0.0172)	(0.0176)	(0.0172)	(0.0174)	(0.0176)
log_ngd	0.00311	-0.0475	-0.0386	-0.00957	-0.0135	-0.0169	-0.0270	0.0178	-0.0255	-0.0140
	(0.0436)	(0.0423)	(0.0380)	(0.0383)	(0.0388)	(0.0477)	(0.0409)	(0.0458)	(0.0392)	(0.0388)
log_edu	-0.0279									
	(0.0338)									
log_def		0.0234*								
		(0.0123)								
log_pubserv			0.0711***							
			(0.0219)							
log_health				-0.0658**						
				(0.0329)						
log_order					-0.00516					
					(0.0217)					
log_envir						-0.000749				
						(0.00759)				
log_house							0.0102			
							(0.0107)			
log_recreation								0.0261		
								(0.0207)		
log_socprotection									-0.0533	
									(0.0364)	
log_ecaffairs										0.000925
										(0.0145)
_cons	0.148	-0.0234	-0.262	0.135	0.0150	0.0116	-0.0356	0.0896	0.206	0.0179
	(0.205)	(0.140)	(0.160)	(0.150)	(0.142)	(0.162)	(0.150)	(0.148)	(0.187)	(0.140)
N	271	271	271	271	271	271	271	271	271	271
CD	2.470	2.161	1.467	3.227	2.351	3.095	2.912	2.627	3.089	3.876

Source: author's calculations

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

LONG RUN RELATIONSHIPS AND SHORT RUN DYNAMICS AMONG UNEMPLOYMENT AND DEMAND COMPONENTS: A STUDY ON SRI LANKA, INDIA AND BANGLADESH

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Abstract

Unemployment of an economy should have some associations with its aggregate demand components. With time series data for 1996-2015 on three aggregate demand components, namely, consumption expenditure (CON), capital formation (GCF) and public spending (GOV), we did econometric exercises such as cointegration, VECM and Wald test to test whether there are long run equilibrium relationships among unemployment (UN) and the three demand components and directions of their interplays in long run and short run frameworks. Doing appropriate diagnostic checking for the residuals of all the estimations, the results show that all the four series are cointegrated that justifies long run associationships among them. Further, the long run causality analysis through VECM reveals that UN, CON and GCF make a cause to GOV for Sri Lanka. For India, UN is caused by all three components of aggregate demand and its CON is caused by UN, GCF and GOV. Bangladesh does not produce any such long run causal relationships among the variables. Further for short run causality results, CON is caused by UN, GCF and GOV in Sri Lanka and India, and for Bangladesh and India, there are short run causalities running from CON, GCF and GOV to unemployment. This means, aggregate demand components in India and Bangladesh influence the unemployment rates of these two countries

Keywords: Unemployment, aggregate consumption, government expenses, gross capital formation, cointegration, VECM, Wald test

JEL classification: J64, E21, E22, E24, H5, C32

1. Introduction

Empirical works on long run relationships and short run dynamics among unemployment and demand components are hard to be obtainable from the existing literature; unemployment backed by consumption, government spending and investment or capital formation are to be underlined in the present context .It is non-deniable that all the variables might be hanging together; one causes other variable to move in positive direction whereas movement in negative direction caused by second one. Complexities are to be acknowledged as economy may moves as Non-Ricardian way when non-optimization of utility is often pronounced in real economy. Despite the above fact, we revisit how macroeconomic demand components do influence the frictions in the labour market so far as unemployment is concerned. As per Keynes, consumption rises as income increases; increase in consumption means reduction of investment because of fall in investment-consumption ratio (Solow 1991), tax revenue is likely to be reduced due to fall in output as investment falls as per historic theoretical framework and hence government revenue- expenditure ratio is likely to be reduced. On the other hand, multiplier effect becomes proactive because of rise in consumption. Although increasing consumption trend complements the robustness of government revenue in normal situation. Interplay among the variables over time matters much. Despite the above theoretical facts, in an economy with institutional or structural weaknesses, consolidation of creation of employment with applications of macroeconomic policies matters much. A variation of aggregate demand components to the desired directions is often observed in reality along with the applications of either monetary or fiscal policy or both; it might turn the existing employment level. It is evident that the unemployment is the cruelest tax to a part of

the citizens; loss of jobs reduces the wellbeing of the citizens and hence psychological distress is pronounced. Human unpleasantness due to unemployment and inflation often regarded as misery index and they are supposed to be the useful indices of the general health of the economy. President Ronald Reagan of USA propounded that inflation is supposed to be public enemy number one in 1980s, a high social cost to speak of. General health of an economy could be assessed by the combined effects of unemployment and inflation rates and these two are inversely related as per study report of Phillips (1958). There is a trade-off between them, but London School of Economics conducted a study for period 1861- 1957 revealing the fact mixed evidence about the shape of the Phillips curve from being horizontal to vertical as opined by Kumar (2012). Llaudes (2005) finds that unemployment duration matters for inflation dynamics, and that the long-term unemployment has a smaller effect on inflation. In some Western European countries in particular, the long-term unemployment have a negligible effect on changes in prices. Principal causes of unemployment in both developed and developing nations are to be identified separately, application of public policies in proper time to remove the evils are quite relevant. The topic, relationship between monetary policy and unemployment, is frequently discussed; the debate is subjected to various empirical studies. Empirical findings support that growth rate of employment is directly proportional to the growth rate of GDP; strong positive association between investment in fixed capital formation and employment is also another macroeconomic finding of the predecessors. Rise in aggregate demand plays crucial role to reduce the unemployment level; increase in real wage should be linked with the increase in productivity. In contrast, producers try to cut wage to enhance their profit. The rising trend of real wage along with the rising trend of productivity would generate sufficient aggregate demand which in turn may be reason of new employment generation. But often market behaves otherwise. Labor productivity growth is a necessary condition for advancing structural transformation and achieving higher standards of living (United Nations Conference on Trade and Development, 2012). Production and investment decisions were taken on the basis of domestic demand before globalization whereas today most of the developing nations adopt such decision with reference to the outlet of export demand. In the era of labor-saving technology, application of capital-intensive technology is inevitable to reduce the cost per unit of output or for decent work for mankind even in the labor-surplus economy, and it displaces labor at the cost of labor deployment. It signifies that real wage is supposed to be enhanced which in turn raises aggregate demand, productivity gains translate into higher demand for domestically produced goods and services.

What are the basic theoretical frameworks by which we could provide jobs to the job seekers when actual growth rate of unemployment exceeds the natural growth rate of unemployment in particular? We are assuming that workers may not be well competent with skills so that they could deploy themselves in the productive job as per their capacity. According to conventional neoclassical theory, flexibility of wage rates and adjustment mechanism of wage for clearing the labor market is pronounced. Capital-labor substitution in a wide range permits producers to pick out appropriate technique of production; while Keynes suggested otherwise - downward wage-rigidity is a limitation for the expansion of employment. Perhaps neither of these approaches favors employment expansion in most of the developing nations.

Policies often applied to achieve a required growth of fixed capital formation that provides the additional employment opportunities for absorbing surplus labor. Generation of mass income in a growing economy or inclusive growth pattern might optimize our employment target. Gain in productivity should be distributed in such a way that allows labour income to grow at the same pace as productivity. As demand grows, it would also be supplementary as an inducement to additional fixed investment, and as a stimulus for industrial growth and the creation of jobs to absorb the job seekers. The implementation of such policies in a market-based economy requires a robust institutional framework adapted to the economic structure and the historical specificities of each country. Fiscal policy is often applied by cutting tax rate which in turn raises aggregate demand. Here is a limitation too, it causes government-demand to move downward direction because of curtailment of tax-revenue and hence aggregate demand is likely to be affected to create new jobs. Policymakers often feel

uncomfortable as neither of the policies can achieve desired goals; additional policy measures like income policy, price control could be applied.

2. Review of Related Literature

We present a list of related research works available in the literature to justify our study. Volume of consumption in view of employment generations is not less important as it is assumed to be voluminous demand component. During worsening labour market, low consumption level directly affects fiscal policy since government revenue is adversely affected, transfer payment too. Karras (1993) justified that government spending on employment and output might rest on volume of government size and the stickability of spending; permanent and continuous changes in government consumption have a greater influence on output and employment than temporary or cyclical changes. The finding also showed that the output elasticity of government consumption was positive but declined with increases in government size. In another study, Gruber (1997) opined that consumption decisions of the households matter the ongoing unemployment level. It is noticed that households of Spain responded during increasing unemployment rate in the early stage of this millennium; Spanish updated their expectation of future income during the phase of massive unemployment, which forced to reduce consumption. But people's consumption does not respond in the short run. Adjustments measures to changes in expectations in future work strongly in view of reduction of consumption – a long run scenario.

In their study, Bnentolila and Ichino (2000) highlighted that there was serious relationship between unemployment and volume of consumption. Increase in duration of unemployment was associated with smaller consumption losses in Spain and Italy in particular as panel data of Spain, Italy, Germany and USA were taken into study.

Empirical evidence of Algan, Cahuc, Zylberberg (2002), based on sample of OECD countries in the 1960-2000 period, recommended that creation of 100 public jobs might be the elimination of jobs closed to 50 private sector jobs, labour market was being bogged down up to a certain extent. Further, crowding out effect of public jobs on private jobs was only significant in countries where public production was highly substitutable to private activities and the public sector offers more attractive wages compared to private labour market. In their study, Galí, López-Salido and Vallés (2004) pointed out that consumption demand increased when government spending went up and the outcome of the study could not be easily reconciled with existing optimizing business cycle models. The study of Stephens (2004) construing changes in subjective job-loss probabilities did not influence on consumption of employed workers whereas changes in expectations to future income affect consumption negatively. The shadow of unemployment affected future consumption primarily through expectations. Relation between government spending shocks and private consumption is revisited by Coenen and Straub (2005) with the econometric tools of DSGE models; non-Ricardian households were taken into account. It exhibited that government spending shocks was conducive for raising the level of consumption level. As per study of Karanassou, Sala and Salvador (2007), dynamicity of labour market establishes capital accumulation plays a basic role in shaping unemployment movements, indirect transmission channels of the capital stock effects by using variables like interest rates or investment ratios is taken into the study. Capital stock is a major determinant of unemployment in the Nordic countries; negative shocks to capital stock growth in Denmark and Sweden are pronounced. The study of Furceri and Zdzienicka (2010) revealed that social spending affected economic activity perceptibly; expansionary effects on GDP in OECD countries for the period 1980 to 2005 were pronounced. An increase in one per cent of social spending raises GDP by about 0.1 per cent point during downturns in particular. Unemployment and health benefits are the key points of their empirical findings. Spending also affects private consumption positively while has a negligible effect on investment. In another study, Fouladi (2010) confirmed that efficiency of government expenditure depended upon kind of expenditure if it was confined to agricultural, gas and oil, construction, industry and mineral and service. Government expenditure as investment had influences on economy in different ways while consumption expenditure caused reduction in production, employment and investment.

The effects of government expenditure shocks on the unemployment rate in the face of proactive holding of assets by the households with rule-of-thumb consumers has been studied by Mayer, Moyen and Stähler (2010). Their findings supported that thumb-rule consumers had a few incentives to work harder in order to consume more as the marginal utility of consumption deteriorates relative to the marginal disutility of work. In contrast, households' optimization behaviour would have a strong incentives to raise labor supply as crowding out in private consumption would raise the marginal utility, incentives to work more. Tayeh and Mustafa (2011) proved that government expenditure had a considerable impact on inflation rate and unemployment rate in Jordon during the period1979- 2000. Accordingly, policy of public spending would enhance job opportunities and assist in alleviating poverty. Ramey (2012) opines that private spending falls significantly in most cases when there is an increase in government spending, tax rates curb the spending multiplier. He also explores the effects of government spending on labor markets which suggests that increases in government spending lower unemployment.

The empirical study of Iacovoiu (2012) observed the relationship between the progression of net capital investment and unemployment dynamics in Romania in the period 2004 – 2012. As a result of the global economic crisis in 2009, a significant reduction in net FDI in 2009 was observed because of lower domestic and external demand that led to a rising unemployment.

According to Sigurdsson (2013), numerical analysis reveals that an increase in growth of capital-production technology raises capital formation and employment in capital production; reducing unemployment in equilibrium. Model with macroeconomic data successfully shows the negative long-run relationship between investment and unemployment. According to Rodolfo and Reggio (2014), during the Great Recession a one percentage point increase in the unemployment rate was related to a reduction in household consumption of more than 0.7 per cent per equivalent adult in Spain. It is observed that the fall in consumption expenditure was due to a reduction in quantities purchased, not lower prices. Bande-Ramudo, Fernandez-Grela and Riveiro-Garcia (2014) examined empirically that consumption shocks on unemployment through changes in investment was evident in Spain; permanent shifts in the consumption-saving practice would have a permanent impact on investment , consequently unemployment rate too.

According to Qionga and Junhuaa (2015), defence-unemployment nexus in China is really a surprise to us so far as datasets on relevant variables for the period 1991 to 2013 are concerned; empirical result shows that the military expenditure pushes up the unemployment rate whereas the increase in its non-military counterpart presses down the rate. The study of Dikko (2016) shows the existence of a negative relationship between capital accumulation and unemployment in all the economies like Namibia, Nigeria, and South Africa. One per cent increase in the level of capital accumulation will reduce the unemployment rates of Namibia, Nigeria, and South Africa by 3.75, 13.07, and 1.59 per cent respectively. Holden and Sparrman (2016) estimated the effect of government purchases on unemployment in 20 OECD countries during the period 1980-2007. It is noticed that unemployment is reduced by about 0.3 percentage points in the same year as government purchases increase by one per cent of GDP; greater effect is also noticed in downswing stage compared to booms. Positive effect of increased government purchases on the employment to population rate is observed during unemployment. In the study with different flavour for the panel of Indonesian provinces Fleriyanto and Sriyana (2016) analyzed the impcts of minimum wage policy upon level of employment. It revealed that minimum wage policy across provinces had created unemployment trap and there was negative correlations between economic growth and employment rate in the provinces. Applying the trade-adjusted shift-share analysis upon the employment level in the post crisis periods in Greece Kallioras, Tsiapa and Zapantis (2016) observed negative national effect component as an outcome of the shocks and the upsets that the Greek economy had suffered.

Onodugo et.al (2017) studied the impact of government expenditure and private investment on unemployment rates during the period 198-2013 in Nigeria. It is observed that capital expenditure both in the short-run and long-run do influence the reduction of the unemployment; the public sector finances on infrastructure lead to an output growth and additional employment generation to speak of. Both short-run and long-run expenditure

induce the reduction of the unemployment rate; the impact of private investment to reduce unemployment in Nigeria cannot be denied. In their work Correia and Alves (2017) analyzed the specificities of employment in Portuguese regions at a disaggregated level of NUTS III, and the synchronisation of regional employment cycles over the 2000-2014. It revealed that Portugal is marked by substantial regional specificities. The analysis of the evolution of employment 'cycles highlight the considerable reduction in the employment rate since the beginning of the 2000s, with particular intensity in the phase of global financial crisis. The study of Yıldırım and Yıldırım (2017) established that show consumption shocks have a significant impact on both the unemployment rate and the investments in Turkey during 2005-2016, used structural VAR (SVAR) models. As per study, Investment shocks also have a similar effect on unemployment rates and positive investment shocks raised employment rates. Accelerator effect is found to be proactive to complement investment because of the increase in consumption. Jablanovic (2017) aimed to analyze a relatively simple chaotic unemployment rate growth model that is capable of generating stable equilibria, cycles, or chaos, and secondly, to to analyze the unemployment rate growth stability in the period 1991-2015 in the Euro Area and assured the prevalence of stable growth of the unemployment rate in the Euro Area in the study period.

In a recent study, Tripathy (2018) analyzes the employment situation in different class of cities in urban India for the period emphasizing upon the relevant city specific determinants of city-wise work-force participation rate. The results show that the indicators such as city-wise average land owned by a person, city-wise percentage of persons receiving any vocational training, percentage of persons currently registered with any placement agency, city size population and city output growth have explained declining work participation rates of the country.

2.1. Objective of the Study

Based on the survey of literature, the present study examines whether there are long run associationships and short run interplays among unemployment, consumption demand, investment demand and government expenditure for India, Sri Lanka and Bangladesh for the period 1996-2015.

2.2. Theoretical Model

As mentioned, unemployment level in an economy is dependent upon, besides other factors, different components of demand. The different components are consumption demand (C), investment demand (I = GCF) and government expenditure (G). Hence,

U = f(C, I, G, A)

where A is the club of all other factors influencing level of unemployment. Taking the the derivative with respect to time (t) and dividing both sides by U we get the relation among them as-

$$\frac{\dot{U}}{U} = \frac{\dot{C}}{C} + \frac{\dot{I}}{I} + \frac{\dot{G}}{G} + \dot{A}/A$$

Keeping all other factors A as fixed then the relation among unemployment and different demand components turned down to-

$$\frac{\dot{U}}{U} = \frac{\dot{C}}{C} + \frac{\dot{I}}{I} + \frac{\dot{G}}{G}$$

The expression shows that the time rate of growth of unemployment is the summation of the time rate of growth of consumption, investment and government demands.

2.3. Data Sources

We have taken only three countries like Sri Lanka, India and Bangladesh for our present study. Time series datasets on percentage change in unemployment, annual growth rates of consumption, government expenses and gross capital formation are taken for the period 1996 to 2015 from World Bank.

2.4. Empirical Methodology

Since we have 20 data points which may have stochastic trends, we need to test for stationarity or unit roots of the four series for all the selected countries. We have tested for unit roots by Augmented Dickey-Fuller (ADF) (1979). The ADF test is based on the assumptions that the error term is serially independent and has a constant variance. For a data set of variable, y (y_t, t = 1, 2, ...,T), where t denotes time, let us consider the following linear regression set up for unit root test for two versions of the ADF(p) regression–viz.,

$$\Delta y_t = \alpha + \beta y_{t-1} + \sum_{j=1}^{p} \gamma_j \Delta y_{t-j} + u_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

for the without time trend case and

$$\Delta y_t = \alpha + \delta t + \beta y_{t-1} + \sum_{j=1}^{p} \gamma_j \Delta y_{t-j} + u_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

for the with time trend case.

If $\beta = 0$ is rejected by the ADF statistic then we say that the series is stationary. If this property holds for all the series of unemployment, consumption expenditure, GCF and government's expenditure, then we can run regression without the chances of getting spurious results. If not, we need to test whether the series are integrated of order one (I(1)) or first difference stationary. If we get the result that all the series are I(1) (that is integrated of same order), or non stationary at level values, then we can test for cointegration between the series to establish long run relations. Since we have four endogenous variables we can run vector auto regression (VAR) model and if we find cointegration among them then we apply vector error correction model (VECM). If VECM provides usual signs and statistically significant results then we can say that there are long run causalities running from any three independent variables to any one dependent variable. If we do not find significant VECM results then we say there are no long run associationships among all the four variables. In that case we test for short run causality in line with Wald test. If we get significant causality results then we test for the fitness of the model. We test for residuals to justify whether there is any serial correlation exists among the error terms (by LM test), whether there is the presence of heteroskedasticity (by Breusche-Pagan test) and whether the residuals are normally distributed (by JB test).

Let us structure a VAR model for four endogenous variables such as unemployment rate (UN), growth of consumption expenditure (CON), growth of gross fixed capital formation (GCF) and growth of government expenditure (GOV).

$$UN_t = \alpha_1 + \sum_{j=1}^{n} \beta_{1j} UN_{t-j} + \sum_{j=1}^{n} \gamma_{1j} CON_{t-j} + \sum_{j=1}^{n} \delta_{1j} GCF_{t-j} + \sum_{j=1}^{n} \theta_{1j} GOV_{t-j} + u_{1t} \quad .. (3)$$

$$CON_t = \alpha_2 + \sum_{j=1}^{n} \beta_{2j} UN_{t-j} + \sum_{j=1}^{n} \gamma_{2j} CON_{t-j} + \sum_{j=1}^{n} \delta_{2j} GCF_{t-j} + \sum_{j=1}^{n} \theta_{2j} GOV_{t-j} + u_{2t} \quad (4)$$

$$GCF_t = \alpha_3 + \sum_{j=1}^{n} \beta_{3j} UN_{t-j} + \sum_{j=1}^{n} \gamma_{3j} CON_{t-j} + \sum_{j=1}^{n} \delta_{3j} GCF_{t-j} + \sum_{j=1}^{n} \theta_{3j} GOV_{t-j} + u_{3t} \quad (5)$$

$$GOV_t = \alpha_4 + \sum_{j=1}^{n} \beta_{4j} UN_{t-j} + \sum_{j=1}^{n} \gamma_{4j} CON_{t-j} + \sum_{j=1}^{n} \delta_{4j} GCF_{t-j} + \sum_{j=1}^{n} \theta_{4j} GOV_{t-j} + u_{4t} \quad (6)$$

where α_1, β_{1j}, γ_{1j}, δ_{1j}, θ_{1j} stand for the intercept and slope coefficients when UN is the dependent variable. The notations with numbers will change accordingly from 2 to 4 for CON, GCF and GOV as the dependent variables. Once the optimum lag is selected then the VAR model will have to be modified. Suppose optimum lag is 2 then the values of j will be 1 and 2.

Once it is tested that the series are cointegrated in line with Johansen technique, we will go for modeling the VECM. VECM is a restricted VAR model and it has cointegrating relation built into the specification so that it restricts the long run behaviours of the endogenous

variables to converge to their long run equilibrium relations while allowing for the short run dynamics. The cointegrating term is known as the error correction (EC) term since the deviation from the long run equilibrium is corrected gradually through a series of short run dynamic adjustments. Here the primary objective is to add estimated error terms with lagged values as the error correction terms. The VECM is given by the following set of equations-

$$\Delta UN_t = \alpha_1 + \sum_{j=1}^{n}\beta_{1j}\Delta UN_{t-j} + \sum_{j=1}^{n}\gamma_{1j}\Delta CON_{t-j} + \sum_{j=1}^{n}\delta_{1j}\Delta GCF_{t-j} + \sum_{j=1}^{n}\theta_{1j}\Delta GOV_{t-j} + \sum_{i=1}^{m}\eta_{1i}\hat{e}_{1,t-i} + \varepsilon_{1t} \quad (7)$$

$$\Delta CON_t = \alpha_2 + \sum_{j=1}^{n}\beta_{2j}\Delta UN_{t-j} + \sum_{j=1}^{n}\gamma_{2j}\Delta CON_{t-j} + \sum_{j=1}^{n}\delta_{2j}\Delta GCF_{t-j} + \sum_{j=1}^{n}\theta_{2j}\Delta GOV_{t-j} + \sum_{i=1}^{m}\eta_{2i}\hat{e}_{2,t-i} + \varepsilon_{2t} \quad (8)$$

$$\Delta GCF_t = \alpha_3 + \sum_{j=1}^{n}\beta_{3j}\Delta UN_{t-j} + \sum_{j=1}^{n}\gamma_{3j}\Delta CON_{t-j} + \sum_{j=1}^{n}\delta_{3j}\Delta GCF_{t-j} + \sum_{j=1}^{n}\theta_{3j}\Delta GOV_{t-j} + \sum_{i=1}^{m}\eta_{3i}\hat{e}_{3,t-i} + \varepsilon_{3t} \quad (9)$$

$$\Delta GOV_t = \alpha_4 + \sum_{j=1}^{n}\beta_{4j}\Delta UN_{t-j} + \sum_{j=1}^{n}\gamma_{4j}\Delta CON_{t-j} + \sum_{j=1}^{n}\delta_{4j}\Delta GCF_{t-j} + \sum_{j=1}^{n}\theta_{4j}\Delta GOV_{t-j} + \sum_{i=1}^{m}\eta_{4i}\hat{e}_{4,t-i} + \varepsilon_{4t} \quad (10)$$

where $\hat{e}_{t-i}$ is the lagged value of the estimated residuals and $\eta\hat{e}_{t-i}$ is the error correction term. 'η' indicates coefficient of EC, it is desirable to be negative and statistically significant to establish the long run associationships among the variables. Further, a negative and significant 'η' signifies long run causality from any three endogenous variables to the rest of the endogenous variable. For example, if $\eta_1<0$ and significant then we say that there are long run causality from CON, GCF and GOV to UN. In addition, 'i' indicates number of cointegrating equations.

Short run causality, say in equation (7), from CON, GCF and GOV to UN can be examined on the basis of null hypothesis, H_0: $\gamma_{1j} = \delta_{1j} = \theta_{1j} = 0$. If the null hypothesis is accepted with probability values less than 0.05 then there is no causality running from CON, GCF and GOV to UN. Wald test ensures the results.

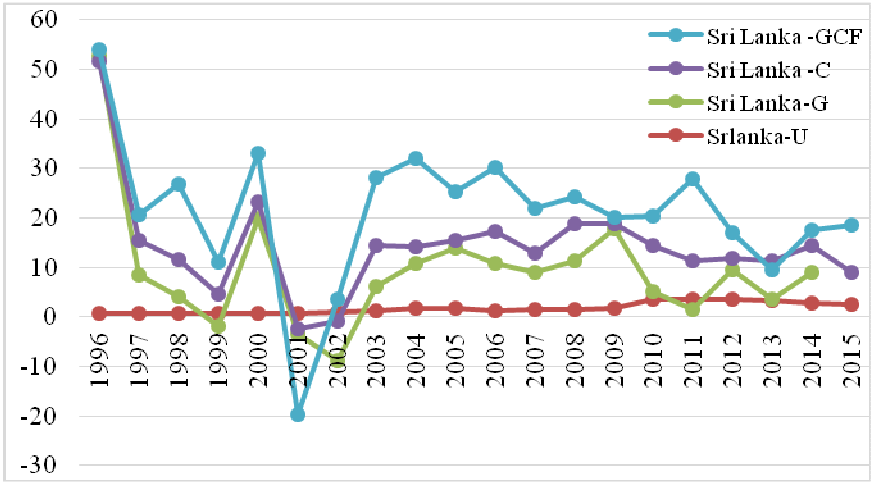
Finally we examine whether the residuals of the models (combinations of dependent and independent endogenous variables) pass the diagnostic checking to ensure the model as good fit. Three diagnostic checking are necessary to test- i) whether residuals are serially correlated, ii) whether residuals are heteroskedastic and iii) whether residuals are normally distributed. The null hypothesis for (i) is 'the errors are not serially correlated', for (ii) is 'the errors are heteroskedastic' and for (iii) is 'the errors are normally distributed'. The test statistics for (i) is Breusch-Godfrey, for (ii) Breusch-Pagan-Godfrey and for (iii) it is Jarque-Bera. A high value of probability in each of the test statistics indicates that the null hypothesis is accepted and so the errors qualify all the diagnostic checking.

2.5. Empirical Investigation

2.5.1. Graphical view

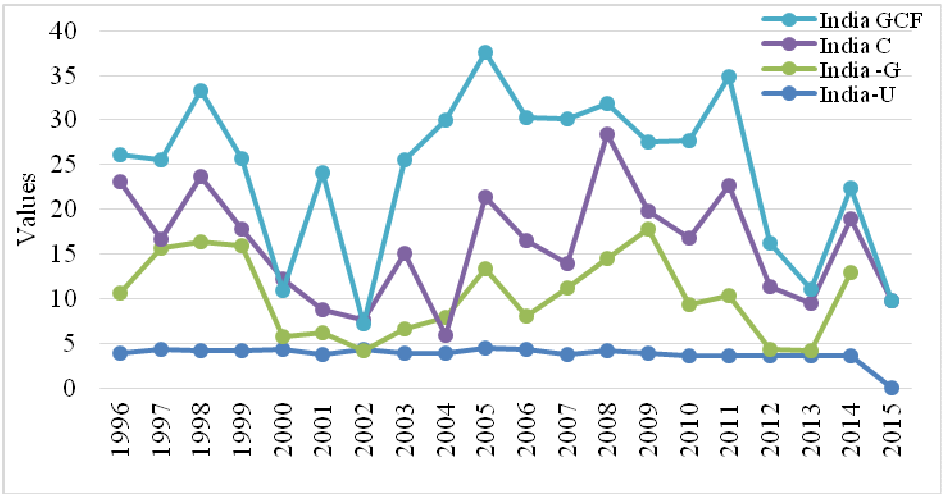
A graphical presentation provides a brief scenario of the selected indicators and it is helpful to read the movements of the indicators over time. Figure 1, Figure 2 and Figure 3 respectively represent the trends of the indicators for Sri Lanka, India and Bangladesh. We see that the magnitudes of the growth rates of GFCF for all the countries are higher compared to that of consumption demand and public demand. Consumption expenditure grows at higher rates compared to the government expenditure for all the countries.

Figure 1. Indicators for Sri Lanka



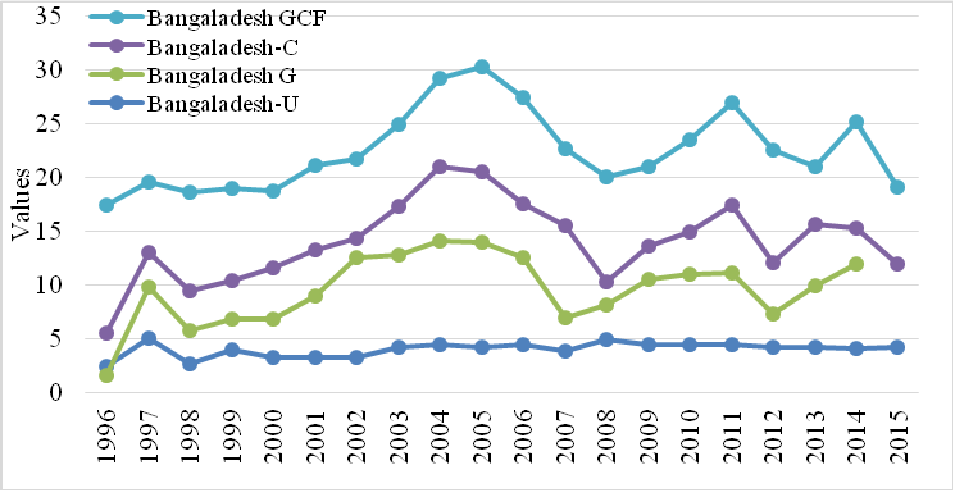
It is to further note that the overall growth rate of GFCF of India hovers around 25 per cent, for Bangladesh it is around 22 per cent but for Sri Lanka, it around 20 per cent. Similarly, the overall growth rate of consumption expenditure is larger for India followed by Bangladesh and Sri Lanka. The public sectors of all the countries contribute almost at the same rates. Hence, not only the volume of aggregate demand is large in India, its growth rate also out steps the neighboring countries.

Figure 2. Indicators for India



The percentage changes of unemployment rates for all the countries lie below the other three indicators. The unemployment scenarios for Sri Lanka and Bangladesh have been worsening over time but India has been improving in absorbing their total labour force into their economic activities. But the major difference is that Sri Lanka maintains unemployment rates below 3 per cent over the entire period of study unlike the other two countries.

Figure 3. Indicators for Bangladesh



2.5.2. Unit roots test results

Since we have 20 year points and the diagrams of all the indicators showing fluctuations, we need to test whether there are stochastic properties in the indicators to avoid spurious statistical results. The stochastic properties or the existence of unit roots have been tested in line with the ADF technique and estimated by equation 1 and 2. The results (refer to Table1**)** show that all the series are free from unit roots problem and so they are stationary at their first differences for all the countries. The series for all the indicators are thus integrated of order one (I(1)). The series for GOV in India is slightly weak; albeit we have considered it to be first difference stationary.

Table 1. Unit roots test results of all the indicators

Country	Indicators (in first differences)	ADF	Prob.	Remarks
Sri Lanka	Unemployment	-3.62	0.05	Stationary
	Consumption	-5.52	0.00	Stationary
	GFCF	-3.76	0.05	Stationary
	Govt. Expd.	-4.44	0.00	Stationary
India	Unemployment	-6.61	0.00	Stationary
	Consumption	-7.57	0.00	Stationary
	GFCF	-4.76	0.00	Stationary
	Govt. Expd.	-2.86	0.07	Stationary
Bangladesh	Unemployment	-3.60	0.05	Stationary
	Consumption	-3.99	0.01	Stationary
	GFCF	-5.67	0.00	Stationary
	Govt. Expd.	-3.07	0.05	Stationary

Note: All the results are derived at the lag of one year.

2.5.3. Johansen Cointegration test results

As the number of endogenous variables is more than two we use VAR model to identify optimum lags and cointegration among the four variables. The optimum lag is selected by looking at the minimum values most of the testing criterions such as LR, Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SIC), Hannan-Quinn information criterion (HQIC) take. In all the cases with each of the four indicators playing the nature of dependent variable interchangeably, the optimum lags are observed to be 2 or 3. But we have 20 time points and after differencing the series turns to 17 (=20-3lags) and with one constant term, the time points ultimately reduced to 16 (=20-3-1). Under this restricted condition with low degrees of freedom, the cointegration test cannot be done. Hence, we have taken only 1 lag to study for cointegration among the variables. Johansen cointegration test technique has been applied and the results have been presented in Table 2.

Table 2. Johansen Cointegration test results

Country	Hypothesized No. of CE(s)	Trace Statistics (Prob)	Max. Eigen Statistics (Prob)	Remarks
Sri Lanka	None *	182.635(0.00)	119.948(0.00)	The variables are cointegrated and there are 2 cointegrating equations at 0.05 level
	At most 1 *	62.687(0.00)	48.239(0.00)	
	At most 2	14.447(0.12)	11.939(0.20)	
	At most 3	2.508(0.18)	2.508(0.14)	
India	None *	128.655(0.00)	86.505(0.00)	The variables are cointegrated and there are 2 cointegrating equations at 0.05 level
	At most 1 *	42.149(0.00)	32.176(0.00)	
	At most 2	9.973 (0.28)	9.47(0.24)	
	At most 3	0.501(0.47)	0.501(0.47)	
Bangladesh	None *	94.765(0.00)	50.223(0.00)	The variables are cointegrated and there are 3 cointegrating equations at 0.05 level
	At most 1 *	44.542(0.00)	26.572(0.00)	
	At most 2 *	17.97(0.02)	16.092(0.02)	
	At most 3	1.877(0.17)	1.877(0.17)	

Note: * mark denotes rejection of the 'no cointegration' hypothesis at the 0.05 level.

It is observed from the table that the Trace Statistics and Maximum Eigen Value Statistics are showing cointegration results among the variables in all the countries at 0.05 levels of significance. This means, the variables are cointegrated and there are long run associationships among them. There are two cointegrating equations for Sri Lanka and India and three for Bangladesh.

Now we test for long run (LR) dynamics among the four variables around the equilibrium relations by VECM. VECM is a restricted VAR model. If we find the error correction coefficients for all the four dependent endogenous variables as negative in sign and statistically significant (with $p<0.05$) then we say that the errors are corrected and there are LR causality running from the rest of the three endogenous independent variables to the endogenous dependent variable. If not there is cointegration but no long run causal relations from three to one. The results of VECM have been presented in Table 3 in summary form.

Table 3. Long run causality test results through VECM

Country	Dependent Variables	Independent Variables	EC term(η)	Prob.	Remarks
Sri Lanka	Unemployment	CON, GCF, GOV	0.025	0.337	No LR causality
	Consumption	UN, GCF, GOV	0.499	0.00	No LR causality
	GFCF	UN, CON, GOV	0.322	0.495	No LR causality
	Govt. Expd.	UN, CON,GCF	-1.285	0.008	UN, CON, GCF→GOV
India	Unemployment	CON, GCF, GOV	-0.436	0.012	CON, GCF, GOV→UN
	Consumption	UN, GCF, GOV	-11.39	0.000	UN, GCF, GOV→CON
	GFCF	UN, CON, GOV	6.863	0.242	No LR causality
	Govt. Expd.	UN, CON,GCF	-0.826	0.832	No LR causality
Bangladesh	Unemployment	CON, GCF, GOV	0.0153	0.003	No LR causality
	Consumption	UN, GCF, GOV	0.385	0.178	No LR causality
	GFCF	UN, CON, GOV	0.145	0.404	No LR causality
	Govt. Expd.	UN, CON,GCF	0.312	0.344	No LR causality

As we have already mentioned in the methodology section that a negative and significant error correction term in a VEC model ensures long run causality, hence, no endogenous variable gets caused by other three endogenous variables in case of Bangladesh. For Sri Lanka, we see that the EC term is negative and significant for GOV as the endogenous dependent variable. Thus, there is long run causality running from UN, CON and GCF to GOV. Although the case for CON as the endogenous variable for Sri Lanka is statistically significant (since $p<0.05$) but its sign is not negative, rather positive which establishes the divergence tendency from the long run relation. The results for India are more conclusive. It is revealed that UN is caused by CON, GCF and GOV and CON is caused by UN, GCF and GOV. In other way to say that unemployment in India is affected by aggregate demand

components that was a prime agenda of our study. Again, although the EC term is negative for GOV as the dependent endogenous variable in India, it is not statistically significant.

2.5.4. Short run causality test

We test for short run causality among the variables by Wald Test. The results have been given in Table 4. The decision rule is through the values of Chi Square test statistics with probabilities less than 0.05. It is observed that in no country GOV is caused by UN, CON and GCF. That means, household and industrial demands and unemployment situation of these three countries do not influence their governments to take spending decisions. That means, private demand does not influence public demands. In case of Sri Lanka and India, CON is caused by UN, GCF and GOV and in case of Bangladesh and India, there are short run causality running from CON, GCF and GOV to UN. This means, aggregate demand components in India and Bangladesh influence the unemployment rates of these two countries. In addition, GCF is motivated by UN, CON and GOV in Bangladesh. There are three cases of causality failure in case of Sri Lanka.

Table 4. Short run causality test results (Wald test)

Country	Dependent Variables	Independent Variables	Chi Square Value	Prob.	Remarks
Sri Lanka	Unemployment	CON, GCF, GOV	2.468	0.480	No SR causality
	Consumption	UN, GCF, GOV	7.768	0.051	UN, GCF, GOV→CON
	GFCF	UN, CON, GOV	3.722	0.293	No SR causality
	Govt. Expd.	UN, CON,GCF	4.035	0.257	No SR causality
India	Unemployment	CON, GCF, GOV	8.105	0.043	CON, GCF, GOV→UN
	Consumption	UN, GCF, GOV	19.18	0.000	UN, GCF, GOV→CON
	GFCF	UN, CON, GOV	0.841	0.839	No SR causality
	Govt. Expd.	UN, CON,GCF	0.070	0.995	No SR causality
Bangladesh	Unemployment	CON, GCF, GOV	15.032	0.001	CON, GCF, GOV→UN
	Consumption	UN, GCF, GOV	5.645	0.131	No SR causality
	GFCF	UN, CON, GOV	11.455	0.009	UN, CON, GOV→GFCF
	Govt. Expd.	UN, CON,GCF	0.696	0.874	No SR causality

Comparing the long run and short run causality results in reference to Table 3 and 4 we see that India is the only country where the case for unemployment produces similar causality results. No other countries' results produce any such similar results in long run and short run causality.

Examining long run and short run associationships among the four endogenous variables for the selected countries should be supplemented by diagnostic checking regarding the residuals or error terms to guarantee the model as good fit. Three different forms of diagnostic checking have been carried out and the results have been depicted in Table 5.

Table 5. Residuals' diagnostic checking

Country	Dependent Variables	Independent Variables	Breusch-Godfrey Serial Correlation LM Test(Prob.-F stat)	Breusch-Pagan-Godfrey Heterosked asticity Test(Prob.-Chi Square)	Histogram-Normality Test (Jarque-Bera, Prob.)	Remarks
Sri Lanka	UN	CON, GCF, GOV	0.998	0.409	0.396*	Model is partially good fit as the errors do not satisfy the normality property
	CON	UN, GCF, GOV	0.353	0.734	0.456*	Model is partially good fit as the errors do not satisfy the normality property
	GCF	UN, CON, GOV	0.999	0.216	0.931	Model is good fit as the errors satisfy all the diagnostic checking

Country	Dependent Variables	Independent Variables	Breusch-Godfrey Serial Correlation LM Test(Prob.-F stat)	Breusch-Pagan-Godfrey Heteroskedasticity Test(Prob.-Chi Square)	Histogram-Normality Test (Jarque-Bera, Prob.)	Remarks
	GOV	UN, CON,GCF	0.964	0.125	0.972	Model is good fit as the errors satisfy all the diagnostic checking
India	UN	CON, GCF, GOV	0.110	0.284	0.617	Model is good fit as the errors satisfy all the diagnostic checking
	CON	UN, GCF, GOV	0.748	0.644	0.740	Model is good fit as the errors satisfy all the diagnostic checking
	GCF	UN, CON, GOV	0.920	0.374	0.637	Model is good fit as the errors satisfy all the diagnostic checking
	GOV	UN, CON,GCF	0.999	0.905	0.845	Model is good fit as the errors satisfy all the diagnostic checking
Bangladesh	UN	CON, GCF, GOV	0.891	0.258	0.570	Model is good fit as the errors satisfy all the diagnostic checking
	CON	UN, GCF, GOV	0.659	0.509	0.869	Model is good fit as the errors satisfy all the diagnostic checking
	GCF	UN, CON, GOV	0.925	0.089	0.920	Model is good fit as the errors satisfy all the diagnostic checking
	GOV	UN, CON,GCF	0.964	0.494	0.398*	Model is partially good fit as the errors do not satisfy the normality property

We see that for all the dependent endogenous variables cases, the residuals are not serially correlated and non heteroskedastic as the probability values of the two test statistics (column 4 and 5) are greater than 0.05 which accept the null hypothesis of no serial correlation and homoskedasticity. Again, all the endogenous dependent variables' residuals are normally distributed (column 6) as the probability values are greater than 50 per cent as per Jarque-Bera method except three regressions. They are two for Sri Lanka with unemployment and consumption as the dependent variable and one for Bangladesh where government expenditure has worked as dependent endogenous variable. We have marked these three results as partially good fit as the other two diagnostic checking have worked in favour. Hence, the results of the overall diagnostic checking show that the estimated models are good fit and so the conclusion we have arrived at have legitimacy.

3. Conclusion

Unemployment of an economy should have some associations with its aggregate demand components and that has been specified to be examined as the major agenda of the present study. With time series data on three aggregate demand components, namely, consumption expenditure, capital formation (or investment expenditure) and public spending, we did the desirable econometric exercises such as cointegration, VECM and Wald test to test whether there are long run equilibrium relationships among unemployment, consumption expenditure, capital formation and public spending and directions of their interplays in long run and short

run frameworks. Doing appropriate diagnostic checking for the residuals of all the estimations, the results show that all the four series are cointegrated justifying long run associationships among them. Further, the long run causality analysis through VECM reveals that unemployment, consumption demand and investment demand make a cause to public demand for Sri Lanka. The results for India are more conclusive. It is revealed that unemployment is caused by all three components of aggregate demand of the economy and its aggregate consumption demand is caused by unemployment, investment demand and public spending. Bangladesh does not produce any such long run causal relationships among the four variables.

Further for short run causality results, the study observed that, in case of Sri Lanka and India, consumption is caused by unemployment, capital formation and government expenditure and in case of Bangladesh and India, there are short run causalities running from consumption, capital formation and government expenditure to unemployment. This means, aggregate demand components in India and Bangladesh influence the unemployment rates of these two countries. In addition, capital formation is motivated by unemployment, consumption and government expenditure in Bangladesh.

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FACTORS INFLUENCING ON PARTICIPATION TO AGRICULTURAL COOPERATIVES IN ARMENIA

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Abstract
The creation of agricultural cooperatives has become one of the major priorities in the sector of agriculture in Armenia. Being a post-Soviet country, Armenia greatly depends on agriculture. According to the data of National Statistical Service of Armenia 20.5 percent of Armenian GDP (Gross Domestic Product) is generated from the agricultural sector of the economy, and hence it is one of the priorities of development of Armenian economy (Armstat, 2016). Nowadays people leaving in rural municipalities of Armenia do not have necessary funding to acquire consumer services, such as housing, education, social benefits, telecommunication, credit, and other financial services (Movsisyan, 2013). In this context, agricultural cooperatives, as a major component of the food and agriculture industry, can help them to market their products and enable them to supply at competitive price levels. The continuous creation of agricultural cooperatives in rural communities is distinguished among priorities of the government. So, one of the main goals of government in this sector must be the enhancing of participation of households to agricultural cooperatives. This paper examines the main factors that influence participation of households to cooperatives. It finds out that there is a need to enhance people's awareness about the benefits of agricultural cooperatives. The paper also examines the impact of agricultural cooperatives on household's income and welfare.

Keywords: agricultural cooperative, cooperative movement, voluntary association, cooperative participation, cooperative identity
JEL classification: M10, O20, Q13, P32

1. Introduction

1.1. Background of the Problem

The small sizes of farms and the fragmented lands are the core issues of agricultural development in the post-privatization period in Armenia and are the main obstacles for the future rise of effectiveness in this field. The past experience of the co-operative movement has a great impact on the current state of agricultural co-operation in Armenia, too. The slowdown in the dissemination in Armenia and in all post-Soviet countries is conditioned by peculiarities of cooperative movement. In 1918 the first collective farms were formed, which was the result of the general ideology of collectivization of the economy. These farms were state-owned entities where employed people had received a fixed salary. The latter were associations formed on the basis of collective use of means of production, in first times they were manifested in different ways, depending on the means of joint use. Particularly, until the 1930s there were sharing only land, and the basic means, such as buildings, machinery and livestock, belonged to the villagers. Accordingly, income was distributed not only to the work performed, but also to the value of the means of production provided by individual members. Later, however, the collective farms were united in the form of "agricultural dumps". In this case, the main means of production were also common property, and the income was distributed according to the census (a measure of the quantity and quality of labor). The

collectivization of the economy led to the fact that in different parts of the USSR (Union of Soviet Socialistic Republics), with the aim of becoming a leader in collectivization indicators and exceeding the planned indices, local officials contributed by administrative methods to the formation of collective farms by virtue of voluntariness. However, the problem was not only the violation of the principle of volunteerism, but also the fact that hundreds of collective farms were formed without being economically justified. As a result, productivity in the agricultural sector has dropped sharply. Essentially, the ungrounded forming of collective farms, not only their economic, but also their social and political goals, and then the fallacy of their former members, completely distorted the normal direction of the development of cooperatives. After the collapse of the USSR, the effectiveness of the use of small and fragmented lands resulting from the privatization should increase dramatically, which, however, was slowed down, partly due to the negative attitude of farmers. This is also the result of the policy of "promotion of personal gains" made by post-Soviet countries, which propagated privatization and individual entrepreneurship. Countries in the transitional period were convinced that private enterprises will provide the highest economic outcomes. Such a process left its negative impact on the development of the former Soviet Union member states, including the cooperative movement of Republic of Armenia.

And now in terms of solving the problems concerning the increase of competitiveness of agriculture the main and essential role is assigned to joint companies of farmers by creating agricultural cooperatives and other organizational units based on the principle of voluntariness. Creation of cooperatives is a natural process and has no alternative in terms of increasing productivity in the agriculture sector, ensuring extended reproduction, increasing the production level, especially in countries with transitional economies.

The promotion of the cooperative movement will greatly contribute to ensuring significant progress in improving the living conditions of the rural population and in development of rural areas. Experience in inculcating the idea of cooperation shows that agricultural cooperatives can solve many essential problems in the agricultural sector of Armenia such as overcoming difficulties in selling agricultural products, using agricultural equipment, making resources (fuel, seeds, fertilizers and etc.) available for farmers.

1.2. Cooperative Movement in Armenia

Three stages of cooperative development have been identified in Armenia. The first starts from 1993 when first autonomous, voluntary farmers' organizations developed in Armenia. But huge quantity of them had been closed soon because of farmers' mentality and their misconceptions about the principles of cooperative management and because of their passive participation or non-participation in the economic activities of cooperatives (Urutyan, 2013).

The second stage starts from 2000 and it includes the activities of donors and international organizations and their programs related to cooperative development. A number of projects were implemented by donor organizations and within these programs a great support was given to the creation of cooperatives. For example, with the assistance of UMCOR (United Methodist Committee on Relief) a program was implemented under which 27 cooperatives were created. In this framework the cooperatives received a large amount of loans to do agricultural inputs purchase order. Project partner cooperatives also got management and marketing training and consulting (Urutyan, 2013).

In 2005 by the technical assistance of Foreign Agricultural Service of United States Department of Agriculture (USDA) has established a credit cooperative organization called "Farm Credit Armenia" UCO (Universal Credit Organization) commercial cooperative.

"Farm Credit Armenia" UCO commercial cooperative offers loans to individuals and legal entities engaged in the agricultural activities and in the manufacturing of agricultural food. Company offers 4 main financial products: agricultural loans, agribusiness loans, SME (small and medium enterprises) loans and leasing of agricultural equipment. The mission of "Farm Credit Armenia" UCO is to improve the quality of life in rural Armenia by providing accessible financial services to agriculture; agribusiness; small and medium enterprises, micro-borrowers; young, beginning, and small farmers; women; and minority rural residents (FCA).

The third stage of cooperative movement begins from 2010. Currently promotion of cooperation is one of essential parts of government policy in the sector of agriculture in

Armenia. The latter is evidenced by a series of documents underlying public policy in the agricultural sector. One of these is the Government program, another is the Sustainable Development Strategy of Rural Areas and Agriculture in Armenia in 2010-2020. Since 2012 by the Decision of Armenian Government the creation of agricultural cooperatives has become one of the major priorities in the sector of agriculture. Among the government's priorities in 2016 the continuous creation of agricultural cooperatives in rural communities is distinguished.

By the Initiative of Ministry of Agriculture the draft was developed and on December 21, 2015, the National Assembly passed the "Agricultural Cooperatives" Law, which would improve the legislative basis for the development of agricultural cooperation, promote the formation of agricultural cooperatives, increase the efficiency of farms activities, increase competitiveness in business sphere, increase the level of food security and specify the main directions of state policy on agricultural cooperation (Minagro, 2016). The law on Agricultural cooperatives is in compliance with the International Labour Organization's proposals and with the provisions established by the International Cooperative Alliance. The law regulates the processes of creation, membership, management, decommissioning, restructuring of agricultural cooperatives, defines the rights, obligations and responsibilities of cooperative's members and defines the relationships between the latter and the state (Law on Agricultural Cooperatives, 2015).

Currently there are about 270 agricultural cooperatives in Armenia, and their main purpose is the collection and harvesting of milk, fruit, vegetable, grain crops growing, service delivery through agricultural equipment, apiculture, pasture management.

Since January 2015 a three-year program "European Neighborhood Programme for Agriculture and Rural Development" (ENPARD) has been launched by the United Nations Industrial Development Organization and the United Nations Development Programm and funded by the European Union and the Austrian Development Agency. The main aims are supporting the creation of agricultural cooperatives in Shirak, Lori Gegharkunik, Aragatsotn, Kotayk, Vayots Dzor Marzes (regions), as well as strengthening of cooperatives, developing business skills, increasing production volumes and product range, technology upgrading, marketing and implementation of agricultural best practices and creating disaster risk reduction systems (Minagro, 2016).

2. Literature Review

2.1. Internatioanl Approach to Cooperative Identity and Principles

According to the definition of International Co-operative Alliance (ICA) agricultural co-operative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise (ica.coop). By the definition of International Labour Organization (ILO) cooperative is an independent association of women and men, united voluntarily to meet their common, social, cultural needs and aspirations through a jointly owned and democratically controlled enterprise (ILO, 2016). According to the definition of United States Department of Agricultural (USDA) a cooperative is a business owned and democratically controlled by the people who use its services and whose benefits are derived and distributed equitably on the basis of use (USDA, 2012). According to the one of the simplest definitions of agricultural cooperatives it is a voluntarily created economic unit for the production and distribution of goods and services, operated by its members who share their mutual benefits and risks (Urutyan V., Avetisyan S., 2006).

As we can see, the approach to agricultural cooperatives is basically same for different international organizations and countries and the main principles underlying creating cooperatives are the followings. 1. Voluntary and Open Membership. 2. Democratic Member Control. 3. Member Economic Participation. 4. Autonomy and Independence. 5. Education, Training and Information. 6. Co-operation among Co-operatives. 7. Concern for Community (ica.coop).

Despite of the united approach to cooperatives, different countries have their own systems for legal regulations on cooperatives. One of the recent studies emphasizes the two main forms of cooperative legislation.

- A general cooperatives law that regulates all types of cooperatives in a country; this is the most common form of cooperative legislation and can be found, for example, in Brazil, Serbia, Germany, Hungary, India (both at federal and at state levels), Jordan, Kenya, Mexico, Spain and Thailand.
- Separate laws for special types of cooperatives; some countries, e.g. Ethiopia, Japan, Romania, Uruguay and others, have adopted specific laws for different cooperative sectors (Movsisyan, 2013).

Despite of that fact that there is a little information about how to make an ideal cooperative legislation and which form is the most successful, a 'Guidelines for Cooperative Legislation' was written by Hagen Henrÿ and published jointly by the ILO and the Committee for the Promotion and Advancement of Cooperatives (COPAC). The trend is towards having one single general law covering all types of cooperatives because it is believed that:

- one law for all types of cooperatives, possibly with specific parts for specific types of cooperatives/activities, for example housing or savings and credit cooperatives, best guarantees the autonomy of cooperatives, i.e. their power to regulate their own affairs as far as possible through by laws/statutes, since the degree of detail in such a law will be lower than in a multitude of laws
- this low degree of detail diminishes bureaucracy
- one single law avoids the fragmentation of the cooperative movement that might occur where different types of cooperatives were registered under different acts and placed under the supervision of different public authorities with, perhaps, heterogeneous policies
- one single law creates legal security for those dealing with cooperatives. Legal security relates rather to structural and liability aspects than to a specific type of cooperative or activity
- in the context of development constraints, one single law is the most adequate tool to reach congruency between development-oriented, member-oriented and self-sufficiency goals of cooperatives (Henry, 2012).

However, in the light of the recent discussions on how to restore cooperative distinctiveness, it is being considered, especially in the industrialized countries, to have different laws.

2.2. International Literature on Cooperative Participation

Many of recent studies have identified the factors influencing farmers' participation in agricultural cooperatives. The following determinants are mainly chosen for explaining farmers' decision to participate in cooperatives: age (MUGABEKAZI, 2014)(Junichi Ito, Zongshun Bao, Qun Su, 2012), (Meike Wollnia, Manfred Zellerb , 2007), (Degnet Abebaw, Mekbib G. Haile, 2013), (Tanguy Bernard, David J. Speilman, 2009), educational background (MUGABEKAZI, 2014), (Shi Zheng, Zhigang Wang, Titus O. Awokuse, 2012), (Meike Wollnia, Manfred Zellerb , 2007), (Arayesh, 2011), (Degnet Abebaw, Mekbib G. Haile, 2013) risk attitude (Shi Zheng, Zhigang Wang, Titus O. Awokuse, 2012), (Junichi Ito, Zongshun Bao, Qun Su, 2012), cultivated area (Shi Zheng, Zhigang Wang, Titus O. Awokuse, 2012), (Junichi Ito, Zongshun Bao, Qun Su, 2012), (Meike Wollnia, Manfred Zellerb , 2007), (Arayesh, 2011), (Degnet Abebaw, Mekbib G. Haile, 2013), (Tanguy Bernard, David J. Speilman, 2009), annual income (Meike Wollnia, Manfred Zellerb , 2007) , (Arayesh, 2011). Most of these studies have found that these determinants have significant effects, expect of study which is conducted in China (Junichi Ito, Zongshun Bao, Qun Su, 2012) in the field of watermelon production. This research shows that variables related to household characteristics are not significant, including number of household members, age of household, educational background, risk attitude. Instead of these determinants it found out the coefficient of following variables positive: adoption of new technology and seed, neighbor participation and production instability.

Some of these studies are emphasizing the role of other determinants of participation, too: previous experience, history (Shi Zheng, Zhigang Wang, Titus O. Awokuse, 2012), (MUGABEKAZI, 2014), credit and technical assistance and extension services (Meike Wollnia, Manfred Zellerb , 2007), (B. Msimango, O. I. Oladele, 2013), psychological features, political factors and communicational-informational factors (Arayesh, 2011).

All these studies found out the main determinants that influence on farmers' decision to participate in agricultural cooperatives in various markets and in different countries. The factors that influence on farmers' participation in agricultural cooperatives in the Republic of Armenia will be further discussed in the later parts of this paper.

Recent studies also tend to focus on how agricultural cooperatives influence farmers' income. Some of them show that cooperatives improve the economic welfare of farmers. These studies show that farmers participating in cooperatives gain more income than their non-cooperative counterparts. One of these studies is conducted in the field of pig raising in Philippines and it shows that there is a direct relationship between membership to a well-managed cooperative and higher level of income from backyard pig raising (Maharjan, K.L., and C.C. Fradejas, 2006).

One of above mentioned studies (Shi Zheng, Zhigang Wang, Titus O. Awokuse, 2012) is also emphasizing the role of agricultural cooperatives on farmers' income. The research conducted in Northern China shows that agricultural producers perceive cooperatives as a positive means for improving their economic welfare. It suggests that in general, farmers participate in cooperatives because they view it as an institution that can help them to reduce production and marketing risks and ultimately enhance their chances of expanding their business operations and increase their income level.

The results of a research conducted in Rwanda show that Cooperative membership significantly increases farm income (with about 40 to 45%), and significantly reduces the likelihood of being poor (with 10 to 14% points) (Ellen VERHOFSTADT, Miet MAERTENS, 2014).

Another study is conducted in Delta State of Nigeria and it shows that the income and severity of poverty of cooperative and non-cooperative farmers provide sufficient evidence that membership in agricultural cooperatives could serve as a means for improving farmers' income and well-being (Omoregbee, E. F., Ighoro, A., 2012).

But on the other hand there are studies that found out that participation in agricultural cooperatives have no influence on farmers' income. One of them is conducted in the field of rice-producing in China. That paper investigated the treatment effect of participation in a rice-producing agricultural cooperative on the rice income of member households as compared with that of rice-cultivating non-participants. The estimated results show that no significant difference between participants and non-participants in the cooperative is observed in terms of net income from rice production after controlling for the differences in farmers' rice income before the treatment (Hisatoshi Hoken, Qun Su, 2015).

3. Methodology and Data

3.1. Data source

The data used in this research were collected from the survey on commodity supply chains in Central Asia and Caucasus in 2014. Survey was conducted by ICARE International Center for Agribusiness Research and Education. The data were collected from Aragatsotn, Lori, Shirak, Syunik, Gegharkunik marzes (regions) of Armenia.

The questionnaire includes nine parts. The first part concerns to household roster and includes demographical questions, such as age and gender of household hand, educational level, questions concerning employment of family members and questions concerning hired labor. Second part includes questions concerning farm type and land resources, such as the area of plot, distance from household, land use type, source of water and questions about ownership and renting land resources in the last 12 months. The third section includes questions concerning to household assets and farm machinery. It contains questions about the farm tools and equipment that are used in main activities. The fourth part concerns to agricultural production. It includes questions about types of crops and fruits producing on

plots, questions about the problems concerning marketing and water availability and questions concerning to input and costs of farm both related to specific crop and other activities needed for production (taxes, fees, depreciation costs). The fifth section contains questions about livestock production. The sixth section dedicated to cooperation. It contains questions about the main activities that are done jointly or farms are willing to do them jointly. It also includes information about formal and informal cooperatives existing in the field and the main benefits that membership is bringing to participants. The seventh section contains questions about processing and quality standards of fertilizers, transport, harvesting, hygiene and animal welfare. The eighth part contains questions about availability of information and extension markets. The ninth part contains questions about uncertainty risk and management options, including questions concerning insurance.

3.2. Descriptive Statistics

As shown in Table 1, the age of the head of households mostly varies between 36 and 55 years. Survey has also indicated that even though the greatest percentage (28.5%) of the heads of households has university degree, the great percentage of them has educational level of middle school, high school or college. It is also shown in Table 1 that more than 90% percent of the heads of households are man. Survey shows that 78,05% respondents' land size is less than 10 hectare.

Table 1. Survey results on households' social-demographic, individual and operational characteristics in the Republic of Armenia

Variable	Number of Households	Percentage
Age of the Head of Household (Year)		
<=35	43	10,75
36-55	206	51,50
56<	151	37,75
Children in the Household (<16years)		
Yes	233	58,10
No	168	41,90
Educational Level of the Head of Household		
Primary	1	0,25
Middle school	99	24,75
High school	88	22,00
College	98	24,50
University degree	114	28,50
Gender of the Head of Household		
Male	360	90,68
Female	37	9,32
Marz (Region)		
Aragatsotn	55	13,72
Gegharkunik	106	26,43
Lori	48	11,97
Shirak	119	29,68
Syunik	73	18,20
Land Size (Hectare)		
<10	313	78,05
10-19	49	12,22

Variable	Number of Households	Percentage
20<	39	9,73
Variety of Crop and Fruit Production (Multiple Choice)		
Wheat	398	99,25
Barley	259	64,59
Potato	129	32,17
Perennial hay grasses	78	19,45
Other vegetables	10	2,49
Annual hay grasses	13	3,24
Corn	5	1,25
Apple	1	0,25
Berries	1	0,25
Water Availability in 2014		
very bad	205	51,38
below average	85	21,30
average	76	19,05
above average	25	6,27
very good	8	2,01
Variety of Livestock Production (Multiple Choice)		
Milk cows	307	76,75
Chickens	195	48,63
Beef cattle	174	43,50
Sheep	152	37,91
Pigs	75	18,70
Sow	33	8,23
Breeding bulls	22	5,49
Bees	22	5,49
Horses	14	3,49
Rabbits	7	1,75
Ducks	3	0,75
Donkeys/Mules	2	0,50
Goats	2	0,50
Other Poultry	1	0,25
Revenue from Crop and Fruit Production in 2014 (Armenian drams)		
0	158	39,40
<=50000	217	54,11
50000-99999	6	1,50
100000-199999	3	0,75
200000-299999	5	1,25
300000-399999	2	0,50
400000-499999	3	0,75
500000-599999	1	0,25
600000-699999	2	0,50

Variable	Number of Households	Percentage
>=700000	4	1,00
Income from Livestock Production in 2014 (Armenian drams)		
0	154	38,40
<10000	71	17,71
10000-99999	40	9,98
100000-199999	69	17,21
200000-299999	41	10,22
300000-399999	17	4,24
400000-499999	8	2,00
>500000	1	0,25
Participation in Informal Cooperatives		
Yes	102	25,44
No	299	74,56
Participation in Formal Cooperatives		
Yes	31	7,73
No	369	92,27
Risk Source/ Drought		
not important at all	3	0,75
somehow important	11	2,75
Important	93	23,25
very important	293	73,25
Risk Source/ Market Price		
not important at all	5	1,25
somehow important	37	9,27
Important	200	50,13
very important	157	39,35
Risk Source/ Customs Regulations and Allowances		
not important at all	238	59,50
somehow important	126	31,50
Important	29	7,25
very important	7	1,75
Risk Source/ Spring Frost		
not important at all	26	6,50
somehow important	81	20,25
Important	226	56,50
very important	67	16,75
Risk Source/ Early Frost		
not important at all	17	4,25
somehow important	85	21,25
Important	228	57,00
very important	70	17,50
Risk Source/ Wind		

Variable	Number of Households	Percentage
Importance		
not important at all	35	8,79
somehow important	121	30,40
Important	176	44,22
very important	66	16,58
Risk Source/ Storm Importance		
not important at all	45	11,25
somehow important	137	34,25
Important	179	44,75
very important	39	9,75
Risk Source/ Varmints Invasion		
not important at all	74	18,50
somehow important	85	21,25
Important	188	47,00
very important	53	13,25
Risk Source/ Hail Importance		
not important at all	5	1,25
somehow important	11	2,75
Important	87	21,75
very important	297	74,25
Risk Source/ Flood Importance		
not important at all	213	53,52
somehow important	105	26,38
Important	62	15,58
very important	18	4,52
Risk Source/ Winter Killing		
not important at all	36	9,05
somehow important	111	27,89
Important	198	49,75
very important	53	13,32
Risk Source/ Changes Importance		
not important at all	12	3,02
somehow important	44	11,06
Important	201	50,50
very important	141	35,43
Access to Information and Extension Services		
Yes	79	19,70
No	322	80,30
Subsidized inputs/Seed		
Yes	108	26,93
No	293	73,07
Subsidized inputs/Fertilizer		

Variable	Number of Households	Percentage
Yes	295	73,57
No	106	26,43
Subsidized inputs/Fuel		
Yes	216	53,87
No	185	46,13
Subsidized inputs/Credit		
Yes	76	19,00
No	324	81,00
Subsidized inputs/Machinery		
Yes	0	0,00
No	400	100,00
Subsidized inputs/Other equipment and devices		
Yes	0	0,00
No	400	100,00

Source: ICARE International Center for Agribusiness Research and Education, Survey conducted in 2014

Table 1 reports, that agricultural products include crops, grain and fruits, as well as livestock products. 39,4% of respondents are not engaged in crop and fruit growing or selling. 54,11% of respondents got less than 50000 Armenian drams (AMD) as revenue from sales of crops and fruits in 2014 and only 1% of them got more than 700.000 AMD as revenue. 99.25% of them are engaged in wheat growing, 64,59% of them are engaged in barley growing and 32.17% of respondents are growing potato. It is also shown that 38,4% of respondents are not engaged in livestock production or sales. As Table 1 shows, great percentage of them are engaged in milk cows, chickens, beef, sheep and pig production. Table 1 shows that 17,71% of respondents earned less than 10000 AMD as annual income from sales of life animal, milk, wool, skin, egg, honey, manure or other in 2014.

The survey also answers the question how was the water availability for farms in 2014. According to answers it is in the "very bad" scale for more than 50% of sampled respondents.

The survey also shows that 102 households (25,44% of sampled respondents) are participants of informal cooperatives and only 31 households (7,73% of sampled respondents) are participating in formal cooperatives. Results of survey also show that 30 participants of formal cooperatives are also participants of other informal cooperatives. In other words, 103 households are participating in agricultural cooperatives, from which 102 are informal cooperative members. Consequently, later we will examine factors affecting households participation in informal cooperatives with the consideration that the determinants that are affecting farmers' participation in cooperatives are going to be mainly the same for both formal and informal cooperatives. Most of activities performing jointly with other farmers are production, mechanized field works, selling of farm products and purchase of farm inputs.

Table 1 also shows the importance of various risks in production and business operations of households. It indicates that drought and hail are considered to be "very important" risks for production. Market price, spring and early frosts, wind, storm, varmints' invasion, winter killing and changes in feed, seed, fuel, machinery repairs, chemicals, custom services are also considered as "important" risks for the great percentage of respondents.

It is also shown in Table 1, that 19,70% of households received information/advice from extension agents. It mostly referred to soil and water conservation and crop protection.

As Table 1 shows, more than 90% of respondents own spades, scythes, pitchforks and rakes. 23,25% of respondents are tractor owners, 48,75% of households are car or minibus owners and 22,00% of them have lorries.

We can also see in Table 1 that 73,57% of households received subsidized fertilizers, 26,93% of them received seed, 53.87% of respondents got subsidized fuel and 19% of them

received credit as a subsidy. Machinery or other equipment and devices were not given as a subsidy to households.

3.3. Definition of Variables and Methods Used in Analysis

As a dependent variable we define "Farmers' participation in informal agricultural cooperatives", because as we discussed above, the great percentage of households are participating in informal cooperatives. Explanatory variables are based on some of previously discussed characteristics of households which we expect have significant influence on farmers participation in cooperatives. Some of independent variables used in our analysis describe socio-demographic characteristics of households. These are the age of the head of household, educational level of the head of household, gender of the head of household, region, land size. The other group of variables describes operational situations of households. It includes the revenue gained from crop and fruit production, as well as from livestock production. We expect that water availability also will be important factor influencing farmers' participation in cooperatives. We include in model the main types of agricultural production and consequently the variables are the following: wheat producers, barley producers, milk cows owners, beef cattle owners, sheep owners, chickens owners. We expect that the access to information and extension services is also a significant factor for participating. We include in model some of important risk sources for farmers, as we expect that farmers will participate in cooperatives if their risks are high. We also think that the factor of receiving of subsidized inputs is also an important determinant of participating.

Stata 14.1 statistical software is used in analyses. As our dependent variable is binary (the 102 households who are participating in informal cooperatives are represented as "1" and 299 of households who are not members of cooperatives are represented as "0"), we could not use simple regression in our analysis. So logit regression model is used, which gives the opportunity to describe data and to explain the relationship between dependent binary variable (participation in informal cooperatives) and other ordinal (educational level of the head of household, water availability, risk source), categorical (gender of the head of household, marz (region)), interval (age of the head of household, land size, income from livestock production in 2014, revenue from crop and fruit production in 2014) and binary (subsidized inputs, access to information and extension services, crop and fruit producers) independent variables. In Table 2 summary is shown for statistics of variables included in analyses.

Table 2. Summary statistics of variables

Variable, Description (when needed)	Mean	Std. Dev.	Min	Max
Participation in Informal Cooperatives	0.254364	0.436047	0	1
Age of the Head of Household	52.0175	12.43478	23	90
Educational Level of the Head of Household (primary, middle school, high school, college, university degree)	3.5625	1.153004	1	5
Gender of the Head of Household	0.906801	0.291078	0	1
Marz (region)	2.882793	1.209846	1	5
Land Size	12.68843	47.87154	1	800
Wheat producers	0.992519	0.086278	0	1
Barley producers	0.645885	0.478842	0	1
Milk cows producers	0.7675	0.422955	0	1
Beef cattle producers	0.435	0.496378	0	1
Water Availability in 2014 (very bad, below average, average, above average, very good)	1.862155	1.057895	1	5
Revenue from Crop and Fruit production	28957.63	204623.6	0	3560000
Income from Livestock production	75162.88	109669.4	0	600000
Access to information and extension services	0.197008	0.398235	0	1
Subsidized seed	0.269327	0.444164	0	1
Subsidized credit	0.19	0.392792	0	1
Risk source/ drought importance (somehow	2.69	0.560969	0	3

Variable, Description (when needed)	Mean	Std. Dev.	Min	Max
important, important, very importamnt)				
Risk source/ market price importance (somehow important, important, very importamnt)	2.275689	0.679333	0	3
Risk source/ hail importance (somehow important, important, very importamnt)	2.69	0.587164	0	3

Source: Outputs of analyses by authors using Stata 14.1 statistical software

4. Results

Table 3. Estimation results for determinants of participation in informal agricultural cooperatives in Armenia

Logistic regression — Number of obs = 389
LR chi2(18) = 59.29
Prob > chi2 = 0.0000
Log likelihood = -192.07392 — Pseudo R2 = 0.1337

Participation in Informal Cooperatives	Odds Ratio	Std. Err.	Z	P>z
Age of the Head of Household	1.008653	0.011295	0.77	0.442
Educational Level of the Head of Household	1.326712	0.157197	2.39	**0.017**
Gender of the Head of Household	2.586396	1.384603	1.78	**0.076**
Marz (region)	0.956701	0.106045	-0.4	0.69
Land Size	1.000431	0.002267	0.19	0.849
Wheat producers	0.617481	0.804877	-0.37	0.711
Barley producers	2.047056	0.617499	2.37	**0.018**
Milk cows producers	0.56423	0.197011	-1.64	0.101
Beef cattle producers	1.75834	0.526621	1.88	**0.06**
Water Availability in 2014	0.68659	0.093214	-2.77	**0.006**
Revenue from Crop and Fruit production	1	7.66E-07	-0.23	0.816
Income from Livestock production	1.000002	1.21E-06	1.81	**0.07**
Access to information and extension services	2.219233	0.683614	2.59	**0.01**
Subsidized seed	0.770523	0.224727	-0.89	0.371
Subsidized credit	2.518992	0.762697	3.05	**0.002**
Risk source/ drought importance	0.729587	0.158491	-1.45	0.147
Risk source/ market price importance	0.880746	0.167138	-0.67	0.503
Risk source/ hail importance	0.671319	0.145079	-1.84	**0.065**
_cons	0.464524	0.858838	-0.41	0.678

Source: Outputs of analyses by authors using Stata 14.1 statistical software

As we can see from Table 3, the P-values of age of the head of household, gender of the head of household, marz (region), land size, wheat producers, milk cows producers, beef cattle producers, revenue from crop and fruit production, income from livestock production, subsidized seed, risk source/ drought importance, risk source/ market price importance and risk source/ hail importance are greater than α=0.05 level of significance, so the test fails to reject the null hypothesis, which means that the above mentioned variables are statistically insignificant, with 5% significance level.

Educational level of the head of household, barley producers, water availability in 2014, access to information and extension services and subsidized credit are variables which have P-values less than α=0.05 level of significance, so the test rejects the null hypothesis, which means that the above mentioned variables are statistically significant, with 5% significance level.

5. Discussion

We can conclude, that for every additional unit increase in independent variable of educational level of the head of household, other things being equal, the probability to join informal cooperatives increases 1.3 times. This means that the farmers who have higher level of education are more likely to participate in cooperatives. So, educational level of the head of household has a significant and positive effect on participation.

The independent variable of barley producers has also significant and positive effect on participation. This means that barley producers are more than 2 times more likely to participate in informal cooperatives than farmers who are not engaged in barley production.

We can also see, that for every additional unit increase in independent variable of water availability in 2014, other things being equal, the probability of joining informal cooperatives decreases with a multiple rate of 0.69. As we mentioned above, the answers of the question concerning water availability include following choices: very bad, below average, average, above average, very good. So, it is obvious, that farmers are more willing to participate in cooperatives when they have worse conditions for water availability.

The independent variable of access to information and extension services has also significant and positive effect on participation. This means that households who have access to extension and information services are 2.2 times more likely to participate in informal cooperatives than farmers who are not receiving these services.

Likewise, the independent variable of subsidized credit has also significant and positive effect on participation. This means that households who receive credit as a subsidies are 2.5 times more likely to participate in informal cooperatives than farmers who don't.

But, as we can see following variables are also statistically significant, with 10% significance level: gender of the head of household, beef cattle producers, risk source/ hail importance, income from livestock production. This means that the households, heads of which are male, are 2.5 times more likely to participate in informal cooperatives than those households, which heads are female. And also beef cattle producers are 1.8 times more likely to participate in informal cooperatives than farmers who are not engaged in beef production. Our expectations are not fulfilled concerning to risk source variables. Moreover, we can see that for every additional unit increase in independent variable of risk source/hail importance, other things being equal, the probability of joining informal cooperatives decreases with a multiple rate of 0.67. Although the variable of income from livestock production is also statistically significant, with 10% significance level, but for every additional unit increase in this independent variable, other things being equal, the probability to join informal cooperatives increases only with a multiple rate of 1,000002. So, we can conclude that this explanatory variable yields no significant outcome.

6. Conclusion

As shows the theoretical part of our study, creation of agricultural cooperatives can solve one of the most important issues in Armenian agricultural sector, which is the problem of fragmented lands. But the findings of study show that the percentage of participation in agricultural cooperatives is not on higher levels in Armenia. Only 7.73% of sampled households are participating in formal agricultural cooperatives and 25.44% of all respondents are members of informal cooperatives. We can conclude from econometric analysis that people with higher educational level are more eager to participate in cooperatives, than householders with primary or middle educational level. Likewise, people who have access to information and extension services are more eager to join cooperatives. So, we can conclude that most of the people living in rural areas are not aware of opportunities to join cooperatives and they are not aware of benefits which are given from doing some activities jointly. Econometric analyses also show that people who consider their operational situation is in bad conditions are more eager to join cooperatives than the others. From the analyses we also found out that man householders are more eager to cooperate than woman heads of households. So, we can say that these analyses will help to concentrate more on segment that is more eager to participate in cooperatives and to raise the awareness of those households who do not participate.

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THE PARTICULAR ANTHROPOLOGICAL CASE OF THE "ILLEGAL HOUSES" OF GREECE

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Abstract

Classical *polis* was born when a collectivity showed more interest in the truth of things, rather than their use, when cohabitation ceased to be the *community of needs*, where desirable is the fulfillment of basic human needs, material or otherwise and took place the transition to the *community of truth*. The last cultural remains of this *way of thinking and acting* survived until very recently, with the foundation of the modern Greek state in 1830 and vanished once and for all, slowly, but steadily, after 1974, with the entrance n the European Economic Community and, finally, the Eurozone, transforming and adjusting the contemporary Greek city to the western globalized standards. In this text we will examine the "wise" illegal houses, creations of social space, of *polis* of the refugee settlements of 1922 and the expansions of the, initially, planned Greek city centers, which transformed slowly, but steadily into pure speculation and greed for profit. This mutation was established with the replacement of the "customary law" and what is widely called "tradition" in constructions, with the rigid Building Regulations. This transition was crucial and it was the outcome of a much greater mutation; the anthropological transformation of the Greek people, its "modernization" and its contemporary, absolute alignment with the western European standards, which have taken over every aspect of human activity, including official urban planning, but, also, unofficial, so-called illegal constructions.

Keywords: Illegal constructions, urban planning, anthropology, western civilization

1. Introduction – Historical background

In human history, Hellenism appeared to be a difference in the way of life, the way of notion (noo-tropism) and the way of doing it. The Greek did not give birth to ideologies: abstract axes of interpretation of reality, imperative organization of life - they did not put forward beliefs, principles, ideal aims, rules of use. In Greek civilization, the prime element (the origin of their culture) was pragmatism of common need[1].

Taking into account recent anthropological data, the ancestor of homo sapiens, first, appeared in the land of historical Macedonia[2] and Thrace, 7.2 million years ago[3] . The First-Greek *Pelasgians*, later *Greeks* and very recently *Hellenes*[4], had all the time and the ideal environmental conditions to experience in the wide-ranging Greek[5] landscape ...*Nature* and to perceive that element, determining the formation of the so-called classical civilization, which differentiated the Greek way of thinking and acting by its historical opponent, the so-called Western civilization. Since then, the Greeks experiencing, studying and knowing *Nature*, they

[1] Yiannaras Chr. (2018), Europe was born from Schisma, Athens: Ikaros, page 310.

[2] The historical Macedonia is an area distinct from the, recently, formed republic of "North Macedonia", laying outside the geographical area of the Slavic states (ex Yugoslavia), traditionally part of what is, culturally, called the Hellenic world.

[3] Knapton S. (2018), Europe was the birthplace of mankind, not Africa, scientists find , at https://www.telegraph.co.uk/science/2017/05/22/europe-birthplace-mankind-not-africa-scientists-find (last access on 07/12/2018)

[4] Herodotou, Histories, Book 94 'and Aristotle Meteorological, C 352

[5] The seismic zone on which the Greek culture, which gave the most polymorphic shape to this continent, combined with the "crowding" of the four climatic zones, while Germany, a triple country, is a virtually homogeneous climate zone. with a range of stimuli unparalleled and responsible for a similar variety and quality of cultural product within a linear linear time that is lost in the depths of prehistory.

perceived the intrinsic property of elements as perishable and ephemeral and, thus, focused their study on those that were eternal and incorruptible. The planets and stars was, in a wonderfully inexplicable way, understood that they changed with time, they were born, grew up and they, also, died, "disappeared," but the laws of *Nature* that move them, hold and include everything, such as centrifugal force, are timeless and unaltered. Man, the epicenter of the study of this ancient civilization, is, also, ephemeral. He is born, grows up, lives and dies. However, the need for survival, reproduction with a opposite gender, the need for belonging to a collectivity, forming a society, the need for freedom, man's own place in the chain of the biological circle of life, are constants over time.

In the laborious attempt to discover the truth, Hellenes chose to study the unchanging, the constant ones, which constitute a reality of universal order, the harmony of natural universe, a clear result of the *logic*[6] of the relationship between the elements of Nature. «Relationships», because everything is connected and co-existing. Nothing alone can contribute adequately to the quest for truth. Every individual reality is variable, perishable, mortal, but the way of its sharing in coexistence, the way of its logical relations with all other things, is in reality unchangeable, indestructible, immortal. Faithful is the phenomenon, *commonly*, certified, and the sole one is in-*credible*, for the opposing reason[7] . The relation-way of existence and coexistence of things is the eternal reason of universal harmony, it is indestructible, unchanging: it is the timeless truth. There exists the inner cause of the Greek city, the civil society, the «πολιτική κοινωνία». If we possess the timeless truth of the perishable things that surround us and share the knowledge that they all share in their existence-coexistence, then we reach the goal to create the feat of the *polis* (city), the political life, in a collectively cooperation in the universal function of things, overcoming the individual and thei individual self-tropism[8] . Everyone acts in common, for the reach of a sole, almost subconscious, target. In the same way that the bee (in an unconscious, total collectivity) performing its everyday work is an irreplaceable[9] link in the natural system chain, the ant in the ground, the eel in the rivers' delta, or the polar bear in the North Pole, all the living are experiencing their humble-irreplaceble life, following the insurmountable rules of the universe, "in the way everything is ruled"[10], from which the Greeks called *cosmos* the world, because of that order[11].

The Greek city was not a quantitative, or organizational, administrative differentiation of people's co-living way . It was the realization that human life only makes sense, through the objective search of the truth, and this is realized by living with sharing a common goal in the city; the universal goal of all material things. The city is born when a collectivity is more interested in the truth than in usefulness, when the congregation ceases to be a society of life where it is desirable to meet the various lower living needs and the transition to the society of truth takes place. It is the search for the way of existence, according to the harmony and cosmicity of logical relations[6], even with regard to survival, living and creating comforts or what we, today, call and experience as technological progress... What prevails is the desire for immortality, the Eros[12].

On the other side of this anthropological view of nature, man and life in the city, we meet after the fall of the Western Roman Empire and the dethronement of the last Latin bishop of

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[6] logic from logos, meaning in relation to: [Heraclitus: Of the speech of a lonely animal, many of them as their own having wisdom ... Xinhos, the common one (word) ... For the sake of seeing ye come in, 2, Diels-Kranz, vol. I, 151, 1-4)]

[7] The common phenomenon, this is faithful, and the only unthinkable being present for the opposing cause (Heraclitus, Diels-Kranz I, 148, 20)

[8] Aristotle defines as absurd "individualism", "private" existence (idiotis: ιδιώτης) a man absorbed by his personal needs and distant from the public; the West, borrowing this notion, wisely, called «idiot» a man who lacks intelligence

[9] Bees are essential to our food production because they pollinate the plants. Of the hundred species of crops, which produce 90% of the world's food, 71 are pollinated by bees. Bee's disappearance entails an imminent risk of the disappearance of life on Earth, Greenpeace website http://savethebees.gr (last access on 07/12/2018)

[10] Heraclitus, in Diels-Kranz, vol. I, pp. 148, 29)

[11] Pythagoras first called it the whole region of the world, from this order: Plutarch, Ethics 886B

[12] *Της αθανασίας ο έρως, το αθανασίας επιθυμείν,* Plato, Symposium 207a 1 and 3-4

old Rome[13], the new cultural life proposition, that of Western Europe. The hordes of barbarians from the east (Huns, Goths, Visigoths, Franks, Burgunds, Alamanians, Saxons, Freesians, Thuringians, Vandals) that arrived from the fourth to the sixth century, till the intersection of the Mediterranean and the Atlantic, catalyzing part of the Greco-Roman world, created what we, today, call Europe and mean the Western European Culture[14]. These new west, barbaric and primitive tribes, culturally distant, millennia of productive existence of civilization in the path of human recorded history, from the Greco-Roman West, which they had just conquered, became the dominant factor in the creation of the new order in the changing world. Consciously aware of their cultural inferiority, due to the obvious contrast, the new Europeans became eager to enter the civilized world with massive baptisms[15], considering Christianity to be the cultural "passport" from the world of savagery, to the Greco-Roman world of education and culture.

With the same rush to cover their cultural "nakedness", they hastened to participate in every other aspect of what was called Greco-Roman civilization. But the distance to be covered was huge. Just as the baptism of these populations was an act very different from the baptisms a few centuries ago in the Greco-Roman world, the perception of the institutions of polis (city), democracy, freedom, of the laws themselves was, also, perceived very differently, necessarily superficially. Simplification and impairment of deeper meanings have led to a simplistic, shallow and adapted version of the crushed civilization, in order to allow not a deeper understanding of texts such as Plato or Aristotle, but at least, the coexistence of these populations away from their recent jungle rules of life[16]. Simplifying and adapting the notions and institutions of the Greco-Roman world have led to what the West has always been and is, today, an authority. The creation and organization of collective institutions, which operate with the perfect implementation of reward-punishment rules for one single purpose: the shielding of the individual, his access to enrichment, power and pleasure. The successful operation of this system is based on the detailed codification of its rules, which act as an "infallible" doctrine and which rules are, essentially (in their essence), ultimately lacking empirical access and being an inactive part of the political system. The share is passive and is based on faithful adherence to the certain rules imposed by an "infallible" authority. In the version of Western Christianity (whichever this is: Catholicism, Protestantism, etc.) this role was taken over by the papal throne and the "infallibility" of the Pope[17].

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[13] Flavius Odovacer was the first non-Roman king, Italy, who overturned the last Western Roman emperor Romulo Augustus on September 4, 476 AD. His tenure is a milestone with regard to the end of the classical Western Roman empire and the beginning of the Middle Ages n Europe

[14] Le Goff J. (2006), Europe was born in the Middle Ages, Athens: City

[15] Remembers the voluntary Christianization of the Albanians who protruded the Greek-Albanian border after the fall of Enver-Hoja Communism in 1992 , who, in an attempt to overthrow the barbaric past of their regime, rushed to be baptized and received his Greek names

[16] The references to the level of culture of the Western European peoples of the time are typical: Indicatively, we mention the inhabitants of the British islands of 1st after Christ in which it is customary the man-food of the deceased father by the first-born son and the subsequent erotic encounter with the mother, public view! (Strabo Geography D 5.4) Georges Dudy describes how human mankind survives until the 11th century after Christ (in Adolescence de la Chretiente Occidentale 980-1140, Geneva: Skira editions, 1967). Until the end of the 8th c. c. (in 798 AD in Narbonne of Galatia, in the Mediterranean) is the punishment of theft with the death penalty, while the punishment of murder is punishable only by a fine! (Michel Rouche, Histoire de la vie privee, I: De l'Empire Romain a l'mil, Paris: Seuil publications, page 409) Cities, with the organizational, institutional form we know, where the concept of public interest exists and the social community, in the Trans-Roman West began to be established only in the 13th century after Christ (Le Goff J. (2006), Europe was born in the Middle Ages, Athens: City, page 135).

[17] Almost immediately upon the arrival of the young Europeans and the abolition of the West Roman Empire, from the 5th Century after Christ the first signs of papal infallibility were presented, combined, as was next, with the claims of the Pope as the highest ecclesiastical authority, until 18 July 1870, the Pope's "Infallibility" was introduced and imposed on the Vatican Synod.

Correspondingly, in the field of city administration, the political Constitution was created. The new Western Europeans will display a timeless admiration for the Greek city and democracy, but once again in their own, historically not adult and culturally immature, viewpoint. Caught up in the functional priorities and in the notion of efficiency as a sole goal, they interpreted the city as *civitas*, *societas*, not as a collectivity, a community (κοινωνία), but as a co-existence, a co-mpany created in order to achieve operational goals; something like a commercial business. The Western man, from his birth in the Trans-Roman West[18] , lives and coexists in the city seeking on a daily basis, the oxymoron of achieving and maximizing of the common citizens' objectives, which are the best defense of their individuals' rights.

Founder of this cultural proposal is saint Augustinus, a bishop of the fifth century, who will be used, four hundred years after his death, from Charlemagne's courtyard to support the entire Western cultural experience. It starts with religion and the individualized version of Christianity, with an unsuspected ignorance of the contrasting difference between the Church and religion, where the concept of faith is ignored as self-confidence, self-fulfillment, self-offering, response to a call, a relationship (Church= Ec-clesia [1]). For Augustine[19] -who did not speak Greek, the language of the Bible-, faith is the whole of individual (cognitive and psychological) beliefs, the correctness of which is imposed by the infallible authority of the Pope[16]. The whole Christianity of the West[20] in any of its "confessional" versions, it interprets the "original sin", the "personal salvation", the "eternal hell" with its formal legal way.

It is precisely on this basis that the modern Greek state will be reconstructed, almost immediately after its establishment, from 1833[21] on. The European Powers, unlike their Ottoman predecessors, exploited the diachronic features of the Greek genre[22], such as selfish ambition and continuous inner discords and have relatively easily enforced their own political-cultural model of government. The Bavarians have "built up" a Western state by, passively, copying (without any adaptation to local national, cultural, environmental or other different characteristic) their own state model, with few loans from their neighboring French, but also from the English model[23]. Army, public administration, judiciary, political system, education system, church, all were passive copying products! No concerns, no questions regarding the adaptation of loans to local, racial, religious, or other peculiarities. An anthropological arbitrariness with certain side-effects, the magnitude of which is today evident in how much the West and its institutions (Mandouvalou 2003) are considered to be the critical judge in every area of human life, from economy to work, to health, education, urban planning ...

Until then, until the establishment of the modern Greek state, the Greek cultural proposal was still alive. After the fall of Constantinople and during the Ottoman domination, the Greeks lived enslaved, but they were not altered culturally. In every occupation, as in the military where the strongest one is imposed, the same happens in cultural terms, despite the repetitive destructions of the Greek libraries[24], the unquestionable supremacy of the descending, cultural proposal of the Eastern Roman Empire was, still, alive. As was the case

[18] Le Goff J. (2006), Europe was born in the Middle Ages, Athens: City

[19] Augustine, Confessions, Athens: Patakis (2007)

[20] Unfortunately, to a great extent, Orthodox Christianity, today, too

[21] Disembarked the Bavarian Prince Othon in Nafplio on January 25, 1833

[22] The overall responsibility for enforcing or accepting the Western proposal of life is unknown if it is more or less the methodical expansive benefit of the West, or indeed , the Greeks had lost every cultural connection to their great past, after four hundred years of Ottoman domination, by accepting, self-sacrificing and passively, as embittered Ottoman citizens, the imitation. This is the subject of another dissertation, which has not yet been done.

[23]Dertillis, G., B. (2018), History of the Greek State, 1750-2001, University Publications of Crete

[24] It is estimated that, after the disasters of the Greek libraries only, 3-4% of the titles from the books that we knew there were, without counting, clearly and incalculably, a larger volume of books that we do not know do they have written. Tziropoulou-Efstathiou A. (2017), The Disasters of Greek Libraries, Athens: Pelasgos Publications)

with the Romans, when they conquered the Greeks, but they were "conquered" culturally[25], so did the much more barbarous Ottomans. The constant use of the Greek language as a sovereign cultural element, which, despite any superficial crises, not only did not cease to be used, but also functionally and inexorably implanted the emerging language of the arrived Asian nomads, is a strong sign of this. It is true that, immediately after the Conquest of Constantinople and the establishment of the Ottomans, the official language of the new Empire remained the Greek. Not the Turkish, the Arabic (whose alphabet they adopted), or some other. In the other sectors of everyday life, besides the percentage of Greeks, which have been intimidated and for survival reasons chose to be Islamized, most people have not changed their customs, their way of thinking and acting. But even the Islamized Greeks did not experience Islam existentially, but as a tactic move for mere survival. The new religion has been adapted to the local cultural example, inevitably. Living examples of this alienated Islam are the survival of Orthodox (!) Customs by modern Turkish citizens, religiously Muslims, of Asia Minor[26], potential descendants of Islamized Christian communities in Greece, who, with the exchange of populations, reached Turkey, or even natives, also Islamized Christians. The anthropological research of the cultural wealth of present-day Turkey has to show the survival of manifold and rare data[27], which refer to various older incomplete islamizationed ethnicities, much older than the Ottomans. It is a fact that the constant thirst of the enslaved people for freedom has never ceased: in practice[28] , or even in its conscience, it was constantly opposed to the occupation regime of the Ottoman Empire. Also managed to save a significant part of the system of self-managed communities[29], (where and when its tyrannical local chief allowed: vizier, pasha, aga) and the Church, despite the capitulation of her head to the conqueror, preserved the collective life of the people, keeping and performing, uninterruptedly, rituals, feasts, customs which saved the consistency, the Greek cultural awareness and the "continuity" of everyday lifestyle, without, though, preserving the continuation of a local political and governance model, loosing, thus, their own way of exercising power.

These remnants of the local way of life, which survived during the Ottoman domination, began to recede slowly, but increasingly, until their current methodical extinction, starting January 25, 1833[30], with the choice of the modern Greek people to exist as citizens[31], voluntary adopters of the Western model: they chose to imitate the model of the national state, of the coexistence based on the *convention* (Constitution) and not on the *relation-ship* (Church of the community, of the faith), on the priority of use and not on the achievement of

[25] Οράτιος: Graecia captaferum victorem cepit (η κυριευθείσα Ελλάς είχε κατακτήσει την νικήτρια Ρώμη)

[26] Indicatively: a) Hileladakis N. (2018) The Turks worship the Holy Mountain! (last access on 08/12/2018), b) Antoniadou M. (2018), Why the Muslims today celebrate St. George, The newspaper Step on the website (last access on 08/12/2018), c) Journal of Hestia, August 16, 2018, Muslims worship the Virgin, on the site http://www.estianews.gr/eidiseis-arthra/mousoulmanes-proskynoun-tin -panagia-stin-thraki (last access on 08/12/2018)

[27] The most ancient living form of the Greek language is today (!) In the Pontus of Asia Minor: British Independent magazine, Leading article: Not such a dead language on https://www.independent.co.uk/voices/editorials/leading-article-not-such-a-dead-language-2174681.html (last access on 08/12/2018)

[28] In the four hundred years of Ottoman rule, historically, there have been recorded sixteen, altogether, smaller or larger liberating revolutions, more than one revolution per generation of enslaved (2011), 16 revolutionary movements until the day of freedom, at https://www.antibaro.gr/article/3036 (last access on 08/12/2018))

[29] Athens: Tsoukatos publications (Polydronidis I. (2017), Greek Orthodox Communities in the Ottoman Empire (18th-19th-early 20th century)

[30] [Following the assassination of Kapodistrias, he met in Providence of Nafplio, E National Assembly and elected King Bavarian Prince Othon, who disembarked in Nafplion on January 25, 1833)

[31] Citizen=ypoikoos in greek, meaning “under the rule of”. With the establishment of the modern Greek State and the adoption of the European national state model, is a European, the inaccurate rendition in the Greek of the Western term “citizenship”, with the degrading (etymological) word of “ypoikootis”, defining the historically proud Greek people (*ούκ είθισται προσκυνείν τοις Έλλησοιν*)

the relationship[32]. The shape of the multinational cosmopolitan Eastern Roman Empire, where Hellenism constituted the universal way of life, the universal culture, was at its end. The new model of organized coexistence self-evidently identified with modernization and progress in post-Napoleonic Europe and was that of the *national state*. This model was applied to every aspect of the state system of the country, thus "building" a typical "western" state, which slowly and steadily, until the Second World War, increasing after and until the country's entry into the European Economic Community and, completely, from the entrance to the Economic Monetary Union today, eroded manners and customs, radically changed the way of thinking and acting, reaching today, in the full folk practice, identification with the contemporary habits of Globalization.

This anthropological change of the timeless Greek is more than just a change in the ethics and customs of a people, more than just adopting passive and voluntarily, an alien and inappropriate, unclear and arbitrary way of life. As noted above, the genesis of the Greek cultural model from antiquity and earlier, as long as archaeological excavation allows us and, above all, the minimal survival of the remains of the Greek libraries, yielded the inferior human instincts of individual survival and satisfaction, in the benefit of creating the city (*polis*), a rational society of needs. Hellenes do not mean man as a person, as a private individual, but only contemptuously[33] . The Greek concept of life was social centred. The Greek aimed at coexistence in order to achieve the feat of the *relations* and not the *usefulness* of things. " Το ζητείν απανταχού το χρήσιμον (The quest of what is useful)" states the primitivism of subordination to the necessities of the instincts, whereas the relations that constitute the "political life", presuppose free, "great-hearted" people[34] . Cohabitation as a guarantee of self-centeredness through contracts was inconceivable, and "society" as a company seeking interest ("societas") was barbarian.

This feat of life in such a city passed, organically, into the self-managed "community" and by the "church of the community (ancient Ecclesia Dimou)" found the continuation of its metaphysical axis in the "church of the faithful (Christian Ecclesia)" and was, thus, rescued during the Ottoman domination as a way of life, but without a central institutional body, that is, with no state representation. So when, after the revolution of 1821 and the liberation of a small part of Greece took place, the time for the re-establishment of a new Greek state, the institutional body for its state representation was, of course, sought out in the up-to-date organizational structure of the European *national state*.

It was, however, a form *unknown* to the Greek, who, ignorant of the Western way of thinking, did not know how to manage the New State's *convention* (Constitution), instead of the priority of the *relation* of things, the sharing in the feat of the city (community). The national state, an element of the French Revolution and Enlightenment, aimed at organizing collectivity based on the freedom of the individual (freedom of any personal choices), on the Equality of all individuals, in terms of their personal rights (ensuring, one to others) and to Brotherhood, through the common constitutional treaty. This scheme was, for the Western, a logical necessity of existence, a prerequisite for the renunciation of their barbaric medieval past. But for the Greeks there was no such need, they were unaware of it in their history, it was alien to their experiences. Already from the Hellenistic period to the Byzantine times and even in the Ottoman domination, Hellenism lived and flourished in a multi-ethnic and multi-racial coexistence of peoples. Their cohesive link was no contract, but the common way of life, the universal Greek culture.

The western nation-state scheme has destroyed this universality, by confining it in the narrow borders of the new European state. This was, also, the beginning of the end of the Greek cultural life proposition. Its ultimate alignment with modern globalized data is, today, the completion of this process: the end and the death of the Greek cultural model. This total, irreversible cultural alienation of the Greek is not, simply, a development in the national historical course of a people, who has changed habits. It is the death of one of the two most prevalent global cultural models; it is the overwhelming establishment of the remaining

[32] Giannaras Chr. (2018), Europe was born from Schism, Athens: Icarus.
[33] Similarly to footnote 6
[34] Aristotelian Politics, 1338b 2-4

opponent, as the only formatter and manager of the world. It is clearly a major historical turning point, that runs through and affects every human activity today, from economy and work to religion, culture, urban planning.

2. The illegal constructions

The illegal structures, considered from this point of view, taking into account the changes of the social-cultural and, more than any other people, for the Greeks, their linguistic[35] anthropology, may lead to a new interpretation which, together with its, up to date, visions, can lead to a holistic and global approach to the identity[36] of illegal buildings. Equally important and wider in one field of human scientific engagement, the study of anthropological history can cultivate respect and modesty, since, through the study, we realize that we are heirs of a long, respected and, for the most part, a noble anthropological heritage[37]. Thus, we can assume that today, more than ever, we have an obligation to reconsider the so-called illegal constructions, starting in 1922, teaching us the "secrets" of the irregular "folk architecture" of the spontaneous settlements of the refugees. Let's look deeper into why the informal national housing policy of the illegal constructions from the 1950s to the 1970s had such a significant positive effect on the economically damaged and socially divided post-world war and post-civil war Greek society .

Why have Western “diseases”, such as social segregation, ghettos, drugs, strictly located Western European cities with dwelling areas-“sleeping containers” and commercial areas-“night ghost zones”, not presented themselves in Greece? What were the hidden and unknown, until now, mechanisms, the endogenous and spontaneous ways of life of an ancient people, which produced a city rather than a ghetto? And why information, which in advance, almost prophetically, has, with so much simplicity and validity, shown the pathogenic failure of the Modern Movement, of Functionalism, is not the backbone of our national urban planning policy, but, instead, we remain unrepentant “retailers” of a foreign model of urban planning, historically millenniums younger than the familiar local one? The importance of adaptation and local data[38] is, only, recently perceived, and we, indifferently, continue to operate with the same cultural subordination of the “Kotzambasides” of the feudal Turkish occupation, consuming the products of the West without any assimilation. There is no

[35] The anthropologist's hypothesis Sapir-Whorf argues first that the structures of the languages affect the structures of civilizations and secondly that the different languages classify human experiences in a different way and thus demonstrate the difference in world perception (perception of things and environment) of each people. Especially the Greek language, a native language that fertilized the European language, shows an opposed difference of worldview from the languages, which they received and use the same words with, sometimes, a different meaning. See, Tziporopoulos-Efstathiou A. (2015), Archangelathos Glossas, Athens: Pelasgos Publications

[36] Linguistic anthropology is of particular importance for the study of the Greek people and together with the social-cultural (study of the way of life and thought of peoples, "culture", English culture) and archaeological anthropology (mainly historical archeology, n with written monuments) will be the main research tools of this thesis

[37] Erickson P & Murphy L. (2002), History of Anthropological Thought, Athens: Critique publications

[38] The importance of adaptation to local architectural and urban data was soon recognized in our country. It began with the Decree of 19.10.1978 (Government Gazette 594 / Δ / 1978) "On the designation as traditional settlements of the state and the definition of the terms and limitations of the construction of these plots" and reached, initially through Law 4014/2011, and, today, Law 4491/2017, replacing OPs. (Committee on Urban Architectural Control). (Architecture Councils). The interest lies at a time when the Greek state has chosen to take a controlling role in the production of space in culturally "sensitive" areas of the urban fabric, a point which coincides with the end of the age of innocence for arbitrariness (1974) their speculative course. That is, when the customary law and the "tradition" cease to dictate the way of the structure when the production of space "in society" ceases and the useful production of space for individual enrichment begins. At that time, the law contract would replace (unsuccessfully) the social control mechanisms of the building.

conversion, or adjustment to the domestic. There is no indication of whether and how the achievements of Western societies can respond to the needs of Greek, or other societies. The specificity of Greek needs, the different historical addictions, priorities, notions, conditions? All, subtly neglected. After four hundred years of absence from the cultural stage, Greeks have re-entered the political arena of Europe with the constitution of the modern Greek state, as if they had no history, no past...

But why did the West, finally, manage to impose its own cultural model? Was it, simply, the expected biological end of millennia of life of an older cultural model? Beyond the reasonable and logical historical end, there is something else. Something irresistible. The unrivaled anthropological factor of our capitalist society, with the increasing dynamics of satisfying the instinctive impulses of the globalized human-consumer: the unlimited supply of material goods and, without limitation, the enjoyment of individual rights of attitudes and power, all these are, certainly, more attractive, more easily accessible within the Western model of life. This is the West's *useful* cultural proposition, much more digestible and tempting. And it is logical, because life in the polis, life in a political society, in a city, presupposes the self-denial of the person and giving-in to the "collective". Understanding this noticeable difference in the concept of life, the possible reasons for preference of one cultural model over the other are obvious…

Thus, after the 1970s, the mutation of illegal constructions follows the cultural mutation of Hellenism. The wise, spontaneous creations of social space and city have, slowly and steadily, turned into pure speculation (Pagonis 2014) reaching today, at the time of globalization, their sophisticated version: the transition from universal popular micro-illegalities scattered in every corner inside and outside the city plan, to the selective macro- illegalities of an economic elite (Hatzimichalis 2015). As expected, with the prevalence of the Western cultural proposal, there is no limit to individual profit; there is no limit to obtaining personal benefits and material goods, at least on a theoretical level. Thus, the illegal constructions of the 1980s lost their human scale in an existential quest for quantity, escaped their logical adaptation with the neighboring, also illegal constructions and ceased to be built by co-work and co-consciousness with the people around them; they ceased to communicate with the city life, which highlights their anthropological inability to understand and manage the foreign function of "life in *convention*", building under the *convention* of the Building Regulation.

The modern Greek version of urban "planning" seems more like a poor adaptation, an improper enforcement to a people with incompatible cultural background. The decades that have passed since the first law of legalization of illegal constructions (L.720 / 1968) and even more so by the first General Building Regulation (G.O.K. 1955), show that the Greek, almost always, recourses to other ways of servicing his housing needs. The *detour* road (with *straight* considered to be the legitimate, functioning within the framework of the organization-operation of a modern western state) seems, over time, to be the preferred one... It recalls the innumerable cases of endeavoring to enforce colonial rules of life to the various indigenous tribes from the Western European conquerors, often with unexpected results of failure. In our neighboring North Africa (Morocco, Tunisia), for example, the natives, who were placed to live in homes of European architecture, built the openings on the walls to avoid excessive local light and sunlight, and for reasons of privacy, that have to do with local customs and ethics. Interestingly, the Europeans, who lived there (in their foreign climatic conditions of Africa), insisted on living in their own "inappropriate" European buildings, although the local home plan, with a courtyard, would offer more comfort, but it was culturally *strange*[39].

Taking into account the contrasting difference between Western and Greek life, it is obvious that the two models of culture share only nominal definitions and intentions on concepts such as freedom, city, and democracy. The starting point for the realization of the one is the *person* and the shielding of all his needs on a rational basis, strictly theoretical, detached from the empirical relation(ship), while the other proposes the coexistence, the experience of the society according to diachronic, universal rules (Giannaras 2015). In an exaggeration, for the sake of a more eloquent glimpse of the gap between the two cultural

[39] See E. T. Hall, The Hidden Dimension, Garden City N.Y .: Doubleday & amp; Co., 1966, 144, 151-152

models, we could compare the choice of Western-type *national state* by the freed modern Greek people, with the of imposing a formal habitation of northern Siberia on an native African of Equator. Even with the restoration of the right analogy in our special case, the incompatibility and failure of the venture is obvious.

In the micro scale of illegal constructions, but also less focused, at the level of the settlement, the anthropological mutation of the modern Greek was established by replacing the customary law and the "tradition" in the construction, with the rigid General Building Regulation, so with legal force. This transition was crucial. Tradition, also, has the power of a "law", but it is established through collective consent, not through a written contract. Respect for tradition ensures collective control, and this is because there is a common understanding of life. Without the regulating factor of tradition, institutionalization starts to take effect (Philippidis 2010). The loss of the common system of values leads to the disappearance of the spirit of cooperation that makes people respect the rights of their neighbors and, ultimately, the whole settlement. Changing the way of thinking has changed the way of planning and led to the lack of cooperation and the resorted to the legal contract, the *convention* of the building regulation. Exactly then, at that very moment of change of culture, the hidden inexplicable ability to produce "illegal" folk architecture was lost; architecture which protected the illegal expansions of the planned centers of modern Greek cities from the Western "diseases" of the Modern Movement. At that time, the Greek city died and took on the characteristics of a contemporary Western one.

The key question is always why? What was that endogenous element of the Greek people that created *the* city, the polis, not only in the classical era, but before and after WWII and what was the root cause of the alienation-degeneration of the informal houses of the epoch of over-consumption of the last thirty years? Which were the hidden components of the habits, the customs, the tradition survived through millennia? Perhaps the fact that those "wise" illegal houses were made by the lower classes, socially and educationally, not by some economic or spiritual elite, is a clue. Perhaps the fact that the completion of, only, the first two or three classes of elementary school was considered sufficient for taking up work and contributing to the harsh rural life of those years was what saved and preserved the tradition in the habits of the economic immigrants-builders of the modern Greek urban centers of the last century.

It was there that Pikionis[40] recognized "great art" when he considered raw naturalness as the main asset of spontaneous folk art. Defining the truth of construction in folk architecture as the "mother of harmony", exorcized the "fakeness of the civilized" West and warned that transient fashions from abroad led to individualism, to a cultural model, foreign and improper to the Greek. During this transitional period (the era of the Modern Movement and beyond), other spiritual people of the time will show the danger of the upcoming de-hellenization in the country's cultural production mechanism. Aris Constantinides views were largely following the same path as Pikionis'. With almost abhorrence to the modern (western) city, he considered nature and man as two, inseparably linked, elements and sought the "lost virginity" in traditional architecture. Far from European intellectual organizational patterns and rational regulatory methods, he sought the "tools" with which "the people build" into morals, customs, religion, society and landscape and climate. In his book The Old Athenian Houses (1950), he visibly stigmatized the "scenography" of the listed neoclassical buildings, contrasting the "real architectures of the old folk Athenian craftsman", the houses of which characterize the plan of a typical residence from antiquity until the Turkish domination. The architect-archaeologist Anastasios Orlandos (1887-1979), a prominent scholar of Greek architecture, from antiquity up to the time of the so-called *traditional architecture*, will identify in folk art the potential of creating "modern Greek art", condemning as a negative factor the destructive introduction of "innovative culture" from the west. The important folklorist, scholar of traditional architecture, George Megas (1893-1976), completes as a cause of disintegration of Greek art, the "mania of innovation", which "broke a lot of the natural and uncompromising

[40] Pikionis D. (1925), Our Folk Art and We, Philiki Company magazine 4, pages 145-158

development of our folk building"[41] . Also, the book Sarakatsanoi, by Hatzimichalis A. in 1957 for the drafts and primitive huts of the nomadic shepherd, was considered by many scholars as the purest survival of antiquity…

It is true that there has been resistance from part of the spiritual world to the upcoming subordinate, anthropological mutation. However, the new official heir and manager of the rich Greek cultural heritage was Hesperia (the West), not the (in the eyes of the New Europeans) post-Ottoman, "barbarized" and confined to narrow limits of the national state, Greece. The architecture of the new Greek state was not Greek, it was not classical, it was *neoclassical*, meaning, the reading and rendering of "Greekness" through the eyes of the West; the interpretation of the cultural example of the classical world, which, as we have seen above, was perceived in a highly defective way, and, above all, far from the way of the Greeks. The Greek tradition was removed from the Greeks themselves. Even the systematic research of the traditional architecture of the Cyclades of Contantine Papas - a Greek architect abroad - a rare and pioneering work, was ignored within the borders of Greece, never translated into Greek and although it is a project that for the first time involved the domestic traditional architecture in correlation with the works of modern architecture and their synthetic principles, it was, totally, ignored, thus giving the role of interconnection of Greek traditional architecture with the international trends and currents to foreigners[42]. In the same spirit of correlation between Greek traditional architecture and the West, Le Corbusier's book, Texts for Greece[43], preceded by a visit to the Cycladic islands with white abstract architecture, led to discovering ..."modern" white minimalism.

Reaching today and with the same ignorance of that deeper nature of the identity of the illegal constructions of the last fifty years and earlier, we are, for the first time, moving determined towards their slow extermination. The sanction in the Greek Parliament of a sequence of five consecutive laws regarding illegal constructions in the period 2009-2017, has also rekindled the national dialogue. The interest of the state is historically unprecedented and is the first time that the scope of the relevant legislation is universal, as it extends to the whole[44] of the country's real estate. But the intensity and quality of the measures, which are ultimately obligatory, lead in the opposite direction from that which the "spoiled" modern Greek people have been addicted to. For the first time, the measures adopted do not lead to horizontal legalization, i.e. to the definitive exclusion from demolition of all immovable property and for all owners. This is because the recent laws, combined with the imposed fiscal policy and the immense change in tax treatment of real estate, seem to allow, in the long run, only to a limited economic elite to maintain the profits from years of real estate investments.

The untouched, since the 1950s, real-estate and construction system in Greece, after the 23.04.2010[45] is, radically, changing for the first time, conveying space and society. The unofficial co-operation of the state with popular desire was a fact that no one dared touch. This violent, institutional revolution has consequences already visible: new constructions are limited[46] and is taken away from the hands of the small and middle class. The status of a vast sea of small properties, which made possible the formation of the modern Greek city, is dying. Historic record of 86% growth in the five-year period 2013-2016, but also as absolute

[41] Megas G. (1942), Objectives and Methods for the Research of Folk Building, Planning-Urban Planning-Architecture 8, pages 41-44

[42] (Philippidis D. (2010), Anonymous Architecture in Greece, or Greek Rapport, Athens: Melissa Publications, p. 209)

[43] Le Corbijée, Texts for Greece

[44] Article 52, Law 4449/2017 on Electronic Identity of Buildings.

[45] Announcement of Prime Minister G. Papandreou entering the country under economic surveillance, Megisti island

[46] Elements of the Hellenic Statistical Authority (ELSTAT) in May 2016: the size of the total building activity (Public-Private) in the whole country, measured by on the basis of the issued building permits, amounted to 849 building permits, corresponding to 140.200 m2 of surface area and 634.300 m3 of volume. It represented a 31.5% decrease in the number of building permits, by 38.5% on the surface and by 38.9% on the volume, as compared to the corresponding month of 2015

figure in the year 2017, reaching 130,000, heritage disclaimers because of ENFIA[47] tax and related charges, indicate a change in the treatment of the property as an asset, which reverses its course. The above data, combined with the number of voluntary releases of building permits for demolition of illegal buildings, indicate their certain future extinction. With instruments the methodical law enforcement[48] in post-crisis Greece, we are moving – as the statistical data[49] show - towards a real estate restriction of legal, and illegal buildings, in the hands of a small economic elite, adapting to the current globalized prescripts, in a way that makes only the illegal macro-constructions, universally, accepted and consumable.

Thus, illegal constructions of the small and middle class, will, at some point, cease[50] to exist. But the question remains: why? Why did the Greek cultural example disappear and the Greek city from political community turned into collective individuality? What was that survived element, which emerged from the unskilled hands of popular craftsmen and builders of illegal houses and created a *polis*, rather than a sheer settlement of people? Why have we forgotten to design a social space and, instead, have produced numerous and lucrative cohabitations? A question that does not answer, only, about the nature of illegal structures, but it may review the whole national way of urban planning theory and practice. If this crucial question is not answered, then the unprecedented recent rise in living and health standards, unhindered access to amenities and facilities in our country, will be proven unbalanced and useless achievements, without the corresponding cultural connotation...

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[49] Elements of the Hellenic Statistical Authority (ELSTAT) in May 2016: the size of the total building activity (Public-Private) in the whole country, measured on the basis of building permits issued, amounted to 849 building permits, corresponding to 140.200 m2 of surface area and 634,300 μm of tumor. Thus, a 31.5% decrease in the number of building permits, by 38.5% on the surface and by 38.9% in volume compared to the corresponding month of 2015

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ESTIMATION OF REGION'S INTELLECTUAL CAPITAL BASED ON THE SYSTEM OF INDICATORS: CASE OF THE RUSSIAN FEDERATION

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Abstract
The paper presents an analytical review of modern sources on the issues of determining, classifying and evaluating a region's intellectual capital. The study identified the most common approaches to intellectual capital assessment, which need to be adjusted taking into account the specificity of the statistical reporting of the Russian Federation, and also because of the need for detailing certain types of intellectual capital. The authors proposed their own approach to assessing a region's intellectual capital using a system of indicators based on the calculation of the integral indicator tested on the example of the Russian Federation's regions. The authors have compiled a map of the intensity of the intellectual capital of the Russian Federation's regions, which is the basis for their comparison by the magnitude of the studied indicator, as well as benchmarking of the key areas of its development for outsider regions.

Keywords: intellectual capital, region, development, competitiveness, knowledge, knowledge economy
JEL classification: R19

1. Introduction

The relevance of the study of intellectual capital issues is due to the significant role of intangible factors in the modern conditions of the knowledge economy to achieve competitive advantages of the territories. The economic effect of the meso-level systems is increasingly determined by the level of generation, transfer and use of knowledge within the boundaries of their territorial location.

The goal of the country's scientific and technological development in the Strategy for the Scientific and Technological Development of the Russian Federation is to ensure the independence and competitiveness of the country through the creation of an effective system for building up and using to the fullest extent possible of the nation's intellectual potential.

Among the fundamental principles of state science and technology policy, the Strategy highlights the concentration of resources: the concentration of intellectual, financial, organizational and infrastructure resources to support research and development, the creation of products and services.

Exactly the concentration of intellectual potential as one of the most significant resources within the boundaries of a particular territory provides it the additional competitive advantages that necessary to respond to the great challenges facing the country (Lepskiy, 2018).

2. Literature Review

The review of the literature is below. It is the basis of highlighting the specific factors characterizing the high role of intellectual capital in regional development.

1. Intellectual capital is the most important resource of innovative socio-economic development, creating a competitive advantage of the territory, is a guarantor of its sustainable development, and is an indicator of its effectiveness.

Drucker (1992), Chen and Dahlman (2006), Liu Chao et al. (2015), Bronisz et al. (2012), Rusu-Tanas (2015), Ilič et al. (2016) define knowledge is as a key resource of the innovation economy, and the intellectual capital as a tool for transition to a new post-industrial society.

Kozak (2013) identified the specific and unique intangible resources among the key growth factors of countries and regions in the context of progressive globalization and liberalization processes.

An analysis of countries with advanced innovative development, such as Singapore, Taiwan, South Korea, Finland, Sweden, and others, demonstrates competitive growth opportunities due to intangible sources: the lack of physical, material capital compensate by a high level of intellectual resources in these countries (Teslenko, et al., 2014).

Many authors (Chub & Makarov, 2015; Kozak, 2013; Bronisz et al., 2012; Rusu-Tanas, 2015; Maltseva, 2018a) consider a well-developed regional intellectual capital management policy as the tool to preserve the sustainable development of territories and to reduce the negative effects of globalization.

The high role of intellectual capital in the formation of regions' "smart" specialization, leading to innovative growth, was shown in the work of Wiedenhofer et al. (2017). The author's points out that the concentration of intellectual capital in itself contributes to the development of entrepreneurial activity in knowledge-intensive industries within the territory, which can be interpreted as an additional development effect generated by the region's intellectual capital.

2. *Separate elements of intellectual capital are the basis of the knowledge economy and settle into fundamentally new qualities under its conditions.*

The basic criteria for the knowledge economy, highlighted by Drucker (1992), are elements of intellectual capital: educated and qualified personnel (human capital); economic incentives and institutional regimes; knowledge generating structures (research, consulting companies, and universities); modern information infrastructure (structural capital).

Intangible factors that ensure the transformation of regional socio-economic systems into integrated structures of fundamentally new quality - clusters, innovation networks are important sources of industrial and service industries growth in the region, as noted by Pachura (2010), Friedel (2007), Rusu-Tanas (2015).

3. *Intellectual capital is aimed at transforming the strategic priorities of the region into a social-oriented plane and formed under the condition of a territory's developed social infrastructure.*

Alexandrov & Fedorova (2017) consider territories' sustainable development under the influence of intellectual capital in a slightly different focus. The main targets for regional development are not the growth of budget revenues, corporations or gross regional product, as much as the increase in the people's life quality, which is determined by a number of factors, where indicators of education, health, culture, etc. are taken into account along with income. They contribute to the reproduction of the intellectual capital itself and determine the effectiveness of its use within the boundaries of the territory.

Teslenko, et al. (2014) based on European experience states that in the new global community the main factor for development is not quantitative factor (size of territories, population, etc.), but a qualitative factor (education of the population, state of science, creativity, innovative approach, social unity).

Similarly, Makarov (2011) points to a change in the type and meaning of a region's development, its socially oriented vector, which focuses on expanding human capabilities, not only as an increase in the country's material well-being.

4. *The role of intangible components in the formation of the products value at the micro level determines the importance of intellectual capital for indicators characterizing the total regional product*

Edvinsson (2002) was one of the first who investigated and proved in his works the role of intangible assets in the value's creation. Kozak (2013) considered knowledge as the main resource for value creation both at the corporate and regional level.

Serdyukova (2013) cites statistical data that demonstrate a steady increase in the share of intangible assets while simultaneously reducing the share of tangible assets that confirms the growing intellectualization of production.

Makarov (2011), defining the role of intellectual capital in the region, considers the formation of the products value at the micro level: an increasing proportion of the products value is made up of its intangible components - this or that knowledge, to obtain which the significant resources is needed and which gives value to products. The increasing importance of intellectual resources in the development of individual organizations leads to a corresponding increase in their importance in the region's development. As a result, the role of regional systems for generating, sharing and using knowledge is increasing (Makarov, 2015).

5. *Special properties of intellectual capital as a competitive resource of a territory (unlimited, renewable, self-growing, synergistic effect) create conditions for its most efficient use at the meso-level*

Serdyukova (2013) gave the essential features of intellectual capital, which determine its high significance for the development of territories: it belongs to complex forms of capital that has great potential for socio-economic activity leading to an increase in the competitiveness of countries and regions.

Efremenko (2010) considering the advantages of intellectual capital for the development of territories notes that it is the only factor of production, the growth of which has an unlimited resource, both in qualitative and quantitative parameters, and in time parameters. This has a particular importance at the present stage, when, due to the limited material capital, competition for it is increasing between the territories.

Stanishevskaya and Imaikin (2010) especially noted the long-term, synergistic nature of intellectual capital, characterized by a "delayed" effect of returns, which has a particular importance for the modern development of the country's economy.

Rusu-Tanas (2015) writes about the synergy resulting from the interaction between elements of intellectual capital within the borders of a particular territory.

3. Methodology

For the study purpose, we made an analysis of the terminological approaches to the definition of "region's intellectual capital", because of which the following definition of the concept was proposed.

The region's intellectual capital is a set of intangible resources, which are carried by separate regional socio-economic systems, structures and individuals, having, together with physical capital, direct or indirect influence on the achievement of current and future results by the region's socio-economic system as a whole (Maltseva, 2018b).

For the empirical substantiation of intellectual capital role for the current and future development of regions, an important task is its assessment, the issues of which are widely represented in the literature.

In the most sources, the evaluation of a region's intellectual capital is carried out based on a system of indicators allocated in accordance with the structural elements of a region's intellectual capital. They are the basis for calculating the integral indicator of a region's intellectual capital, which makes it possible to give its generalized assessment and to rank the regions according to the level of available intellectual capital.

The main difficulty in evaluating intellectual capital is in the fact that it represents an intangible resource, which cannot always be estimated by formal indicators. Certain indicators characterize it not directly, but indirectly, according to the result of its influence on a particular regional subsystem, while for the purity of the experiment, only those characteristics that show the presence of one or another type of regional intellectual capital are needed.

Due to the peculiarities of intellectual capital, there is a certain problem in establishing the correspondence between the system of traditional statistical indicators and key types of intellectual capital.

Thus, due to objective difficulties the assessment of a region's intellectual capital in the most cases has a framework approximate nature, while it remains very significant for managing intellectual capital at the level of an individual region.

As part of the study, we made an analysis of methodological approaches to the selection of indicators of a region's intellectual capital, which demonstrates the presence of very different points of view on solving the problem.

In some cases, classical classifications of intellectual capital types were chosen as the basis for structuring indicators (Bontis, 2004; Liu Chao et al., 2015; Lisichenok, 2004), including the detalization of individual components (Makarov, 2011; Monakhov, et al., 2016; Maltseva et al, 2018), in others cases a non-structured list of them is offered (Bronisz et al., 2012) or self-composed integrated groups is offered (Ivanova, 2013). The first approach seems to be the most expedient, since it is most capable of identifying various types of intellectual capital and determining its deficiency in various areas.

The methodology for structuring indicators, presented by Chub and Makarov (2015), it is necessary to highlight separately. In this methodology in addition to identifying the types of intellectual capital, the essential role of the estimated indicators is determined in accordance with three groups: investments, assets and effects.

Most authors (Ivanova, 2013; Liu Chao et al., 2015; Yeh-Yun Lin and Edvinsson, 2008; Bontis, 2004; Bronisz et al. (2012); Lubacha-Sember, 2016) estimate the intellectual indicator using integral indicator, for the calculation of which there are standard methods (Klyushnikova and Shitova, 2016):

1) Method by the sum of indicators (linear model).
2) Method by the sum of weighted average arithmetic group indicators.
3) Method by the product of weighted average geometric group indicators.
4) Distance method.

Yeh-Yun Lin and Edvinsson (2008) propose the calculation of the integral indicator of intellectual capital and its individual components as the sum of normalized values. Bontis (2004) used a similar approach from the standpoint of the methodology.

Lubacha-Sember (2016) used the Alpha-Cronbach coefficient as an indicator of compliance of indexes with the intellectual capital indicators.

In some cases, the authors move away from the integrated assessment of a region's intellectual capital and apply the rankings of individual indicators included in the assessment systems, and on the basis of their generalization, draw conclusions about the state of the indicator in general, as was done by Yeh-Yun Lin and Edvinsson (2008) in addition to the basic analysis.

Pöyhönen and Smedlund (2004) assessed the intellectual capital is based on interview results.

Thus, to assess a region's intellectual capital, various methodological techniques can be used, which involve the transformation of basic indicators to ensure comparability of results (rationing, standardization, maximin method) and the calculation of the integral indicator, for which average indicators are using (arithmetic or geometric), taking into account the specific weights (if available).

4. Results

For the purposes of statistical estimation of intellectual capital, it is proposed in this paper to use a system of indicators constructed in accordance with the structural classification of intellectual capital defined above and allowing the most accurate determination of available intellectual capital.

Data from the collected books of Federal Service of State Statistics, the collected book "The rating of innovative development of the Russian Federation's subjects" by the Higher School of Economics (HSE) (2017), and a number of ratings of the Russian Federation's subjects compiled by the Center for Regional Policy Development (CRPD) (2017), Association of Russia's Innovative Regions (ARIR) (2018), Rating Agency RIA RATING (RIA) (2016, 2017), Rating Agency RAEX (Expert RA) (2017) were selected as indicators

for this study. The period under investigation is 2014 and 2015. The used indicators are given in Table. 1.

The author's approach to the formation of the indicators system for assessing a region's intellectual capital is below (Table 1).

Table 1. Indicators of region's intellectual capital

Type of intellectual capital		Indicators	Source
		Human capital	
Knowledge capital	H1	Percent of employed population with higher education	Federal Service of State Statistics
	H2	Number of students studying under the bachelor's, specialist's, magistracy programs for 10 000 population, people	
	H3	Number of teaching staff engaged in educational activities in accordance with higher education programs per 1000 population, people	
	H4	Number of personnel engaged in R&D per 10,000 population, people	
	H5	Number of researchers with academic degrees per 1000 population, people	
	H6	Graduation from the postgraduate program per 10 000 population, people	
	H7	Graduation from the doctoral program for 10 000 population, people	
Capital of competences	H8	Number of employees who received additional vocational education from the number of workers on payroll of the relevant categories of personnel and age, %	
	H9	Number of employees who have undergone vocational training in basic professional education programs from the number of workers on payroll, in%	Federal Service of State Statistics
	H10	Number of employees who received professional education in basic professional educational programs from the number of workers on payroll, %	
	H11	Graduation of skilled workers and employees per 10 000 population, people	
	H12	Graduation of mid-level specialists for 10,000 population, people	
	H13	Share of employed in high-tech and mid-tech branches of industrial production in the total number of employed in the region's economy	HSE
	H14	Share of employed in knowledge-intensive sectors of the service sector in the total number of employed in the region's economy	
	H15	Use of special software in organizations per 100 organizations, units	Federal Service of State Statistics
	H16	Use of electronic document management in organizations per 100 organizations, units	
	H17	Used advanced production technologies per 100 organizations, units	
	H18	Share of organizations that carried out technological innovations in the total number of organizations (organizations of industrial production)	
	H19	Share of organizations that carried out non-technological (marketing and / or organizational) innovations, in the total number of organizations (organizations of industrial production)	HSE
	H20	Number of employees who received training in the form of short-term courses, professional trainings, mentoring from the number of workers on payroll, %	Federal Service of State Statistics
Capital of professional experience	H21	Number of articles published in peer-reviewed journals, indexed in Russian Science Citation Index, per 10 researchers, units	HSE
Capital of professional and personal reputation	H22	Rating of governors, point	CRPD
Health Capital	H23	Morbidity per 1000 population, people	Federal

			Service of State Statistics
		Reputational capital	
Image capital	R1	Rating of the Russian Federation's subjects by the value of the Russian regional innovation index, index	HSE
	R2	Rating of innovation regions of Russia, index	ARIR
	R3	Rating of the socio-economic situation of the Russian Federation's subjects, index	RIA
	R4	Rating of Russian regions for life's quality, index	
	R5	Investment climate of regions, index	Expert RA
	R6	Balance of migration growth of persons with higher professional education, persons	Federal Service of State Statistics
	R7	Balance of migration growth of doctors of science; candidates of sciences, persons	
Customer capital	R8	Share of organizations that participated in joint projects for the implementation of R&D, in the total number of organizations (organizations of industrial production)	HSE
Brand capital	R9	Share of exports in the total volume of shipped products *	
	R10	Share of exports of technologies and services of a technical nature in total exports *	Federal Service of State Statistics
	R11	Turnover of retail trade per capita, rubles	
	R12	Turnover of wholesale trade in the total volume of shipped products *	
	R13	Share of innovative goods, works, services in the total volume of shipped goods, performed works and services (organizations of industrial production)	
	R14	Share of newly introduced or subjected to significant technological changes of innovative goods, works, services, new to the market, in the total volume of shipped goods, performed works and services (organizations of industrial production)	HSE
		Infrastructure capital	
Capital of regional environment	I1	Number of spectators of theaters and number of visits to museums per 1000 population, people	Federal Service of State Statistics
	I2	Rating of the Russian Federation's subjects by the value of the index "Socio-economic conditions of innovative activity", index	HSE
	I3	The labor market index in the regions of the Russian Federation, index	RIA
Capital of regional management system	I4	Rating of the Russian Federation's subjects by the value of the index "Quality of innovation policy", index	
	I5	The presence of a strategy (concept) of innovative development (innovation strategy) and / or a profile section on innovation development (innovation support) in the development strategy of the region, the presence / absence	
	I6	The presence of the designated zones (territories) of priority development of innovation activity in the scheme of territorial planning, as well as in the materials for its justification, the presence / absence	
	I7	The presence of a specialized legislative act that defines the basic principles, directions and measures of state support for innovation activities in the region, the presence / absence	HSE
	I8	The presence of a specialized program or a set of measures of state support for the development of innovations, innovation activities or subjects of innovation activity, the presence / absence	
	I9	The presence of specialized coordination (advisory) bodies on innovation policy (support of innovation) affiliated to the highest official or the highest executive body of state power of the Russian Federation's subject, the presence / absence	
	I10	The presence of specialized regional development institutions (funds, agencies, development corporations, etc.) with the functional to support of innovation subjects and / or the	

		implementation of innovative projects, the presence / absence	
	I11	Managerial risk (rating), point	Expert RA
Capital of regional infrastructure	I12	Supply of general education organizations	
	I13	Supply of professional educational organizations, which training qualified workers	
	I14	Supply of professional educational organizations, which training mid-level specialists	
	I15	Supply of organizations, which training postgraduate students	
	I16	Supply of organizations which training doctoral students	
	I17	Population per hospital bed, persons	
	I18	The capacity of out-patient polyclinic organizations per 10 000 people, visits per shift	
	I19	Number of sports facilities per 10000 population, units	Federal Service of State Statistics
	I20	Library fund per 1000 population, units	
	I21	Population coverage by TV and radio broadcasting, %	
	I22	The share of trapped and detoxified air pollutants in the total number of waste pollutants from stationary sources	
	I23	Number of active fixed and mobile broadband Internet subscribers per 100 population	
	I24	Number of active fixed and mobile broadband Internet subscribers per 100 population	
	I25	Intensity of use of information and communication technologies in organizations,%	
	I26	Intensity of use of information and communication technologies in organizations,%	
	I27	Percentage of organizations that has a website	
		Innovative capital	
Capital of Intellectual Property	IP1	Number of issued patents per 1000 population, units	Federal Service of State Statistics
	IP2	The share of organizations that has ready technological innovations, developed by own strength, in the total number of organizations (organizations of industrial production)	HSE
Capital of ideas and projects	IP3	Number of patent applications per 1000 population, units	Federal Service of State Statistics
	IP4	Rating of the Russian Federation's subjects by the value of the index "Scientific and Technical Potential", index	HSE
	IP5	Rating of the Russian Federation's subjects by the value of the index "innovation activity", index	

Source: Authors' calculations

For each group of indicators that characterize the group of intellectual capital, the coefficient of internal consistency of Cronbach's alpha was calculated separately for each year, the threshold value of which is set equal to 0.7.

The obtained values that were above the threshold value are either very close to it (0.680), which allows us to speak about the internal consistency of the indexes of each type of intellectual capital and the appropriateness of studying the selected groups.

All indicators, except indicator ones, were investigated for deviation from the normal distribution. Indicators with a distribution different from normal were normalized according to the formula:

$$\tilde{x} = \sqrt[a]{x},$$

x - the initial value of the indicator, $\tilde{x}$ is the normalized value of the indicator, a is the degree of transformation (determined experimentally from 2 to 4 in such a way that the coefficient of asymmetry is less than 0.5).

The coefficients of variation were calculated for normalized data.

The highest variation is noted for the number of people graduated from the doctoral program, as well as organizations that carried out their training; share of people employed in high-tech and mid-tech branches of industrial; people in knowledge-intensive service industries; share of organizations engaged in technological and non-technological innovations, as well as having ready-made technological innovations developed using company's own resources; the share of innovative goods, works, services in the total volume of shipped goods, performed works, services, including newly introduced or subjected to significant technological changes.

These indicators has significant values in highly developed regions and very low values in the Russian Federation's regions with insufficient scientific and innovative potential.

It is obvious that a high variation is typical for indicators representing regional indices and ratings.

All initial values were normalized for reduction to a single scale:

$$x' = \frac{\tilde{x} - \tilde{x}_{min}}{\tilde{x}_{max} - \tilde{x}_{min}},$$

where $\tilde{x}$ is the normalized value of the indicator, $\tilde{x}_{min}$ is the minimum value of the indicator, $\tilde{x}_{max}$ is the maximum value of the indicator. Indicators H23 ("Morbidity per 1000 population") and I11 ("Management risk (rating)") after the normalization were inverted as $1 - x'$, because they negatively affect the final result.

For the four components of intellectual capital, subindexes were calculated using the distance method:

$$I_K = \sqrt{\sum (1 - x'_i)^2}$$

For the distance method, the smallest value of the index is characterizes the greater significance.

The final index of the regions' intellectual capital is in the Table 2, and it was obtained by the product of the components:

$$I = I_{HC} \cdot I_{RC} \cdot I_{IF} \cdot I_{IP},$$

where I_{HC} is the index of human capital, I_{RC} is the index of reputational capital, I_{IF} is the index of financial capital, and I_{IP} is the index of capital of intellectual property.

Table 2. Index of regions' intellectual capital (top-20).

Region	2014		2015	
	score	rank	score	rank
Moscow	6,167	2	4,300	1
Republic of Tatarstan	6,792	3	5,950	2
Saint Petersburg	4,934	1	6,455	3
Tomsk region	13,091	4	11,680	4
Republic of Bashkortostan	15,260	7	13,461	5
Nizhny Novgorod region	14,160	5	13,742	6
Voronezh region	17,452	11	13,947	7
Kaluga region	16,728	9	14,195	8
Sverdlovsk region	14,701	6	14,792	9
Novosibirsk region	17,185	10	14,997	10
Chuvash Republic	18,036	13	15,684	11
Khabarovsk region	16,070	8	16,155	12
Krasnoyarsk region	19,435	17	17,128	13
Lipetsk region	18,937	15	17,368	14
Yaroslavl region	17,673	12	17,504	15
Chelyabinsk region	19,445	18	18,244	16
Republic of Mordovia	20,139	19	18,262	17
Perm region	19,197	16	18,664	18

Region	2014		2015	
	score	rank	score	rank
Rostov region	21,167	21	18,893	19
Moscow region	20,644	20	19,282	20

Source: Authors' calculations

The presented data show the leading positions of the Moscow, St. Petersburg, Republics of Tatarstan and Bashkortostan, Tomsk and Nizhny Novgorod regions on the integral value of intellectual capital. Fluctuations in the values over periods are evident. It is worth noting the gap between the values of the integrated indicators of the top-10 regions: the first three regions has very low scores (this corresponds to the ranking rule) (Figure 1).

Figure 1. Regional intellectual capital intensity

Source: Authors' calculations

The presented assessment of the regions allows us to see the place of each of them in the rating and to evaluate the competitive advantages of the subjects having higher positions for the purpose of benchmarking. At the same time, the strengths and weaknesses themselves can be studied in terms of specific types of intellectual capital and indicators that characterize them, which provides a detailed analysis.

5. Conclusion

An effective regional intellectual capital management policy can be an effective tool for achieving high rates of economic growth, competitiveness and sustainability. All this is due to the high role of the knowledge component in the sectors of the economy and the social sphere at the present stage.

The results of the study are the basis for further study of a region's intellectual capital, in particular its impact on the effectiveness of socio-economic development, sustainability, as well as identifying the role of universities and other structures that generate it, on the level of its concentration within the boundaries of their location.

Acknowledgements

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GUIDELINES

for the Writers & a format model for the articles submitted to be reviewed & published in the journal

Regional Science Inquiry Journal

(EconLit, Scopus, RSA I) – www.rsijournal.eu

Guidelines for the Writers & a format model for the articles submitted to be reviewed & published in the journal

The Title of the paper must be centered, and the font must be Times New Roman, size 12, in Uppercase, in Bold

For the writers' personal information use the Times New Roman font, size 11, in bold, and centered. Use lowercase for the first name and uppercase for the last name. The line below the name includes the professional title and workplace; use the Times New Roman font, size 10, centered. In the third line write only the contact e-mail address in Times New Roman 10, centered.

Name LAST NAME
Professional Title, Workplace
E-mail Address

Name LAST NAME
Professional Title, Workplace
E-mail Address

Abstract

The abstract consists of a single paragraph, no longer than 250 words. The font must be Times New Roman, size 11. The text must be justified. The title "Abstract" must be aligned left, in Times New Roman, size 11, in bold. A space of one line must be left between the title and the text of the abstract. The abstract must contain sufficient information, be factual, and include the basic data of the paper.

Keywords: Use 3 to 5 keywords, separated by commas

JEL classification: We kindly request that you classify your paper according to the JEL system, which is used to classify articles, dissertations, books, book reviews, and a variety of other applications. The use of the JEL classification is necessary so that your paper be properly indexed in databases such as EconLit. Select the codes that represent your article and separate them by commas. You can find information on the JEL system here: https://www.aeaweb.org/jel/guide/jel.php

1. Introduction

All articles must begin with an introduction, a section which demarcates the theoretical background and the goals of the paper.

The present document provides the necessary information and formatting guidelines for you to write your article. We recommend that you copy this file to your computer and insert your own text in it, keeping the format that has already been set. All the different parts of the article (title, main text, headers, titles, etc.) have already been set, as in the present document-model. The main text must be written in regular Times New Roman font, size 11, justified, with a 0.5 cm indent for the first line of each paragraph.

We recommend that you save this document to your computer as a Word document model. Therefore, it will be easy for you to have your article in the correct format and ready to be submitted. **The only form in which the file will be accepted is MS Word 2003**. If you have a later version of Microsoft Office / Word, you can edit it as follows:

- Once you have finished formatting your text, create a pdf file, and then save your file as a Word "97-2003" (.doc) file.

- Compare the two files – the pdf one and the Word "97-2003" (.doc) one.
- If you do not note any significant differences between the two, then – and only then – you can submit your article to us, **sending both the pdf and the Word "97-2003" (.doc) files** to our e-mail address.

If you use a word processor other than Microsoft Word, we recommend that you follow the same procedure as above, creating a pdf file and using the appropriate add-on in order to save your document in MS Word "97-2003" (.doc) form. Once you compare the two files (and find no significant differences), send us both.

2. General Guidelines on Paper Formatting

2.1. Body

The body of the text consists of different sections which describe the content of the article (for example: Method, Findings, Analysis, Discussion, etc.). You can use up to three levels of sections – sub-sections. For the Body of the text, use the default format style in Word, selecting the Times New Roman font, size 11, justified, with a 0.5 cm indent for the first line of each paragraph (this is further detailed in the section "Paragraphs").

2.2. References

The references included in the paper must be cited at the end of the text. All references used in the body of the paper must be listed alphabetically (this is further detailed in the section "References").

2.3. Appendices

The section "Appendices" follows the section "References".

3. Page formatting

3.1. Page size

The page size must be A4 (21 x 29,7 cm), and its orientation must be "portrait". This stands for all the pages of the paper. "Landscape" orientation is inadmissible.

3.2. Margins

Top margin: 2,54cm
Bottom margin: 1,5cm
Left and right margins: 3,17cm
Gutter margin: 0cm

3.3. Headers and Footers

Go to "Format" → "Page", and select a 1,25cm margin for the header and a 1,25cm margin for the footer. Do not write inside the headers and footers, and do not insert page numbers.

3.4. Footnotes

The use of footnotes or endnotes is expressly prohibited. In case further explanation is deemed necessary, you must integrate it in the body of the paper.

3.5. Abbreviations and Acronyms

Abbreviations and acronyms must be defined in the abstract, as well as the first time each one is used in the body of the text.

3.6. Section headers

We recommend that you use up to three sections – sub-sections. Select a simple numbering for the sections – sub-sections according to the present model.

3.7. First level header format

For the headers of the main sections use the Times New Roman font, size 11, in bold and underlined, and leave a size 12 spacing before the paragraph and a size 6 spacing after the paragraph. The header must be aligned left. Use a capital letter only for the first letter of the header.

3.8. Second level header format

For second level headers, follow this model. Use the Times New Roman font, size 11, in bold, and leave a size 12 spacing before the paragraph and a size 3 spacing after the paragraph. Select a 0.5 cm indent. The header must be aligned left. Use a capital letter only for the first letter of the header.

3.8.1. Third level header

For third level headers, follow this model. Use the Times New Roman font, size 11, in bold and italics, and leave a size 6 spacing before the paragraph and a size 0 spacing after the paragraph. The header must be aligned left, with a left indent of 1 cm. Use a capital letter only for the first letter of the header.

4. Paragraphs

In every paragraph, use the Times New Roman font, size 11, with single line spacing. We recommend you modify the default (normal) format style in Word and use that in your text. For all paragraphs, the spacings before and after the paragraph must be size 0, and the line spacing single. Use a 0,5cm indent only for the first line of each paragraph. Leave no spacings nor lines between paragraphs.

4.1. Lists

In case you need to present data in the form of a list, use the following format:

- Bullet indent: 1,14cm
- Text:
    - Following tab at: 1,5 cm
    - Indent at: 1,5cm

Use the same format (the above values) if you use numbering for your list.

1. Example of numbered list 1
2. Example of numbered list 1

5. Figures, images, and tables

5.1. Figures and images

Insert your figures and images directly after the part where they are mentioned in the body of text. They must be centered, numbered, and have a short descriptive title.

Figures put together “as they are”, using Office tools, are absolutely inadmissible. The figures used must have been exclusively inserted as images in Word, in gif, jpg, or png form (with an analysis of at least 200dpi), and in line with the text. The width of an image must not exceed 14,5cm so that it does not exceed the margins set above.

The images, figures, and tables must be inserted “as they are” in the text, in line with it. **Figures and images which have been inserted in a text box are absolutely inadmissible.**

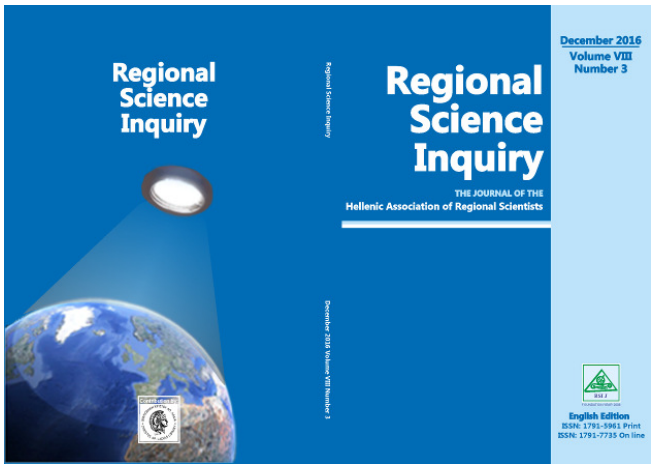
5.1.1. Reference inside the text

Avoid phrases such as “the table above” or the “figure below” when citing figures and images. Use instead “in Table 1”, “in Figure 2”, etc.

5.1.2. Examples

A model of how to format figures/images follows. For the title, use the Times New Roman font, size 10, in bold. Write the title above the figure, and set a size 6 spacing before the title and a size 0 spacing after it. The line spacing of the title must be 1.5 line. Both the image and its title must be centered.

Image 1: Title



Source: cite the source

Directly below the figure you must cite the source from which you took the image, or any note regarding the figure, written in Times New Roman, size 10. Write it below the figure, leaving a size 0 spacing before and after it, use a line spacing of 1.5 line, and make it centered.

5.2. Tables

For the title, use the Times New Roman font, size 10, in bold. Write the title above the table, and set a size 6 spacing before the title and a size 0 spacing after it. The line spacing of the title must be 1.5 line. Both the table and its title must be centered. The width of the table must not exceed 14,5cm so that it does not exceed the page margins set.

Table 1. Example of how a table must be formatted

Age	Frequency	Percentage %
Under 40	44	32.1
40 - 49	68	49.6
Over 50	25	18.2
Total	**137**	**100.0**

Source: cite the source

If the table needs to continue on the next page, select in the “Table properties” that the first line be repeated as a header in every page, as in the above example of Table 1. **Tables (or figures or images) which are included in pages with a “Landscape” orientation are absolutely inadmissible.**

Every table must have horizontal lines 1 pt. wide at the top and bottom, as shown in the example. The use of vertical lines and color fill at the background of the cells is strictly prohibited.

Directly below the table you must cite the source or any note regarding the table, written in Times New Roman, size 10. Write it below the table, leaving a size 0 spacing before and a size 6 spacing after it, and make it centered.

6. Mathematical formulas

There is a variety of tools in order to insert and process mathematical formulas, such as the "Mathematics", found in the most recent editions of Word, "Math Type", "Fast Math Formula Editor", "MathCast Equation Editor", "Math Editor". Since it is impossible for us to provide you with compatibility with all these tools in all their editions, **we can only admit your paper if it contains mathematical formulas solely in the form of images.**

Keep a continuous numbering for the mathematical formulas and center them in the page, as shown in the following example:

$$y = ax^2 + bx + c \tag{1}$$

The same stands for formulas or particular mathematical symbols you may have integrated in your text. For instance, if you want to use the term ax^2 in your text, you must insert it as an imaged, in line with the text. The images containing the mathematical formulas must be legible (at least 300dpi).

In the exceptional case of a text which may contain a great number of mathematical formulas, the writer may send it to us in TeX form if they so wish.

7. References

We recommend that you use the Chicago Manual of Style Author-Date system, as it is recommended by the AEA (American Economic Association) for the journals included in the EconLit database, and it is the dominant style of bibliography in the field of Economics. For more information you can go to the following links:

- https://www.aeaweb.org/journals/policies/sample-references
- http://www.chicagomanualofstyle.org/tools_citationguide.html
- http://libguides.williams.edu/citing/chicago-author-date#s-lg-box-12037253

7.1. Online references (internet citations)

Check your links again before sending your file, to confirm that they are active.

Avoid long internet links. Where possible, also cite the title of the website operator-owner. Return the font color to black, and remove the hyperlink. Links such as the following are impractical and distasteful, therefore should be avoided.

Example of an inadmissible hyperlink

https://el.wikipedia.org/wiki/%CE%9F%CE%B9%CE%BA%CE%BF%CE%BD%CE%BF%CE%BC%CE%B9%CE%BA%CE%AC

7.2. References Formatting

For your list of references, use the Times New Roman font, size 10, with single line spacing. The paragraph format must include a size 0 spacing before the paragraph and a size 0 spacing after it, aligned left. Use a 0,5 cm indent only for the first line of each paragraph. Leave no spacings or lines between paragraphs.

7.3. Example of how References must be formatted

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