

# Regional Price Levels in the Czech Republic

Petr Musil<sup>1</sup> | *Czech Statistical Office, Prague, Czech Republic*

## Abstract

International comparison belongs to statistical topics which attracts either experts or general public. Official statistics provides estimates of national price levels only. Therefore, official regional analysis is based on national price levels and does not take into account potential differences in prices among regions within a country. Fortunately, researchers have been dealing with them and estimates for several countries are available.

The topic is also important in the Czech Republic even two papers focused on regional price levels were published in *Statistika* journal in 2016. The aim of the paper is to compare both approaches from various perspectives.<sup>2</sup>

## Keywords

*Regional price levels, comparison, Czech Republic*

## JEL code

*R10*

## INTRODUCTION

International comparison of economic indicators started in 1960s. In the beginning, economic indicators were transformed to the same currency (e.g. US dollar) using exchange rate. On one hand, the method is very easy, on the other hand, exchange rate does not reflect actual difference in price levels. At the best case, it describes price relations of negotiable products. Highly sophisticated approach has been developed by international institutions. The approach is based on expenditure side and covers all products in the economy including non-negotiable ones, for more details see Eurostat-OECD Methodological Manual on Purchasing Power Parities (EC, OECD, 2012). Indicators at national currencies are transformed to the artificial currency PPS (purchase power standard) using purchase power parities (PPPs) that express actual price differences.

Regional accounts may be considered as national accounts for a region. Actually, a limited set of indicators is available for many countries because of restricted data sources and severity of compilation. European standard on national accounts ESA 2010 (EC, 2013) does not require expenditure components of GDP at regional level. Regional price levels are not officially compiled, nevertheless they have been estimated in several countries by researchers.

<sup>1</sup> Na padesátém 81, 100 82 Prague 10, Czech Republic. E-mail: petr.musil@czso.cz, phone: (+420)274052308. Author is also working at the University of Economics in Prague, Nám. W. Churchilla 4, 130 67 Prague 3, Czech Republic.

<sup>2</sup> Editor's note: another discussion paper comparing these two articles focused on regional price levels (both published in *Statistika: Statistics and Economy Journal* in 2016) will be published in the next *Statistika* issue No. 3/2017.

## 1 STATE OF THE ART IN THE CZECH REPUBLIC

Kramulová et al. (2016) and Kocourek et al. (2016) published papers focused on regional price levels in *Statistika* journal in 2016. This is undoubtedly a current issue desired in academic community. Both author teams declare more or less the same goal: to assess price differences among regions of the Czech Republic. It seems that research has been carried out independently as approaches are slightly different.

### 1.1 Methodology

Both papers offer an extensive literature review. Readers are apprised of approaches in other countries (e.g. Germany, China, UK, USA, Slovakia). Kramulová et al. (2016) provide the follow up to the previous research and describe only changes in methodology. Original methodology can be found in Čadil et al. (2014). Kocourek et al. (2016) introduce their methodology and data sources.

Generally, both author teams argue that their methodology is more or less based on the international recommendations given in Eurostat-OECD Methodological Manual on Purchasing Power Parities (hereafter Manual). However, differences compared to the Manual are not negligible and may have an impact on the results. Both approaches are focused on household expenditure only though this indicator is not officially published within regional accounts. It is obvious that the main reason is the interest in living conditions of households. Nevertheless, I see the research challenge to estimate regional price level for GDP (including other expenditure components). It would improve interregional analysis of economic performance. As mentioned, regional GDP by expenditure approach is not published by official statistics, but estimated by researchers (Sixta and Vltavská, 2016).

Both teams follow the Manual in estimating weights and aggregation methods. Weights are based regional consumption baskets estimated independently and the EKS method (Éltető-Köves-Szulc) is applied for aggregation. A data collection is carried out for international comparison that cannot be used for regional price levels. The Czech Statistical Office conducts monthly price collection for consumer price index which is carried out in 35 districts representing about 50% districts in the Czech Republic (CZSO, 2016). It should be mentioned that prices of selected products are not surveyed by interviewers in stores but they are collected centrally i.e. no regional data are available. Moreover, data collection is designed to provide reliable results for the Czech Republic but representativeness at regional level is not ensured. This data source is used in both papers and it should be emphasized in order to acquaint the users with the limits of the results even though data were checked and processed.

As prices for some products in some regions were missing they had to be estimated. Both approaches are based on similar methods (e.g. bridging) that are recommended in the Manual. Above that, regional prices for selected products are not available at all. Kramulová et al. (2016) stated that e-commerce has become more common which leads to the decrease in regional differences. An important item for which regional prices are not available is rent which influences regional price levels significantly. Completely different approaches were applied by both teams. Kramulová et al. (2016) more or less follow the Manual (chapter 6) and use mainly stratification method. Rent of dwellings for which stratification method is not applied was estimated using model approach that is based on prices of buildings. The approach of Kocourek et al. (2016) is inspired by Melser and Hill (2007) and it is based on mortgages repayments. It should be mentioned that mortgages repayments are considered as consumption expenditure neither in national accounts nor in household budget survey. Melser and Hill (2007) published quite comprehensive article where approaches to spatial analysis are compared and discussed. They argued that payments approach is problematic (Melser and Hill, 2007, p. 28). The paper is mainly focused on practice in New Zealand. Apart from the Czech approach, CPI in New Zealand comprises also purchase and construction of dwellings (Melser and Hill, 2007, p. 83). It means that weighting scheme of CPI is based on a different concept including investments to dwellings. It may have an impact of results as the used approach measures something that is not included in the weighting scheme.

## 1.2 Results

Kramulová et al. (2016) published just regional price levels for NUTS 3 ('kraje') without any additional breakdown. Authors also performed comparison with the previous research and analyzed differences between regional price levels for 2007 and 2012. Revaluation of regional net disposable income of households to regional price levels was carried out. Next authors discussed comparability of results for 2007 and 2012 as several changes occurred in meantime.

Kocourek et al. (2016) presented a set of extensive results. Regional price levels are published for each district broken down by COICOP classification (12 divisions). Aggregation to NUTS 3 and NUTS 2 regions is also carried out. Authors were able to estimate directly regional price levels in regions where data collection is performed. Regional price levels in other districts were estimated using regression analysis as the similar approach was applied by Roos (2006) for German regional price levels. However, approaches are not completely the same; Roos (2006) used fewer predictors such as GDP per capita. It is obvious that these predictors cannot be applied at district level in the Czech Republic. Kocourek et al. (2016) used different predictors for each division of COICOP classification. Although statistical significance of all parameters was proved, the factual dependence may be questionable. For instance, authors identified a relation between prices of alcoholic beverages (purchased in outlets), tobacco and narcotics (COICOP 02) and number of business units operating in the field of accommodation and food services activities per 1 000 inhabitants and also number of business units operating in the field of arts, entertainment and recreation per 1 000 inhabitants.

The comparison of results is shown in Table 1. Unsurprisingly, the highest price level is observed in Hlavní město Praha according to both approaches. Kramulová et al. (2016) estimated regional price level at 122.3 whereas Kocourek et al. (2016) at 117.1. The reasoning is provided in both papers. Generally, the differences in price levels are recorded in Kramulová et al. (2016) as standard deviation is 6.8 than in Kocourek et al. (standard deviation 4.8). Except Hlavní město Praha estimated regional price levels differ less than 5 p.p.

**Table 1** Comparison of results

Region	Regional price levels		
	Kramulová et al. (2016)	Kocourek et al. (2016)	Difference (p.p.)
Hlavní město Praha	122.3	117.1	5.2
Středočeský kraj	106.3	104.8	1.5
Jihočeský kraj	99.0	99.7	-0.7
Plzeňský kraj	100.0	100.1	-0.1
Karlovarský kraj	99.9	97.7	2.2
Ústecký kraj	96.7	97.4	-0.7
Liberecký kraj	100.5	101.4	-0.9
Královhradecký kraj	96.7	101.2	-4.5
Pardubický kraj	96.2	100.1	-3.9
Kraj Vysočina	93.1	97.7	-4.6
Jihomoravský kraj	100.6	103.0	-2.4
Olomoucký kraj	96.9	99.2	-2.3
Zlínský kraj	97.5	101.5	-4.0
Moravskoslezský kraj	97.2	98.9	-1.7

Source: Own construction, Kramulová et al. (2016), Kocourek et al. (2016)

## CONCLUSION

I highly appreciate that researchers have dealt with regional price levels in the Czech Republic. I find the issue very important as it has an impact on regional indicators. Nevertheless, official statistics will probably never estimate regional price levels as source data are very limited or not available at all. Users should keep in mind that estimated regional price levels are less reliable than national price levels because of above mentioned reasons. As the methodology differs the results vary but the main findings are more or less the same. I assume that the main reason of different results is a dissimilar approach to dwelling services. Users whose attention is drawn to macroeconomic statistics would probably prefer research conducted by Kramulová et al. (2016). I see the main advantage in consistency with national accounts indicators in terms of the same principles, definitions and breakdowns. General public probably identify with the second research that offers more detailed results which enable to compare districts. Detailed regional analysis can also benefit from the detailed breakdown though reliability is lower. Nevertheless, results are dependent on selected predictors and their factual and statistical relationships to regional price levels.

## References

- ČADIL, J., MAZOUCH, P., MUSIL, P., KRAMULOVÁ, J. True Regional Purchasing Power: Evidence from the Czech Republic. *Post-Communist Economies*, 2014, Vol. 26, No. 2, pp. 241–256.
- CZSO. *Inflation – Types, Definition, Tables* [online]. Prague: Czech Statistical Office, 2016. [cit. 1.3.2017]. < [https://www.czso.cz/csu/czso/inflation\\_rate](https://www.czso.cz/csu/czso/inflation_rate) >.
- EUROPEAN COMMISSION. *European System of Accounts (ESA 2010)*. Luxembourg: Publications Office of the European Union. 2013.
- EUROPEAN COMMISSION / OECD. *Eurostat-OECD Methodological Manual on Purchasing Power Parities*. 2<sup>nd</sup> Ed. Luxembourg: Publications Office of the European Union, 2012.
- KRAMULOVÁ J., MUSIL, P., ZEMAN, J., MICHLOVÁ R. Regional Price Levels in the Czech Republic – Past and Current Perspectives [online]. *Statistika: Statistics and Economy Journal*, 2016, Vol. 96, Iss. 3, pp. 22–34.
- KOCOUREK A., ŠIMANOVÁ, J., ŠMÍDA J. Estimation of Regional Price Levels in the Districts of the Czech Republic [online]. *Statistika: Statistics and Economy Journal*, 2016, Vol. 96, Iss. 4, pp. 56–70.
- MELSER, D. AND HILL, R. Methods for Constructing Spatial Cost of Living Indexes. *Official Statistics Research Series*, 2007, Vol. 1, pp. 1–113.
- ROOS, M. W. Regional price Levels in Germany. *Applied Economics*, 2006, Vol. 38, Iss. 1, pp. 1553–1566.
- SIXTA, J. AND VLTAVSKÁ, K. Regional Input-output Tables: Practical Aspects of its Compilation for the Regions of the Czech Republic. *Ekonomický časopis*, 2016, Vol. 64, Iss. 1, pp. 56–69.