Regional Disparities in Housing Affordability in the Czech Republic

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Abstract: The paper is focused on measuring regional disparities in financial affordability of housing in the Czech Republic in the period 2000-2006. The aim of the paper is to discover whether the disparities have been growing or shrinking among regions and among different types of households and what were the reasons behind such development. Due to the lack of relevant data file(s) on household incomes and housing expenditures the authors used alternative methodological approach. In the first step the authors defined (according to Census 2001 data) different 'model' types of households – different in the size of the household, in the economic activity of household members and in occupational status of each household member. For such 'model' types of households the authors calculated disposable incomes using the official wage statistics (gross wages) and simulation model of taxes and benefits. In the second step the authors set housing standards for the different household types (appropriate housing). For measuring housing affordability and regional differences in housing affordability several indicators were used (e.g. share of housing expenditures on household incomes, residual income, price-to-income ratio, lending multiplier). Other indicators were used for assessment of the development of regional disparities (e.g. variation coefficient, β-divergence coefficient etc). The results show that regional disparities in affordability of both rental and owner-occupied housing increased in the period 2000-2003 for all types of households and decreased in the period 2004-2006. The paper then analyzes the reasons of the specific development in regional disparities in housing affordability.

Introduction

Regions in the Czech Republic (NUTS 3 regions, a total of 14 administrative regions including Prague as an independent region) exhibit disparity mainly in the areas of economic performance (the region's share of GDP) and employment trends, and differences between regions became more pronounced particular in the 1990s (Hampl 2001, Blažek, Csank 2007). This trend was caused by the basic changes in society and in the economy, which occurred during the transition period and in response to the artificial equalising policy of the state in the period before 1989. The dynamic changes in regional differentiation occurred primarily in the second half of the 1990s, while after 2000 regional disparities hovered around the levels already attained, and new regional structures of the CR began to stabilise (Blažek, Csank 2007). Regional differences in the economic performance of regions are accompanied by regional disparities in infrastructure, educational conditions, and housing conditions.

As demonstrated in many publications focusing on the analysis and description of changes in the area of housing and housing policy reforms over the course of the economic transformation in the CR (e.g. Lux et al. 2002, Lux, Sunega, Kostelecký, Čermák, Košinár 2004, Donner 2006, Lux, Sunega 2006, Lux 2007), one of the consequences of the economic

changes in the CR was the substantial quantitative and qualitative changes in housing supply (especially in terms of the extent and form of new housing construction) and in the amount and distribution of household expenditures on housing. The relative expenditures of Czech households on housing (defined as the average percentage of expenditures on housing out of total monthly household expenditures) grew over the course of the transformation period, from 11% in 1990 to 22% in 2003 (Lux, Sunega, Kostelecký, Čermák, Montag 2005). Regular monitoring and analyses of Czech household expenditure on housing (Sunega 2003, Lux & Burdová 2000, Lux 2002, Lux et al. 2002) have shown that expenditures on housing have gradually come to account for an increasingly larger share of the total consumption expenditure of Czech households and have become the main expenditure item of Czech households. In addition, after 2000 there was a substantial increase in inequalities, in terms of the amount of relative expenditures on housing, between the poorest and the richest households (Lux, Sunega, Kostelecký, Čermák, Montag 2005: 169).

Pronounced regional differences emerged over time among regions in the market price of owner-occupied and cooperative housing and in the level of so-called market rent, and they are what directly contribute to the formation and increase in regional disparities in financial affordability of housing (hereinafter only *housing affordability*). However, despite this fact, these disparities have not been systematically mapped and analysed. Although Prague households have the highest average wages in the Czech Republic (RSCP 2006), according to the Czech Statistical Office the average price of a flat in Prague in 2003 was 6.9 times the average annual net income of Prague households, while in the Czech Republic as a whole the price is "only" 3.3 times the average annual net household income. In this regard, a hypothesis that comes to mind is that regional price disparities (and evidently also housing affordability disparities) are probably higher than the disparities between regions in terms of economic performance.

While over the course of the transformation period wage differences grew (Večerník 2001), housing prices increased relatively equally in various qualitatively different segments of the market (ČSÚ 2005). Employee wages in professions requiring a university education are 1.5 times higher in Prague than in the other Czech regions, but among employees in fields not requiring higher education wage variation is much lower. It can therefore be assumed that regional disparities in the share of households, for which housing could potentially be unaffordable, owing to the uneven trends in housing prices and incomes, exist and are growing.

The objective of this paper is to map regional differences in the affordability of rental and owner-occupied housing in 2000–2006 and identify households for which there is a risk of housing unaffordability. Another objective is to answer the question of how regional differences in housing affordability evolved and whether the share of households at risk of being unable to afford housing is growing. Finally, we will test the hypothesis of whether regional disparities in housing affordability are greater than the regional disparities in trends for other basic economic indicators (per capita GDP, unemployment, net disposable income) and whether the trend in regional disparities of housing affordability over time corresponds to the trends in the regional disparities of the other above-mentioned economic indicators. In other words, how much does the trend in regional disparities in housing affordability correspond to the trend in regional disparities in economic performances in the CR? Owing to a lack of adequate data on net household incomes and housing expenditures in the regions of the CR, an alternative, specially developed method, which makes up for the lack of regional data, was used to map the trend in housing affordability in individual regions.

Measuring Housing Affordability

There are essentially three basic methods of analysing housing affordability (Garnett 2000): the indicator, reference and residual methods. The indicator method uses indicators that measure the financial burden on households represented by expenditures on housing; the indicators usually involve a ratio of expenditures on housing to household income. Hulchanski (1995) notes that "households face a housing affordability problem … when the ratio of expenditures for securing adequate housing to total net income exceeds a certain percentage threshold". The indicators can vary depending on how housing costs and household income are defined. The most common indicator, used particularly for estimating the affordability of rental housing, is the indicator of the percentage of net rent or expenditures on housing to total net household income (hereinafter the so-called *expenditure burden*).

The reference method does not set a threshold for the expenditure burden, but refers to the situation either in another housing sector (e.g. the rent should be set at the level of rent in private rental housing) or to the need secure housing for certain groups of the population (e.g. the rent should be set at such a level that family households with working household heads, more than one child, and low wages are able to afford it). The residual method is based on an evaluation of the amount of so-called residual income, which is equal to the amount of total net household income less expenditures on housing and less the amount of the living minimum necessary to cover other basic living costs of individual household members. For example, Grigsby and Rosenburg postulate that "affordability should be defined so as to ensure that an adequate income, after deducting housing expenditures, is enough to cover the other basic needs of household members" (cited in Hui 2001).

However, none of these methods (and especially the expenditure burden and residual income) is entirely devoid of the need for a normatively set threshold that, when exceeded, indicates that housing is unaffordable for the given household – for example, determining a maximum expenditure burden threshold or minimum residual income (hereafter the *affordability threshold*). Determining the affordability threshold is difficult to substantiate scientifically, as is every other normative inference. In some countries these thresholds are not explicitly set but implicitly follow from the state's housing allowance policy. Determining the affordability threshold is thus influenced by a normative and often subjective inference, and it would be difficult to determine it in any "objective" way. Any chosen method for determining such a threshold could be easily disputed scientifically, and therefore, in an analysis of the housing affordability it is necessary to proceed cautiously and critically. A shift in this regard is the "quasi-normative" approach to housing affordability developed by Lux (2004, 2005, 2007); in it affordability thresholds are determined from the level of public expenditures under alternative terms of public support and the resulting level of real expenditures on housing.

The normative aspect involved in determining the affordability threshold is one of the problems involved in measuring and evaluating housing affordability. All the indicators used to measure how affordable housing is for various groups of households in different parts of the country must also cope with the fact that an analysis of just housing expenditures does not sufficiently take into account the quality of housing itself, the size of the housing, the protection of tenancy rights, and other costs connected with housing (commuting expenses). The high expenditure burden (which at first glance looks like a problem of housing affordability) for some households living, for example, in rental housing need not be caused by the household's low income or a generally high level of housing expenditures, but may just stem from the fact that these households live in housing that is too luxurious and/or too large

for the size of their household (for example, a two-member household living in a four-room flat), where the rents are consequently higher. Were such households to move to "adequate" housing (which again can only be defined normatively usually according to number of household members), then their expenditure burden would fall significantly, to a level that is no longer evaluated as unaffordable or unmanageable. A simple "unadjusted" calculation of the expenditure burden can produce a distorted image of how much pressure a household is really under in terms of housing affordability. The indicators used to measure housing affordability have to tackle this problem, otherwise they reflect distortions in the given housing market rather than genuine disparities in housing affordability (e.g. Thalmann 1999)

Individual types of housing tenure vary considerably in terms of forms of housing expenditure. Therefore, alternative indicators are useful for the purpose of observing the trend in the financial affordability of owner-occupied housing. The reason is that the expenditure burden need not necessarily reveal the true scope of the problem of financial affordability of housing if it is approximated to households as a whole, including both households that acquired housing relatively recently (usually at a higher market price) and households that acquired owner-occupied or cooperative housing many years ago or during the process of privatising municipal flats (under "non-market" price conditions). Some households have had to obtain a loan to acquire their housing, while others have not. Alternative indicators that are more useful for mapping and evaluating the affordability of owner-occupied housing are, for example, the price-to-income ratio (the median or mean price of housing sold to the median or mean annual net income of households, *P/I*) and the lending multiplier (the total credit loaned, as the sum of total credit payments, to total net annual household income, LM).

The analysis of the trend in housing affordability in transition countries, or here more precisely in the Czech Republic, is in many ways specific. This is mainly because the degree of protection afforded against negative developments in the housing market is more unequally distributed among Czech households than in advanced countries. In terms of access to housing (the socio-economic perspective) in this country, as in other transition countries, two main market segments took shape over the course of the economic transformation. The "legacy" of the effects of the housing policy under the previous regime; after 1989 the continued regulation of rent (specifically, the inadequate reforms in the area of rental housing); and the privatisation of municipal flats at advantageous prices: these are the main factors that caused Czech society to be divided in terms of access to housing and in terms of housing affordability into two basic and clearly separate (though not easily precisely definable) groups: the group of households enjoying the advantages of "privileged" housing, a group that includes people paying regulated rent, people who acquired their owner-occupied or cooperative housing before 1989, and people who had the opportunity to buy their own housing as part of the privatisation of municipal flats, wherein flats were, and still are, sold far below their market price; and the group in "unprivileged" housing, which includes people that are paying needlessly high market rents that are high owing to the very existence of rent regulation (Lux, Sunega 2002), people who, owing to fixed-term leases and the entirely free-handed manner of setting rent, enjoy less legislative protection from landlords, and people described as "without housing"[1] (divorced couples or adult children forced to live with another household because of their own low income and the impossibility of inheriting "privileges"), and people who acquired their owner-occupied or cooperative housing under market conditions and paid a market price for it.

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[1] Homeless would be inadequate term in this case, since these people live in a house or a flat.

Unlike other social inequalities this segmentation (and the social inequality in access to housing that derives from it) was created not by the effect of market forces but by the realities of the economic transformation, the actions of the state and municipalities, and central and local housing policy, even in other transition countries (Lux ed. 2003). Therefore, an analysis of the trend in housing affordability should be conducted separately for the "privileged" and for the "unprivileged" housing sectors.

In order to accurately analyse the trend in housing affordability and the trend in regional disparities in housing affordability in the Czech Republic, an analysis will be conducted separately for individual tenures (rental and owner-occupied), separately for the "privileged" and "unprivileged" segments of the market, and separately for individual types of household, and using the concept of "adequate" housing (i.e. housing that corresponds to the size of the given type of household). Owing to the lack of data on the "privileged" segment of owner-occupied housing (the privatised housing stock), our analysis will have to be limited to the "privileged" and "unprivileged" segments of market rental housing and the "unprivileged" segment of owner-occupied housing. A comparison of the trend in housing affordability for variously defined types of household should, among other things, help test the hypothesis of whether regional disparities in the number (percentage) of households potentially at risk of housing unaffordability, owing to unequal trends in housing prices and household incomes, exist and are growing stronger.

Methodology and Data Sources

In the Czech Republic there are no data files that would enable a simple analysis of regional disparities in housing affordability, i.e. an analysis of real disparities based on information about real households and their real expenditures and incomes. Although to obtain a national picture of housing affordability it is possible to use the *Family Budget Survey* data file (or *Statistics on Income and Living Conditions* data file) from the Czech Statistical Office, given the size of the sample of respondents and the quality of the sample (a quota sample) it cannot be used for an analysis of regional disparities. This however is not the only problem. The Czech Republic has no relevant data on household incomes; the *Family Budget Survey* cannot be used for this purpose either. Therefore, in order to model household income there is no choice but to use other sources, in particular the regional wage statistics of the Czech Statistical Office.

An alternative approach was therefore used to analyse the regional differences in housing affordability, where we created types of households and types of housing, and an "adequate" type of housing was assigned to each type of household (this is how we addressed the possible objection that it is necessary to take into account housing consumption i.e. occupying housing that does not correspond in size to the size of the household). In order to measure the affordability of "privileged" and "unprivileged" rental housing the expenditure burden indicator was used and for "unprivileged" owner-occupied housing the price-to-income ratio and the lending multiplier were used.

The approach for calculating the indicators of housing affordability and mapping the disparities in housing affordability can be summarised in seven points:

1. Creating a typology of households
2. Calculating net household incomes

3. Creating a typology of housing
4. Determining average market prices and average market rents
5. Assigning housing types to household types
6. Calculating the indicators of housing affordability
7. Analysing regional disparities.

Creating a typology of households

To calculate all the indicators of housing affordability (expenditure burden, price-to-income ratio and lending multiplier), types of households were defined on the basis of the following criteria:

- *The economic activity of the household members* – economically active, unemployed, pensioner, parent on parental leave;
- *The category of employment of economically active household members* – divided up into ten basic occupational groups (based on the ISCO[2] occupational classification) according to the occupation of the household head;
- *The size and composition of households* – households of individuals, childless married or cohabiting couples, married or cohabiting couples with one child, married or cohabiting couples with two children, married or cohabiting couples with more than two children, lone parents with one child, lone parents with more than one child.

The above criteria used to create household types were selected with a view to the fact that existing wage statistics provide regional data on wage levels in reference to economic activity and occupational category. But various combinations of the above criteria would generate more than two hundred different household types. That high a number of household types is not suitable for analysis. Given that some household types are relatively marginally represented in the Czech population, household types were selected on the basis of an analysis of data from the 2001 Census (SLDB 2001) corresponding to the actual share of individual household types in the Czech population after 2001. After unsuitable or marginally represented household types were eliminated from the analysis, sixty household types remained, which account for roughly 66% of all Czech households (selected households included, for example, a household of one pensioner, a family household of qualified workers with two children, or a university-educated professional who lives alone etc.).

Calculating net household incomes

The types of economically active households were assigned average gross incomes in conformity with regional statistics (RSCP, regional average) and in the case of pensioner households the average pension amount in the region. It was assumed in the case of households where both partners (spouses) are employed that their type of employment falls into the same ISCO category. It is unlikely that two working members of a household will have the exact same occupation, and from a tax perspective that can be significant, so the average income in the given occupational category was doubled and then divided into one income for a man and one income for a woman, based on the ratio of women's to men's

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[2] The International Standard Classification of Occupations
(http://www.ilo.org/public/english/bureau/stat/isco/index.htm).

incomes in the given category and the given region. Also important from a tax perspective[3] is the age of any children in the household. The age categories of children were therefore selected according to the largest age categories in the age distribution of children in the Czech population, according to the Census 2001. In the second step the net income and any potential social benefits (state social support etc.) were calculated for all sixty types of household in all the regions, and for each of the years in the period 2000-2006. We assumed only incomes from employment; entrepreneurs were omitted from the analysis since it was impossible to estimate their reliable net household income. We assumed that a maximum of two economically active individuals in the households have an income (third or fourth household members were economically inactive or pensioners) and that tax deductions (or tax exemptions) are used by the person with the higher income. The tax and benefit amounts were worked out in accordance with the regulations (legislation) in effect in the given year, as over the course of the period under observation the method of calculating tax and some benefits slightly changed, the amount of the living minimum was valorised, and so on. Some of the main changes that were made to the taxation method include the gradual transformation of tax exemptions to tax deductions, starting in 2005, the reduction of the marginal tax rate of the two lowest tax brackets, and the option for spouses to take advantage of joint taxation starting in 2005.

Creating a typology of housing

The following types of housing were defined for the purpose of calculating all the indicators of housing affordability: the four most common flat sizes (1+1, 2+1[4], 3+1 a 4+1) and the family home as a housing type. The total (usable) floor space for each category was defined as the average for the given type of housing according to the Census 2001 data on occupied flats in flat blocks (multidwelling houses). The average one-room flat (1+1) has a floor area of 38 m^2, a two-room flat 57 m^2, a three-room flat 73 m^2, and a four-room flat 88 m^2. It should be mentioned that the average does not differ dramatically from the median, and thus the average is not too distorted by the effect of extremely small or extremely large measurements. The same flat-size categories were used for all the regions, as the Census 2001 data showed that there are no major differences between flat sizes in different regions. Housing in a family home refers to a standard family home, 135 m^2, as defined by the Institute of Regional Information, Ltd., which collects data on the prices of this type of family home.

Determining average market prices and average market rents

The market prices of flats and the market level of rents in the regions and regional towns was determined using the price and rent monitoring system of the Institute of Regional Information, Ltd. The system monitors 335 selected towns in the Czech Republic. In 2001 the total population that inhabits the selected 335 towns accounted for two-thirds of the total population of the Czech Republic. According to the Census 2001, in that year 89% of flats in flat (multidwelling) buildings were located in these towns. An original method was developed to determine the average market prices of flats, average market prices of family homes, average market rent levels, and average regional rent levels in individual regions. The method

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[3] Because of the amount of tax deductions.
[4] I.e. 2 rooms and a separate kitchen.

was based on determining the correlation between the size of a flat, its price and rent and the correlation between the prices of family homes and flats.

To obtain reasonably accurate information on the average market prices of flats and average market rent it is necessary that the set of input data (i.e. data on second-hand houses or flats advertised for sell) for the town in the survey contains at least thirty reliable items (flats and their prices or rents), after eliminating extreme and incomparable prices (e.g. the prices of new flats, flats following reconstruction, luxury flats, flats above-standard amenities, etc.). Extreme values thresholds, that is, thresholds for identification of prices or rent that are extremely high or low, have changed gradually; in 2001–2006 the lower and upper extreme value thresholds hovered around the limits of 50–150% of the average price in the previous period. Given the considerable rise in the prices of older flats, in 2007 the upper extreme in some towns rose to a level of 200% of the average value in 2006. If after "cleaning" (i.e. after elimination of outliers) the data in the given town (out of 335 observed towns) thirty data items on flat prices were not found, the price was derived with the aid of a "inter-location comparative model" of housing attractivity. The model draws on some basic criteria to evaluate the effect of location and other characteristics of the municipality on the price of a flat for any given municipality (location) in the Czech Republic. In the regions, the main value spots (poles) are assessed from the perspective of housing attractivity and the strength of the ties of surrounding towns (municipalities) to these spots (based on travelling distance, the quality of transportation connections, size of the municipality, recreational appeal, and enhancing or detracting factors).

To ensure the comparability of the price data on flats it is necessary to convert the prices of flats of different sizes to a standard housing unit (standard flat). A standard flat is a Category-1 flat with approx. 40% depreciation and a floor space of 68 m^2 in a standard, not marginal, location. The average price (rent) of a standard flat for an entire region (regional average) was calculated as the average price (rent) of standard flats for the observed towns in the given region, adjusted by a coefficient reflecting prices in municipalities that were not monitored. This coefficient represents a coefficient of correlation between the average price (rent) in the monitored towns in 2006 and the average price (rent) in all the municipalities in the CR in 2006, while the prices (rents) in municipalities that had not been monitored were counted using the "inter-location attractivity model" (described above). The average prices (rents) were reduced using the coefficient, given that mainly larger towns (i.e. with on average higher prices and rents) figured among the monitored 335 towns. In the final step the offer prices (rents) for standard flats in regions towns and in the regions were used to calculate the prices for the selected size categories of flats. To calculate the prices and rents for flats of various sizes, an algorithm was used that reflects the dependency of the price or rent per 1 m^2 of floor space on the total floor space of the flat. The degree of correlation between the unit price (rent) and the size of the flat (the degree of correction of prices and rents) was determined on the basis of data from the actual monitoring of prices and rents.

Given that the rent offered in ordinary advertisements is often a one-sided, upward biased price (compared to what the final agreed rental price is), the average rents determined according to above described steps were reduced by 15%. This "reduction rate" (15%) was based on findings from a questionnaire survey on negotiated market rents (survey among private landlords). In towns where a sufficiently large set of data was not available for reliable calculating average market rent, an indirect method was used, based on the usual rate of return (capitalisation rate). The approach to calculating the prices of family homes was similar to the approach for monitoring the prices of flats. In the "privileged" segment of rental housing the

rent was set as the maximum regulated rent for a given type of flat in a given region in a given year. The regional data was obtained as a weighted average of the maximum regulated rent in individual municipalities in the region.

Assigning housing types to household types

The individual types of household were normatively assigned an "adequate" type of housing based on the composition and number of members of the household. Individuals were assigned a 1+1 flat, married and cohabiting partners were assigned a 2+1 flat, two-parent families with one child a 3+1 flat, and two-parent families with two children a 4+1 flat. Data from the Census 2001 indicate that it is not often that Czech families with two children live in a 4+1 flat, and so for further analysis it is possible to modify this simple key for assigning types of housing. For a comprehensive picture, some types of households were assigned housing in a family home.

Calculating the indicators of housing affordability

The expenditure burden in rental housing was calculated for all household types, and the price-to-income ratio and lending multiplier were calculated for households in owner-occupied housing. To calculate all the indicators, expenditures on housing were calculated separately for the "privileged" housing segment and for the "unprivileged" housing segment. There are two basic components of housing expenditures: rent (or the capital costs incurred from the purchase of owner-occupied housing) and other expenditures connected with housing (expenditures on energy, heating, cleaning, etc.). Other expenditures connected with housing could not be significantly monitored owing to the lack of data. The financial affordability indicator (expenditure burden) was thus applied only to the first component of housing expenditures. The capital costs incurred in acquiring owner-occupied housing were set as the amount of the repayment (annuity) on credit borrowed in order to purchase owner-occupied housing at a given price of flat or family home. To calculate all the indicators (*expenditure burden*, the *price-to-income ratio* and the *lending multiplier*) the estimated net incomes of the selected types of households were compared with the estimated expenditures on "adequate" housing.

Analysing regional disparities in housing affordability

A database was created out of the calculated housing affordability indicators containing data for all sixty types of household in all regions, from the year 2000 to 2006. In the analysis of regional disparities in the affordability of rental and owner-occupied housing, we focused on three levels of regional differences: the trend in differences between individual regions and types of households, the general trend in regional differences, and the changes in the proportion of households potentially at risk of being unable to afford housing in the individual regions.

The trend in housing affordability in individual regions was analysed separately for rental and owner-occupied housing. Analysing the trend in housing affordability for each of the sixty types of households would be very complicated and difficult to grasp, and therefore the trend

of the averages of the indicators of housing affordability were traced for the sum of all households in a given region, and with the aid of a cluster analysis four clusters of households were generated that feature similar values of the selected housing affordability indicator. Subsequently the trend in housing affordability was traced for the individual clusters of households in all the regions. The purpose of this analysis was to reveal how the trends in housing affordability differ or coincide among individual regions.

Another way of examining regional disparities in housing affordability is to test the hypothesis of whether the differences between regions over time decrease or increase. To evaluate regional disparities and their trends over time standard statistical variability measures were used: variance, standard deviation, the coefficient of variation, and the Gini coefficient. All these indicators produced very similar results, so in a presentation of the results it will be enough to look just at the coefficient of variation. An alternative approach to measuring the trend in regional differences over time is to use the so-called ß-convergence coefficient (e.g. Sala-i-Martin 1996, Barro, Sala-i-Martin 1991). The coefficient is used in economics and generally it indicates whether a poor economy is growing faster than a rich one. The concept can also be applied to regional differences in housing affordability. The beta-convergence coefficient can be expressed as the Pearson's coefficient of correlation between the relevant annual increase in the value of the financial affordability indicator and the absolute value of the indicator in a given year. A positive coefficient value indicates that a relative (year-to-year) increase in the value of the housing affordability indicator correlates with the value in the initial year, thus, affordability is decreasing (especially in regions where the affordability of housing is very low).

Another level at which regional differences in housing affordability were analysed was by examining the trend in the share of houses potentially at risk of being unable to afford housing out of the total number of households in the given region. Based on the normatively defined amounts of the maximum threshold of the expenditure burden from rent, residual income, and the maximum value of the *P/I* indicator, and based on bank criteria for the credibility (creditworthiness) of households for obtaining credit to purchase "adequate" housing, it was possible to identify those households potentially at risk of being unable to afford housing. The real share of such households in individual regions was quantified according to the Census 2001 and compared in individual years.

Analyses of Regional Disparities in the Affordability of Rental Housing

The affordability of rental housing was analysed separately for the "privileged" segment and the "unprivileged" segment of rental housing. The trends in housing affordability in the "privileged" and "unprivileged" segments differ considerably. The burden of expenditure on regulated rent since 2000 has been falling in all the regions, and regional differences in the expenditure burden of households in "privileged" rental housing are small (limited only to a significantly higher expenditure burden in Prague compared to the other regions). The coefficient of variation, which describes regional differences in the burden of expenditure on rent in the "privileged" segment of rental housing, remained at essentially the same level from 2000 to 2006 (Figure 1). The regional differences in the expenditure burden in this regard and in the observed period therefore generally neither increased nor decreased. The main reason for this development was that from 2002 rent deregulation stopped entirely (in real terms rents even fell), and only "other" expenditures on housing (the costs of energy and services)

increased, which for reasons mentioned above are not reflected in these analyses. In 2000 and 2001 there was only a slight rise in rent in the "privileged" segment of rental housing, which was roughly equal to the inflation rate in those years. The only exception was households of managers, where the sharp rise in incomes in Prague contributed to reducing regional differences. From 2000 to 2006 the only households potentially at risk of being unable to afford this type of housing were households of long-term unemployed in Prague.

Figure 1: Trend in the coefficient of variation for selected types of households between 2000 and 2006
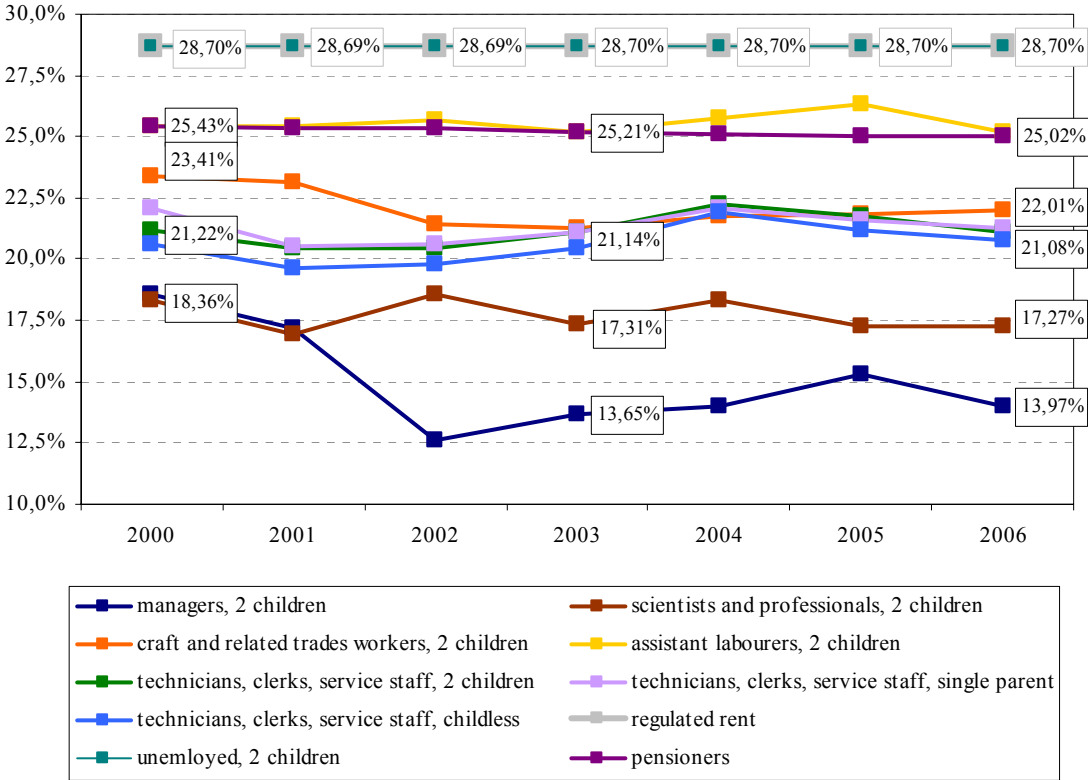
Source: IRI, Regional Statistics on the Cost of Labour (RSCP), Czech Statistical Office, authors' calculations.

Housing affordability in the "unprivileged" segment of rental housing appears to be much more variable from the perspective of the trend in the expenditure burden, regional disparities, and the development of disparities over time. An analysis of the development of the average expenditure burden for all the households within an individual region showed that the highest expenditure burden on market rent is found for Prague households, followed by households in Southern Moravia, while the lowest expenditure burden is observed for households in the Ústí nad Labem region, where the potential expenditure burden in 2006 was 2.5 times lower (in comparison to Prague). Although the largest number of households of unemployed and a relatively large percentage of low-income households live in the Ústí nad Labem region, the low level of rent compared to Prague means that "unprivileged" rental housing is more affordable. The expenditure burden in other Czech regions is roughly mid-way between the expenditure burden for the Southern Moravia region and the Ústí nad Labem region. From the perspective of its development over time from 2000 to 2004, the expenditure burden grew in all the regions except Prague, while between 2004 and 2005 it remained roughly at the same level in all the regions except Prague, and from 2005 to 2006 the expenditure burden fell in all the regions except Moravia-Silesia. In Prague the expenditure burden only increased until 2003 and then it began to fall. The trend in the expenditure burden in the region of Moravia-

Silesia differs from that in other regions up to 2005; to that time the households in this region had the lowest expenditure burdens, but by 2006 this region had the fifth-highest average household expenditure burden. This developed stemmed from a sharp rise in rents, which was not accompanied by a sharp rise in wages (incomes).

However, the average expenditure burden blurs the relatively large differences between individual types of households. Given that it would be difficult and confusing to compare the differences in the expenditure burden for each of the sixty types of households, a cluster analysis was used to create four clusters of households, which are characterised by their similar expenditure burdens. Households in the cluster with the highest expenditure burden have an expenditure burden around 54%, while the average expenditure burden in the cluster of households with the lowest expenditure burden is just 13% (table 1).

Table 1: Clusters of households by expenditure burdens in 2006

| | | Expenditure burden ("market" rent) % | | | | | | Number of household types | Percentage in CR population - SLDB 2001 |
					Standard deviation				
		Maximum	Average	Minimum	between types and regions	between regions	between types		
Groups of households - expenditure burden	Very high	145,84	53,94	20,75	18,90	14,60	12,50	12	18,54
	Rather high	55,45	28,02	14,18	7,07	6,47	3,36	16	18,14
	Rather low	39,30	20,47	9,03	4,99	4,57	2,24	16	18,18
	Very low	25,85	13,19	4,32	3,77	2,44	2,92	16	9,12

Source: IRI, Regional Statistics of Labour Costs (RSCP), Czech Statistical Office, authors' calculations.

The cluster of households with a very high expenditure burden includes households that do not have their own income and are dependent on social assistance from the state (households of long-term unemployed), households of pensioners, single-parent workers, and sales or service staff (e.g. shop assistants, waiters, etc.). The cluster of households with a higher expenditure burden ("rather high") includes households of people with lower occupational status (craft and related trades workers, machine operators, clerks), where there is only one income in the family. The cluster of households with a lower expenditure burden ("rather low") includes two-income households of craft and related trades workers and families of technicians and professionals with one income. The lowest expenditure burden ("very low") is found among households with two employees in the occupational categories of technicians, professionals, and managers. Table 1 presents the values of the average expenditure burden for individual household clusters in 2006. The highest expenditure burden from "market" rent in 2006 was among households of unemployed in Prague, while the lowest expenditure burden was among childless households of managers in the Ústí nad Labem region. The expenditure burden for a couple, both managers, in Ústí nad Labem in 2006 was around 29 times lower than the expenditure burden of unemployed persons in Prague. The standard deviation in Table 1 indicates how much the specific expenditure burden of individual types of households in clusters differs in various regions from the average values. A high level of standard deviation signifies large differences in the expenditure burden of individual types of households in the given cluster, or the presence of some types of households whose expenditure burden differs significantly from the average value calculated for the entire household cluster. Conversely, a low level of standard deviation means the differences within the cluster are small. It is evident from the standard deviation figures that in the cluster of households with the highest expenditure burden there is also the greatest variation in the expenditure burden (standard deviation is 18,90), while the cluster of households with a low

expenditure burden is relatively homogeneous. Given that individual types of households were divided into clusters based on the level of the expenditure burden, within individual clusters the expenditure burden of households varies more substantially between regions than between types (of households).

If we focus on the trend in regional differences, we do not find a continuous increase in regional differences from 2000 to 2006. From 2000 to 2003 regional disparities in the affordability of "unprivileged" rental housing did increase, but from 2004 regional disparities decreased. This trend can be likened to a wave. Rent increased first in regions with already high rent, and regional inequalities peaked in 2003; then the differences were redistributed, as regions with higher rent saw the rent stagnate, and regions with lower rent saw it rise. This trend can be illustrated on the basis of the beta-convergence coefficient, which represents a correlation coefficient between relative annual changes in the expenditure burden and the values of the expenditure burden in the initial year (2000). A positive coefficient value means that the relative increase in the expenditure burden correlates with the expenditure burden in the given year; therefore, the expenditure burden grew mainly in regions with a high expenditure burden already and therefore, regional differences increased. Conversely, a negative coefficient beta signifies a reduction in regional differences. The least noticeable change in the regional differences between 2000 and 2006 is in the expenditure burden of households of female shop assistants living alone, and, conversely, regional differences between households of managers were noticeably eroded (Figure 2). Between 2000 and 2003 disparities increased among all types of households and between 2003 and 2006 they decreased. The reason is the already mentioned stagnation of rents in regions with the highest levels of rent.
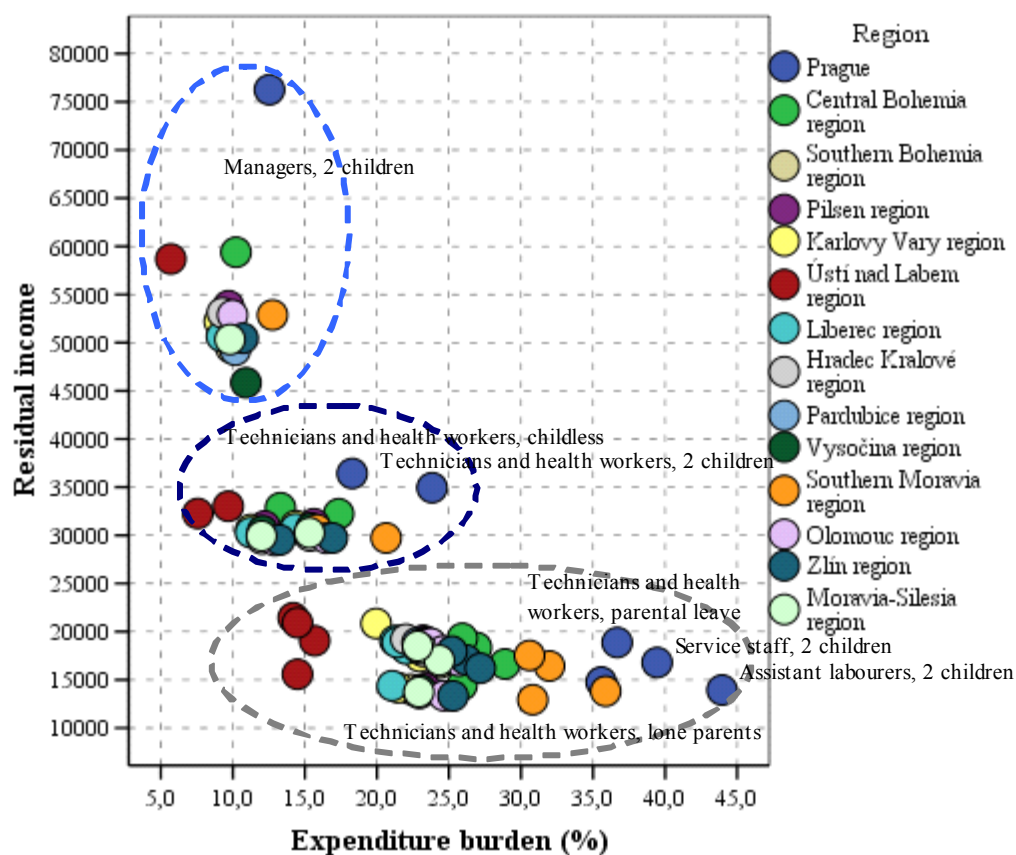
Figure 2: Examples of the trends in the beta-coefficient for the expenditure burden of types of households
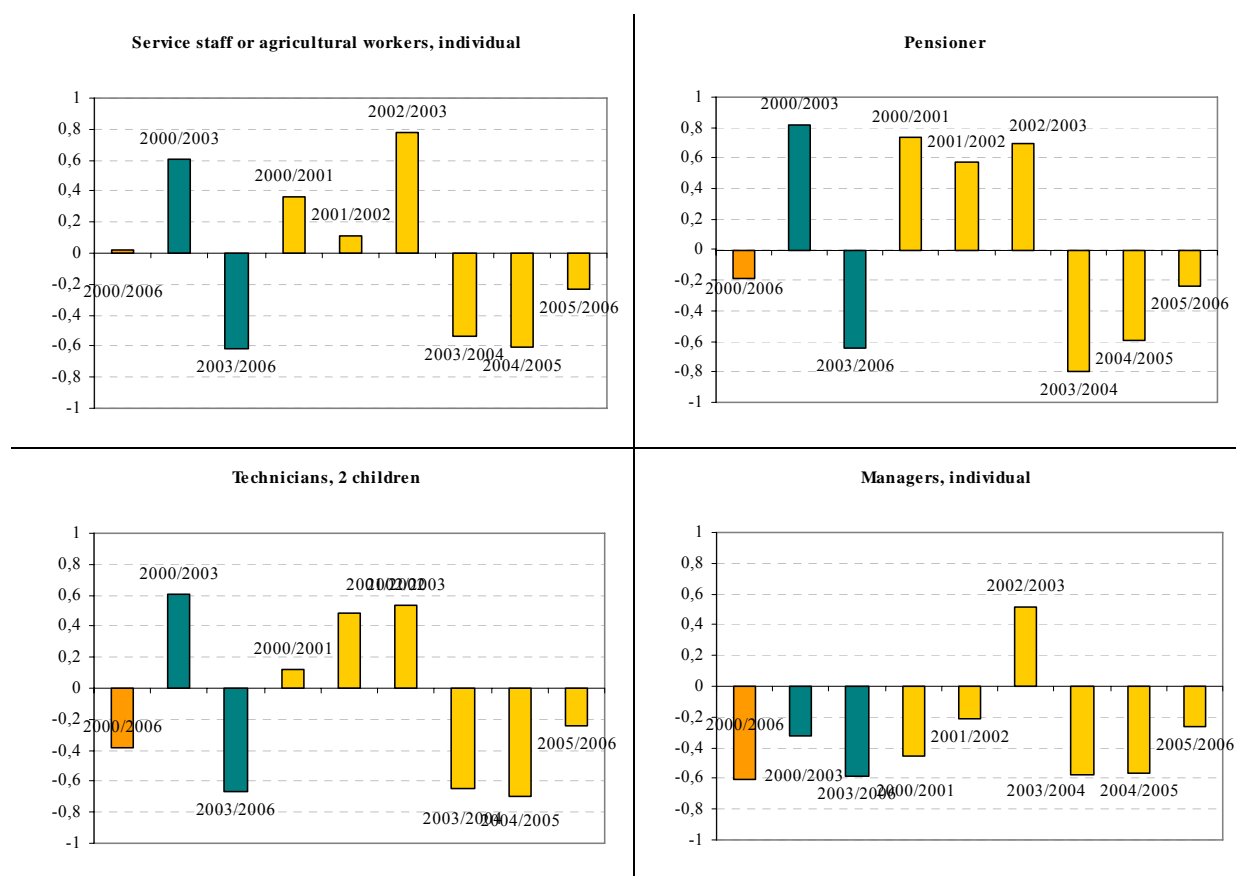
Source: IRI, Regional Statistics of Labour Costs (RSCP), Czech Statistical Office, authors' calculations.

Alongside the expenditure burden, residual income is another indicator used to measure housing affordability. Residual income indicates the sum of resources a household is left with after they have paid their rent. Figure 3 shows the regional differences in the expenditure burden and in residual income in 2006. Three clusters of households can be detected in the figure. The first represents households of managers, which have the lowest regional differences in the expenditure burden, but the highest regional differences in the residual income. In this group, Prague leaves all the other regions behind; while the expenditure burden of managers in Prague corresponds to the expenditure burden of technicians in other regions, the residual income is entirely different (residual income of managers in Prague is much higher). Incomes in Prague are absolutely the highest, and the same is true of rent levels, and for this reason, even despite the high expenditure burden, after deducting the highest rent from the highest income Prague managers are still left with the most residual resources. The second group is the large occupational category typically represented by a technician. Regional differences in residual income are not as large for this group as in the case of managers, but larger differences exist in the expenditure burden. The third group represents mainly households of assistant (unskilled) labourers and most of the single-parent households and households with a household member of parental leave (typically represented by technicians and medical assistants). In this group again, Prague, together with the Southern Moravia region, stand out from the other regions. The amount of residual income in the regions is roughly the same as in the others, but the expenditure burden is much higher.

Figure 3: Expenditure burden and residual income in 2006 among employee families

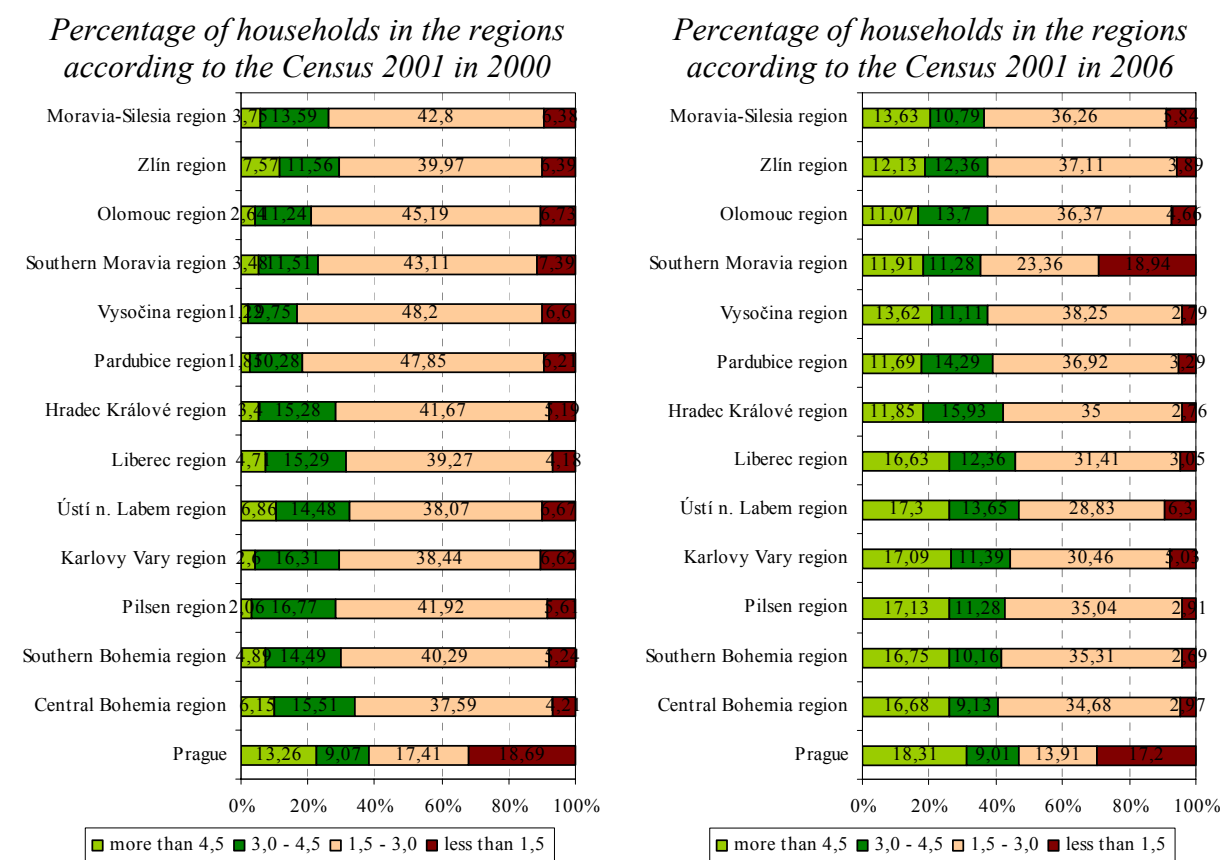*Source: IRI, Regional Statistics of Labour Costs (RSCP), Czech Statistical Office, authors' calculations.*
Note: The values for the expenditure burden express the rent to net income ratio in percentages. The values of the residual income indicator express the difference between net income and rent in CZK.

When we examine the differences between particular regions, three stand out: the Ústí nad Labem region, with low rates of expenditure burden, and Prague and the Southern Moravian region, with high rates of expenditure burden. From the perspective of the trend in the expenditure burden itself, a significant difference is found in the region of Moravia-Silesia, which in 2000 was at the same level as the Ústí nad Labem region in terms of housing affordability, but by 2006, owing to the sharp increase in rent in this region, had shifted to a point mid-way between most regions. A comparison of the expenditure burden in 2006 in the regional towns surprisingly revealed that the expenditure burden of households in Prague compared to other regional towns (especially Brno) is not exceptionally higher, and in a regional comparison Prague's distinctness is caused by its specific position as the capital (and as a city and a region at the same time).

The households potentially most at risk of being unable to afford market rental housing between 2000 and 2006 were those on social assistance, households of pensioners, workers with a low-ranking occupation, and families with only one employed member, and this risk was especially notable in Prague and the region of Southern Moravia. The expenditure burden from market rent in these households was in many regions over 30%. If the maximum threshold of the expenditure burden was normatively set at 30%, in 2006, 39% of all households in Prague would have exceeded this threshold and even 41% of households in the region of Southern Moravia. From the perspective of residual income (Figure 4), the share of households at risk of being unable to afford rental housing was lower – in the same year the

residual income of 17% of households in Prague and 19% of households in the region of Southern Moravia were not left with 1.5 times the amount of the minimum living costs of the household members (the living minimum less the amounts intended for shared household needs, i.e. housing costs in particular). Households of unemployed, pensioners, and lower occupational categories (service staff, agricultural workers, craft and related trades workers, and unskilled workers - labourers) rank among those most at risk; inequalities in housing affordability among the regions in these groups of households are the largest, and they also decrease over time the least.

Figure 4: The percentage of monitored households in various categories by amount of residual income in the "unprivileged" sector of rental housing (according to the Census 2001)

Percentage of households in the regions according to the Census 2001 in 2000

Percentage of households in the regions according to the Census 2001 in 2006

Source: IRI, Regional Statistics of Labour Costs (RSCP), Czech Statistical Office, authors' calculations.

An Analysis of Regional Disparities in the Affordability of Owner-Occupied Housing

The trend in affordability of owner-occupied housing in regions in the CR between 2000 and 2006 somewhat resembled the trend in affordability in "unprivileged" rental housing. The *P/I* indicator increased in the majority of regions from 2000 to 2004, then stopped, and then continued to increase again between 2005 and 2006. From the perspective of the trend in regional disparities, between 2000 and 2003 regional differences grew, but in 2003 the trend turned around and regional differences began to fall sharply, and the decline continued into 2005 (Figure 5). This decrease was mainly caused by the difference in the trend in the *P/I*

indicator in Prague and in the Southern Moravia region compared to other regions. While the *P/I* indicator decreased in 2004 for the majority of household types in Prague and in the Southern Moravia region, in other regions it was still growing in 2004 (Figure 5). The reason was the different course in flat prices in different regions. From 2004 to 2005 flat prices in regions with already high prices (Prague, Southern Moravia region) did not grow as markedly as in previous years, while in other regions a sharp increase in prices occurred between 2003 and 2004.

Figure 5: Summary index of the *P/I* indicator in 2000 – 2006 (60 types of households)
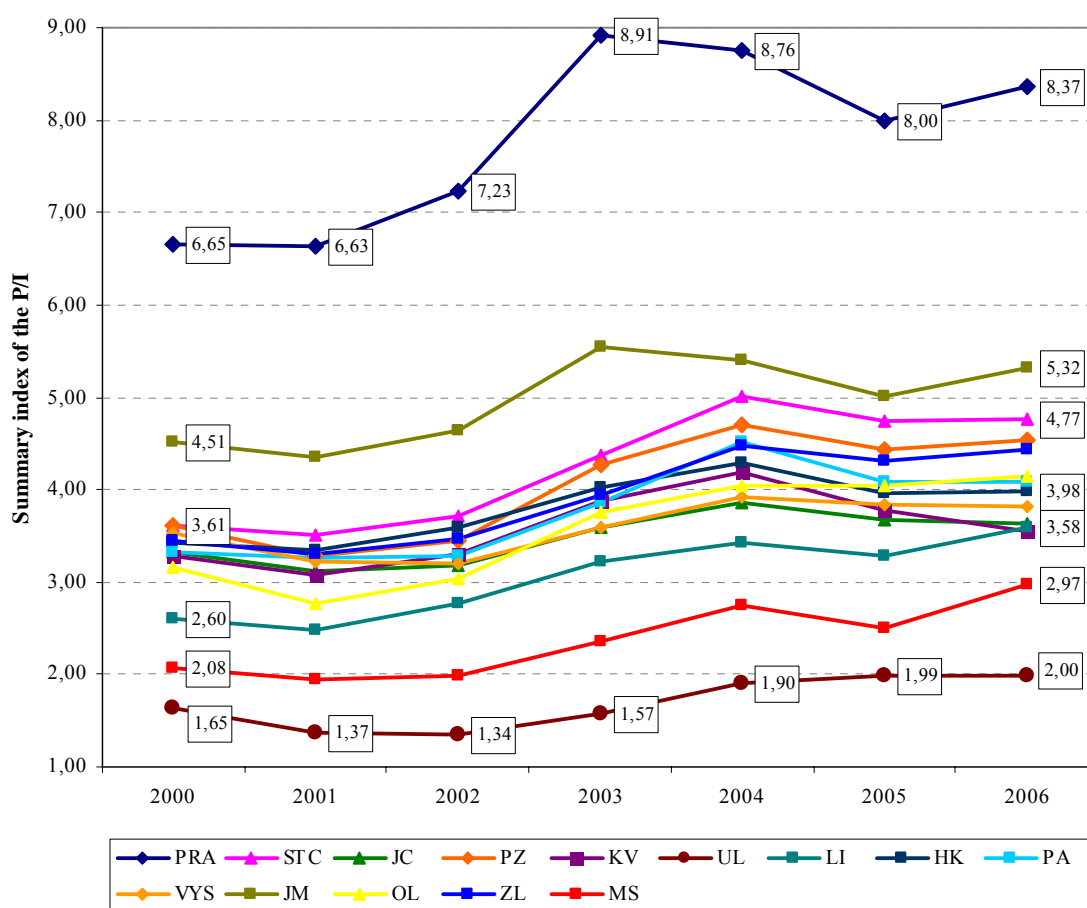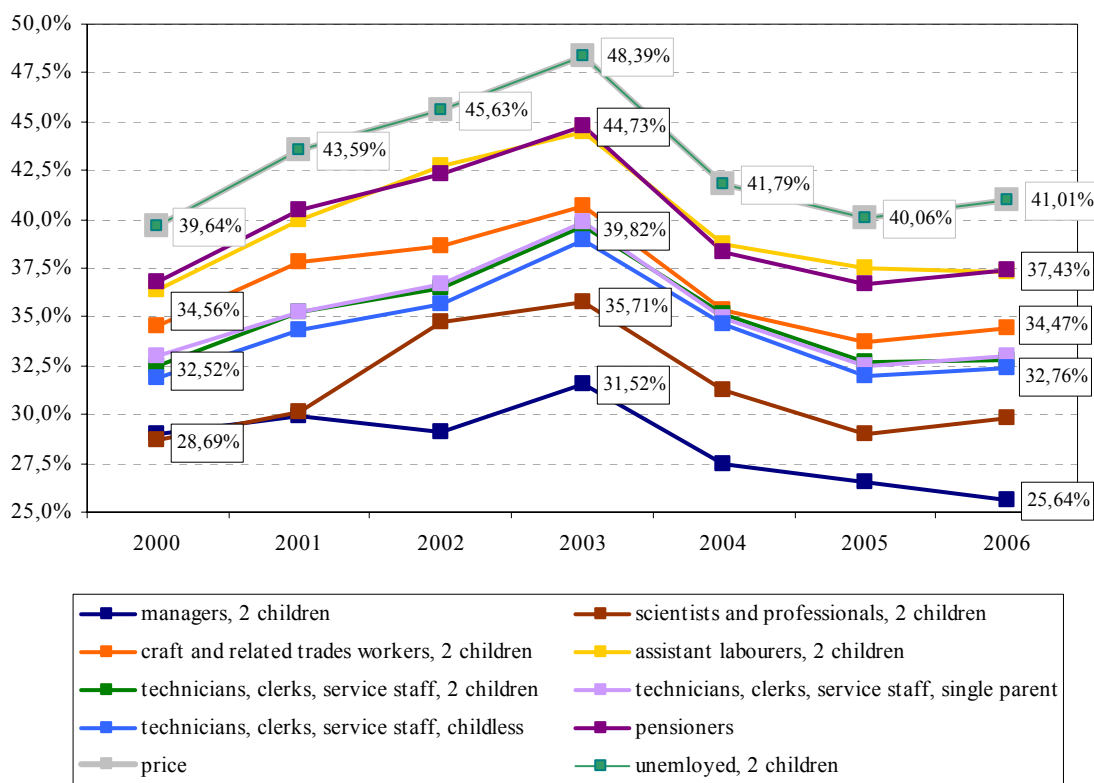

Source: IRI, Regional Statistics of Labour Costs (RSCP), Czech Statistical Office, authors' calculations.
Note. The summary index was calculated as the average of the *P/I* for all 60 types of households weighted with the real percentage of these households by SLDB 2001.

The region that differs most from the majority of other regions is Prague, and in the case of households with low incomes, also the Ústí nad Labem region and the Moravia-Silesia region. In Prague owner-occupied housing is the least affordable (in comparison to other Czech regions), while it is the most affordable in the Ústí nad Labem region and the Moravia-Silesia region. An analysis of the financial affordability of owner-occupied housing in regional towns showed that Prague, unlike in the case of market rental housing, also stands out from the regional towns. Although the affordability of rental housing in Prague and Brno is similar, owner-occupied housing is much less affordable in Prague than in Brno. The reasons are the much higher prices of owner-occupied housing in Prague compared to Brno. The biggest regional differences are evident among households of long-term unemployed, pensioners, and low-skilled occupation categories (service staff, agricultural workers, craft and related trades

workers, and labourers – unskilled workers), while conversely minimal differences between regions are observed among families of senior employees and managers (Figure 6).

Figure 6: The trend in the coefficient of variation of the *P/I* indicator for family households

Source: IRI, Regional Statistics of Labour Costs (RSCP), Czech Statistical Office, authors' calculations.
Note: The category of "service" staff includes occupations like shop assistants, waiters, etc., mainly persons employed in services requiring mid-level or low qualifications.

Between 2000 and 2006 it was true again for owner-occupied housing that the groups potentially most at risk of being unable to afford housing were households dependent on social benefits, pensioner households, households of unskilled (or low-skilled) workers, and families in which only one member is economically active. The most households potentially at risk[5] are found in Prague, Southern Moravia, and the Central Bohemia regions; in 2006, the *P/I* indicator was higher than 7 for 29% of households in Prague, 18% of households Southern Moravia, and 18% of households in Central Bohemia[6].
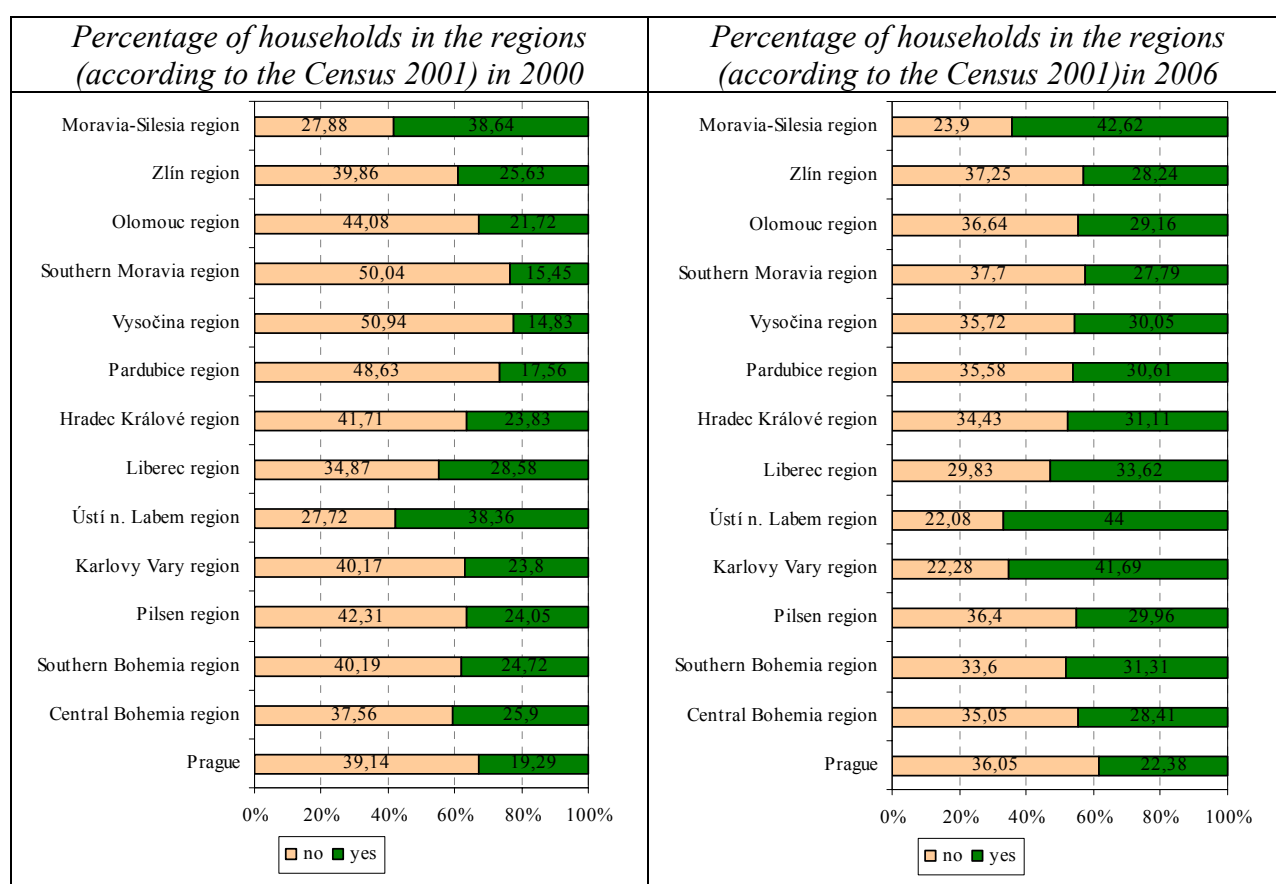
Among the households potentially at risk of being unable to afford owner-occupied housing, it is possible to include households that, based on the standard criteria of mortgage banks, would not be regarded as "solvent" enough to be granted mortgage credit, i.e. they would not be seen as capable of paying off the mortgage on the given flat. Such households included households partly or entirely dependent on social benefits, pensioner households and households of single parents, but also households of assistant labourers – unskilled workers, service staff (e.g. shop assistants, waiters, etc.) and agricultural workers. The biggest

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[5] For households potentially at risk of being unable to afford housing were in this case considered households who would have to spend more than seven net annual incomes for purchasing „adequate" (see methodology) owner-occupied housing (flat).

[6] The percentage of households potentially at risk of being unable to afford housing out of the total number of households in the CR was determined using data from the Census 2001.

proportion of "insolvent" households in 2000 were surprisingly not found in Prague but in the Southern Moravia region (50%) and in the Vysočina region (51%); in 2006 it was again in the Southern Moravia region (38%) and in the Zlín region (37%). Between 2000 and 2006 there was a significant reduction in the number of households regarded as "insolvent" in all the regions. Given that at the same time the *P/I* indicator increased in the majority of regions, it seems a paradox that access to mortgage credit for the purpose of purchasing "adequate" housing also increased at the same time. There are two reasons for this. During the period under observation interest rates fells and household incomes grew faster than did the amount set as the living minimum required as a creditworthiness criterion. In addition, the mortgage lenders relaxed to some extent the conditions (like for example LTV values, maturity etc.) for granting mortgage loans.

Figure 7: Households solvent enough for obtaining mortgage credit to purchase an adequate flat

Percentage of households in the regions (according to the Census 2001) in 2000	Percentage of households in the regions (according to the Census 2001) in 2006
Moravia-Silesia region — no 27,88 / yes 38,64	Moravia-Silesia region — no 23,9 / yes 42,62
Zlín region — no 39,86 / yes 25,63	Zlín region — no 37,25 / yes 28,24
Olomouc region — no 44,08 / yes 21,72	Olomouc region — no 36,64 / yes 29,16
Southern Moravia region — no 50,04 / yes 15,45	Southern Moravia region — no 37,7 / yes 27,79
Vysočina region — no 50,94 / yes 14,83	Vysočina region — no 35,72 / yes 30,05
Pardubice region — no 48,63 / yes 17,56	Pardubice region — no 35,58 / yes 30,61
Hradec Králové region — no 41,71 / yes 23,83	Hradec Králové region — no 34,43 / yes 31,11
Liberec region — no 34,87 / yes 28,58	Liberec region — no 29,83 / yes 33,62
Ústí n. Labem region — no 27,72 / yes 38,36	Ústí n. Labem region — no 22,08 / yes 44
Karlovy Vary region — no 40,17 / yes 23,8	Karlovy Vary region — no 22,28 / yes 41,69
Pilsen region — no 42,31 / yes 24,05	Pilsen region — no 36,4 / yes 29,96
Southern Bohemia region — no 40,19 / yes 24,72	Southern Bohemia region — no 33,6 / yes 31,31
Central Bohemia region — no 37,56 / yes 25,9	Central Bohemia region — no 35,05 / yes 28,41
Prague — no 39,14 / yes 19,29	Prague — no 36,05 / yes 22,38

Source: IRI, Regional Statistics of Labour Costs (RSCP), Czech Statistical Office, authors' calculations.

An Analysis of the Relationship between Regional Disparities in Housing Affordability and Disparities in the Economic Performance of Regions in the Czech Republic

A hypothesis was expressed at the opening of this paper that regional disparities in housing prices and probably also in housing affordability are higher than regional disparities in the economic performance of regions in general. In this part of the text we will attempt, using empirical data, either to confirm or refute this hypothesis. To test regional disparities in the

economic performance of the regions in the Czech Republic, we selected several basic economic indicators regularly published by the Czech Statistical Office: per capita GDP in the regions, per capita net disposable income of households (from the national budgets statistics), and the rate of unemployment published by the Czech Statistical Office[7].

Figure 8 depicts the regional differences in the affordability of "market" rental housing (figure on the left) and in the affordability of owner-occupied housing (figure on the right) in just selected years between 2000 and 2006, for an easier-to-grasp picture. The bars in the left figure indicate the deviation of the average expenditure burden from the national average in a given region and a given year in percentage points. Analogically the bars in the right figure express the deviation of the average *P/I* indicator from the national average in a given region and a given year in percentage points. It is clear from the figures that the regional disparities in the affordability of owner-occupied housing (measured with the *P/I* indicator) are larger than the regional disparities in the affordability of "market" rental housing (measured with the indicator of expenditure burden). If, for example, the average *P/I* indicator in Prague in 2002 was more than 100 percentage points above the national average *P/I* (see the figure on the right), the average expenditure burden in Prague in the same year was "only" around 70 percentage points above the average expenditure burden for the entire Czech Republic (see the figure on the left). The figure also clearly shows how the values or the regional indicators of the affordability of "unprivileged" rental housing (expenditure burden) and the affordability of owner-occupied housing (*P/I*) converged with or diverged from the national average over time. The higher the bar, the greater the divergence from the national average, and vice versa. The figure also reveals the above-described trend of Prague, the Moravia-Silesia region and the Ústí nad Labem region gravitating towards the national average in 2004 and 2006, while, conversely, other regions (e.g. Southern Bohemia, Karlovy Vary) increasingly diverged from the national average.

Figure 8: Regional disparities in the affordability of "market" rental housing and owner-occupied housing (flats) in 2000, 2002, 2004 and 2006
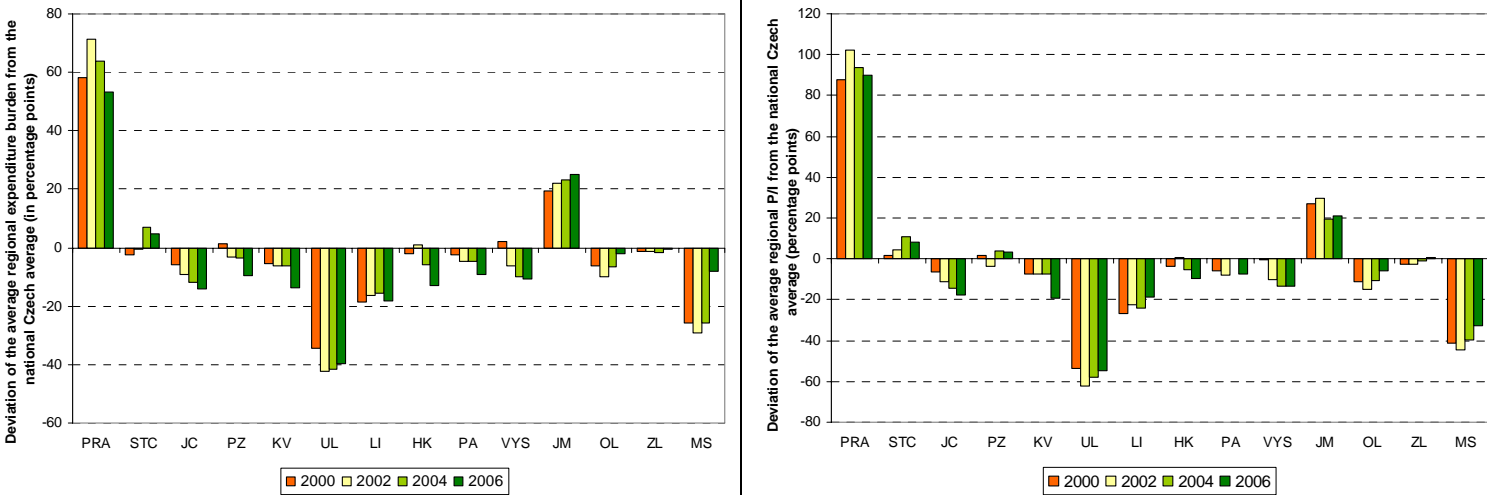

Source: IRI, Regional Statistics on Labour Costs (RSCP), Czech Statistical Office, authors' calculations.

Figure 9 depicts the regional differences in per capita GDP, or more precisely, how much regional GDP diverges from national per capital GDP. The data in the figure can be interpreted in the same way as the data in Figure 8. The economic predominance of Prague as

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[7] Determined on the basis of the Labour Force Survey.

a specific type of region (Prague is both a region and a regional city) is immediately obvious from the figure. Per capita GDP in Prague was double that of the national level in practically all the years in the period under observation. Per capita GDP in the other regions is below the national average of per capita GDP. Measured as per capita GDP, economic performance is low mainly in the Karlovy Vary and Olomouc regions. Figure 9 reveals that during the period of observation the economic differences between individual regions did not grow smaller, rather just the opposite. If we take into account per capita GDP for 2006, it is clear that Prague's economic predominance increased, while per capita GDP in most of the other regions fell further below the national average. An exception in this regard was the Moravia-Silesia region and partly also the Liberec region.

Figure 9: Regional disparities in per capita GDP in 2000, 2002, 2004 and 2006
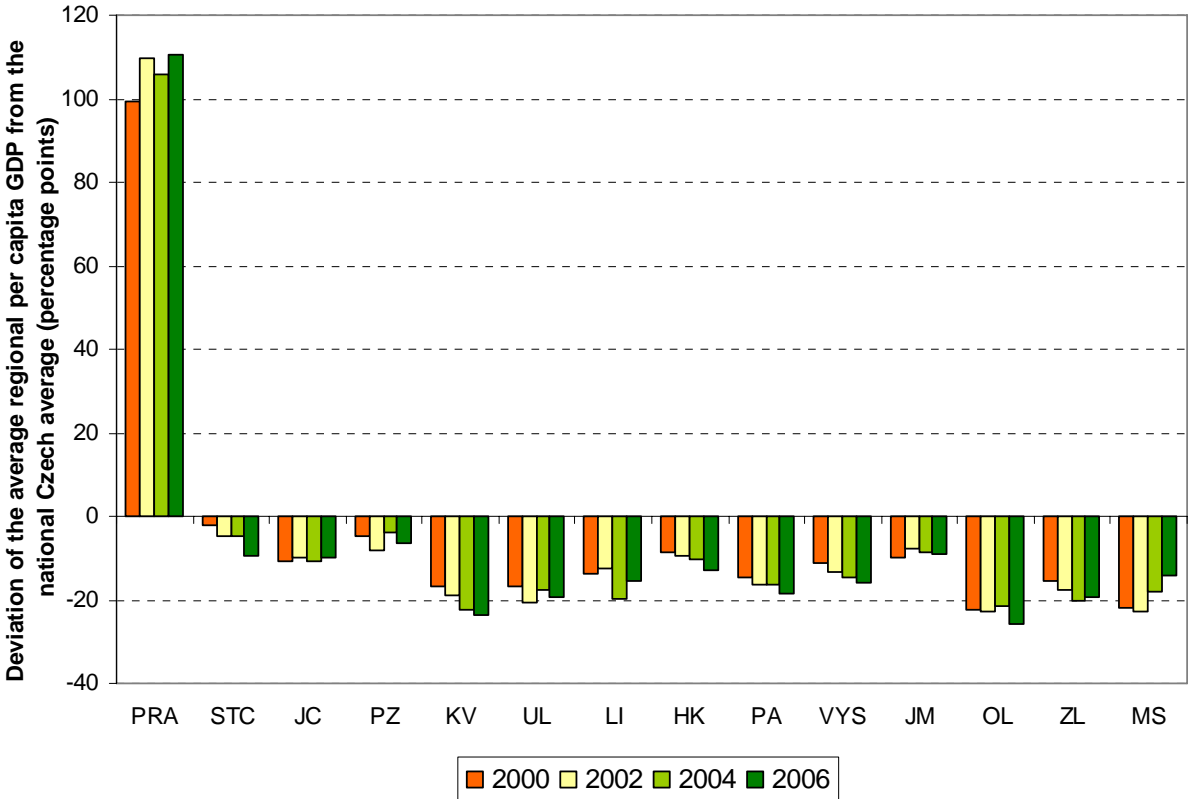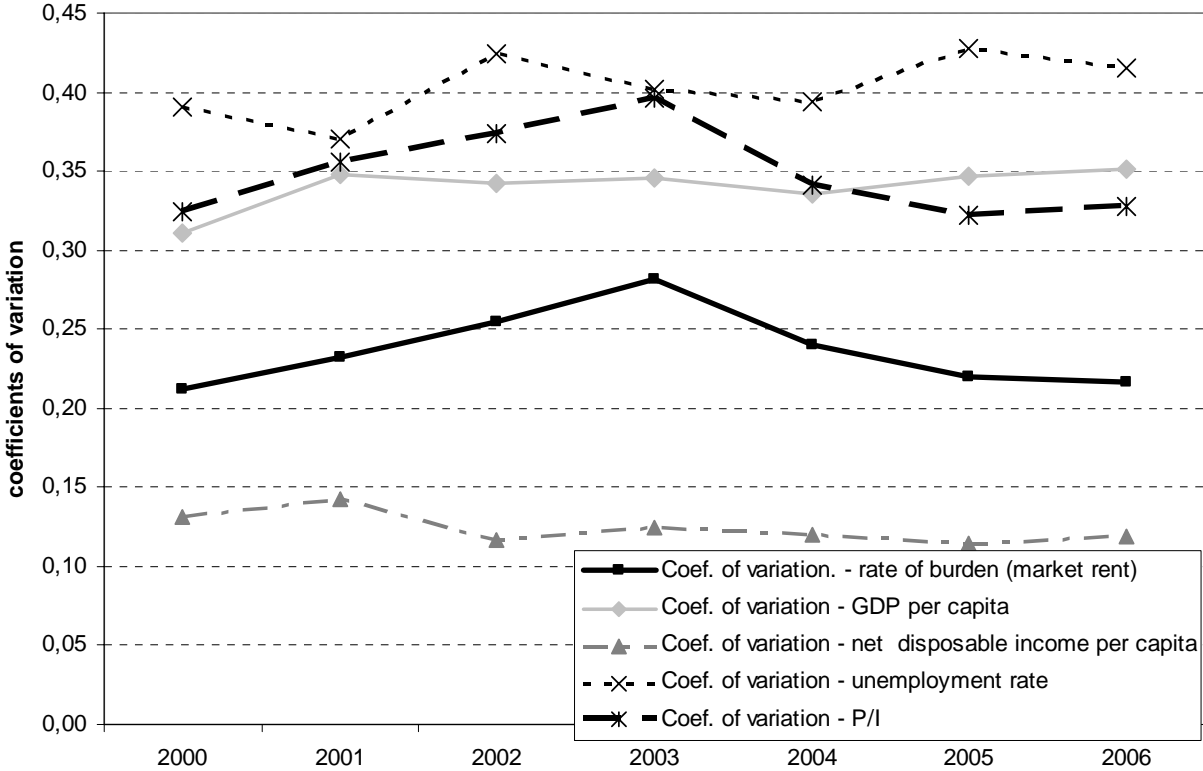

Source: Czech Statistical Office, authors' calculations.

A coefficient of variation was used to compare regional disparities in housing affordability over time. Correlation coefficient between variation coefficients was then used to test the hypothesis about the effect of regional disparities in economic performance on the disparities in housing affordability. Unlike, for example, standard deviation, the coefficient of variation is not sensitive to the absolute values of observed indicators (it is "normalised" towards the average); it is nondimensional, and thus it can be used to compare the variability of various indicators. Figure 10 presents the values of the coefficients of variation in individual years during the period under observation for the expenditure burden on "market" rent, the average *P/I*, per capita GDP, net disposable income, and the unemployment rate. It is evident from the figure that the values of the coefficient of variation for all the economic indicators, except per capita net disposable income of households, are higher than the values of the coefficient of variation for the expenditure burden on rental housing. In other words, regional disparities in economic performance (with the exception of per capita net disposable income) were greater

than the regional disparities in the potential affordability of "market" rental housing. On the other hand, regional disparities in the affordability of owner-occupied housing are higher than regional disparities in economic performance, with the exception of the regional disparities in the unemployment rate (and in 2005 and 2006 also regional disparities in per capita GDP). In the case of owner-occupied housing, regional disparities in the affordability of owner-occupied housing are greater than the regional disparities in the economic performance of the regions (with the exception of disparities in the rate of unemployment). Conversely, in the cases of rental housing, regional disparities in the economic performance of the regions (with the exception of per capita net disposable income) are greater than the disparities in the affordability of market rental housing.

Figure 10: Regional disparities in housing affordability and economic performance

Source: Czech Statistical Office, authors' calculations.

The question arises as to whether there is a statistically significant relationship between regional disparities in the affordability of housing (rental and owner-occupied) and regional disparities in economic performance, i.e. to what degree is it possible to explain the decrease (increase) in regional disparities in housing affordability by a decrease (increase) in the regional disparities in economic performance. This question is partly answered by Figure 10, where it is clear that the coefficients of variation for housing affordability and the coefficients of variation for indicators of economic performance do not share the same trend over time. To test this, we calculated Pearson coefficient of correlation between the coefficients of variation for average expenditure burden on market rent[8] (and the coefficients of variation for average *P/I*) and the coefficients of variation for selected indicators of economic performance (see Table 2). The data in Table 2 indicate that, surprisingly, it was not possible in any case to identify a statistically significant relationship between regional disparities in housing

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[8] Coefficients of variation were calculated for individual years in the period under observation (2000-2006) and they express the variability of the given indicator between regions in the CR.

affordability and regional disparities in general economic performance. One of the reasons for this may be the very short time series (and consequently the very small number of observations, N) that this relationship was tested on. This surprising finding will be the subject of further research.

Table 2: The correlation between regional disparities in housing affordability and regional disparities in economic performance

	Pearson's correlation	Sig. (2-tailed)	N
Regional disparities in the affordability of market rental housing			
Per capita GDP in current prices	0,306	0,504	7
Per capita net disposable income	-0,092	0,845	7
Unemployment rate	0,023	0,961	7
Regional disparities in the affordability of owner-occupied housing (P/I)			
Per capita GDP in current prices	0,300	0,514	7
Per capita net disposable income	0,093	0,842	7
Unemployment rate	-0,089	0,849	7

Source: authors' calculations.

Conclusion

This paper proposes a specific method of evaluating regional disparities in housing affordability that makes it possible to overcome the problem of insufficient data from official statistics (the non-existences of data files of the requisite sample size that can be broken down to the level of individual regions), which can often be the case in the countries of Central and Eastern Europe. One disadvantage of this method is the fact that it can't be used to evaluate real (rental or owner-occupied) housing affordability for individual types of households, and that it only tells us about potential housing affordability under given modelled (and partly normative) assumptions. On the other hand, an advantage is that it can be used to make an accurate analysis of regional disparities in potential housing affordability over time and between individual types of households, as presented above.

The findings from the analyses of regional disparities in the affordability of rental and owner-occupied housing indicate that regional disparities can mainly be observed among low-income households and the biggest regional differences are observed between such households in Prague (and in Brno in the case of "market" rental housing) and households in the other regions. From 2000 to 2003 these differences grew in significance, but in 2003 the trend stopped, and compared to the situation in 2003, in 2006 regional differences in the affordability of rental and owner-occupied housing decreased. The above-mentioned trends in rent levels and prices of owner-occupied housing are behind this development. Up to 2003 rents and the prices of flats grew sharply particularly in regions with high rents, while from 2004 rents and prices of flats in regions with lower rents and prices grew more substantially.

Although the percentage of households potentially at risk of being unable to afford rental housing decreased in almost all the regions, according to the trend in the residual income values, and at the same time there was a decrease in the number of households that (hypothetically) would be unable to afford mortgage credit to purchase "adequate" housing, not a negligible portion of households was still potentially at risk of being unable to afford housing.

The analysis of the trend in the affordability of owner-occupied and rental housing for individual types of households in individual regions revealed that among higher-income households (households of senior and management employees and professionals and specialists) the regional differences are not as significant as among the lowest-income households. In regions where the prices and rent levels of flats are high (Prague, Southern Moravia) the amount of net income of qualified workers is significantly higher than in the majority of other regions, while the income of employees with lower qualifications, though also higher than in other regions, is not higher to such a significant extent. Regardless of whether the family of a manager lives and works in Prague, Brno or České Budějovice, the potential affordability of housing (measured by the expenditure burden on rent and by the *P/I* ratio) of these families will be similar. Among lower occupational categories, however, the differences between individual regions are beginning to differ substantially. In other words, for certain types of households it would be very difficult or almost impossible to be able to afford to live in the more advanced, "more expensive" regions.

This potential barrier to migration between regions can have a negative impact on the labour market, as, for example, families of people working in services, shop assistants, and other service employees, and even families of craft and related trades workers would find it difficult to live in Prague, even though there is a big demand for labour to fill these occupations in the capital. These households "logically" decide to remain in regions where housing is more affordable, even though they are often regions with high unemployment and few job opportunities. Another potential risk is represented by the relatively small difference in the affordability of rental housing for families in which one parent is on parental leave – when housing is unaffordable for families, this can have certain (not proven yet) impact on the demographic behaviour of young people. In Prague and in the Southern Moravia region the majority of family households in which only one member was economically active fell into the group of those potentially at risk of being unable to afford housing. In these regions in particular it is possible to expect that young people will postpone having a family or will move to places where housing is more affordable. The connection between the financial affordability of housing in the regions of the CR and the domestic migration of the population (in particular labour migration) will be the subject of further research.

The analyses confirmed the hypothesis that regional disparities in the prices of owner-occupied housing were higher in the observed period than regional disparities in the economic performance of the regions in general (measured with the per capita GDP indicator, per capita net disposable income, and the unemployment rate). It was not possible to confirm the hypothesis that regional disparities in the potential affordability of "market" rental housing are higher than regional disparities in the economic performance of the regions in general. However, in the years under observation (2000-2006) regional disparities in the potential affordability of owner-occupied housing were higher than the regional disparities in the economic performance of the regions (with the exception of disparities in the unemployment rate and disparities in the per capita GDP in 2005 and 2006). A surprising conclusion then is in particular the fact that the trend in regional disparities in housing affordability appears to be independent from the trend in regional disparities in economic performance. In other words, a decrease (increase) in the differences in the economic performance of the regions, based on preliminary analyses, statistically has little to do with any decrease (increase) in the differences in the affordability of ("market" rental or owner-occupied) housing. One possible explanation for this could be that the time series on which this correlation was tested was too

short. The connection between regional disparities in economic performance and in housing affordability will therefore be the subject of future research.

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