Effective distribution of sample over time as well as over space with relation to monthly Processing in the Czech Republic

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In the Czech Republic, sampling frame procedure is likely quite similar to the procedures for sampling in other European countries. Sampling frame is drawn from the register of inhabited dwellings (Census Area Register) and has no relation to the register of individuals due to the law restrictions. Stratification is applied – sampling frame is drawn the way it should reflect that all districts are included and if possible all size of municipality groups as well. Sampling method is based on two stages

- 1st stage – randomized systematic sample of Census Areas (CA) in NUTS4 (probability of inclusion proportional to number of permanently inhabited dwellings in CA)
- 2nd stage – random sample of selected dwellings
    - fixed distribution according to size of municipalities in NUTS4

Sample of dwellings and consequently respondents is being changed regularly. Each dwelling remains in the sample for 5 consecutive quarters. Rotation of the sample means that every quarter the sample changes by 20 %. The size of municipality or degree of urbanisation is not considered as a part of the rotation scheme. Although there is a recommendation how surveyed dwellings should be ideally distributed in the quarter (see following table), it is not compulsory and the real distribution is adapted according to demand of fieldworkers (fieldwork strategy). It is also necessary to add, that the real fieldwork strategy (based on regional financial and human resources) is of good quality and always willing to fulfil the recommendation.

We have also implemented certain rules and checks for rotation scheme:

- to check the minimum and maximum of surveyed census areas according to reference weeks and NUTS4 or NUTS3 or to compute dispersion
- in repeated visits in the households the possibility to switch the reference weeks +1
- Evaluation – feedback, reports

Table 1 Rotation scheme – allocation of Census Area

NUTS 3	Reference weeks (1st quarter)													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	
hl.m.Praha	43	42	42	42	42	42	42	42	42	42	43	43	43	550
Středočeský	50	50	50	50	50	50	50	50	50	50	50	50	50	650
Jihočeský	31	31	31	30	31	31	30	30	31	31	31	31	31	400
Plzeňský	31	31	30	31	31	31	31	31	31	31	31	30	30	400
Karlovarský	23	23	23	23	23	23	23	23	23	23	23	23	24	300
Ústecký	30	31	31	31	31	31	31	31	31	31	30	31	30	400
Liberecký	23	23	23	24	23	23	23	23	23	23	23	23	23	300
Královéhradecký	23	23	23	23	23	23	24	23	23	23	23	23	23	300
Pardubický	23	23	23	23	23	23	23	24	23	23	23	23	23	300
Vysočina	23	23	23	23	24	23	23	23	23	23	23	23	23	300
Jihomoravský	42	43	43	42	42	42	42	42	42	42	42	43	43	550
Olomoucký	23	23	24	23	23	23	23	23	23	23	23	23	23	300
Zlínský	23	23	23	23	23	23	23	23	23	24	23	23	23	300
Moravskoslezský	46	46	46	46	46	46	47	47	46	46	46	46	46	600
ČR celkem	434	435	435	434	435	434	435	435	434	435	434	435	435	5650

In general, all those rules and recommendations had been implemented before we launched the production of monthly statistics – monthly unemployment rate. From the perspective of monthly production, new challenges have emerged, mostly related to monthly data processing. It includes the following:

- reference months in quarterly distribution (4-5-4 pattern)
- how to ensure a regular distribution of census areas according to size of municipality or degree of urbanization to particular months
- problems with remote municipalities in the wintertime
- no month-to-month overlap
- only recommendation for fieldwork – is it sufficient?

The following table shows how in the selected NUTS4, CAs were distributed during the 3th quarter 2013. Regarding the respective quarter and selected NUTS4, we can conclude that no significant problems were experienced and such distribution is more or less acceptable.

Problems might arise when looking on the monthly distribution from the perspective of the size of municipality or degree of urbanization. Currently, there are neither rules nor recommendations how such issue should be solved. We have to admit, that current situation allows fieldworkers to visit only bigger cities in one month and only towns or villages in other month, which, clearly, can have an impact on monthly data.

Table 2 Allocation of Census Areas according to NUTS 4 (Q3 2013)

NUTS4	NUTS3	Total CA	Reference weeks													Dispersion	Max-min
				2	3	4	5	6	7	8	9	10	11	12	13		
.																	
5101	51	70	6	5	5	6	5	6	6	5	5	5	6	5	5	0,24	1
5102	51	65	5	5	5	5	5	5	5	6	5	5	5	5	4	0,15	2
5103	51	111	8	9	8	9	9	8	8	9	9	8	8	9	9	0,25	1
5104	51	54	4	4	5	4	4	4	4	4	4	5	4	4	4	0,13	1
	51	**300**	**23**	**23**	**23**	**24**	**23**	**23**	**23**	**24**	**23**	**23**	**23**	**23**	**22**	**0,22**	**2**
5201	52	89	6	7	8	7	7	7	6	7	6	7	7	7	7	0,28	2
5202	52	45	4	4	3	3	4	4	2	4	4	3	4	3	3	0,40	2
5203	52	64	5	6	4	5	6	5	6	4	6	4	4	4	5	0,69	2
5204	52	45	4	2	3	4	3	3	4	4	4	3	4	4	3	0,40	2
5205	52	57	4	4	5	4	3	4	6	4	3	6	4	5	5	0,85	**3**
	52	**300**	**23**	**23**	**23**	**23**	**23**	**23**	**24**	**23**	**23**	**23**	**23**	**23**	**23**	**0,07**	**1**
5301	53	61	4	4	4	5	5	4	4	4	5	5	5	6	6	0,52	2
5302	53	98	7	7	9	7	7	9	8	8	7	7	8	7	7	0,56	2
5303	53	69	6	6	5	6	5	5	5	6	5	5	5	5	5	0,21	1
5304	53	72	6	6	5	5	6	5	6	6	6	6	5	5	5	0,25	1
	53	**300**	**23**	**23**	**23**	**23**	**23**	**23**	**23**	**24**	**23**	**23**	**23**	**23**	**23**	**0,07**	**1**
.																	
Total		**5650**	**434**	**435**	**435**	**435**	**433**	**434**	**436**	**437**	**433**	**435**	**435**	**435**	**433**	**1,31**	**4**

Real distribution of CAs according to size of municipality and degree of urbanization is shown in two following tables. Two NUTS3 were chosen, further specification (NUTS4 - as in the previous table) would be confusing in this case.

Statistical dispersion and Max-Min difference reflect the complexity of producing monthly statistics on Labour Market in relation to household surveys. Numbers in blue appear to be as problematic already, reds are highly unstable.

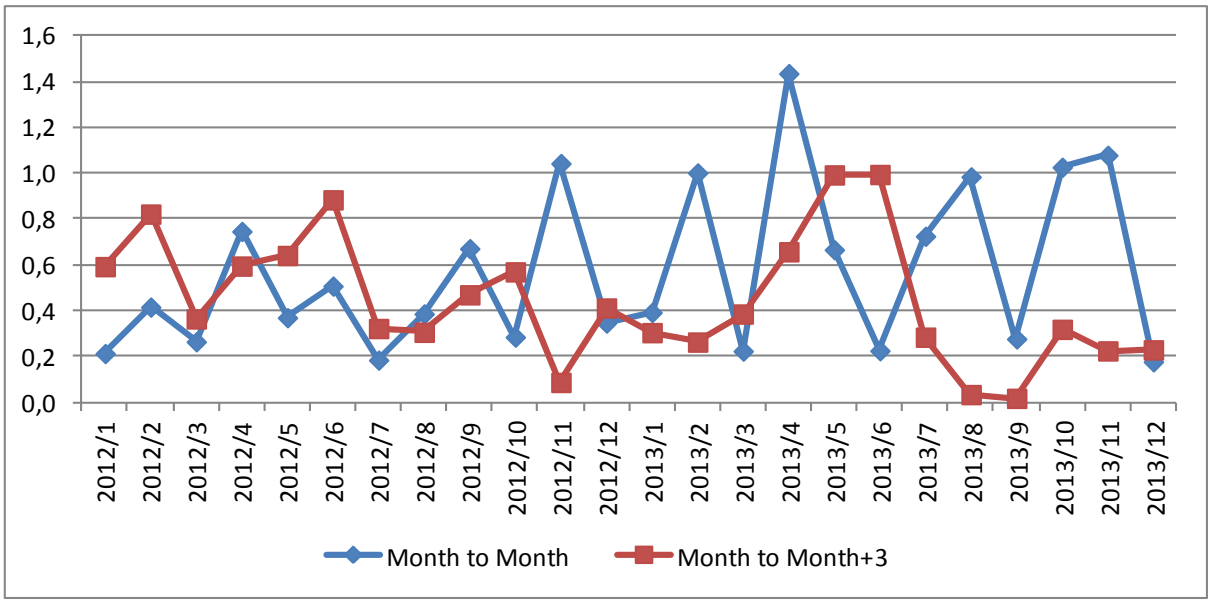
Table 3 Real allocation of Census Areas according to size of municipality and degree of urbanization in selected NUTS3 (Q1 2013)

NUTS3	Size of municipality	Number of CA	Reference week													Dispersion	Max-min
			1	2	3	4	5	6	7	8	9	10	11	12	13		
.																	
52	Total	300	23	23	23	23	23	23	23	24	23	23	23	23	23	0,07	1
	0-999	72	6	4	5	3	8	7	6	5	7	7	5	5	4	**1,94**	**5**
	1000-9999	90	5	6	6	5	8	7	9	3	6	12	7	12	4	**6,99**	**9**
	10000-49999	84	7	7	8	10	3	7	4	10	7	3	6	3	9	**5,94**	**7**
	50000+	54	5	6	4	5	4	2	4	6	3	1	5	3	6	**2,28**	**5**
53	Total	300	23	23	23	23	23	24	23	23	23	23	23	23	23	0,07	1
	0-999	90	10	11	9	6	5	10	6	6	7	7	4	4	5	**5,15**	**7**
	1000-9999	94	2	4	7	12	10	7	11	10	9	5	6	6	5	**8,18**	**10**
	10000-49999	86	8	7	5	5	4	5	5	7	6	7	9	9	9	**2,85**	**5**
	50000+	30	3	1	2	0	4	2	1	0	1	4	4	4	4	**2,37**	**4**
.																	

NUTS3	Degree of urbanization	Number of CA	Reference week													Dispersion	Max-min
			1	2	3	4	5	6	7	8	9	10	11	12	13		
.																	
52	Total	300	23	23	23	23	23	23	23	24	23	23	23	23	23	0,07	1
	1	54	5	6	4	5	4	2	4	6	3	1	5	3	6	**2,28**	**5**
	2	120	8	9	11	13	6	9	6	12	9	11	8	7	11	**4,64**	**7**
	3	126	10	8	8	5	13	12	13	6	11	11	10	13	6	**7,44**	**8**
53	Total	300	23	23	23	23	23	24	23	23	23	23	23	23	23	0,07	1
	1	30	3	1	2	0	4	2	1	0	1	4	4	4	4	**2,37**	**4**
	2	114	9	9	7	8	6	7	11	10	9	7	11	10	10	**2,49**	**5**
	3	156	11	13	14	15	13	15	11	13	13	12	8	9	9	**4,77**	**7**
.																	

As already mentioned above, having 4-5-4 pattern within one quarter along with such rotation scheme (80 % quarter-to-quarter overlap, 0 % month-to-month overlap), which is used for monthly processing, some other statistical methods need to be applied.

Graph 1 Absolute differences (in percentage points) in employment rates in the Czech Republic (2012-2013)



For ensuring correct interpretation of results (trends mainly), comparison of particular month (m) with m+3 month is more appropriate – as the graph above illustrates. The average of absolute differences for the respective period is 0.6 for month-to-month comparison and 0.4 for month-to-month+3 comparison.