Bulgaria: first results from home data – on-line job advertisements (OJAs)

Introduction

The analysis is based on the extracted OJAs from the two biggest Internet job-portals in Bulgaria: www.jobs.bg and www.zaplata.bg. The analysis has been carried out taking into accounts the new advertisements published daily in the two Bulgarian job portals for the period May-July 2019. This is the first attempt at analyzing data for OJAs by using Internet portals for advertising job vacancies. Regrettably, the short period does not allow for in-depth study of the trend for vacancies offered at regional level. This could be done at a latter stage as the work in this direction continues and the role and significance of the Big Data for the official statistics could be illustrated through larger empirical material (longer time series).

In order to be methodologically correct, the following facts and assumptions must be taken into account for the purposes of this analysis:

• The traditional JV survey takes account of job vacancies declared by employers at the end of each quarter (according to a European Regulation);

• On-line job vacancy (OJVs) is a different concept from OJAs. Although an OJA may contain 0, 1 or more OJVs, it is assumed for the purposes of this analysis that an OJA contains exactly one OJV. In this case, the two concepts could be used as synonyms.

Methodological consideration: In the future, it is recommended (in order to improve the correctness of the analysis) from the web-scraped data set for OJAs to produce a random sample for the manual, expert verification of how many OJVs contain each OJA included in the sample. Then applying the classical approach to representative, sample surveys, and based on the results obtained, it can be stated with some precision whether the assumption made above is correct or not.

- The total number of monthly OJAs for the period May - July 2019 is calculated from the sum of the daily number of advertisements;
- The average vacancies declared online on the job market in Bulgaria by NUTS 3 for the period of May-July 2019;

The original number of OJAs extracted for the period May - July 2019 from the two sites totaled 195,950. After clearing duplicate records (by comparing all OJAs variables and secondary de-duplication by date, company, city, country and job) 181 059 OJAs records were finally received i.e., 7.6% duplicate records have been deleted.

Obtained data on OJAs by districts of the country offered by the employers show that the largest number is in the districts of Bourgas (4727), Varna (6434), Plovdiv (5654) and Sofia (25462). It can be said that the large number of online vacancies in these areas is logical, given that they contain the largest cities of the country which are industrial and administrative centers. The majority of the country's population is concentrated there compared to the other 24 districts. Some exceptions are observed in Veliko Tarnovo district - 1293 OJVs, Blagoevgrad - 1134, Rousse - 1540 and Stara Zagora - 1577 OJVs. In contrast to the areas mentioned above, a four-digit number for the number of job vacancies in these four areas can also be considered as a temporary phenomenon, since the observed period is too short.

For the correctness of the analytical comparisons by the country districts (NUTS 3), a series of indicators was calculated, as the number of OJAs is related to the number of population[1], work force[2], employed and unemployed[3] by the country districts (Table 1).

Table 1:

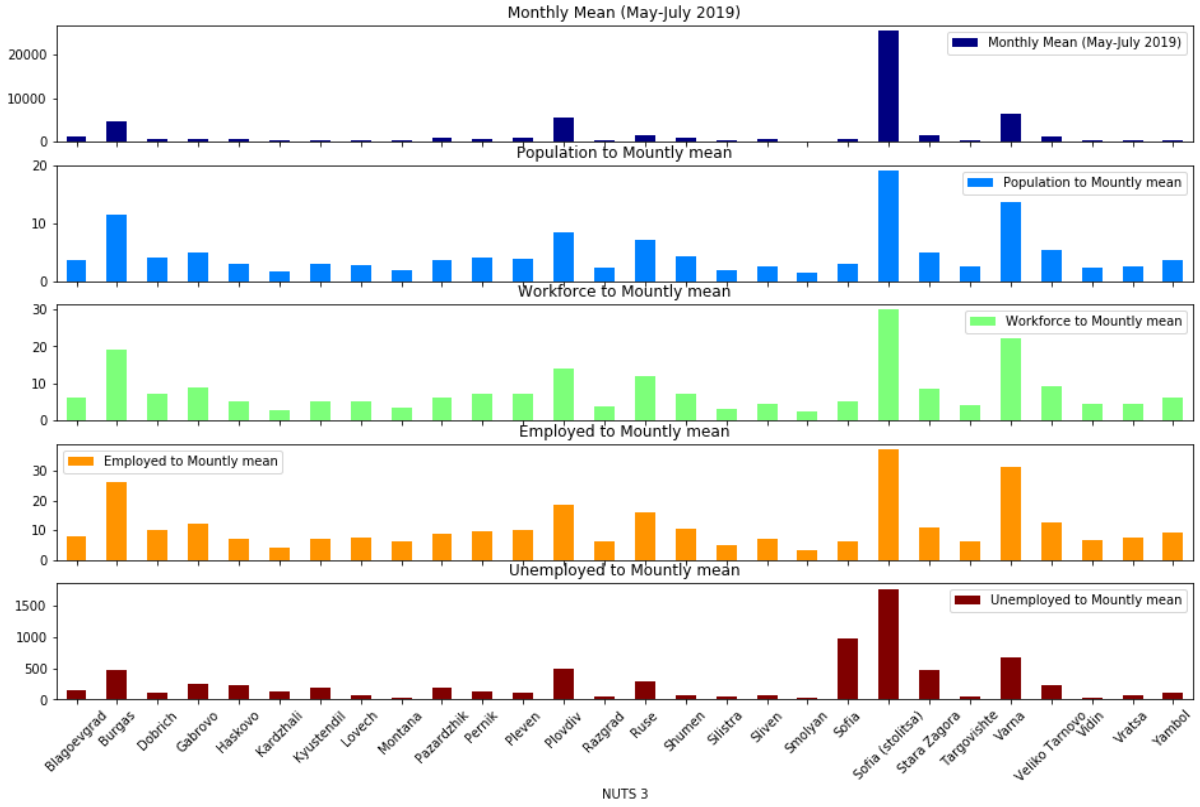
Number of OJVs and main proportions (in ‰) for the period May - July 2019

	Monthly Mean (May-July 2019)	Population to Mountly mean	Workforce to Mountly mean	Employed to Mountly mean	Unemployed to Mountly mean
NUTS 3					
Blagoevgrad	1134	4	6	8	155
Burgas	4727	12	19	26	468
Dobrich	726	4	7	10	105
Gabrovo	534	5	9	12	254
Haskovo	682	3	5	7	227
Kardzhali	249	2	3	4	119
Kyustendil	343	3	5	7	191
Lovech	353	3	5	8	71
Montana	251	2	3	6	33
Pazardzhik	948	4	6	9	182
Pernik	503	4	7	10	123
Pleven	949	4	7	10	114
Plovdiv	5654	8	14	19	496
Razgrad	260	2	4	6	50
Ruse	1540	7	12	16	291
Shumen	752	4	7	10	77
Silistra	207	2	3	5	40
Sliven	492	3	5	7	63
Smolyan	164	2	3	3	30
Sofia	677	3	5	6	967
Sofia (stolitsa)	25462	19	30	37	1768
Stara Zagora	1577	5	9	11	464

[1] The population number is relevant for the end of 2019 according to data from the current demographic statistics.
[2] The data are from the survey of the work force for 2019.
[3]The data are from the survey of the work force for 2019.

Targovishte	281	3	4	6	49
Varna	6434	14	22	31	677
Veliko Tarnovo	1293	5	9	13	223
Vidin	199	2	4	7	27
Vratsa	429	3	5	8	68
Yambol	421	4	6	9	100

Diagram of Number of OJVs and main proportions (in ‰) for the period May - July 2019



Most interesting is the indicator - OJAs offered per 1000 unemployed people under NUTS3 for the period May-July 2019. For example, there are 1768 OJVs offered to 1000 unemployed people in Sofia – the capital. The high number of job vacancies shows that employers are looking for skilled workers for their businesses. For the other larger districts the same data are as follows per 1000 unemployed: Sofia district - 967; Burgas - 468; Varna - 677; Plovdiv - 496. In regions, where the population is relatively smaller, OJVs per 1 000 unemployed are: Veliko Tarnovo - 223; Gabrovo - 254; Dobrich - 105; Kardzhali - 119; Kyustendil - 191; Pazardzhik - 182; Pernik - 123; Pleven - 114; Haskovo - 227. In the smallest districts, OJVs per 1000 people unemployed are as follows: Shumen - 77; Yambol -

100; Vidin 27; Vratsa - 68; Lovech - 71; Montana - 33; Silistra - 40; Sliven - 63; Smolyan - 30; Targovishte - 49. It should be noted that the population factor (total, working age, employed and unemployed), as a whole, is important, but it is also ranked by a number of other factors and reasons characterizing each of the 28 areas of the country. This means that the geographical position of the district, the communications that have been built, as well as a number of socio-demographic and economic factors that determine the employment potential of the population, respectively for the offered number of online vacancies, are important for the dimension of each indicator.

Another interesting indicator from Table 1 is the ratio of OJVs offered per 1,000 employees. In the districts with the largest cities of the country there is also an increase in the available vacancies per 1000 people employed. For Sofia - the capital these are 37, Plovdiv - 19, Burgas - 26 and Varna - 31 offered OJVs. In other areas of the country, this indicator has relatively lower values. For the period considered, there are few online jobs available per 1000 people employed, which can be explained by the increased demand and job finding, which is the result of the favorable for work summer season. These two indicators are directly relevant to the labor market. In this sense, they characterize and focus on the aggregates of the population that are directly related to OJAs for searcing of labour force.

The data on other ratios between the number of OJVs and the population, respectively relative to the working population in the districts of the country, show smaller values. They reflect in a more generalized way the processes of the labor market, as they are tailored to the size of the districts, and especially to the size of the district cities. This makes them fairly comparable, but with relatively less relevant information on the current situation on the labor market and its changes.

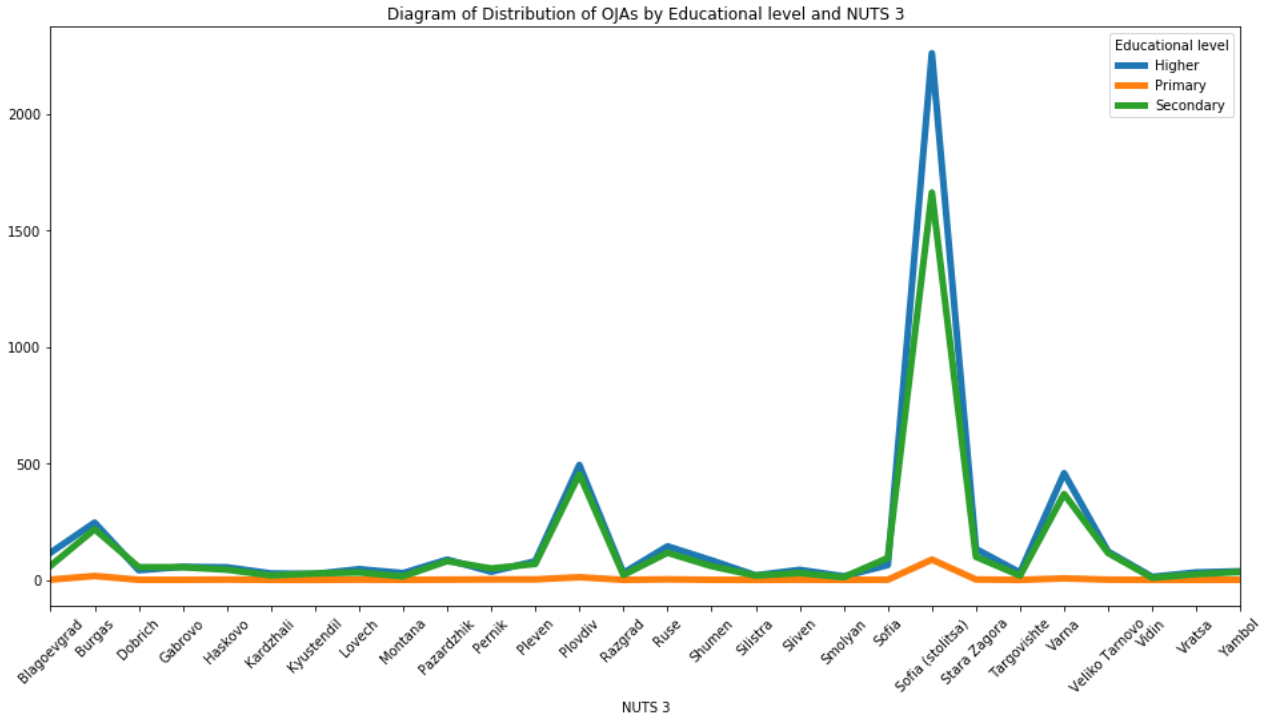
The main conclusion from the data is that, under other things being equal, the demand and supply of job vacancies in the labor market strive for balance. In the larger areas of the country more jobs are offered online. Obviously, the demand and supply are the highest there, but the requirements of the employers are also higher in terms of the skills of workers (see Table 2).

Table 2: Distribution of OJAs by Educational level and NUTS 3

Educational level	Higher	Primary	Secondary
NUTS 3			
Blagoevgrad	117	1	61
Burgas	246	17	217
Dobrich	41	0	55
Gabrovo	56	0	54
Haskovo	54	1	44
Kardzhali	28	0	19
Kyustendil	25	0	27
Lovech	46	1	32
Montana	29	0	15
Pazardzhik	87	1	80
Pernik	35	2	49
Pleven	80	2	68
Plovdiv	493	11	453
Razgrad	30	0	21
Ruse	144	2	116
Shumen	84	0	59
Silistra	19	0	18
Sliven	43	1	29
Smolyan	15	0	11
Sofia	63	1	94
Sofia (stolitsa)	2259	87	1662
Stara Zagora	133	2	99
Targovishte	31	0	18
Varna	458	6	368
Veliko Tarnovo	121	1	115
Vidin	13	0	9
Vratsa	32	0	24
Yambol	37	0	34

The distribution of the offered OJVs by districts of the country and degrees of education over the observed period indicates that specialists with higher and secondary education are most in demand. This indicates that the innovative approaches to work in most businesses in the country require skilled labor. Obviously, the competition and prosperity of businesses, nationally and internationally, dictates to employers the need to seek and hire

individuals with more knowledge and skills. This situation is well expressed in the largest regions of the country: Sofia - the capital, Plovdiv, Varna and Burgas.

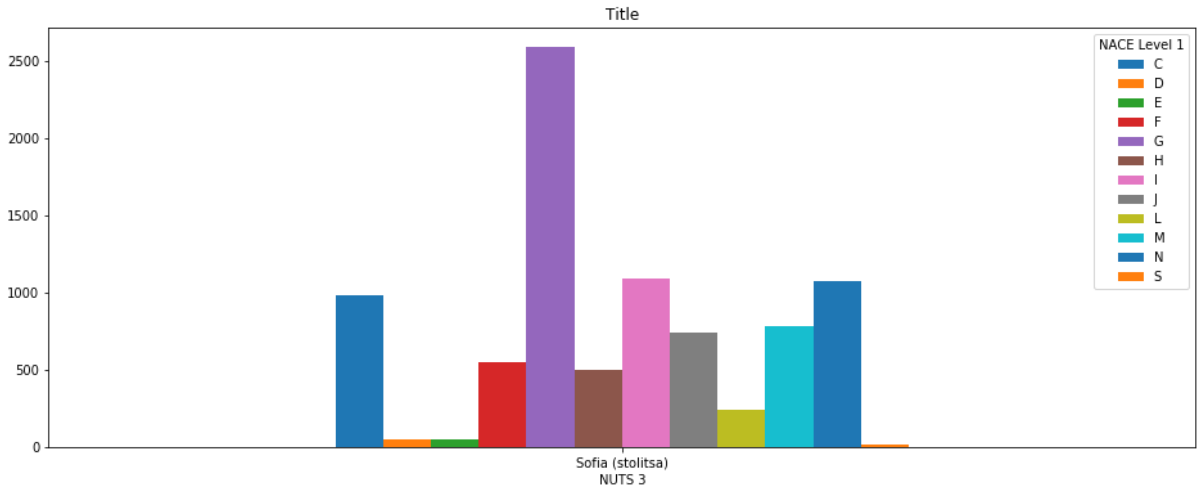


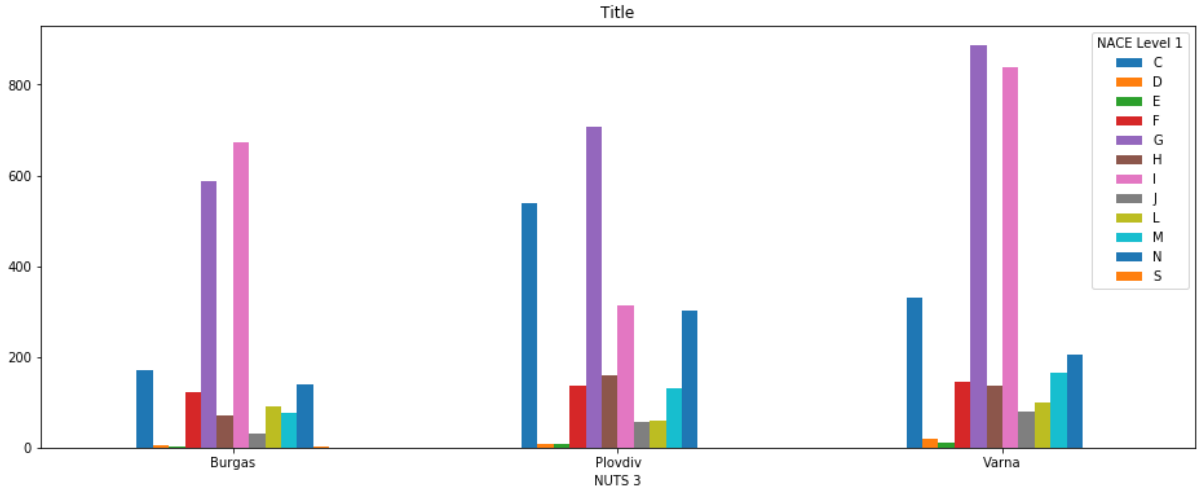
Another feature of OJVs is the type of working time, with 95% of all advertisements being offered at the national level for the May-July 2019 period are for full time jobs.

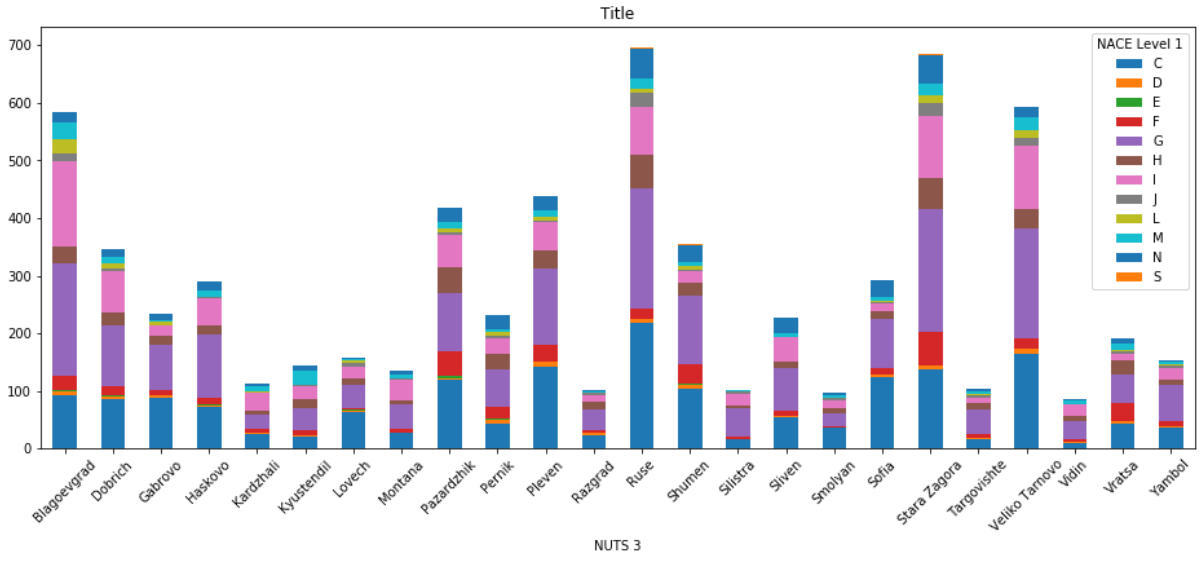
From the total number of OJAs for the period May-July 2019, for only 70 937 OJAs (or 40% of all) we have found the economic sector of employers offering online job vacancies according to the NACE Rev. 2. This is done by comparing the name of the employer from the advertisement in the job portals to the company name from the statistical business register. In this way, the economic activity from the register was joined to a job advertisement (Table 3).

Table 3: Distribution of OJAs by NUTS 3 and NACE Level 1 for the period May-July 2019

NACE Level 1	C	D	E	F	G	H	I	J	L	M	N	S
NUTS 3												
Blagoevgrad	94	6	1	25	196	30	147	14	25	28	19	0
Burgas	169	6	3	123	587	70	672	31	92	76	139	2
Dobrich	86	5	1	15	107	21	72	4	9	11	14	0
Gabrovo	88	5	0	8	79	16	17	1	6	2	12	0
Haskovo	73	2	3	10	110	17	47	1	1	11	14	0
Kardzhali	26	2	1	7	24	6	32	2	1	10	5	0
Kyustendil	20	3	0	9	39	16	22	2	0	24	9	0
Lovech	65	1	2	3	40	10	20	7	4	3	3	0
Montana	27	2	0	5	43	8	34	2	1	7	7	0
Pazardzhik	119	2	6	43	99	46	54	6	6	12	24	0
Pernik	44	7	1	20	65	28	26	5	7	5	24	0
Pleven	143	8	0	30	131	32	49	4	5	12	24	0
Plovdiv	538	8	8	136	707	160	312	57	60	131	302	0
Razgrad	23	4	0	6	35	13	11	5	1	2	3	0
Ruse	219	7	0	17	209	58	84	24	7	18	52	2
Shumen	104	7	2	34	119	22	20	4	6	7	31	1
Silistra	15	2	0	3	49	5	20	5	0	2	1	0
Sliven	54	2	0	10	73	12	41	0	2	6	26	0
Smolyan	36	0	0	3	22	9	15	3	0	4	5	0
Sofia	124	6	0	9	86	13	14	2	2	7	28	0
Sofia (stolitsa)	978	47	52	546	2586	499	1086	738	243	784	1069	11
Stara Zagora	139	5	1	59	213	52	109	23	12	21	48	2
Targovishte	16	4	0	5	43	12	8	4	2	5	4	0
Varna	331	20	11	145	886	137	839	80	100	166	206	1
Veliko Tarnovo	165	9	0	17	191	34	110	14	13	22	18	0
Vidin	9	2	0	5	33	9	19	1	0	5	3	0
Vratsa	43	4	0	32	48	26	10	5	4	10	10	0
Yambol	37	2	0	8	64	10	20	4	2	4	3	0



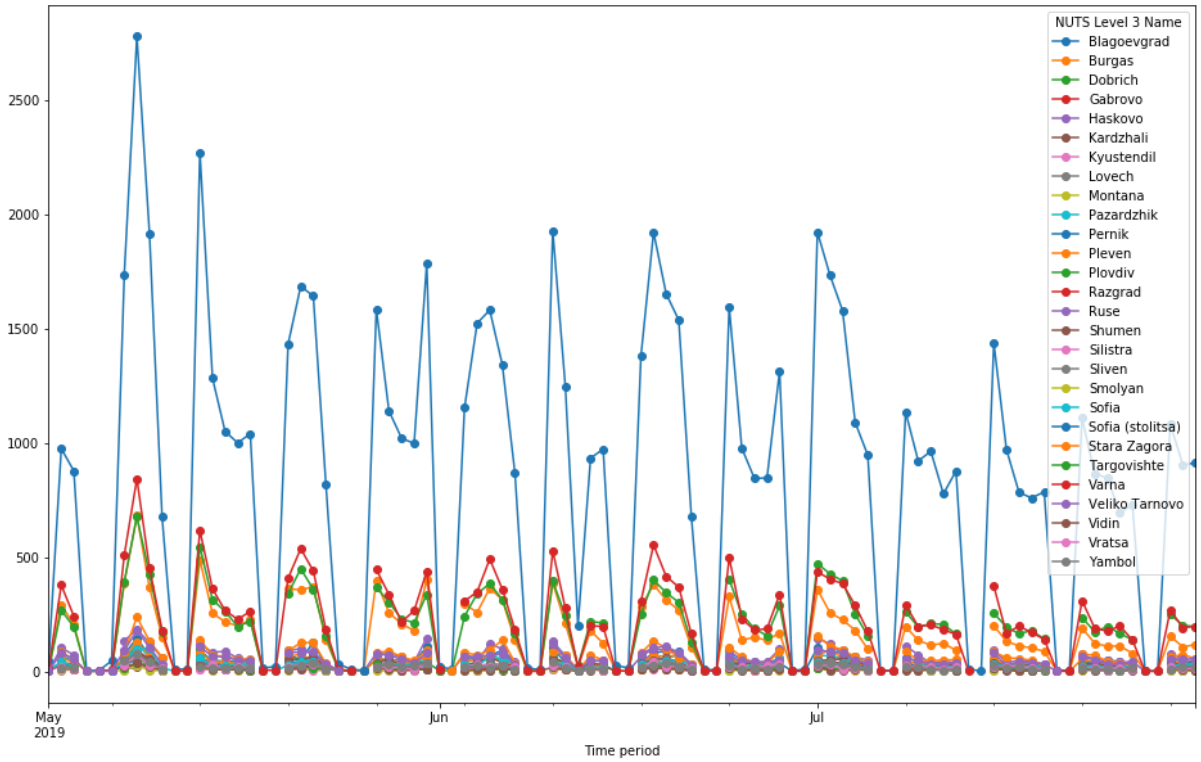




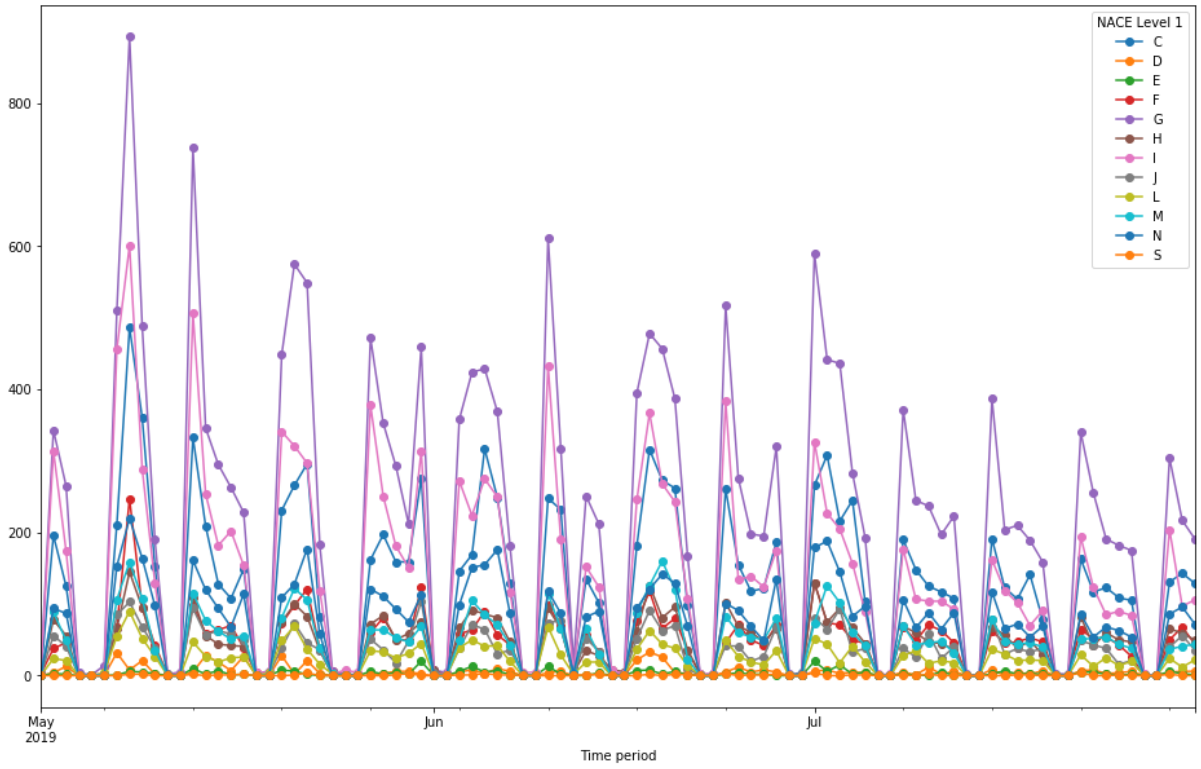
For the list with the statistical indicators described on the WPB wiki confluence page, the graphic presentation of the calculated results is the following:

1. Daily number of newly posted OJVs

By NUTS 3



By NACE Level 1:



The trends shown in the graphs above present a relatively constant pattern, with the number of daily new advertisements declines in the summer months and particularly in July.

2. Daily average newly posted OJVs within month

By NUTS3:

Table 4: Count of OJV advertisements by NUTS Level 3 and time period

Time period	2019-05	2019-06	2019-07
NUTS Level 3 Name			
Blagoevgrad	1279	1051	1073
Burgas	6174	4585	3422
Dobrich	874	684	619
Gabrovo	606	460	537
Haskovo	715	664	667
Kardzhali	300	222	226
Kyustendil	338	360	331
Lovech	370	327	361
Montana	274	241	237
Pazardzhik	1023	938	882
Pernik	591	460	458
Pleven	1098	841	908
Plovdiv	6460	5271	5230
Razgrad	266	261	252
Ruse	1783	1381	1455
Shumen	812	743	701
Silistra	200	210	210
Sliven	527	499	451
Smolyan	190	155	146
Sofia	768	655	609
Sofia (stolitsa)	27912	24617	23856
Stara Zagora	1795	1452	1483
Targovishte	324	276	244
Varna	7661	6183	5457
Veliko Tarnovo	1492	1231	1156
Vidin	269	169	158
Vratsa	464	423	400
Yambol	517	383	364

By NACE Level 1:

Table 5: Count of OJV advertisements by NACE Level 1 and Time period

Time period	2019-05	2019-06	2019-07
NACE Level 1			
C	4293	3721	3487
D	238	168	120
E	92	85	98
F	1575	1231	1326
G	8158	6591	6232
H	1410	1374	1368
I	5650	4260	3126
J	1171	971	1014
L	763	672	583
M	1557	1478	1259
N	2359	2048	2064
S	19	22	18

Table 6: Count of OJV advertisements by Education Level and Time period

Time period	2019-05	2019-06	2019-07
Education Level			
Higher	5476	4659	4566
Primary	163	150	129
Secondary	4271	3890	3753

3. The number of on-line job vacancies on the reference day in line with the JVS survey.

It will be further calculated after retrieving data on 30.09. 2019 as reporting day for traditional JV survey.