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Abstract

Comparisons of well-being indicators in monetary terms across regions of a country do not provide insights into actual differences in well-being. The reason is variability of price levels across regions, especially in large countries like Russia. Thus, the indicators should be adjusted to the regional price levels, which, in turn, poses a problem of estimating such levels. In Russia, official data on price levels (termed cost-of-living indices) are available; however, they are by city/town rather than by region, so being unsuitable for regional studies. This paper describes the methodology of aggregating the city cost-of-living indices to the regional ones and presents the results obtained for 2016–2020. These results serve as a mean for estimation of price-adjusted regional incomes per capita (regional real incomes). As can be expected, taking account of regional costs of living smooths to some extent the pattern of regional inequality. A comparison of the European and Asian parts of Russia suggests that real income per capita in the latter permanently remains lower than in the former.

Keywords Spatial price index · Regional price level · Cross-region income comparison · Price-adjusted income

1 Introduction

Comparisons of well-being indicators in monetary terms (such as personal income, household consumption, wage, poverty line, etc.) between regions of a country do not provide insights into actual differences in well-being. The purchasing power of the national currency varies across regions, resulting in different levels of consumption provided by the same amount of money. This problem is especially severe in large countries, where local price levels can vary widely. For instance, the maximum to minimum ratio of the city cost of living in 2018 was 2.0 in the US (Campbell, 2021, Table 2) and 2.4 in Russia (Rosstat, 2021a). Thus, to make a comparison between regions or cities adequate, their indicators have to be adjusted to the respective price levels, also referred to as spatial price indices, spatial adjustment factors, sub-national PPPs, and cost-of-living indices (COLI).

Numerous researches constructing such indicators, as either a goal or a tool for adjustment of regional monetary indicators, can be found in the literature. Reviews due to Biggeri & Tiziana (2014), Aten (2017), and Weinand & Auer (2020) suggest that not only academic researchers, but also official statistical bodies do this work. Lacking data on regional price levels, some researchers apply rough proxies such as housing prices. For instance, Beenstock & Felsenstein (2007) used them for cross-region comparisons in Israel; Li & Gibson (2014) exploited this method for China. Sometimes, regional consumer price indices (CPI) are exploited for inter-regional comparisons.[1]

Although official statistical bodies in some countries try to estimate spatial price indices, this work is for the most part experimental and nonrecurrent. Countries where regular official data on local price levels are available are still few in number. In the US, the Council for Community and Economic Research (C2ER) produces and publishes quarterly COLI (formerly known as the 'ACCRA cost-of-living index') across about 300 cities. This index is the cost of a basket of 57 goods and services (with uniform weights) in a city relative to the cross-section average (C2ER, 2018). Although C2ER is a non-governmental institution, its data can be considered as 'semi-official' (since they have been partly publishing in the "Statistical Abstract of the United States"). Recently, C2ER started producing COLI across counties and states of the US. In the UK, the Office for National Statistics produced relative regional consumer price levels for 2004, 2005, 2010, and 2016. The regional baskets involve the same set of goods and services as covered by the UK CPI, however, with region-specific weights used to compute Fisher-like indices for every pair of regions. These data serve for calculating final price levels in

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[1] This method, however, provides distorted estimates of regional price levels, especially in countries with high inflation (Gluschenko, 2006, 2016).

the form of the Éltető-Köves-Szulc indices with the UK as the base (ONS, 2018, pp. 14–16). The State Government of Western Australia produces regional price index biannually from 2011 across both regions and towns. This index is the cost of a basket containing more than 300 goods and services relative to its cost in Perth with weights of the Perth CPI. Regional indices are the aggregate of town indices for a region with weights reflecting town's share of the region's population (DPIRD, 2020).[2]

The Russian Federal State Statistics Service (Rosstat) provides a few indicators that represent regional price levels. Since 1992, it has been publishing monthly data on the cost of a uniform staples basket by region. The basket changed from time to time. It contained 19 foods from 1992 to 1996, 25 foods from January 1997 to June 2000, and 33 foods from July 2000 to the present. One more indicator used for inter-regional comparisons in Russia is the subsistence minimum that is proportional to the cost of the staples basket. A more representative monthly indicator was introduced in 2002, namely, the cost of a fixed basket of consumer goods and services for inter-regional comparisons of the population purchasing capacity. This basket (usually referred to as simply 'fixed basket') covers 83 goods and services and is also uniform across regions. At present, it is the most widespread indicator used in Russian regional studies for providing cross-regional comparability. The advantage of the basket costs is that they allow getting an idea of the absolute (and not comparative) real income. For instance, a monthly personal income per capita divided by the cost of a basket suggests how many such baskets a representative consumer can buy for his/her monthly income. At the same time, the basket costs are easily transformed into a comparative form (for example, a spatial price index can be computed as the ratio of the basket cost in some region to the national basket cost).

Since 2009, Rosstat has started publishing annual data on COLI across a bit less than 300 cities and towns from all regions of Russia. This indicator is highly representative, including the most part of goods and services covered by the Russian CPI. Hence, it provides more accurate estimates of real regional monetary indicators than the cost of the fixed basket (not to mention the staples basket). However, the fact that the Russian COLI is reported by city/town and not by region makes it inconvenient for cross-regional comparisons. To overcome this shortcoming, the city COLI need to be aggregated into regional ones. This paper reports methodology of such aggregating and estimates regional COLI for 2016–2020. This extends results in Gluschanko & Karandasova (2017) that cover 2009–2015.[3] Benefiting from the obtained COLI, real (i.e. comparable across regions) incomes per capita are estimated. As expected, adjustment for

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[2] Weinand & Auer (2020) assert, providing no reference, that also the Turkish official statistics regularly estimates regional price levels. However, I could not find respective data.
[3] Appendix Tables A1 and A2 report united results from this paper and Gluschanko & Karandasova (2017).

regional price differences smoothes to some extent regional inequality. In addition, real incomes per capita in 'macroregions', the European and Asian parts of Russia (the latter, in turn, consisting of Siberia and the Russia Far East), are estimated over 2009–2020. A comparison evidences that the Asian part of Russia permanently remains poorer than the European part despite compensating wage differentials in the Asian part.

2 Data and Methodology

From the viewpoint of the index numbers theory, two main types of methodologies of constructing spatial price indices can be distinguished. The first one bases on local baskets of goods and services with location-specific weights, so taking account of difference in consumption patterns across locations. The costs of these baskets are processed in a complex way to obtain Éltető-Köves-Szulc or Geary-Khamis spatial price indices (ILO, 2004, p. 500). The second approach bases on a basket that is uniform across locations (so imputing the same consumption pattern to all locations). The costs of this basket in the locations relative to its cost in a benchmark location (as a rule, to the national average cost) serve as the spatial price indices. So obtained indices are less flexible than those produced by the first methodology. However, the advantage of this methodology is its significant simplicity and clarity.

The Russian COLI exploits the second methodology (Rosstat, 2012). It benefits from data collected for CPI and covers 275 goods and services (most of items included in CPI); the average national prices serve as a numeraire. Thus, an individual COLI is the price level in a given city/town relative to the average national level. Since the consumer prices are collected monthly, they are aggregated into annual values as simple arithmetic averages over 12 months. The weights in the COLI basket are the same as in the CPI for Russia as a whole. They reflect the national average consumption pattern in the previous year. COLI is estimated (and published) for all city/towns where prices are observed.[4]

On average, there are 3.4 such cities/towns per region (in 2020). Most regions (67 of 85, i.e., 78%) are represented by 2 to 4 cities/towns. One city/town represents 9 regions, of which 3 are regions by themselves ('cities-regions' Moscow, Saint Petersburg, and Sevastopol). The Moscow Oblast is represented by 15 cities/towns; 8 regions are represented by 5 to 7 cities/towns. The spatial sample changes from time to time, however, the changes are minor.

The source of the raw data, COLI by city/town, is Rosstat (2021a) that indicates COLIs in integer percentages. Table 1 reports summary statistics of these data.

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[4] As in many other countries, the Russian CPI is estimated for the urban population only.

Table 1 Descriptive statistics of COLI across Russian cities/towns

Statistic	2016	2017	2018	2019	2020
Minimum, %	70	70	73	73	74
Maximum, %	170	158	175	178	158
Maximum/minimum	2.4	2.3	2.4	2.4	2.1
Median, %	95.0	96.0	97.0	97.0	97.0
Standard deviation, p.p.	15.2	14.7	15.0	14.5	13.4
Gini index, %	8.0	7. 9	7.5	7.3	6.9
Number of cities	276	275	276	283	282

The lowest COLI were in Lagan' (Republic of Kalmykia) in 2016, in Magas in 2017 and then in Nazran' (Republic of Ingushetia). The table shows significant decreases in the highest COLI in 2017 and 2020. This is a result of missing COLI in the most expensive town from the Chukotka Autonomous Okrug (the most remote and expensive region of Russia) for these years in Rosstat's (2021a) report.[5]

A simple formula gives COLI for a city/town (Rosstat, 2012, p. 15):

$$COLI_{ir} = \sum_{k=1}^{m} w_k \frac{p_{irk}}{p_{0k}}, \tag{1}$$

where p_{irk} is price for good (service) k in city/town i from region r, p_{0k} is the national average price, w_k is the weight of k-th good (service), and m is the number of items in the COLI basket.

The Russian statistics estimates regional average prices as weighted averages over cities/towns that are monitored in the region, the weights reflecting proportions of their population. A simple transformation of the respective formula from Rosstat (2014, p. 57) gives the following relationship for the regional average price:

$$p_{rk} = \frac{\sum_{i \in R(r)} N_{ir} p_{irk}}{\sum_{i \in R(r)} N_{ir}} = \sum_{i \in R(r)} n_{ir} p_{irk}, \tag{2}$$

where N_{ir} is the population of city/town i from region r, $R(r)$ is the set of cities/towns in which prices are collected in region r, and n_{ir} is the weight of i-th city/town in region r

Benefiting from Formulae (1) and (2), we can aggregate COLI across cities/towns into regional COLI in a way that is in accordance with the Russian statistical methodology:

$$COLI_r = \sum_{k=1}^{m} w_k \frac{1}{p_{0k}} \sum_{i \in R(r)} n_{ir} p_{irk} = \sum_{i \in R(r)} n_{ir} \sum_{k=1}^{m} w_k \frac{p_{irk}}{p_{0k}} = \sum_{i \in R(r)} n_{ir} COLI_{ir}. \tag{3}$$

As seen, it is simply a weighted average of the relevant city/town COLIs.

The source of data on population is Rosstat (2021b), where populations are reported as of January 1. The arithmetic mean of data for two adjacent years provides the annual average populations.

As Formulae (1) and (3) show, both the city and regional COLI have a comparative form by construction. Therefore, real income estimated with the use of the regional COLI, in contrast

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[5] Table 2 and Figure 2 in the next section give an idea of the geographical location of the mentioned regions.

to the cost of a basket, only suggest how high or low is income as compared to the (nominal) national income per capita, and is silent as to actual well-being in some absolute terms.

3 Regional Costs of Living

The Russian Federation consists of 85 constituent units (republics, *oblasts*, one autonomous *oblast*, *krais*, autonomous *okrugs*, and three federal cities) termed federal subjects. Despite different designations, all these are equal in legal terms. In this study, a federal subject (including federal cities of Moscow, Saint Petersburg, and Sevastopol) is meant by a region. There are two exceptions, though, that are due to a feature of the political division of Russia. Two federal subjects include national entities, autonomous *okrugs* (AO), that are themselves the federal subjects. Namely, the Arkhangelsk Oblast includes the Nenets AO, and the Tymen Oblst includes the Khanty-Mansi AO and Yamalo-Nenets AO. To avoid double counting, these oblasts without AOs are taken as regions in this study.

Table 2 tabulates regional COLIs computed by Formula (3). They are reported in integer percentages, that is, with the same precision as the raw data.

Table 2 COLI by region, % (Russia as a whole = 100%)

Region	2016	2017	2018	2019	2020
European part of Russia					
1. Belgorod Oblast	85	84	86	86	86
2. Bryansk Oblast	94	94	95	95	95
3. Vladimir Oblast	98	98	99	100	99
4. Voronezh Oblast	93	92	92	92	92
5. Ivanovo Oblast	98	98	99	97	97
6. Kaluga Oblast	98	99	98	98	97
7. Kostroma Oblast	92	92	91	90	95
8. Kursk Oblast	88	87	88	89	89
9. Lipetsk Oblast	88	88	88	88	89
10. Moscow Oblast	107	108	109	109	109
11. Oryol Oblast	90	90	90	90	91
12. Ryazan Oblast	92	93	94	95	96
13. Smolensk Oblast	100	100	101	100	100
14. Tambov Oblast	89	88	90	90	90
15. Tver Oblast	98	97	97	96	96
16. Tula Oblast	94	95	97	97	97
17. Yaroslavl Oblast	99	99	100	100	99
18. City of Moscow	127	127	127	129	128
19. Republic of Karelia	106	106	109	108	109
20. Republic of Komi	108	109	109	110	109
21. Arkhangelsk Oblast (without AO)	109	110	109	107	108
22. Nenets AO	154	151	148	141	139
23. Vologda Oblast	105	104	103	101	103
24. Kaliningrad Oblast	104	104	104	103	104
25. Leningrad Oblast	103	104	104	104	104

26. Murmansk Oblast	120	121	121	121	122
27. Novgorod Oblast	93	94	96	97	97
28. Pskov Oblast	99	99	100	99	98
29. City of Saint Petersburg	110	111	112	112	113
30. Republic of Adygeya	93	93	93	93	93
31. Republic of Kalmykia	84	85	91	92	92
32. Republic of Crimea	96	99	100	100	98
33. Krasnodar Krai	101	101	102	102	102
34. Astrakhan Oblast	95	96	96	96	95
35. Volgograd Oblast	93	93	92	91	91
36. Rostov Oblast	98	96	97	96	97
37. City of Sevastopol	95	101	101	104	104
38. Republic of Dagestan	90	89	90	88	90
39. Republic of Ingushetia	74	72	74	75	76
40. Kabardian-Balkar Republic	90	90	90	88	89
41. Karachai-Cherkess Republic	94	94	93	91	92
42. Republic of Northern Ossetia	91	90	90	88	88
43. Chechen Republic	86	85	89	87	86
44. Stavropol Krai	92	93	96	96	97
45. Republic of Bashkortostan	93	94	95	95	94
46. Republic of Mariy El	88	88	89	89	88
47. Republic of Mordovia	86	85	86	86	86
48. Republic of Tatarstan	90	89	90	89	90
49. Udmurt Republic	94	93	92	93	94
50. Chuvash Republic	89	88	88	88	88
51. Perm Krai	99	98	98	98	100
52. Kirov Oblast	94	92	93	94	93
53. Nizhni Novgorod Oblast	99	100	101	100	100
54. Orenburg Oblast	88	88	89	89	88
55. Penza Oblast	88	88	89	88	89
56. Samara Oblast	97	95	95	92	93
57. Saratov Oblast	88	88	87	87	88
58. Ulyanovsk Oblast	93	94	95	95	95
59. Kurgan Oblast	97	97	97	97	97
60. Sverdlovsk Oblast	102	102	101	100	98
61. Chelyabinsk Oblast	90	87	89	90	90
Asian part of Russia					
Siberia					
62. Republic of Altai	109	108	105	104	104
63. Republic of Tuva	96	94	94	94	94
64. Republic of Khakasia	92	92	93	94	94
65. Altai Krai	89	89	89	90	92
66. Krasnoyarsk Krai	104	103	103	103	103
67. Irkutsk Oblast	97	95	95	96	96
68. Kemerovo Oblast	88	87	88	89	89
69. Novosibirsk Oblast	101	100	98	98	98
70. Omsk Oblast	85	85	85	88	89
71. Tomsk Oblast	98	97	98	99	100
72. Tyumen Oblast (without AOs)	102	103	102	100	100
73. Khanty-Mansi AO	121	119	119	117	116
74. Yamalo-Nenets AO	126	126	124	120	118
Russian Far East					
75. Republic of Buryatia	97	96	97	98	99
76. Republic of Sakha (Yakutia)	127	129	131	131	130
77. Transbaikal Krai	100	100	100	101	103
78. Kamchatka Krai	160	158	155	152	149

79. Primorsky Krai	119	116	115	115	116
80. Khabarovsk Krai	126	124	122	124	123
81. Amur Oblast	108	104	105	105	107
82. Magadan Oblast	141	141	135	135	135
83. Sakhalin Oblast	129	126	124	124	126
84. Jewish Autonomous Oblast	111	110	110	111	113
85. Chukotka AO	158	158	164	165	158

Table 2 (as well as Table 4 below) distinguishes large spatial blocks ('macroregions'), namely, the European and Asian parts of Russia. The latter, in turn, is divided into Siberia and the Russian Far East. Geographers consider the entire Asian part of Russia as Siberia. However, since the 1920s, a different interpretation exists that considers Asian Russia as consisting of Siberia and the Russian Far East. The division between them is ambiguous. This study deems regions that enter into the Far-Eastern Federal District as of 2020 to be the Russian Far East, and those from the Siberian Federal District plus the Tyumen Oblast to be Siberia.

Table 3 provides a generalized pattern of the regional price levels, reporting descriptive statistics of their distribution.

Table 3 Descriptive statistics of regional COLIs

Statistic	2016	2017	2018	2019	2020
Minimum, %	74	72	74	75	76
Maximum, %	160	158	164	165	158
Maximum/minimum	2.2	2.2	2.2	2.2	2.1
Median, %	97.3	96.3	97.0	96.8	96.8
Standard deviation, p.p.	16.0	15.9	15.4	15.1	14.4
Gini index, %	7.7	7.7	7.4	7.3	7.1

The minimal COLI is peculiar to the Republic of Ingushetia in all years under consideration. The maximal COLI occurs in the Kamchatka Krai (in 2016 and 2017) and the Chukotka AO (in 2017 to 2020). As it is mentioned in Section 2, the most expensive town in the Chukotka AO is missing in 2017 and 2020. Counterfactual experiments (inserting missing COLIs with values for previous year) suggest that this leads to underestimation of the Chukotka COLI by 3 or 4 percent points; they would be 161% in 2017 and 162% in 2020. Similar experiments with other differences of the spatial sample across years reveal no significant effects at all. The pattern appears more or less stable with weak indications of convergence (judging from the standard deviation and Gini index).

Depicting the distribution of regional COLI in the first and last years of the time span under consideration, Figure 1 suggests that convergence does take place. The fraction of regions with price levels about the national average, 95% to 105%, increased from 33% in 2016 to 40% in 2020. However, convergence occurred mainly due to the rise in price levels in 'cheap'

regions. The share of regions with COLI below 95% declined from 44% to 38%, while the group of regions with COLI above 105% shrank by one region only.
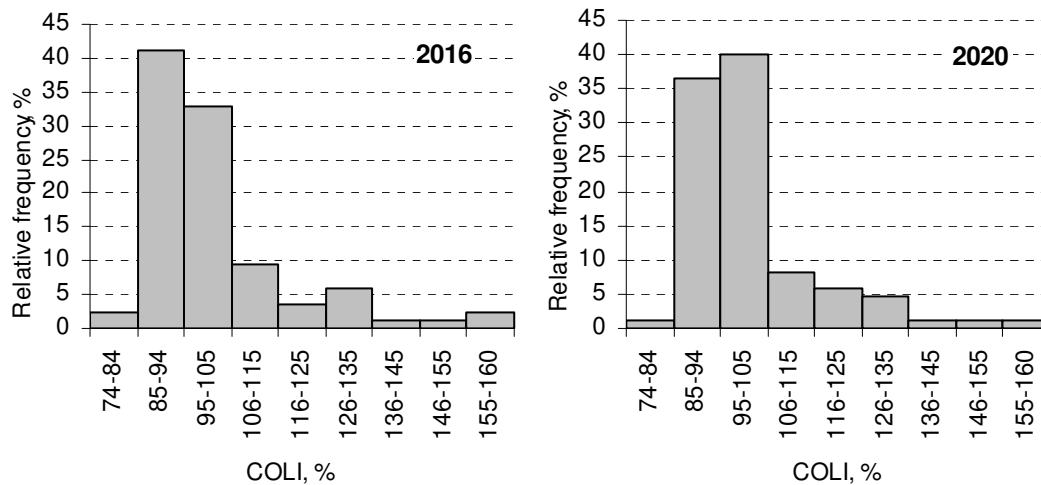

Fig. 1 Histograms of the regional COLI in 2016 and 2020

While Figure 1 deals with a time dimension of the COLI distribution, Figure 2 shows it in a spatial dimension (the range of COLI is aggregated into five grades in it). The spatial pattern of COLI looks reasonable. In the central and southern parts of European Russia, COLIs are about the national average (95% to 105% of it) or below it. Two exceptions are the country capital Moscow (128%) and the surrounding Moscow Oblast (109%) as well as one more megapolis, Saint Petersburg (113%). The phenomenon of high price levels in the capital and major cities is observed in many countries. Higher transportation costs are the reason for high COLI in the northern regions of European Russia. In moderately remote regions, the Republics of Karelia and Komi and the (southern part of) Arkhangelsk Oblast, COLI is 108% or 109%, while in the more remote Murmansk Oblast it rises to 122% and in the difficult-to-access Nenets AO it reaches 139%.

In the south of Siberia, COLIs are about the national average or below it, exceeding this level only in the northern Khanty-Mansi and Yamalo-Nenets AOs. However, it seems that the Krasnoyarsk Krai, with its large northern part, should have a higher COLI. The reason for the low COLI here is that this part is sparsely populated; statistical price observations cover a sole northern city, Norilsk. Despite the high price level (132%), this city contributes about 11% to the regional COLI, which gives only 3 percentage points. In the Russian Far East, COLI is about the national level in two regions only. In most regions, high COLIs are due to the remoteness of these from the rest of Russia and difficult access to some of them (because of poor transport infrastructure).
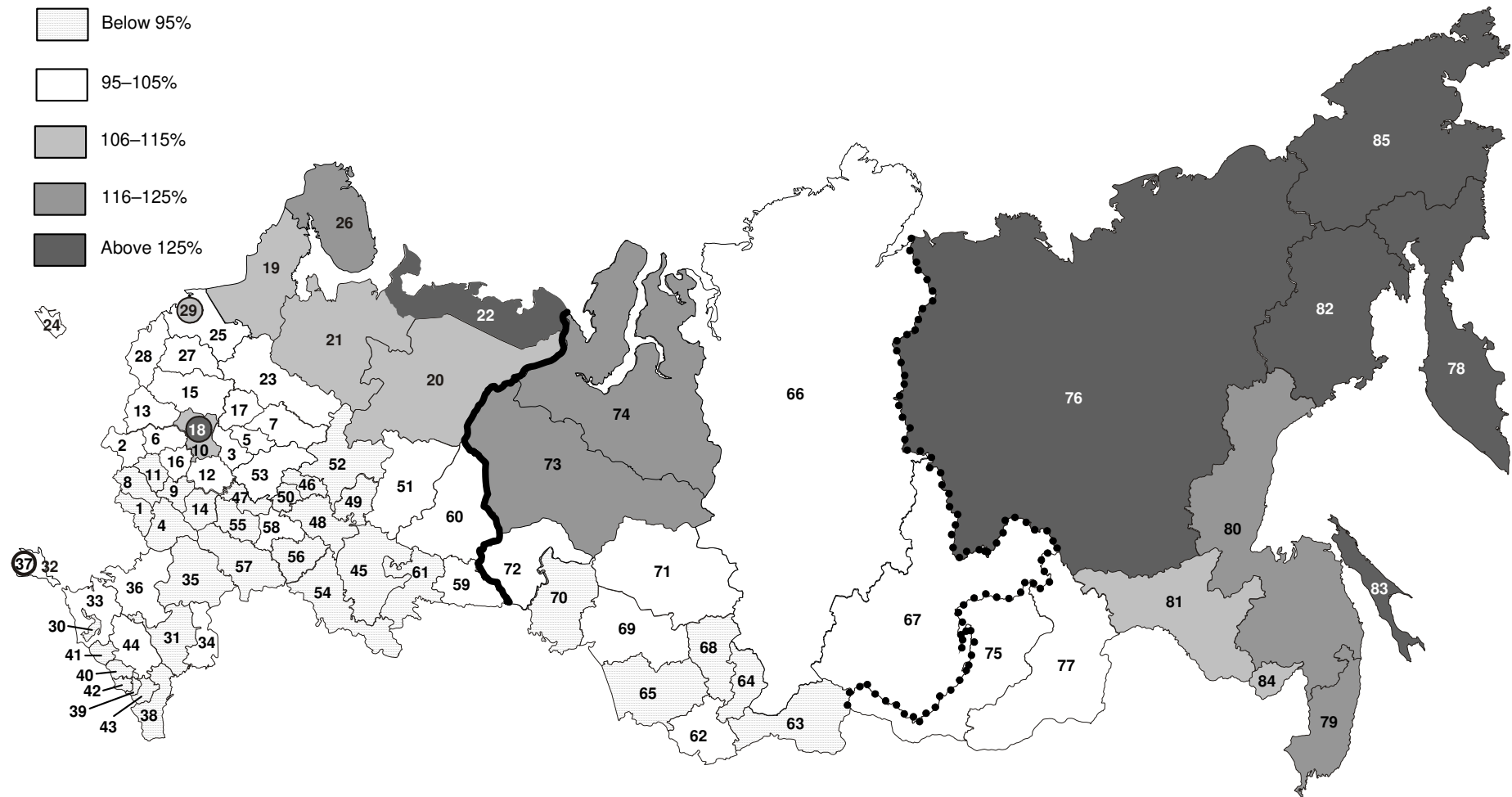
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Fig. 2 Geographical distribution of COLI in 2020

Notes: See Table 2 for numerical designations of regions. The thick line divides the European (westward) and Asian (eastward) parts of Russia; the dotted line divides Siberia (westward) and the Russian Far East (eastward).

4 Real Incomes per Capita in the Regions

The term 'real incomes' means that they are denominated in a monetary unit with a uniform purchasing power. Its sense differs depending on whether a change in purchasing power of the monetary unit in time or across country's locations is meant. In the former – most common – case, incomes are adjusted for inflation (typically, with the use of CPI). In the latter case, incomes are adjusted for differences in prices between locations. It is this meaning of the term 'real incomes' that is used in this paper.

Table 4 reports real incomes per capita in the Russian regions relative to the national average, y_{rt} (where t stands for years). They are computed as

$$y_{rt} = \frac{Y_{rt}/COLI_{rt}}{Y_t}, \tag{4}$$

where Y_{rt} is the nominal income per capita in region r, and Y_t is the national income per capita. Data on nominal personal incomes per capita are drawn from EMISS (2021); COLIs are taken from Table 2.

Table 4 Real income per capita by region (relative to the national income per capita), %

Region	2016	2017	2018	2019	2020
European part of Russia					
1. Belgorod Oblast	113	113	107	106	107
2. Bryansk Oblast	83	83	84	84	83
3. Vladimir Oblast	74	75	72	72	73
4. Voronezh Oblast	102	101	99	98	98
5. Ivanovo Oblast	78	80	74	75	76
6. Kaluga Oblast	95	91	89	91	93
7. Kostroma Oblast	82	82	78	80	74
8. Kursk Oblast	94	94	93	93	94
9. Lipetsk Oblast	102	104	102	104	102
10. Moscow Oblast	124	123	123	123	120
11. Oryol Oblast	83	84	83	82	83
12. Ryazan Oblast	83	82	82	80	79
13. Smolensk Oblast	76	77	77	78	79
14. Tambov Oblast	94	93	90	89	87
15. Tver Oblast	79	79	78	80	80
16. Tula Oblast	92	90	84	84	84
17. Yaroslavl Oblast	87	86	81	81	83
18. City of Moscow	158	162	164	165	166
19. Republic of Karelia	80	81	81	81	83
20. Republic of Komi	95	93	94	91	93
21. Arkhangelsk Oblast (without AO)	63	64	65	68	70
22. Nenets A.O.	211	208	216	214	217
23. Vologda Oblast	82	78	79	79	80
24. Kaliningrad Oblast	80	80	80	80	78
25. Leningrad Oblast	90	89	91	88	89
26. Murmansk Oblast	101	102	103	103	106
27. Novgorod Oblast	88	86	79	76	75
28. Pskov Oblast	72	74	72	73	75

29. City of Saint Petersburg	117	120	121	119	120
30. Republic of Adygeya	87	89	89	89	90
31. Republic of Kalmykia	60	60	56	57	60
32. Republic of Crimea	60	63	65	63	65
33. Krasnodar Krai	106	103	101	99	100
34. Astrakhan Oblast	78	75	74	73	74
35. Volgograd Oblast	75	75	75	75	78
36. Rostov Oblast	88	90	90	90	91
37. City of Sevastopol	89	87	86	82	79
38. Republic of Dagestan	93	93	86	88	86
39. Republic of Ingushetia	69	69	65	63	63
40. Kabardian-Balkar Republic	71	71	70	69	68
41. Karachai-Cherkess Republic	61	60	59	59	57
42. Republic of Northern Ossetia	79	79	78	79	76
43. Chechen Republic	86	82	79	79	79
44. Stavropol Krai	74	76	73	72	69
45. Republic of Bashkortostan	98	95	92	91	90
46. Republic of Mariy El	69	68	67	66	67
47. Republic of Mordovia	67	67	65	65	67
48. Republic of Tatarstan	118	115	113	113	111
49. Udmurt Republic	82	81	78	76	76
50. Chuvash Republic	65	64	63	65	67
51. Perm Krai	91	91	88	88	84
52. Kirov Oblast	74	75	72	71	73
53. Nizhni Novgorod Oblast	98	95	93	96	94
54. Orenburg Oblast	81	81	79	78	77
55. Penza Oblast	76	76	74	74	76
56. Samara Oblast	90	90	90	90	89
57. Saratov Oblast	73	72	74	74	77
58. Ulyanovsk Oblast	79	78	72	71	73
59. Kurgan Oblast	67	66	63	62	63
60. Sverdlovsk Oblast	111	109	110	111	107
61. Chelyabinsk Oblast	85	85	82	80	82

Asian part of Russia
   Siberia

62. Republic of Altai	53	54	56	55	57
63. Republic of Tuva	51	50	50	50	52
64. Republic of Khakasia	69	69	70	68	71
65. Altai Krai	78	78	77	75	73
66. Krasnoyarsk Krai	87	88	88	87	88
67. Irkutsk Oblast	75	78	77	78	78
68. Kemerovo Oblast	79	79	80	79	79
69. Novosibirsk Oblast	86	87	88	89	89
70. Omsk Oblast	94	91	90	87	86
71. Tomsk Oblast	86	86	84	81	81
72. Tyumen Oblast (without AOs)	92	92	93	92	92
73. Khanty-Mansi AO	126	128	128	129	130
74. Yamalo-Nenets AO	186	189	192	197	210

Russian Far East

75. Republic of Buryatia	79	78	74	73	73
76. Republic of Sakha (Yakutia)	99	99	99	98	98
77. Transbaikal Krai	71	72	72	72	73
78. Kamchatka Krai	89	90	95	98	102
79. Primorsky Krai	85	87	90	91	91
80. Khabarovsk Krai	94	94	96	95	95
81. Amur Oblast	84	88	89	89	92

82. Magadan Oblast	118	122	133	137	142
83. Sakhalin Oblast	124	126	130	134	134
84. Jewish Autonomous Oblast	67	67	67	68	69
85. Chukotka AO	139	145	145	143	159

The lowest real incomes in 2016–2020 were in the Republic of Tuva, a depressive region in Siberia. The highest incomes featured the Yamalo-Nenets AO, a northern oil-and-gas-extracting region (also in Siberia). In nominal terms, the lowest incomes were observed in the Republic of Tuva in 2016–2019, and in the Republic of Ingushetia, a North-Caucasian region from European Russia, in 2020. The highest nominal incomes were in the Yamalo-Nenets AO in 2016–2018, and in the Chukotka AO in 2019–2020.

Table 5 tabulates descriptive statistics of incomes per capita relative to the national average, comparing nominal and real incomes.

Table 5 Descriptive statistics of relative incomes per capita in the Russian regions

Indicator	2016	2017	2018	2019	2020
Nominal incomes					
Minimum, %	48.5	47.1	46.9	47.0	47.3
Maximum, %	234.4	238.4	238.7	236.0	250.7
Maximum/minimum	4.8	5.1	5.1	5.0	5.3
Mean, %	91.6	91.4	91.2	90.8	91.7
Median, %	82.1	81.7	80.6	80.2	79.4
Standard deviation, p.p.	37.3	38.1	39.6	39.7	41.1
Gini index, %	18.8	19.0	19.7	19.9	20.0
Real incomes					
Minimum, %	51	50	50	50	52
Maximum, %	211	208	216	214	217
Maximum/minimum	4.2	4.1	4.3	4.3	4.1
Mean, %	89.3	89.3	88.5	88.4	89.0
Median, %	85.1	85.3	82.2	81.2	81.6
Standard deviation, p.p.	25.2	25.4	26.7	27.0	28.1
Gini index, %	13.4	13.4	14.1	14.3	14.3

Comparison of statistics for nominal and real incomes suggests that inter-regional differences, as can be expected, are less in the case of real incomes. To some extent, they are smoothed out by the difference in regional COLI. Indeed, COLI in rich regions are on average higher than those in poor ones are. In 2020, the coefficient of correlation between nominal incomes per capita and COLI was 0.84; a 1-percent change of nominal income changed COLI by 0.32% in the same direction. This decreases regional inequality in real incomes (the Gini index) by about 30% as compared to inequality in nominal incomes. The standard deviation and Gini index evidence weak divergence of both nominal and real incomes over time. The distributions of real incomes plotted in Figure 3 confirms this.
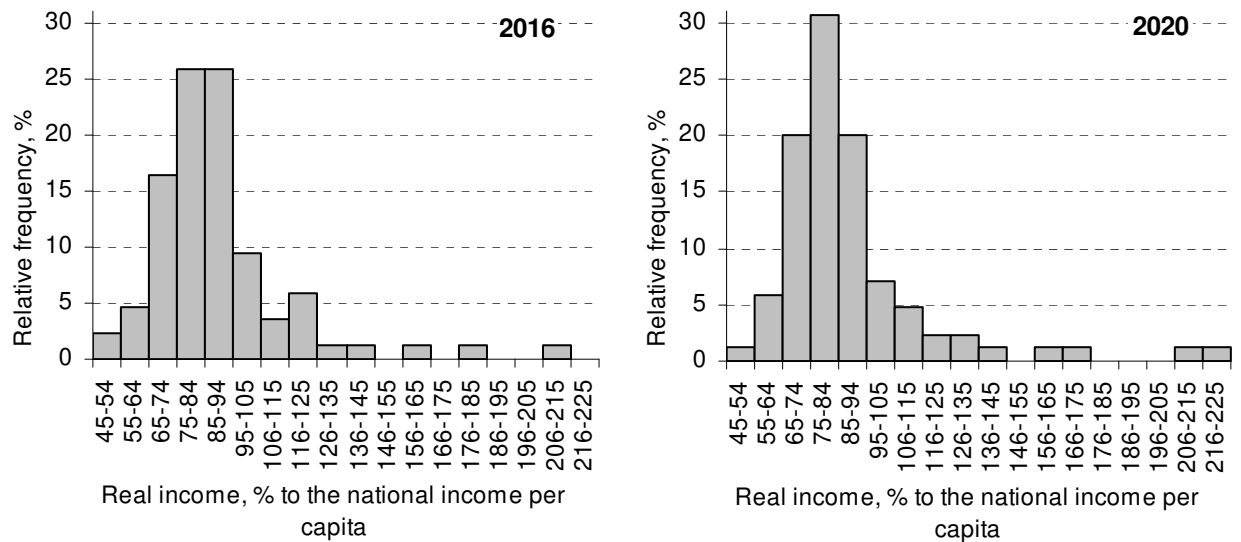
Fig. 3 Histograms of the regional real incomes in 2016 and 2020

The number of regions with real income above 105% of the national level remained in 2020 the same as in 2016, while the number of regions with income about the national level decreased. In general, the distribution in 2020 shifted in the direction of poorer regions. Convergence of regional COLI was not able to prevent divergence of real incomes; it only slightly decreased the divergence.

Since the COVID pandemic began in 2020, it is interesting to compare incomes in 2020 with incomes in the pre-pandemic year. Both the descriptive statistics in Table 5 and detailed data in Table 4 indicate the absence of fundamental changes; the changes are comparable to previous years. However, as mentioned at the end of Section 2, they are changes in regional well-being relative to the national level, and are not capable of reflecting changes in absolute well-being. To capture the latter, it is necessary to take into account the real change in the national level of personal incomes per capita, $\Delta_{t-1,t} = \frac{Y_t/CPI_{t-1,t}}{Y_{t-1}}$, where $CPI_{t-1,t}$ stand for annual CPI. With $Y_{2020}/Y_{2019} = 100.96\%$ and inflation of 4.91% (CPI = 1.0491) we have $\Delta_{2019,2020} = 96.23\%$. That is, the national level of personal incomes per capita in 2020 was by 3.8% lower than in 2019 in prices of that year. It follows from Formula (4) that the change in absolute well-being in region r in 2020 as compared to 2019 can be computed as $\Delta_{r,2019,2020} = \frac{m_{r,2020}}{m_{r,2019}} \Delta_{2019,2020}$. Real income decreased in 2020 as compared to 2019 in most regions, ranging from –9.9% (in the Kostroma Oblast) to –0.2%. However, slight growth occurred in six regions. Among them are three poorest regions (the Republics of Kalmykia, Altai, and Tuva) and three northern regions (the Yamalo-Nenets and Chukotka AOs, and the Kamchatka Krai).

14
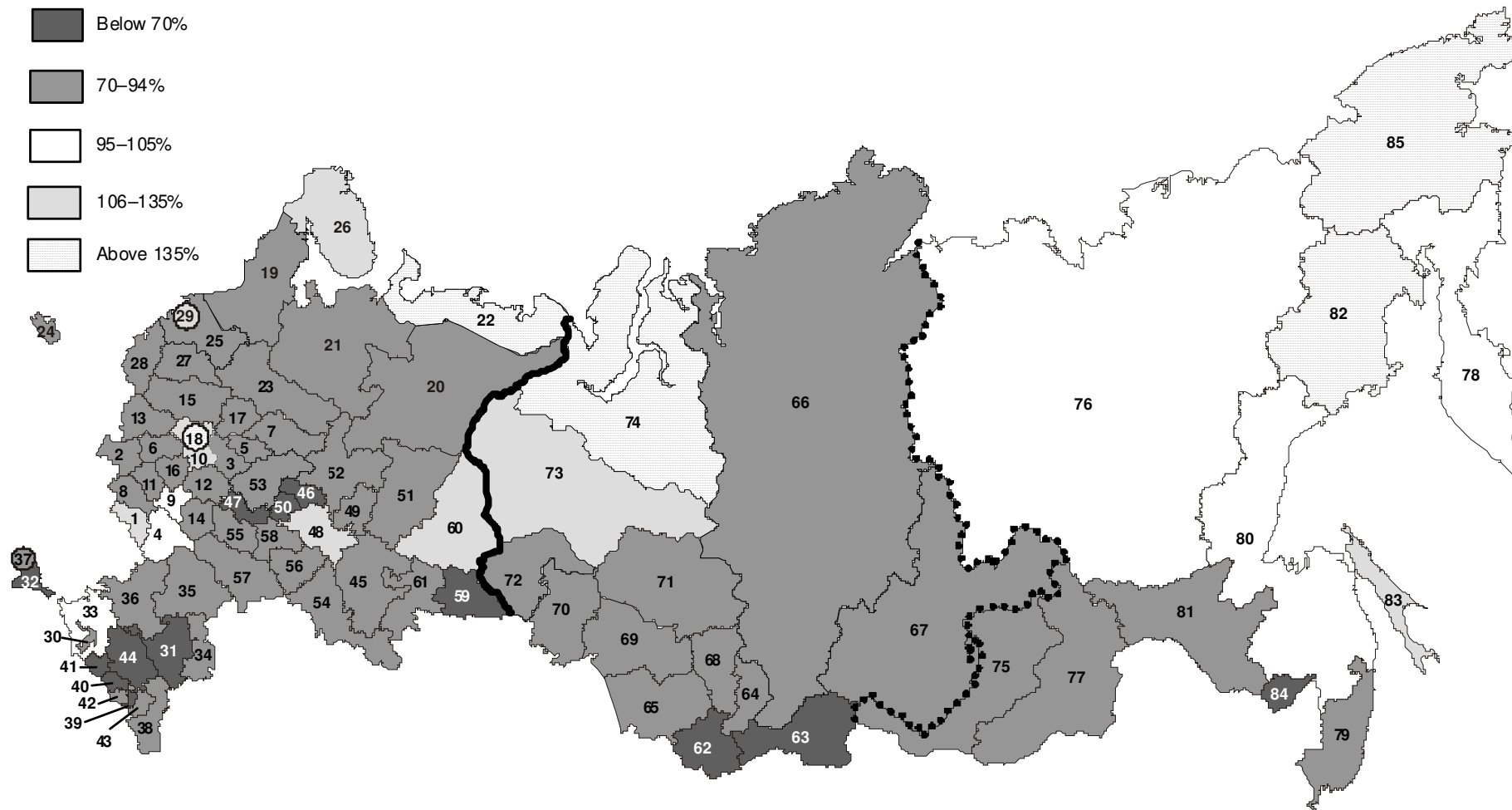
Fig. 4 Geographical distribution of real income in 2020

Notes: See Table 4 for numerical designations of regions. The thick line divides the European (westward) and Asian (eastward) parts of Russia; the dotted line divides Siberia (westward) and the Russian Far East (eastward).

15

Figure 4 relates the estimates of real incomes to geography, aggregating their range into five grades. In European Russia, poor regions prevail. As can be expected, real incomes exceed the national average in the northernmost regions, the Murmansk Oblast and Yamalo-Nenets AO. High real incomes are peculiar to Moscow and the Moscow Oblast as well as to Saint Petersburg despite high COLI there. Apart those, there are only three regions with real incomes above the national level, namely, the Republic of Tatarstan and the Belgorod and Sverdlovsk *oblasts*.

The situation of Asian Russia appears negative from the socio-economic point of view. Real incomes here should be higher than the national level in order to compensate for unfavorable natural conditions and remoteness. To this end, Russian legislation established compensating differentials for all regions of Asian Russia; increasing coefficients to wages and salaries varying from 1.4 to 2.0 (depending on the specific locality). Nonetheless, real incomes exceed the national level only in five regions of Asian Russia. Even the in such northern regions as the Republic of Sakha and the Kamchatka Krai, real incomes are close to the national income per capita, while the increasing coefficient is 1.4 to 2.0 in the former and 1.6 to 2.0 in the latter.

Figure 5 shows the evolution of real incomes per capita by macroregion over 2009–2020. Real incomes in macroregions are calculated as the weighted averages of regional real incomes with weights being proportions of regional population in the total population of the given macroregion. Regional real incomes for 2009–2015 are drawn from Gluschanko & Karandasova (2017).

Fig. 5 The evolution of real personal income per capita by macroregion

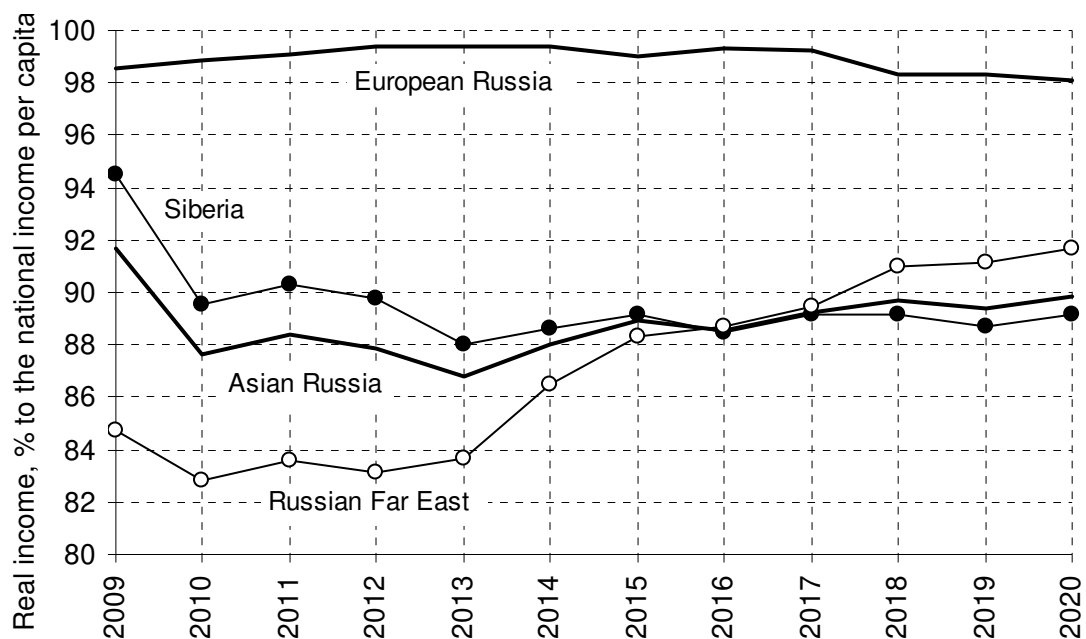Figure 5 evidences no improvement in the situation in Asian Russia over time. Real income here is permanently lower than in the European part of the country, on average by roughly 10%.[6] Some rise in real income in the Russian Far East is accompanied by its decline in Siberia. Real personal incomes, which not only do not compensate for unfavorable living conditions, but are significantly lower than in the European part of the country, are an obstacle to development of Asian Russia and contribute to its depopulation (especially in the Russia Far East).

5 Conclusion

This paper employs official statistical data on the cost of living indices (COLI) across Russian cities/towns over 2016–2020 to obtain regional COLI. The procedure consists in aggregating the city/town COLI by a weight-based averaging. As shown, this procedure is relatively simple, albeit cumbersome.

Regional COLIs obtained moderately converge over the time span under consideration. Their spatial distribution looks reasonable; fundamental spatial differences are explained by high costs of transportation goods to remote regions. In addition, the phenomenon observed in many other countries that the higher the incomes in a location, the higher the prices there, also takes place in Russia. The correlation coefficient between nominal personal incomes per capita in Russian regions and regional COLIs is more than 0.8; the elasticity of COLI vis-à-vis nominal income is about 0.3.

The regional COLIs are used for estimating real personal incomes per capita in the Russian regions relative to the national average. The above-mentioned phenomenon leads to decrease of regional inequality in real incomes by about 30% as compared to inequality in nominal incomes. Despite convergence of COLIs, real incomes slightly diverge over time. In the pandemic 2020, the purchasing power of income fell as compared to the previous year in 79 out of 85 regions (with the maximum decline of almost 10%). The spatial distribution of real incomes appears unsatisfactory. The Asian part of Russia is especially at a disadvantage. Real personal incomes there not only do not compensate for unfavorable living conditions, but also are significantly lower than in the European part of the country, with no signs of improvement over time.

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[6] It may seem strange that in both European and Asian Russia real income is less than 100%. However, the weighted average of real incomes over all regions (i.e., the national real income per capita) need not be 100% (i.e., the national nominal income per capita). Consider a simple numerical example. A country consists of two regions, say, North and South, with populations 25% and 75% of the total, respectively. Let nominal income per capita be 160% of the national income per capita in the North and 80% in the South. Price level (COLI) is 130% relative to the national average in the North and 90% in the South. Then relative real income per capita is 123.1% in the North, 88.9% in the South, and 97.4% (=123.1×0.25+88.9×0.75) in the country as a whole.

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Appendix

Table A1 COLI by region in 2009–2020 , % (Russia as a whole = 100%)

Region	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
European part of Russia												
1. Belgorod Oblast	82.12	83.39	84.40	83.58	84.43	87	87	85	84	86	86	86
2. Bryansk Oblast	89.42	90.31	90.73	90.06	90.91	95	95	94	94	95	95	95
3. Vladimir Oblast	94.75	96.72	97.11	97.00	96.76	99	100	98	98	99	100	99
4. Voronezh Oblast	94.29	95.96	95.62	91.74	89.38	92	93	93	92	92	92	92
5. Ivanovo Oblast	94.40	95.80	96.84	97.16	96.47	99	99	98	98	99	97	97
6. Kaluga Oblast	91.78	92.66	92.63	92.32	92.99	98	99	98	99	98	98	97
7. Kostroma Oblast	89.20	91.66	92.81	93.43	92.11	92	92	92	92	91	90	95
8. Kursk Oblast	88.40	88.45	87.84	87.27	85.84	87	87	88	87	88	89	89
9. Lipetsk Oblast	89.63	90.47	89.63	88.82	87.57	89	89	88	88	88	88	89
10. Moscow Oblast	104.59	106.62	106.30	105.77	107.36	108	108	107	108	109	109	109
11. Oryol Oblast	83.03	84.83	85.69	85.23	85.25	88	89	90	90	90	90	91
12. Ryazan Oblast	96.98	97.14	96.32	95.87	94.42	92	93	92	93	94	95	96
13. Smolensk Oblast	94.35	97.55	98.03	98.13	97.50	102	102	100	100	101	100	100
14. Tambov Oblast	86.25	87.64	88.86	89.23	87.23	88	89	89	88	90	90	90
15. Tver Oblast	100.46	100.31	99.59	100.87	99.88	100	100	98	97	97	96	96
16. Tula Oblast	89.86	91.38	90.62	90.90	90.35	93	95	94	95	97	97	97
17. Yaroslavl Oblast	92.35	93.98	94.65	95.99	96.56	98	100	99	99	100	100	99
18. City of Moscow	123.98	126.71	126.13	127.52	128.93	126	127	127	127	127	129	128
19. Republic of Karelia	97.26	100.57	102.81	102.47	102.82	104	105	106	106	109	108	109
20. Republic of Komi	113.53	114.05	112.31	110.98	110.79	110	110	108	109	109	110	109
21. Arkhangelsk Oblast (without AO)	105.29	109.43	109.82	108.88	108.14	107	108	109	110	109	107	108
22. Nenets AO	174.31	168.40	167.88	163.10	155.73	156	154	154	151	148	141	139
Arkhangelsk Oblast as a whole	107.50	111.40	111.87	110.85	109.91	109	110	111	112	111	112	113
23. Vologda Oblast	102.49	104.20	105.61	105.36	104.39	104	104	105	104	103	101	103
24. Kaliningrad Oblast	104.96	103.69	101.84	101.81	99.67	100	101	104	104	104	103	104
25. Leningrad Oblast	98.62	102.49	101.13	101.69	102.16	102	102	103	104	104	104	104
26. Murmansk Oblast	125.17	126.95	123.49	122.35	118.59	120	120	120	121	121	121	122
27. Novgorod Oblast	91.95	94.88	93.68	93.34	93.37	93	93	93	94	96	97	97
28. Pskov Oblast	91.37	93.51	94.70	95.11	96.39	98	99	99	99	100	99	98
29. City of Saint Petersburg	107.25	108.67	107.82	108.06	108.95	108	108	110	111	112	112	113
30. Republic of Adygeya	90.85	91.66	90.87	90.96	89.47	92	93	93	93	93	93	93

31. Republic of Kalmykia	83.87	85.73	86.18	86.37	86.88	88	88	84	85	91	92	92
32. Republic of Crimea							89	96	99	100	100	98
33. Krasnodar Krai	96.14	98.97	95.46	94.53	94.71	100	101	101	101	102	102	102
34. Astrakhan Oblast	89.21	89.97	90.77	90.19	89.76	91	93	95	96	96	96	95
35. Volgograd Oblast	90.57	92.03	91.78	91.87	90.40	89	93	93	93	92	91	91
36. Rostov Oblast	96.19	97.73	97.41	97.41	97.32	99	99	98	96	97	96	97
37. City of Sevastopol							84	95	101	101	104	104
38. Republic of Dagestan	87.75	90.20	90.82	91.74	91.34	90	91	90	89	90	88	90
39. Republic of Ingushetia	89.69	92.05	90.27	89.28	86.18	84	86	74	72	74	75	76
40. Kabardian-Balkar Republic	81.19	82.36	82.63	84.20	86.30	90	91	90	90	90	88	89
41. Karachai-Cherkess Republic	86.16	89.48	90.24	90.54	91.64	94	94	94	94	93	91	92
42. Republic of Northern Ossetia	84.01	87.20	87.37	88.04	87.70	91	90	91	90	90	88	88
43. Chechen Republic	90.80	96.91	97.57	97.16	94.74	97	99	86	85	89	87	86
44. Stavropol Krai	96.95	99.57	99.11	96.68	93.00	94	93	92	93	96	96	97
45. Republic of Bashkortostan	87.28	90.46	90.98	89.65	89.38	91	93	93	94	95	95	94
46. Republic of Mariy El	83.51	85.97	86.47	85.81	85.36	88	89	88	88	89	89	88
47. Republic of Mordovia	83.87	87.85	89.15	89.10	87.97	89	89	86	85	86	86	86
48. Republic of Tatarstan	83.18	86.59	87.05	87.69	90.17	92	91	90	89	90	89	90
49. Udmurt Republic	85.04	87.78	88.53	88.90	89.83	92	93	94	93	92	93	94
50. Chuvash Republic	86.37	88.27	88.62	87.90	87.57	88	88	89	88	88	88	88
51. Perm Krai	102.89	103.74	103.11	103.08	101.47	100	99	99	98	98	98	100
52. Kirov Oblast	94.99	96.12	97.80	96.50	96.78	95	95	94	92	93	94	93
53. Nizhni Novgorod Oblast	97.68	98.10	98.53	99.03	99.02	101	101	99	100	101	100	100
54. Orenburg Oblast	86.07	87.13	87.91	87.70	87.85	88	89	88	88	89	89	88
55. Penza Oblast	86.68	89.01	89.10	87.44	86.27	87	88	88	88	89	88	89
56. Samara Oblast	103.79	102.10	101.67	101.51	100.15	98	98	97	95	95	92	93
57. Saratov Oblast	86.68	88.33	88.31	88.12	88.81	88	89	88	88	87	87	88
58. Ulyanovsk Oblast	87.03	88.36	89.01	89.04	90.18	91	92	93	94	95	95	95
59. Kurgan Oblast	91.26	93.62	94.51	95.07	94.00	96	97	97	97	97	97	97
60. Sverdlovsk Oblast	103.21	105.61	106.05	106.08	105.12	102	103	102	102	101	100	98
61. Chelyabinsk Oblast	88.34	89.34	90.77	90.94	91.44	91	91	90	87	89	90	90
Asian part of Russia												
Siberia												
62. Republic of Altai	107.23	108.92	103.30	104.69	104.09	110	110	109	108	105	104	104
63. Republic of Tuva	96.98	99.35	99.51	99.53	98.49	97	97	96	94	94	94	94
64. Republic of Khakasia	94.20	97.04	96.30	95.36	97.21	97	94	92	92	93	94	94

65. Altai Krai	88.06	89.02	88.27	87.20	87.36	87	88	89	89	89	90	92
66. Krasnoyarsk Krai	105.32	106.50	105.81	107.52	108.06	104	104	104	103	103	103	103
67. Irkutsk Oblast	96.24	98.55	98.01	98.10	98.09	95	95	97	95	95	96	96
68. Kemerovo Oblast	85.25	87.20	86.96	87.68	89.67	89	88	88	87	88	89	89
69. Novosibirsk Oblast	101.11	102.41	101.85	101.75	102.48	101	101	101	100	98	98	98
70. Omsk Oblast	85.50	84.86	83.53	83.54	84.29	85	85	85	85	85	88	89
71. Tomsk Oblast	98.44	99.68	99.65	99.54	99.73	99	98	98	97	98	99	100
72. Tyumen Oblast (without AOs)	102.54	104.24	104.71	103.57	102.70	101	100	102	103	102	100	100
73. Khanty-Mansi AO	131.69	132.14	130.28	128.04	126.03	121	121	121	119	119	117	116
74. Yamalo-Nenets AO	134.27	146.07	140.43	138.07	134.29	132	128	126	126	124	120	118
Tyumen Oblast as a whole	119.51	122.53	120.90	119.08	117.08	114	112	113	113	112	110	109
Russian Far East												
75. Republic of Buryatia	95.96	98.20	99.19	100.40	98.87	99	99	97	96	97	98	99
76. Republic of Sakha (Yakutia)	131.51	130.53	130.06	131.20	129.10	128	125	127	129	131	131	130
77. Transbaikal Krai	98.14	101.56	101.72	101.72	100.73	98	99	100	100	100	101	103
78. Kamchatka Krai	167.87	170.41	166.34	165.97	161.10	164	159	160	158	155	152	149
79. Primorsky Krai	116.22	116.85	116.69	117.39	116.97	117	119	119	116	115	115	116
80. Khabarovsk Krai	131.66	133.45	133.42	134.18	131.72	129	130	126	124	122	124	123
81. Amur Oblast	105.79	108.00	109.25	109.92	107.41	109	109	108	104	105	105	107
82. Magadan Oblast	142.05	142.14	142.28	144.74	143.86	142	141	141	141	135	135	135
83. Sakhalin Oblast	143.98	143.03	141.58	138.96	135.22	136	131	129	126	124	124	126
84. Jewish Autonomous Oblast	108.29	110.74	111.80	113.84	114.67	111	112	111	110	110	111	113
85. Chukotka AO	198.95	192.40	183.16	184.23	180.90	170	160	158	158	164	165	158

Note: Data for 2009 –2015 are from Gluschenko & Karandashova (2017) with minor modifications.

Table A2 Real income per capita by region (relative to the national income per capita) in 2009–2020 , % (Russia as a whole = 100%)

Region	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
European part of Russia												
1. Belgorod Oblast	102.0	107.5	107.2	111.6	107.2	103	107	113	113	107	106	107
2. Bryansk Oblast	76.0	78.0	81.4	83.5	80.1	79	82	83	83	84	84	83
3. Vladimir Oblast	67.6	70.7	70.9	72.0	72.7	72	75	74	75	72	72	73
4. Voronezh Oblast	75.3	76.3	80.1	88.9	94.5	99	105	102	101	99	98	98
5. Ivanovo Oblast	58.6	61.2	64.6	71.0	71.7	73	75	78	80	74	75	76
6. Kaluga Oblast	86.3	88.1	91.2	96.8	93.1	91	92	95	91	89	91	93
7. Kostroma Oblast	71.0	76.6	75.6	73.1	71.7	76	79	82	82	78	80	74
8. Kursk Oblast	85.7	87.6	89.8	93.1	88.2	92	97	94	94	93	93	94
9. Lipetsk Oblast	95.7	92.9	90.3	96.1	97.6	100	100	102	104	102	104	102
10. Moscow Oblast	113.5	112.0	115.9	124.5	119.6	117	118	124	123	123	123	120
11. Oryol Oblast	77.9	81.5	83.3	85.0	78.8	79	82	83	84	83	82	83
12. Ryazan Oblast	73.0	75.4	73.9	79.3	78.1	84	84	83	82	82	80	79
13. Smolensk Oblast	79.1	78.7	78.4	80.3	73.8	74	77	76	77	77	78	79
14. Tambov Oblast	82.1	82.0	82.0	84.2	87.9	90	92	94	93	90	89	87
15. Tver Oblast	71.8	72.9	72.2	73.8	75.1	77	79	79	79	78	80	80
16. Tula Oblast	86.9	88.6	90.1	91.6	84.8	86	89	92	90	84	84	84
17. Yaroslavl Oblast	86.0	81.3	78.9	83.5	83.3	85	88	87	86	81	81	83
18. City of Moscow	191.3	183.4	180.5	165.3	168.9	161	158	158	162	164	165	166
19. Republic of Karelia	87.0	84.2	82.1	84.3	83.6	80	81	80	81	81	81	83
20. Republic of Komi	104.7	103.0	102.5	104.9	100.9	98	94	95	93	94	91	93
21. Arkhangelsk Oblast (without AO)	55.8	57.8	58.1	57.3	59.5	62	64	63	64	65	68	70
22. Nenets AO	276.0	252.0	239.4	246.5	240.8	229	221	211	208	216	214	217
Arkhangelsk Oblast as a whole	96.5	92.8	92.3	89.9	89.8	94	94	92	91	92	91	91
23. Vologda Oblast	70.7	71.5	71.3	74.6	70.8	76	79	82	78	79	79	80
24. Kaliningrad Oblast	83.3	81.6	79.8	82.3	78.4	82	83	80	80	80	80	78
25. Leningrad Oblast	75.3	76.2	75.8	76.1	75.7	77	83	90	89	91	88	89
26. Murmansk Oblast	105.6	99.9	98.6	101.8	104.8	103	101	101	102	103	103	106
27. Novgorod Oblast	86.2	86.7	87.2	90.2	85.9	90	92	88	86	79	76	75
28. Pskov Oblast	74.1	72.2	72.1	73.8	72.2	73	72	72	74	72	73	75
29. City of Saint Petersburg	118.9	120.5	116.4	110.9	109.0	112	115	117	120	121	119	120
30. Republic of Adygeya	68.8	70.7	75.6	80.8	81.5	88	82	87	89	89	89	90
31. Republic of Kalmykia	49.1	47.8	49.3	50.8	52.3	54	57	60	60	56	57	60
32. Republic of Crimea							58	60	63	65	63	65

23

33. Krasnodar Krai	84.7	90.0	94.8	98.8	103.3	102	103	106	103	101	99	100
34. Astrakhan Oblast	86.3	86.2	85.0	84.9	86.5	88	85	78	75	74	73	74
35. Volgograd Oblast	81.9	79.0	76.1	75.1	77.8	79	79	75	75	75	75	78
36. Rostov Oblast	78.8	79.1	79.1	80.1	82.1	84	86	88	90	90	90	91
37. City of Sevastopol							70	89	87	86	82	79
38. Republic of Dagestan	89.4	91.7	96.8	97.3	91.9	94	97	93	93	86	88	86
39. Republic of Ingushetia	52.8	55.2	61.6	59.4	60.0	64	59	69	69	65	63	63
40. Kabardian-Balkar Republic	72.8	72.3	73.6	70.2	67.6	67	69	71	71	70	69	68
41. Karachai-Cherkess Republic	63.2	64.1	62.6	63.7	60.4	63	62	61	60	59	59	57
42. Republic of Northern Ossetia	70.3	79.8	75.8	79.1	76.1	77	80	79	79	78	79	76
43. Chechen Republic		65.2	69.2	67.7	74.7	74	76	86	82	79	79	79
44. Stavropol Krai	68.6	69.0	70.1	76.1	78.7	80	75	74	76	73	72	69
45. Republic of Bashkortostan	109.3	102.0	100.7	102.2	104.0	103	97	98	95	92	91	90
46. Republic of Mariy El	65.2	63.4	63.0	62.9	66.3	69	69	69	68	67	66	67
47. Republic of Mordovia	67.2	67.8	64.5	63.2	62.1	64	65	67	67	65	65	67
48. Republic of Tatarstan	113.1	112.2	111.8	117.9	116.6	117	118	118	115	113	113	111
49. Udmurt Republic	77.0	78.0	78.6	80.9	77.0	80	86	82	81	78	76	76
50. Chuvash Republic	65.7	66.1	65.6	67.4	65.7	68	68	65	64	63	65	67
51. Perm Krai	103.4	100.8	99.4	97.5	95.7	99	106	91	91	88	88	84
52. Kirov Oblast	70.1	73.2	72.2	74.7	69.9	75	75	74	75	72	71	73
53. Nizhni Novgorod Oblast	87.8	88.6	89.6	94.5	95.8	97	98	98	95	93	96	94
54. Orenburg Oblast	82.6	82.1	81.5	81.2	81.5	86	85	81	81	79	78	77
55. Penza Oblast	77.9	76.6	76.5	78.4	75.8	78	81	76	76	74	74	76
56. Samara Oblast	102.8	104.5	103.0	104.8	102.4	98	94	90	90	90	90	89
57. Saratov Oblast	71.6	72.5	71.4	69.8	71.4	73	75	73	72	74	74	77
58. Ulyanovsk Oblast	73.2	78.4	77.4	79.2	77.1	83	82	79	78	72	71	73
59. Kurgan Oblast	78.8	76.1	73.1	73.1	70.7	70	69	67	66	63	62	63
60. Sverdlovsk Oblast	113.1	110.8	113.0	113.1	112.8	112	110	111	109	110	111	107
61. Chelyabinsk Oblast	101.9	99.3	97.9	93.8	93.6	93	89	85	85	82	80	82

Asian part of Russia
  Siberia

62. Republic of Altai	61.2	65.5	64.5	58.8	54.9	56	54	53	54	56	55	57
63. Republic of Tuva	61.3	53.9	53.0	52.0	53.6	52	53	51	50	50	50	52
64. Republic of Khakasia	67.3	69.6	71.1	72.3	66.7	66	67	69	69	70	68	71
65. Altai Krai	66.3	65.4	68.2	67.2	70.8	76	79	78	78	77	75	73
66. Krasnoyarsk Krai	95.6	90.4	91.6	90.2	87.4	85	86	87	88	88	87	88

67. Irkutsk Oblast	85.5	80.9	78.6	78.2	74.8	75	75	75	78	77	78	78
68. Kemerovo Oblast	95.4	92.8	92.2	90.9	83.9	82	82	79	79	80	79	79
69. Novosibirsk Oblast	88.5	83.8	86.2	87.7	85.9	84	83	86	87	88	89	89
70. Omsk Oblast	97.3	94.5	99.4	100.5	95.3	100	98	94	91	90	87	86
71. Tomsk Oblast	83.7	79.8	79.8	78.0	89.3	90	90	86	86	84	81	81
72. Tyumen Oblast (without AOs)	108.1	100.3	100.1	98.1	91.6	94	94	92	92	93	92	92
73. Khanty-Mansi AO	144.7	129.3	125.3	122.2	123.2	123	127	126	128	128	129	130
74. Yamalo-Nenets AO	177.2	156.6	160.3	164.0	170.6	171	175	186	189	192	197	210
Tyumen Oblast as a whole	137.3	123.8	122.2	121.0	120.3	121	123	122	123	124	125	127
Russian Far East												
75. Republic of Buryatia	79.9	76.7	76.2	75.9	74.4	76	79	79	78	74	73	73
76. Republic of Sakha (Yakutia)	95.2	93.3	94.8	94.2	92.3	95	98	99	99	99	98	98
77. Transbaikal Krai	76.6	73.8	75.5	74.3	73.7	73	74	71	72	72	72	73
78. Kamchatka Krai	84.8	83.6	83.8	82.4	85.9	87	89	89	90	95	98	102
79. Primorsky Krai	78.9	78.1	79.0	79.5	79.1	85	87	85	87	90	91	91
80. Khabarovsk Krai	89.6	88.8	85.7	82.4	86.4	89	90	94	94	96	95	95
81. Amur Oblast	73.8	70.0	78.4	85.4	83.5	85	85	84	88	89	89	92
82. Magadan Oblast	103.1	103.2	103.0	109.0	114.3	116	119	118	122	133	137	142
83. Sakhalin Oblast	116.5	113.3	109.7	101.4	108.8	113	121	124	126	130	134	134
84. Jewish Autonomous Oblast	74.6	73.1	71.1	69.8	69.3	72	70	67	67	67	68	69
85. Chukotka AO	100.0	104.6	113.1	113.4	119.7	128	130	139	145	145	143	159

Note: Data for 2009 –2015 are from Gluschenko & Karandashova (2017) with minor modifications.