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Regional Poverty and Income Inequality in Central and Eastern Europe

Evidence from the Luxembourg Income
Study

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Abstract

This paper reports levels of income inequality and poverty in four Central and Eastern European countries: the Czech Republic, Hungary, Poland and Russia. Unlike many previous researchers who examine transition economies, we aggregate the detailed individual-level income surveys made available through the efforts of the Luxembourg Income Study at the regional level of analysis. Although national-level investigations have contributed much to our understanding of the income distribution dynamics, these studies mask intracountry variance in levels of income inequality and thus may not capture the true distribution of household income and accurately reflect individual wellbeing. Accordingly, we compute summary measures of inequality and relative poverty rates, using both local and national relative poverty lines, for the most recent waves of data available. We offer comparisons between regional and national median .../...

Keywords: poverty, income inequality, regions, Central and Eastern Europe

JEL classification: I3, O52, P36, R11, R12

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incomes and assess levels of inter- and intraregional income inequality. In addition, we make comparisons to regions within Western European countries and find that, contrary to what is often asserted, interregional disparities in Central and Eastern Europe countries are not as large as those found in some Western European countries.

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Introduction

Regional economic change is an important part of the economic development process in all countries—rich, poor and middle income. The effects of regional economic change on poverty, inequality, social exclusion, population health, and other relevant social dimensions are just beginning to emerge. For instance, recent papers have shown that China's regional growth progress has varied considerable by region, leading to rising inequality within and between China's regions (Wei and Wu 2002). India shows a similar pattern. Studies of subnational (regional) poverty and inequality have also recently been completed for Europe and for other wealthy nations (Goerlich and Mas 2001; Jesuit *et al.* 2002; Osberg 2000; Rainwater *et al.* 2001; Stewart 2002).

One of the most rapidly changing regions of the world in the 1990s were the former centrally planned economies in Central and Eastern Europe (CEE), including the Czech Republic, Hungary, Poland and Russia, which we study in this paper. These CEE nations have undergone a very rapid change from planned economies to market-based societies. As a result, repressed inequalities in wages owing to the Soviet-style institutions of wage determination largely disappeared during the 1990s. These wage and earnings patterns were replaced by entrepreneurial and market-based returns to skills and risk-taking, producing overall national income and earnings inequality levels in the CEE by the end of the 1990s which resemble those in some Western European and in other middle-income countries like Mexico (Förster and Tóth 1997; Smeeding 2002). Of course, these changes did not proceed on an even keel within each of these nations. Some areas prospered and others lagged behind.

While comparative evidence on macroeconomic and labour market related regional disparities in Central and Eastern Europe is widespread and growing, most of these analyses are based on macro-regional aggregate data. So far, and despite the significant contributions made by a recent World Bank report (2001), precious little is known on the micro level of inequalities, i.e. regional differences in household incomes and poverty (but see also Bailey 1997).

The present paper seeks to fill some of these gaps and proposes an enhanced analysis of income inequality, poverty, and to a lesser extent economic growth, across the regions within four CEE countries. More specifically, is income inequality higher in some areas than in others within CEE countries? What are the contributions of inter- versus intraregional inequalities in total income inequality within CEE countries? How does the adoption of a local rather than a national poverty line affect estimates of poverty within CEE regions? How do regions within CEE countries compare to regions within Western Europe? Finally, is there a relationship between economic growth, income inequality and poverty across CEE regions, as some suggest?

1 Setting the scene: regional variations in macroeconomic performances and recent evidence at the micro level

Pretransition governments pursued a centrally planned economic policy which, inter alia, led to specific industries (in particular heavy industries) being placed in specific regions according to political rather than economic criteria. It may therefore be expected, and has often been claimed, that at the start of transition regional disparities in terms of macroeconomic performance and employment structure were high in Central and Eastern Europe. Furthermore, the transition to a market economy is believed to have accentuated those regional disequilibria.¹

This seems, indeed, to have happened. Comparative cross-country studies generally point to an increase in regional disparities with regard to GDP and employment/unemployment in Central Eastern Europe. The *OECD Territorial Outlook 2001* (OECD 2001), for instance, reports that the coefficient of variation of per capita GDP across regions has risen between 1995 and 1997 in all three central eastern member countries of the OECD: the Czech Republic (from 31 to 33), Hungary (from 31 to 36) and Poland (from 19 to 24). More precisely, for the Czech Republic the report defines the northwestern and southeastern regions as most deprived, while Prague and Plzeň seem less affected (OECD 2001:51). For Hungary, a ‘significant widening of territorial disparities is reported’ due to the fact that the capital region was the only one capable of withstanding a situation of declining real GDP and increasing unemployment (OECD 2001:69). For Poland, a clear division between the richer western and poorer eastern part is described, disturbed by the richest region, the capital region around Warsaw.

As for regional labour market performances, an early study conducted in the first phase of transition (OECD 1995) suggests that ‘...spatial variations in unemployment rates materialized “at a stroke” after the introduction of market-oriented reforms in all transition countries... (these variations) may last for a long time, because of the different capacities of regions to adapt to a market-based system’ (OECD 1995:11). Further, OECD (2001:34) shows that the Czech Republic, Hungary and Poland are part of those two-thirds of OECD countries in which regional disparities in unemployment have been widening in the second half of the 1990s; in the first two countries under a situation of increasing average (national) unemployment, and in Poland under a situation of decreasing average unemployment. The latter trend suggests a polarized pattern since positive employment growth is spatially differentiated.

¹ While we focus on the decompression of earnings as the key cause of rising income inequality during the transition, such factors such as privatization, land reform, the emergence of an entrepreneurial class, changes in public policies, and corruption, among others, have all been linked to its growth (see e.g. Aghion and Blanchard 1994; Atkinson and Micklewright 1992; Commander and Coricelli 1995; Flemming and Micklewright 1999; World Bank 2001).

How do the absolute levels of regional disparities compare with ‘traditional’ OECD countries? Hungary stands out. As far as the regional concentration of total GDP is concerned, as much as 42 per cent of national GDP is concentrated in its richest region,² the capital region around Budapest. On OECD average, 25 per cent of GDP is concentrated in the respective richest regions of countries, and this percentage is slightly lower in the Czech Republic and Poland (22 per cent and 20 per cent, respectively). The coefficient of variation of per capita GDP is above OECD average in Hungary,³ around average in the Czech Republic and below average in Poland (OECD 2001:33).

As for regional variations in unemployment rates, levels in the Czech Republic and Hungary (no information for Poland is available) actually do not diverge much from those experienced in other OECD countries (coefficient of variation of 31 for Hungary, 41 for the Czech Republic) and they are in lower than in the two countries with highest regional variation in unemployment: Germany⁴ (44) and Italy (61) (OECD 2000:39). In addition, a decomposition analysis of the variance in unemployment rates shows that most of the explained variation in unemployment across regions is accounted for by education in the Czech Republic and Hungary (OECD 2000:42). In sum, regional disparities in Central Eastern Europe are high but, with the exception of GDP concentration in Hungary, they do not seem to be extraordinarily high when compared to OECD countries.

In the most recent in-depth analysis of regional macroeconomic and unemployment variations, Römisch (2001) shows for nine Central Eastern European countries that, at the beginning of this decade, there exist large disparities between the capital city regions and the rest of CEE regions as well as an East-West pattern in terms of GDP and GDP per capita. Similar patterns are also found in terms of unemployment variations, with a few exceptions. In Hungary and Poland, for instance, unemployment rates in the eastern regions are not significantly higher despite GDP levels well below the national average. Römisch relates this to the high share of agriculture in those regions which do not generate high GDP but (unlike in Western Europe) are able to absorb or hide open unemployment.

As for the trend between 1993 and 1998, in accordance with the OECD figures quoted above, Römisch (2001:5-7) reports regional variations of both total GDP and GDP per capita⁵ on the rise throughout CEE countries. To situate the three countries included in

² This is the highest value across OECD.

³ In fact, the fourth highest value as Mexico, the United Kingdom and France show still higher coefficients.

⁴ This only holds for reunified Germany but not Western Germany taken apart.

⁵ The (unweighted) nine-country average of the Gini coefficient for the regional GDP distribution increased from 0.275 to 0.300, and the coefficient of variation of per capita GDP increased from 0.237 to 0.284 between 1993 and 1998.

the present paper in the frame of other Central Eastern European countries, it should be noted that their levels of variation of per capita GDP are around average, with lower variation occurring in Lithuania and, in particular, Bulgaria and higher variation in Estonia and the Slovak Republic.

A kernel density analysis of the data suggests that ‘without the capital cities, the distribution (of per capita GDP) has been stable and neither convergence nor divergence has occurred across the majority of the (poorer) regions in the countries’ (Römisch 2001:9). It also reveals that regions with above-average unemployment at the start are likely to have even higher unemployment in the following. In explaining the existence of regional disparities, Römisch’s results point to the importance of the services sector on relative GDP and unemployment levels.⁶ Other factors explaining a region’s economic performance are their distances to the West and their distance to capital city regions, which both seem to generate positive spillovers. Finally, agglomeration effects were found to exert a significant and positive influence on regional GDP and unemployment levels (Römisch 2001:15-18).

While comparative evidence on macroeconomic and labour market related regional disparities in Central and Eastern Europe is widespread and growing, relatively little is known on the micro level of inequalities, i.e. regional differences in household incomes and poverty in a comparative perspective. In his major study on income, inequality and poverty in transition countries, Milanovic (1998), for instance, attributes one paragraph to the regional aspect of poverty. Comparing micro data for the Czech Republic, Hungary, Poland and Slovakia for the early to mid 1990s, he concludes that ‘poverty rates decline with increase in the size of locality’ (Milanovic 1998:106). This finding relates to the larger share of highly skilled people in capital cities and the low level of income of farmers. The analysis, however, is based on large versus smaller cities and villages rather than on geographical regions.

A recent report published by the World Bank (2001) addresses many of the shortcomings of previous research on the market transition in CEE that we have thus far identified. Indeed, the report offers an exhaustive set of indicators on income inequality and poverty based on microdata from most of the countries in Central and Eastern Europe. Furthermore, these microdata are also aggregated at the subnational levels of analysis so that intracountry disparities may be analyzed. One of the key findings of this report is that the transition has resulted in divergent economic outcomes in the Commonwealth of Independent States (CIS) countries, such as Russia, and in the Central and South Eastern European and Baltic (CSB) countries such as Poland (2001:163-4). Another important conclusion from this report is that the capital cities in CEE countries, especially in the CSB countries, have lower rates of poverty than in their nations as a whole and that there are some regions within countries where the risk of

⁶ Regression results were significant also in the specification without the capital city regions.

poverty is more than 3 times greater than the national rate (2001:74-80). Despite the significant contribution that this report makes, there are a few remaining gaps that this paper seeks to fill.

Unlike the World Bank report, we adopt a harmonized definition of household income and offer a more detailed aggregation of households at the regional level of analysis. We also we make use of more recent data and examine at least two cross-sections for each country in order to investigate changes over time. Furthermore, we estimate income inequality within regions and use both a local and national standard when measuring poverty, neither of which has been previously accomplished. In addition, we compare regions within CEE countries to those in West European nations in order to assess the magnitude of interregional disparities between current EU members, three candidate countries and Russia. Finally, we offer some very preliminary evidence concerning the relationship between poverty, income inequality and economic growth in CEE regions.

2 Data and methods

This paper examines income inequality and income poverty using the harmonized microdata made available through the efforts of the Luxembourg Income Study (LIS) for the following countries and years: the Czech Republic (1992, 1996), Hungary (1991, 1994), Poland (1992, 1995, 1999) and Russia (1992, 1995).⁷ The core concept used in this paper is that of *disposable* income. More precisely, gross wages and salaries, self-employment income, cash property income, pension income and social transfers of all household members are added and income taxes and mandatory employee contributions are subtracted to yield household disposable income.⁸ In order to account for differences in household size, this paper adopts the standard approach of taking the square root of the number of household members to calculate equivalent disposable income (Atkinson *et al.* 1995:21).⁹

⁷ Detailed information on the characteristics of the underlying surveys can be obtained from the LIS technical documentation site www.lisproject.org/techdoc.htm. In general, sample sizes of surveys vary between app. 3,000 (Hungary) and 27,000 (Czech Republic). It bears mentioning that the quality of the surveys included in the LIS varies somewhat. For example, the LIS datasets for the Czech Republic and Poland are based upon official sources and are of higher quality than the ‘unofficial’ sources of data for Russia and Hungary (see Smeeding 2001).

⁸ Unfortunately, income from home food production is not available in the Wave III datasets and, thus, it is not included in our income concept.

⁹ There is an important debate focusing on the various equivalence scales one should adopt when examining CEE countries (see for example, Lanjouw *et al.* 1998). However, research has shown that the choice of equivalency scale is most important when examining a subgroup of the population, such as children or the elderly. Since we are examining the entire population, our results are not as sensitive to this choice.

Another important measurement decision made in this paper concerns top and bottom coding. We bottom code the LIS datasets at 1 per cent of equivalized mean income and top code at 10 times the median of non-equivalized income for the nation sample (Gottschalk and Smeeding 1997:661). This procedure limits the effect of extreme values at either end of the distribution. Finally, we exclude all records with zero disposable incomes in the measures of income poverty that we report. This decision is consistent with Atkinson *et al.* (1995) and with the method used and recommended by the LIS Key Figures reported on the LIS website.¹⁰ A final methodological decision is whether to consider inequality and poverty among households or persons (say, to count a couple with two children four times rather than once). As our concern is with the position of citizens and to treat each citizen as equal in the distribution, our results refer to ‘person weights’ which equal the household weight times the number of household members.¹¹

Finally, many argue that household consumption (expenditure) is preferable to income when estimating economic wellbeing (see for example, Ravallion 1994). Indeed, we concede that irregular pay and income underreporting make reliance on income as the estimate of wellbeing somewhat problematic, especially in Russia (World Bank 2001:367-68). For these reasons, the recent World Bank report on CEE countries (2001) favours household consumption when measuring poverty,¹² but reports both income and consumption inequality. In fact, previous research has demonstrated that within the affluent countries findings are very similar whichever approach is adopted. This is also true within the CEE countries when calculating income inequality, with the exception of CIS countries such as Russia (see also World Bank 2001:143-4). However, when comparing our poverty results to those published by the World Bank (2001, Appendix D), our rates are consistently higher although our ranking of countries remains the same. Furthermore, contributing to these discrepancies is the fact that we use different years (and a different survey in the case of Hungary) as well as different equivalency scales. Nonetheless, in future research we hope to obtain harmonized estimates of household expenditures for sake of comparison.

2.1 Defining regions

Unfortunately, not all of the national-level surveys from Central or Eastern European Countries included in the LIS report the respondent’s region/state/province of residence. In the countries we include in this regional analysis, the units tend to be well defined politically, territorially and culturally. The exception to this is found in the case of Hungary, where we were only able to identify Budapest as a geographical unit while the other categories are based on an urban versus rural definition. In addition, in some cases

¹⁰ www.lisproject.org.

¹¹ This is in line with the current practice in European and international research. Atkinson *et al.* (2002:29), for instance, argue ‘We are not suggesting that individuals should be considered in isolation; but each person should count for one’.

¹² Except for Hungary and the Slovak Republic (2001:376).

we decided to aggregate regions even when a more detailed breakdown was available so that we could maintain comparability across the LIS data waves¹³ (for example, in Poland and in Russia). Finally, due to the reform of Poland's provinces in 1999, the regional aggregations for Poland 1999 are not exactly comparable to the groupings in 1992 and 1995.¹⁴ However, we believe that this has had little effect on our results since, in order to maintain comparability between Poland's Wave III and IV regions, we aggregate households into nine regions rather than provinces. Specifically, we aggregate households at the level of Czech regions (8); Hungary's capital city (Budapest), major cities, towns, villages and farmsteads; and Polish (9) and Russian regions (9).¹⁵ The list of regions, including the number of observations from which the measures of inequality and poverty are derived and 95 per cent confidence intervals for the estimates we report, is included in the Appendix.

2.2 Measures of income inequality and decomposition

We use three general measures to estimate income inequality in our study: the Theil Index, the Gini coefficient and the ratio of regional and national median incomes. The Theil Index is an additively decomposable index of income inequality, allowing one to estimate each subgroup's contribution to total income inequality within a population (Cowell 2000:109). In this case, we compute the Theil index using regions as our subgroup. We also report Gini coefficients at the regional and national levels of analysis. Gini scores are based on the Lorenz curve, which plots cumulative percentages of the population against their cumulative aggregate incomes. A value of zero indicates 'perfect equality', in which every individual has the same income. A value of one indicates 'perfect inequality' and results if one person has all the income. The advantage of this measure is that its computation includes the entire income distribution. Furthermore, it is the best-known measure of inequality in the social sciences. Also significant for our study, the Gini coefficient is an appropriate estimator of *intraregional* income inequality. Finally, as a complementary way of capturing *interregional* inequality within a country, we report the regional/national median income ratio. This is simply computed as the ratio of a region's median household equivalent income to the national median household equivalent income. However, all of these measures are most sensitive to changes around the median and, thus, may not be as useful in quantifying changes at the bottom (or at the top) of the income distribution,

¹³ In the following, the term 'LIS data wave III' refers to the early 1990s, 'wave IV' to the mid 1990s and 'wave V' to the late 1990s.

¹⁴ This administrative reform took effect on 1 January 1999 having become legislation in 1998, with Poland's 49 provinces reorganized into 16 new provinces. In any case, we use 9 geographic groups rather than the provinces thus limiting the effect this has on our results.

¹⁵ Ideally we would be able to aggregate households into smaller and/or more relevant subnational units such as primary sampling units or those having administratively significant boundaries. However, we are limited to these definitions for practical reasons of data availability, confidentiality and comparability. Nonetheless, our regional aggregations offer an improvement over previous research.

a major concern of this study (see Atkinson *et al.* 1995:23). Accordingly, we also compute relative poverty rates using both national and local poverty lines.

2.3 Local and national standards in the measure of poverty

The most basic decision poverty researchers confront is whether to adopt an absolute or relative approach to measuring poverty. The former entails estimating a ‘market basket’ of goods and determining an absolute poverty line that is the cost of purchasing these goods for households of various sizes. The latter bases the poverty line on the distribution of income and establishes a point, such as 50 per cent of the median, below which households are considered ‘poor.’ Most cross-national research on poverty within affluent countries uses the second method and this is the official approach to measuring poverty adopted by Eurostat (1998, 2000). In addition to this, however, researchers conducting regional investigations are confronted with another choice—the definition of the reference society—whichever approach (absolute or relative) they adopt since ‘...there is also the possibility of variations in standards for defining poverty across the regions of a nation’ (Rainwater *et al.* 1999:4). For example, if one is using the absolute approach to defining poverty, the market basket is adjusted to reflect local prices rather than a national average. Thus, the poverty line varies regionally according to the costs of the goods in the basket (see also Citro and Michael 1995).¹⁶

In most comparative research on poverty, the poverty line is defined as a fraction of the *national* median equivalent income (commonly 50 percent, though 40 percent and 60 percent are also often used). Applying this 50 percent approach to regional analyses, we are confronted with the choice between using this national standard or substituting a regional one as a reference group. Rainwater *et al.* argue that the regional standard ‘...approximates much better, although not perfectly, the community standards for social activities and participation that define persons as of “average” social standing or “below average” or “poor”’:

Using a local relative standard takes into account whatever variations in the cost of living are relevant and relevant differences in consumption, and relevant differences in social understanding of what consumption possibilities mean for social participation and related social activities. (Rainwater *et al.* 1999:5, see also Rainwater 1991, 1992)

On the other hand, adopting a national-relative standard is sensitive to the wealth of a region relative to the national standard. This interregional approach more clearly captures disparities in wealth between regions and does not reflect intraregional income

¹⁶ Note that, under certain policy-related considerations such as the allocation of structural funds in an enlarged European Union, there are also arguments to look at supranational poverty thresholds, taking the whole Europe as a reference society. Förster *et al.* (2002), for instance, estimate indicators for income and consistent poverty for selected EU candidate countries under European-wide thresholds. See also Beblo and Knaus (2000).

inequality per se. This will be more clearly demonstrated in Section 3. Rather than deciding which approach more accurately measures economic wellbeing, we use both in this paper.¹⁷

The alternative is to use an absolute approach at either the subnational or national level. The World Bank, for instance uses different absolute poverty lines for each of the world's regions: \$1 per person per day in Africa; \$2 per person per day in Latin America; \$3 per person per day in Central Asia; and \$4.3 for Central and Eastern Europe. The United States, on the other hand, has its own 'absolute' poverty line of \$10-15 per person per day, depending on family size (Smeeding *et al.* 2001). However, absolute poverty standards can be captured nationally only when we can define comparable baskets of goods in 'real' terms across a set of countries. This process can be achieved using purchasing power parities (PPPs) such as those developed by the OECD. However, these PPPs are not well suited for microdata and do not account for wide differences across nations in the way that public goods such as healthcare, education, and the like are financed (Smeeding and Rainwater 2002). Also, differential quality of microdata may affect the results since PPPs are calculated relative to aggregate national account statistics, not microdata (see Smeeding *et al.* 2001). And even if the national absolute approach could be tolerated, one would not be able to actualize the absolute local approach unless regional (local) price indices were also calculated. For all of these reasons, we use the relative approach in this article.

3 Results

In the following tables and figures, we report levels of income inequality and poverty for the four countries we examine and their 31 regions over three points in time in the 1990s. Confidence intervals based on the bootstrap standard errors of the estimates are also reported, allowing us to make conclusions with greater statistical certainty.¹⁸ We begin at the national level, where we find that there are considerable differences in levels of income inequality and poverty between countries and that these levels increased in all of the countries during the 1990s. Next, we examine intra- and interregional inequality and report regional figures and conclude that there is substantial variation with respect to levels of economic wellbeing within each of the countries. In this section we also explore the effects of using different poverty lines and find that there are often significant consequences associated with using a regional or national poverty line threshold. Finally, we look at trends in micro- and macroeconomic disparities for two regions with different growth patterns in the Czech Republic in the 1990s.

¹⁷ See Jäntti and Danziger (2000:326-33) for an overview of alternative measures of poverty, including the often used Foster, Greer and Thorbecke (1984) class of indicators. In future research we hope to exploit some of these measures.

¹⁸ We use 300 iterations of the bootstrap in order to calculate our standard errors and confidence intervals (see Osberg 2000; Osberg and Xu 1999).

3.1 National rates and trends

Before moving to our regional results, it is useful to examine national levels and trends in income inequality and relative poverty. Table 1 reports overall Theil Indices, Gini coefficients and relative poverty rates (at 50 per cent and 60 per cent of the median) for each of the datasets we examine. As shown in this table, levels of income inequality and relative poverty varied considerably between the four Central and Eastern European countries and there is a clear ranking. Namely, the Czech Republic consistently reported the lowest levels of income inequality and poverty, followed by Hungary and Poland, which have similar levels, and then by Russia, which reported the largest levels of income inequality and poverty among the four countries. Although one should be cautious when interpreting trends from just two points in time, the results indicate that income inequality and poverty increased in all of the countries between the early and mid 1990s. However, the figures for Poland 1999, the only result from the late 1990s we include in our analysis, suggests that this trend reversed towards the end of the decade.¹⁹ Nonetheless, there was still a net increase in income inequality and poverty within Poland over the course of the decade of the 1990s. In future work, we will determine if this same trend is evident in the other countries that we examine.

Table 1: National income inequality and poverty

Country	Income Inequality		Relative Poverty	
	Theil	Gini	50% median	60% median
Czech Rep. 1992	0.082	0.207	2.3	6.5
Czech Rep. 1996	0.120	0.259	4.9	10.5
Hungary 1991	0.145	0.283	8.2	14.3
Hungary 1994	0.185	0.323	10.1	15
Poland 1992	0.123	0.274	7.7	13.7
Poland 1995	0.190	0.318	11.6	17.7
Poland 1999	0.170	0.293	8.6	15.2
Russia 1992	0.273	0.395	19.3	25.9
Russia 1995	0.351	0.447	20.1	25.7

Source: Authors' calculations from LIS.

3.2 Intra- and interregional income inequality

As a first step in our regional analysis, Figure 1 displays Theil Indices for each of the countries we examine, plus Italy. We include Italy as a reference since it is a country widely known to have the large regional disparities.²⁰ As discussed, the Theil is a decomposable index of income inequality that makes it particularly suited for our

¹⁹ Trend estimates for Hungary point to a similar pattern; increasing inequality in the early and again mid 1990s, followed by a stabilization in the late 1990s (Szivosz and Tóth 2001; Förster and Pellizzari 2000).

²⁰ See Jesuit *et al.* (2002) for results on regional poverty within West European countries. In some of the following figures, we also compare our results to 75 regions from 5 West European countries since 3 of our 4 countries are EU candidate countries.

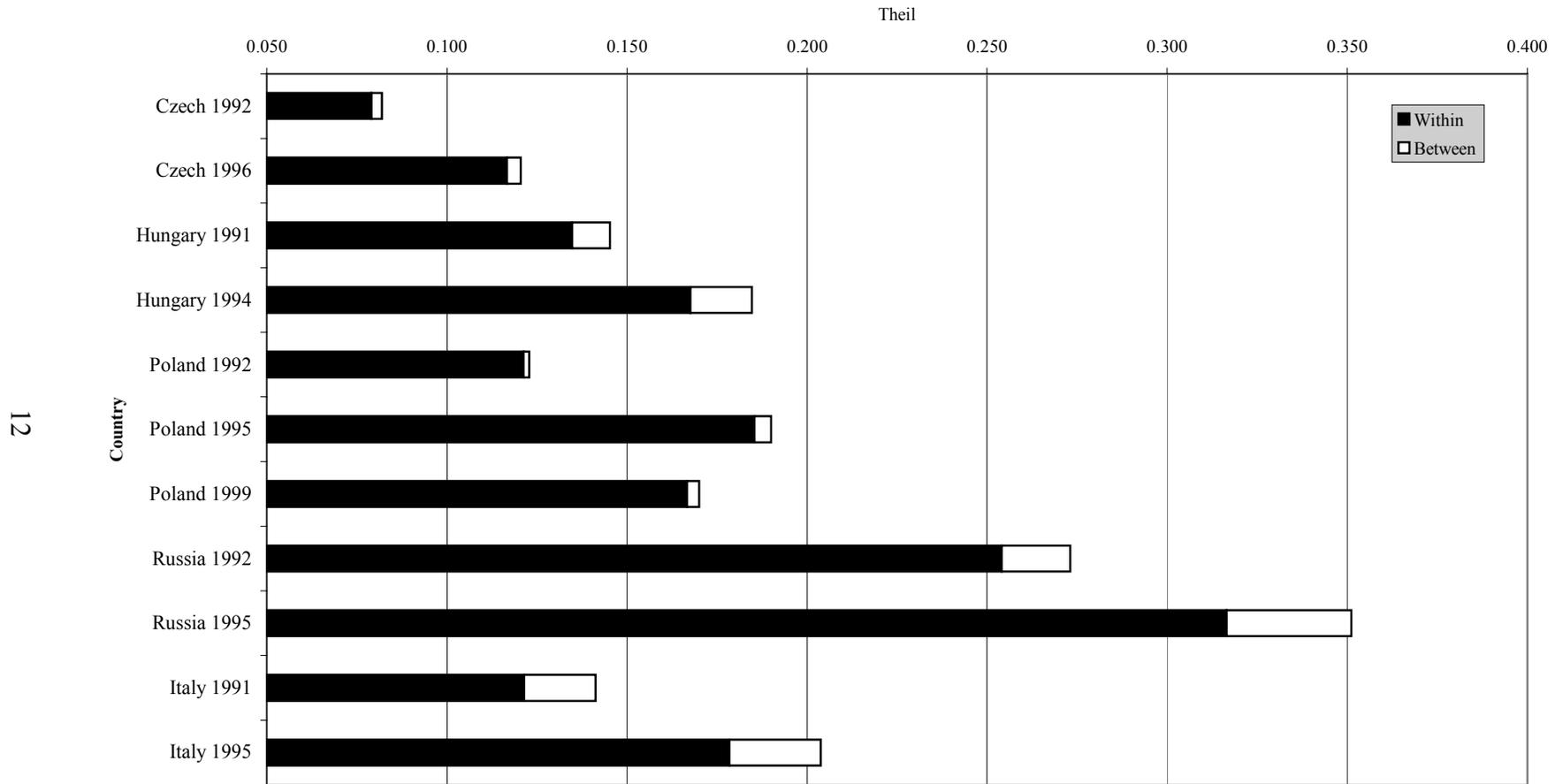
regional analysis (see Cowell 2000). In this case, we can determine the proportion of income inequality attributable to *intraregional* inequalities versus *interregional* inequalities. As shown in the figure (and Table 1), inequality increased in all of countries between the early 1990s and mid 1990s. Furthermore, the decomposition shows that both intra- and interregional inequality increased between the early and mid 1990s. However, the results from Poland—the only country for which we have LIS data available for Wave V, at the moment—suggest that inequality may have receded in the late 1990s. In terms of ranking the countries, interregional disparities were greatest in Russia in 1995 (even larger than in Italy) and lowest in Poland in 1992. Finally, by converting the Theil indices to proportions, it is evident that the vast majority of inequality in each of the countries is due to intraregional, rather than interregional disparities, ranging from 90.1 per cent in Russia in 1995 to as much as 98.7 per cent in Poland in 1992—this is also clearly shown in the figure by the relative sizes of the bars. Contrary to conventional wisdom, the interregional part of income inequality in EU candidate countries is thus lower than in some of EU member countries.

Although Figure 1 provides a general portrait of regional inequalities in Central and Eastern European countries, Figures 2-5 offer a more detailed description of intra- and interregional inequality, respectively. In Figure 2, we plot the distribution of regional Gini coefficients using modified ‘box and whiskers’ plots (see Tukey 1977). In these summary plots, the line across the box represents the median regional Gini coefficient while the box indicates the interquartile range (difference between the regional Gini at the 25th and 75th percentiles). The whiskers, or lines extending above and below the box, report the maximum and minimum reported Gini coefficient within each country. Each box represents a country and the number of regions within each is reported along the x-axis. We also include an aggregation of the 31 CEE regions we examine in Waves III and IV and an aggregation of regional figures from five West European countries reported in Jesuit *et al.* 2002.²¹ This latter figure allows us to make more direct comparisons to regional disparities within West and Central/East European regions.

By examining both the lengths of the boxes (interquartile range) and the range between the minimum and maximum values (the whiskers), Figure 2 illustrates that intraregional inequalities varied widely in the countries under examination. In fact, studies limited to the national level of analysis miss a great deal of intracountry variance in levels of income inequality. For example, the Gini coefficient for the whole of the Czech Republic in 1992 equaled 0.207. In Prague, however, the gap between the rich and the poor was considerably wider and the Gini equaled 0.263 in the same year (also represented by the top of the whisker extending from the box in Figure 2; the maximum value in the Czech Republic in 1992). In Poland and Hungary, there are similar findings

²¹ The five countries comprising the 75 West European regions are: Finland (1991, 1995), France (1989, 1994), Italy (1991, 1995), the United Kingdom (1991, 1995) and West Germany (1989, 1994).

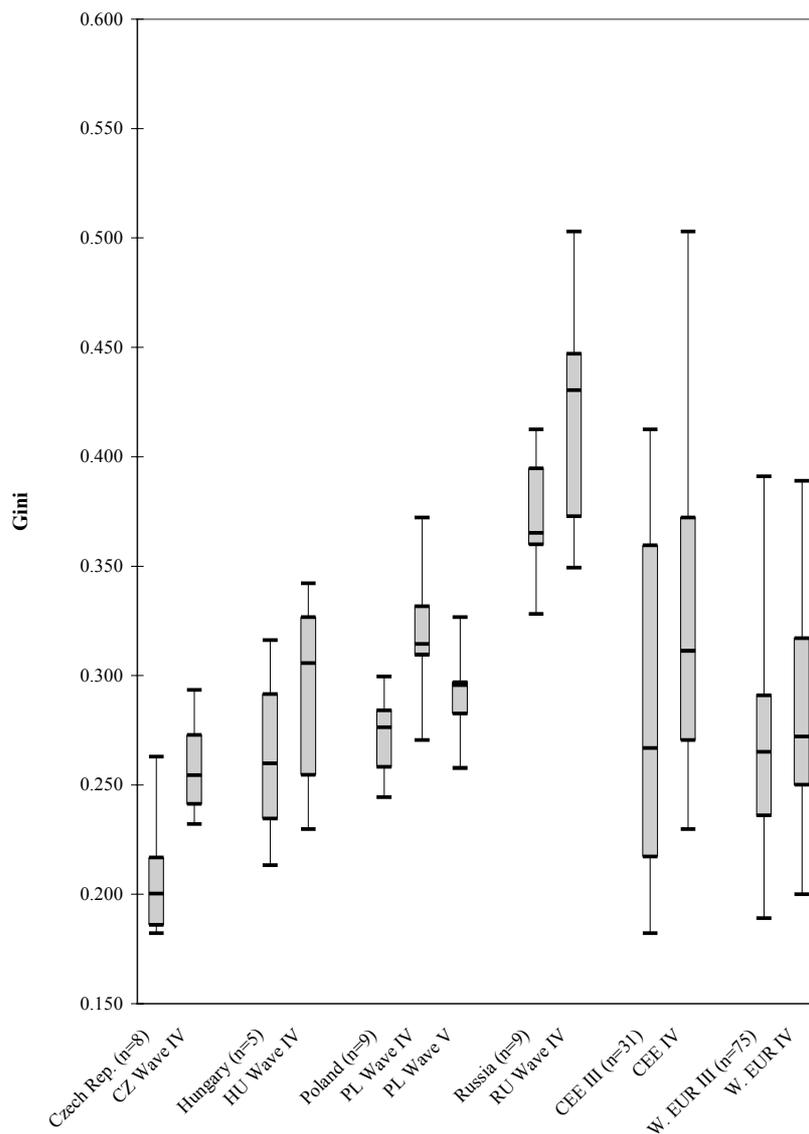
Figure 1: Theil coefficients, within versus between regions



Source: Authors's calculations using LIS.

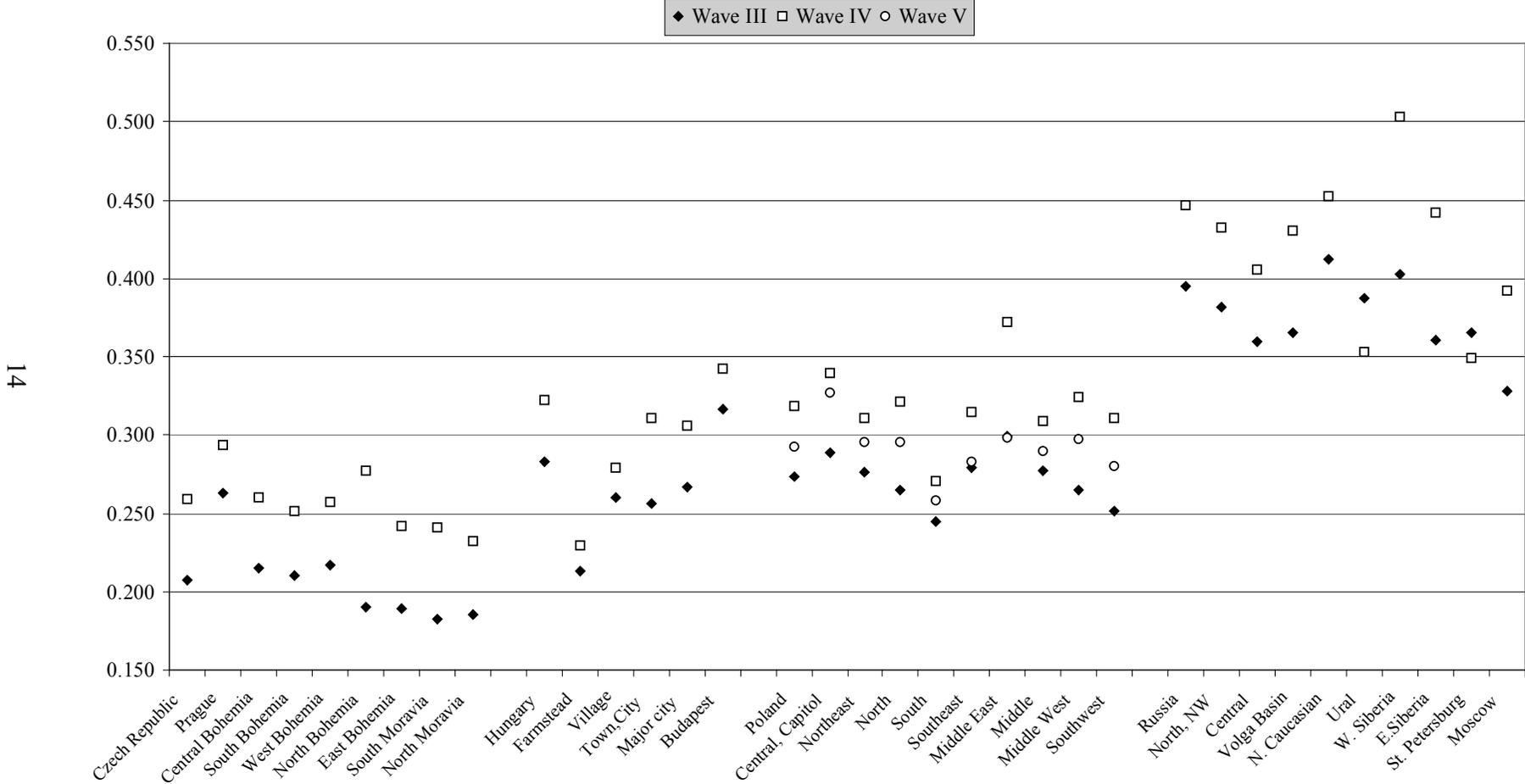
in that income inequality was higher in the urban capital cities than within the nations as a whole, though we are unable to conclude that this was the case in Poland for 1992 or for either year in Hungary with 95 per cent certainty. In Russia, on the other hand, income inequality in the urban capital Moscow was significantly lower than the national figures—Moscow (1992) Gini = 0.328; Russia (1992) Gini = 0.395. It follows that the levels of income inequality in the capitals Budapest, Warsaw and Moscow were more similar than in their respective countries.

Figure 2: Regional Gini coefficient box plots



Source: Authors' calculations using LIS.

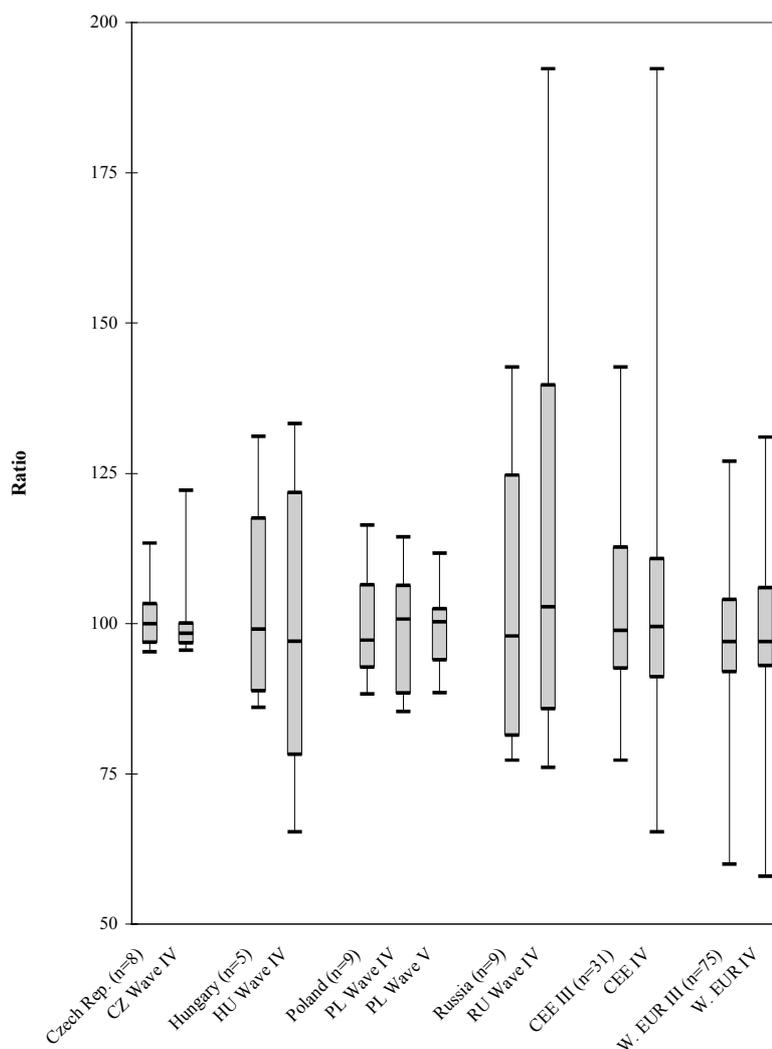
Figure 3: Regional Gini coefficients



Source: Authors' calculations using LIS.

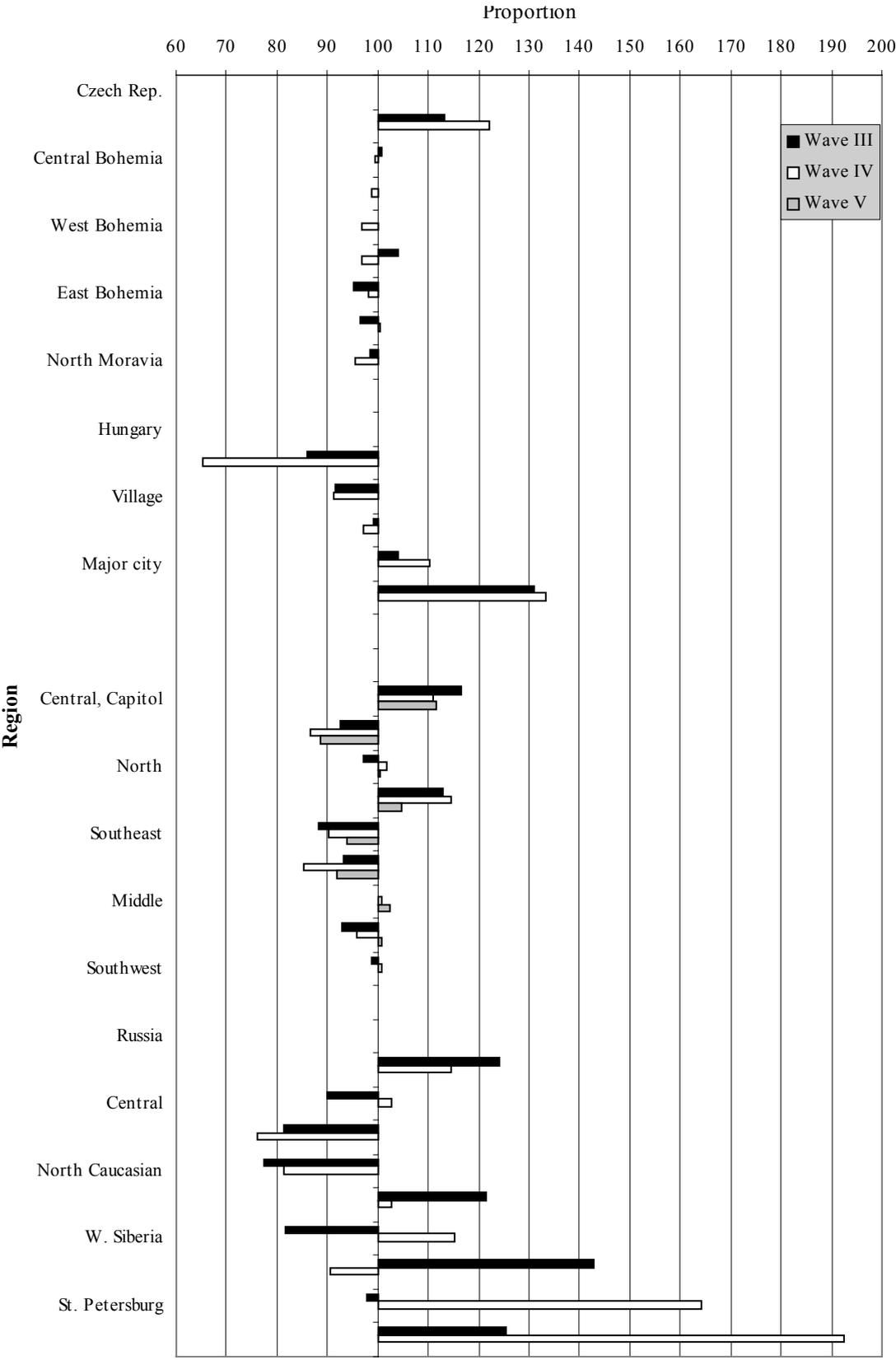
Furthermore, it is evident that the regional levels of income inequality, as well as the range of regional inequality indicated by the length of the boxes in Figure 2 (the interquartile ranges), increased in all of the countries between the early and mid 1990s. This trend was witnessed most dramatically in the Czech Republic and Russia where the median regional Gini coefficient increased to 0.254 from 0.200 and to 0.430 from 0.365, respectively. On the other hand, the evidence shows once again that income inequality declined between 1996 and 1999 in Poland. In many cases the confidence intervals we report do not overlap and thus indicate that we can be at least 95 per cent sure of these changes in regional inequality over time. Finally, when compared to the 75 EU regions in Western Europe, Figure 2 suggests that the range of intraregional income inequality within Central and Eastern Europe is considerably wider than in Western Europe. However, much of this is due to the inclusion of Russia, which is not currently a candidate for entry into the EU. If we were to exclude these regions from the box plot, we would find that the levels of intraregional inequality with Central and Eastern Europe are, in fact, similar to levels in the West.

Figure 4: Ratio of regional to national median household income box plots



Source. Authors' calculations using LIS.

Figure 5: Regional median/national median



Source: Authors' calculations using LIS.

In contrast to the preceding figures detailing *intraregional* income inequality, Figures 4 and 5 offer a more precise picture of *interregional* disparities within each of the countries. In this case, we plot the ratio of each region's median household income to the national median household income. Examining the countries, we find that interregional disparities were significantly greater in Russia and Hungary²² than in the Czech Republic and Poland. For example, in Figure 4 we can see that in Poland in 1992 the interquartile range equaled 92.8 per cent at the 25th percentile and 106.4 per cent at the 75th percentile while these figures equaled 81.5 per cent and 124.7 per cent, respectively, in Russia in the same year. Finally, in the two countries with wider regional disparities, Hungary and Russia, the gap between the regions widened in the 1990s. The interregional gap in the Czech Republic and Poland, on the other hand, essentially remained stable and perhaps narrowed between the waves. Finally, we once again find that the range of regional inequality is greater in the CEE countries than within Western EU regions but it is also clear that these distributions are again influenced by the considerably wider distribution within Russia.

When examining Figure 5 more closely, it is evident that some regions were 'winners' relative to the national median income while others were 'losers.' For example, Prague, Budapest and Moscow were all winners in that the gap between these regions and the nation as a whole widened in the early 1990s. Whereas North Bohemia in the Czech Republic, farmsteads in Hungary, and East Siberia in Russia are all example of losers. In fact, one general pattern that emerges from Figure 5 is that the urban–rural gap grew within Central and Eastern European countries during the first half of the 1990s.

In sum, there is a good deal of regional variation in levels of income inequality within the countries we examine. In fact, it is evident that national income inequality figures mask a great deal of within-country variance in the level of inequality. Furthermore, regional disparities are greater in Russia and Hungary than they are in the Czech Republic and Poland. We also found strong evidence indicating that both intra- and interregional inequalities grew in the countries under examination during the first half of the 1990s. With regard to the latter point, this is especially true in the countries that had the largest initial levels of income inequality, Hungary and Russia. However, the evidence from Poland in Wave V suggests that this trend may have been reversed in the second half of the 1990s.

Finally, when compared to regions within Western Europe, we found that both intra- and interregional inequality was greater in Central and Eastern Europe in the 1990s, a conclusion which has perhaps become part of the 'conventional wisdom' when discussing regional disparities in the CEE versus the West. However, if we were to exclude Russia from the CEE regional aggregation, we would find that the rates of

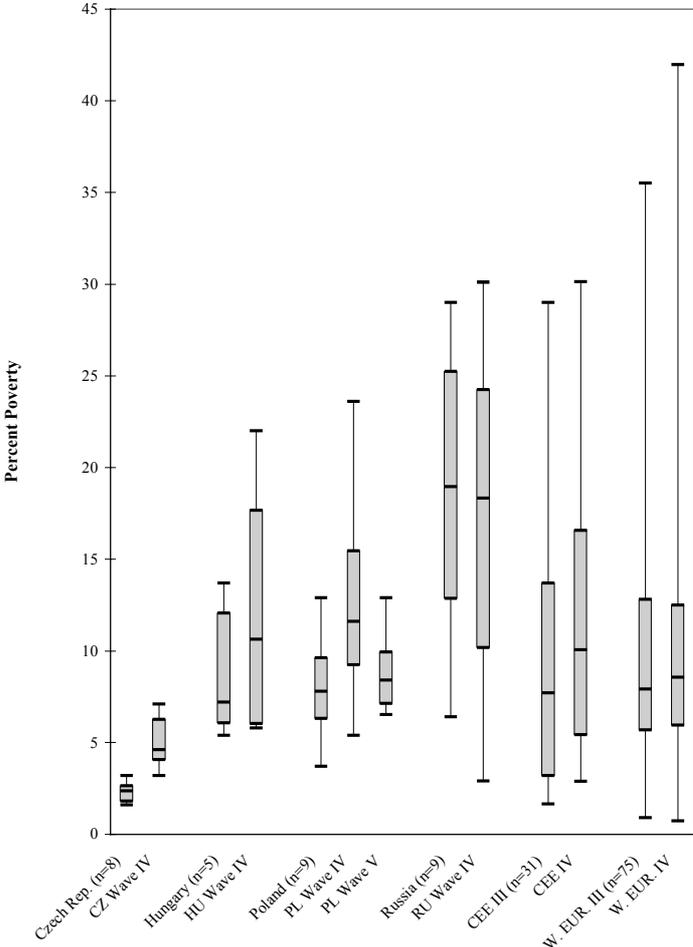
²² Caution has to be applied when interpreting the results for Hungary. As noted earlier, regions in Hungary do not refer to administrative entities such as in the other countries but rather to socioeconomic rural–urban categories, a fact which may overstate income disparities.

inequality are more similar than is often claimed, although regional disparities still tend to be somewhat greater within CEE countries than in the West.

3.3 Regional poverty

Although the preceding description of regional income inequality provided some important insights, it told us little about the economic wellbeing of individuals within Central and Eastern European regions. Accordingly, we chose to focus more attention on the bottom of the income distribution and estimated relative poverty in the 31 regions. Thus, Figures 6 and 7 report regional poverty rates for the countries we examine using the national poverty line for Waves III, IV and V (Poland only).

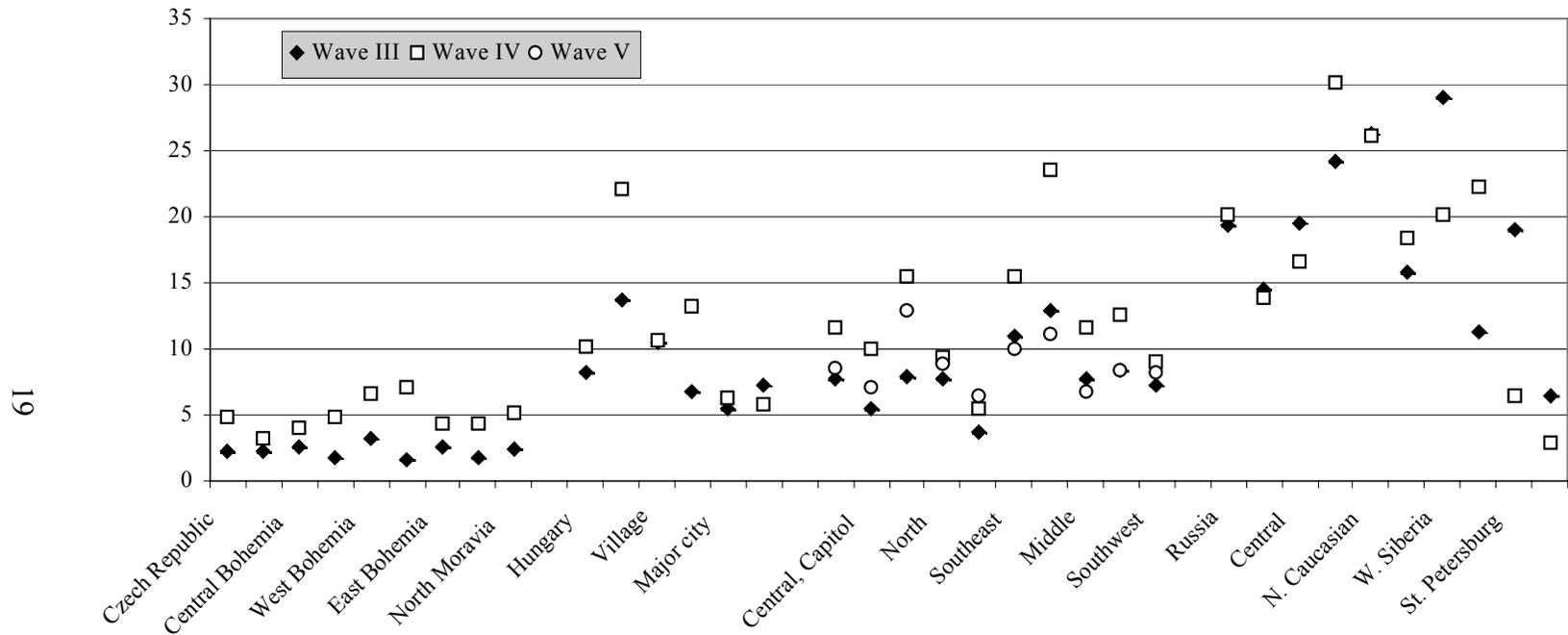
Figure 6: Poverty rates using the national line



Source: Authors' calculations using LIS.

The box and whiskers plot shown in Figure 6 and the plot of values and confidence intervals displayed in Figure 7 clearly demonstrate that there is a great deal of regional variation in the rate of poverty across the regions of Central and Eastern Europe. For example, the interquartile range across the 31 regions we examined in Wave III, as

Figure 7: Regional poverty rates, national lines



Source: Authors' calculations using LIS.

shown in Figure 6, extended from 3.2 per cent to 13.7 per cent poverty, with a median poverty rate equal to 7.7 per cent. For comparison, the same figures for the Western European regions are 5.7 per cent and 12.8 per cent for the interquartile range with a median equal to 7.9 per cent. Furthermore, there is also a good deal of variation in the rate of poverty within countries. In Russia, the country that showed the largest regional variation in poverty in both waves, the interquartile range extended from 12.9 per cent to 25.2 per cent in 1992 and the median regional poverty rate equaled 19.0 per cent in this same year. Furthermore, in 1992 poverty ranged from a low of 6.4 per cent in Moscow to a high 29 per cent in West Siberia. This latter point is also shown clearly in Figure 7 and we can conclude with 95 per cent statistical certainty that poverty was lower in Moscow than in nearly every other region in Russia (with the exception of East Siberia where the confidence intervals overlap slightly).²³ In the Czech Republic, on the other hand, we found considerably less variance in the rate of poverty across the regions. As shown in Figure 6, the interquartile range in the poverty rate in 1992 extended from 1.8 per cent to 2.6 per cent and ranged from a low of 1.6 per cent in North Bohemia to a high of 3.2 per cent in West Bohemia. Nonetheless, the national poverty rate for the Czech Republic of 2.3 per cent (shown in Figure 7) would still hide some regional variation.

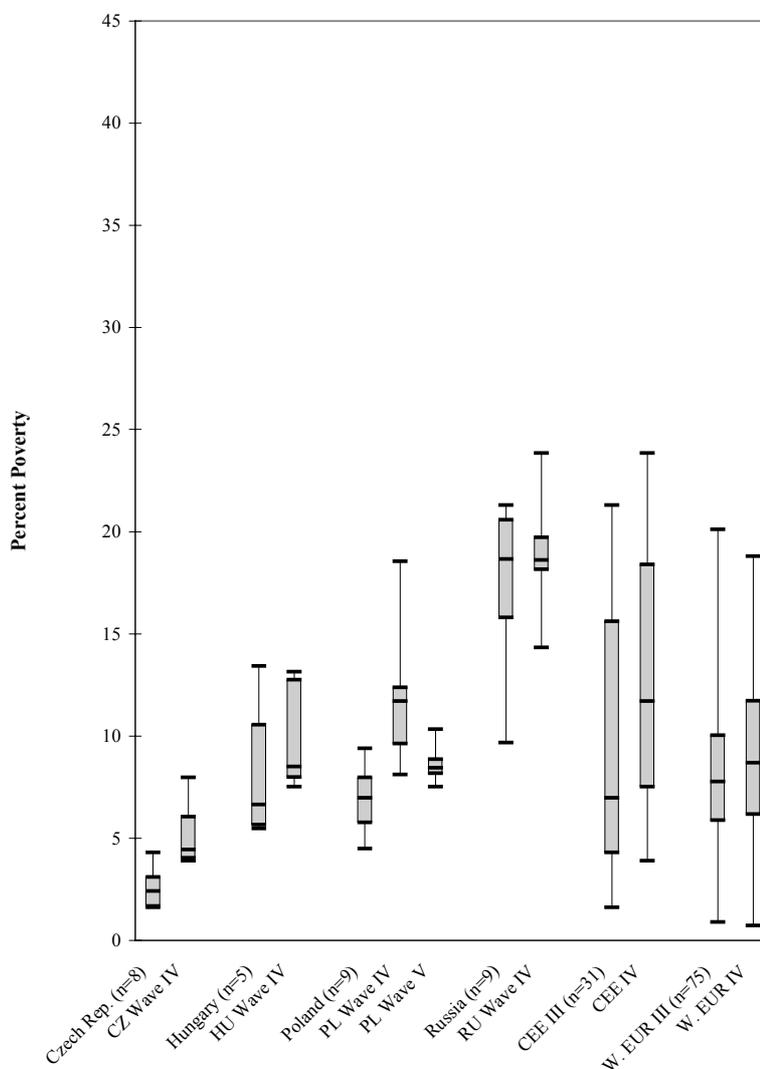
Figures 6 and 7 also clearly show that the interregional poverty gap within all countries widened between Waves III and IV, as evidenced by the lengthening of the boxes and the whiskers in Figure 6. This is most clearly seen in Hungary and Poland. Interestingly, the gap between regions narrowed considerably in Poland between Waves IV and V. In fact, the interquartile range in Poland in Wave V is slightly smaller than the range reported in Wave III (down to 0.7 per cent from 2.2 per cent). Despite this narrowing, the regional median poverty rate was higher in Poland in Wave V than in Wave III and thus poverty did shift upwards during the decade of the 1990s. Finally, it is important to note that the poverty estimates increased in every region between LIS Waves III and IV. In fact, this increase was statistically significant in about half of the regions examined.

As discussed previously, measuring poverty at the regional level of analysis involves the question of: what is the more appropriate reference society, the local community (region) or the nation as a whole? In Figures 8 and 9, we report regional poverty rates using a *local* poverty line to compare to the results using the national line just discussed. As shown in Figure 8, there continues to be a wide variance in regional poverty even when a local poverty line is adopted. For example, the interquartile range for the 31 regions we examined in Wave III extended from 4.3 per cent to 15.6 per cent. Within most countries, however, the reported regional disparities in the rate of poverty are lower when the local line is adopted. This is most clearly shown in the results for

²³ In fact, we are being rather restrictive in our use of the confidence intervals since we only want to be 95 per cent certain that the poverty rate in one region is higher than in another. When confidence intervals do not overlap it indicates a 'stricter condition' that a region's poverty rate is higher than a value x and, independently, that another region's rate is lower than x (see Stewart 2002:14).

Russia. Comparing these box plots to the distributions reported in Figure 4 we find that the interquartile range in regional poverty extends from 15.8 per cent to 20.6 per cent in Wave III using the local line, while the national line yielded a range from 12.9 per cent to 25.2 per cent. This is true in the other countries with the exception of the Czech Republic, where the range in values is actually slightly wider user a local line. Finally, the most striking difference between Figure 4 and Figure 6, which plotted the box and whiskers using the national poverty line, is the comparison with the 75 West European regions. Specifically, when a local line is adopted it appears that regional disparities in the rate of poverty are wider in CEE than in West Europe. This is not due to higher variations in poverty in CEE countries when using local poverty lines (they are, in fact, slightly lower than when using national poverty lines) but to a much lower variation in western EU countries.

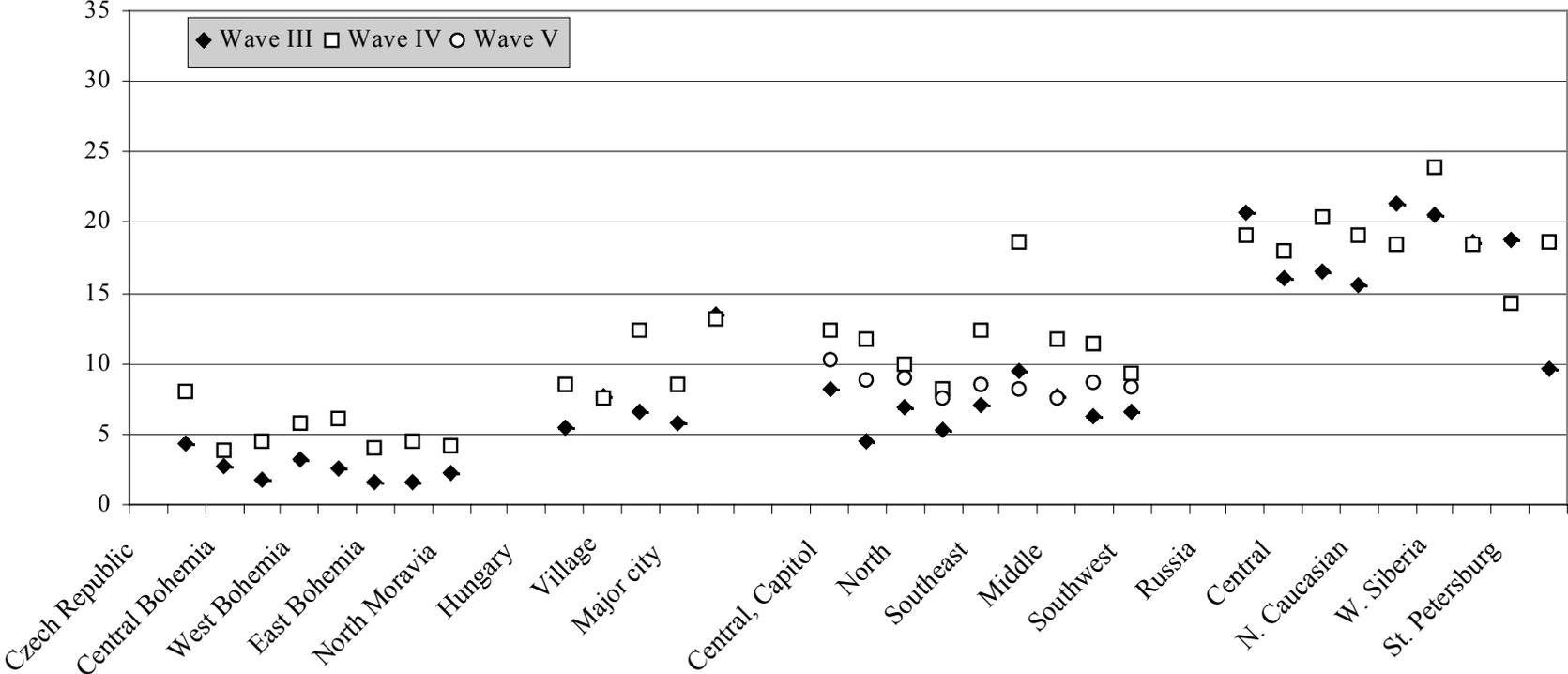
Figure 8: Poverty rates using the local line



Source: Authors calculations using LIS.

Figure 9: Regional poverty rates, local lines

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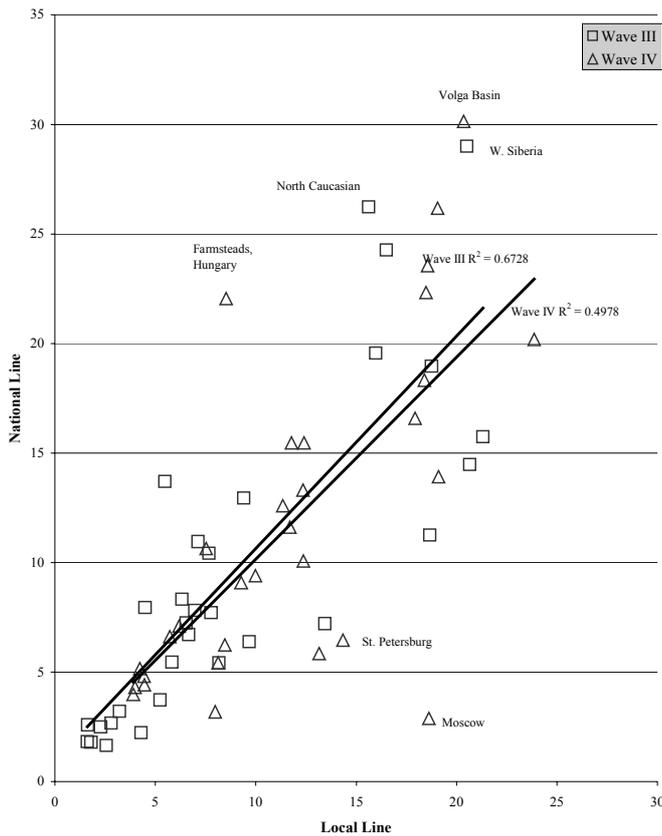
Source: Authors' calculations using LIS.

More significantly, there are some considerable differences that arise from using different poverty lines. This can be seen when comparing the results shown in Figure 9 with the results displayed in Figure 7. For example, the poverty rate in West Siberia, Russia was reported at 29 per cent using the national line and was equal to 20.5 per cent when the local line was adopted. Similarly, in Wave IV in the Volga Basin in Russia the poverty rate using the national line equals 30.1 per cent while it equals 20.4 per cent using the local line. Based upon the confidence intervals, which do not overlap on these estimates, we can conclude that the rates of poverty using these various lines differ. In Hungary, the rate of poverty among farmers is more than halved when a 'local' line is adopted, although we cannot say that these estimates differ with any statistical certainty. In these regions, and many others, using a national line could result in overestimating the extent of poverty in a region. On the other hand, in other regions the adoption of a local line results in regional poverty rates that are higher than reported when using a national line, indicating that the use of the former could result in significantly understating the level of poverty in a region. In Moscow in Wave IV, for example, the poverty rate using the national line equals about 3 per cent while the same figure increases to almost 19 per cent when a local line is used. The same is true in Budapest, where the use of a local line indicates that poverty in the capital city is equal to about 13 per cent while the poverty rate using a national line equals roughly 6 per cent. These results raise questions about the finding that poverty tends to be lower in the capital cities of CEE countries than in the rest of the countries, which was a major conclusion of the World Bank report (2001:74-6) and which we also found some evidence of using national lines. In short, national standard poverty lines fail to account for local standards *and* costs of living, which vary considerable across the regions within CEE countries. Once again, the confidence intervals for these differing rates indicate that we can be at least a 95 per cent certain that the reported poverty rates differ.

Despite these important discrepancies, there is a fairly strong relationship between both measures of poverty, as we would expect. This is more clearly demonstrated in Figure 10, which plots the two estimates of poverty. As shown in this figure, between one-half and about two-thirds of the variance between the poverty rate using the local line and the rate using the national line is shared in Waves III and IV. Furthermore, this figure also emphasizes the important discrepancies between the two rates of poverty we just discussed. Namely, the use of a national or local poverty line only has significant consequences in countries where there is considerable regional diversity, such as in Russia or Hungary. The explanation for this is straightforward since the regional poverty thresholds are determined by the median incomes of the nation and the region. Where there is a larger divergence between these two figures, we can expect a larger discrepancy between the two poverty rates. This is clearly shown in Figure 11, which plots the ratio of poverty rates to the ratio of median incomes. Using a national line we are able to rank regions by their relative wealth and determine which regions are further away from their country's national standard. In effect, the national line allows us to gauge a nation's *interregional* inequality in economic wellbeing. For example, the fact

that more than one-quarter of Russians living in the Volga Basin fell below the Russian poverty line in both waves reflects the fact that the Volga Basin is poor compared to Russia as a whole, as demonstrated in Figure 7. Such an approach also more clearly approximates the EU's current criteria for the allocation of Objective 1 funds, which may be an issue due to prospects of pending enlargement in three of the four countries examined (European Commission 1999).

Figure 10: Scatterplot between poverty rates, national line versus local line, Waves III and IV



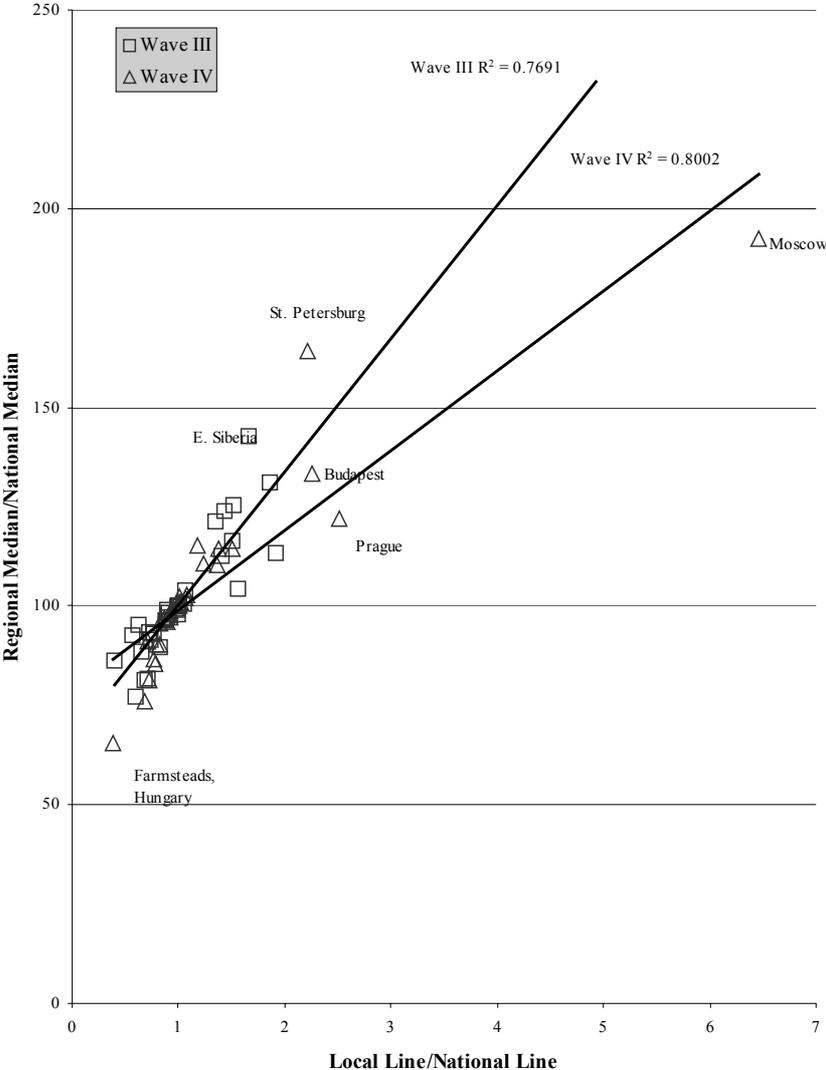
Source: Authors' calculations using LIS.

The local poverty line, on the other hand, captures intraregional poverty or inequality. Furthermore, the local line takes into account differing standards of living across regions and, to a certain extent, varying prices.²⁴ Using the Volga Basin as an example once again, it is evident that there are still many poor people in this region even after adopting a local line. However, the point is that they are poor compared to others in their region, not only compared to Russians as a whole. In addition, there are regions that are relatively wealthy and where local standards as well as the cost of living are higher compared to the nation as a whole. We identified Moscow, Prague and Budapest as such instances. In these cases, we may actually understate the level of poverty within a region and hence fail to identify persons who are in danger of being marginalized and quite possibly in economic need. Nonetheless, despite the proposed theoretical

²⁴ In future research, we hope to develop a spatial price index to directly capture varying costs of living across regions.

advantages associated with a local approach, both methods complement each other in presenting us with a clearer portrait of regional poverty within countries.

Figure 11: Scatterplot between the ration of median incomes and the ratio of poverty lines, Waves III and IV



Source: Authors' calculations using LIS.

3.4 Regional growth and inequality in the Czech Republic and Poland: tentative evidence

Our final analysis focuses on the relationship between income inequality and economic growth. Due to data limitations, we are only able to examine 17 regions in two countries: the Czech Republic and Poland. Furthermore, we cannot examine the same periods of time for both countries and thus results must be considered very tentative. Table 2 reports annual per capita GDP growth within these regions and the countries as a whole, adjusted using purchasing power parities (PPPs). The regions we consider in this section include the most ‘dynamic’, as well as those that lagged behind. We also

report annual percent changes in the income inequality and poverty measures we use in this paper as well as two additional indicators: the share of total income received at the top and bottom quintiles of the population. These summary indicators enable us to tentatively examine whether there is a systematic relationship between economic growth and poverty/inequality, and whether inequality trends are driven by movements at the top and bottom of the income distribution (i.e. ‘rich getting richer’ and/or ‘poor getting poorer’).

Table 2. Regional annual percent changes in growth and inequality

Region	GDPp		Poverty		Percentile Ratios		Income Shares	
	(PPP)	Gini	National	Local	P90P50	P10P50	Top 20%	Bottom 20%
Czech Republic ¹	7.1	5.7	20.8	-	3.6	-2.4	2.5	-4.0
Prague	8.7	2.7	8.5	14.3	1.9	-2.9	0.9	-3.6
Central Bohemia	6.2	4.6	9.6	7.9	3.8	-1.8	2.4	-3.0
South Bohemia	6.1	4.3	21.9	20.2	2.6	-2.7	1.7	-3.6
West Bohemia	6.9	4.2	16.5	13.4	2.5	-2.2	1.7	-3.6
North Bohemia	7.1	9.0	30.6	19.7	4.6	-3.4	4.6	-6.3
East Bohemia	5.8	6.0	11.9	20.0	3.2	-2.4	2.7	-3.6
South Moravia	5.3	6.8	19.9	22.4	3.9	-3.0	2.8	-4.7
North Moravia	8.3	5.5	16.6	14.3	2.9	-2.0	2.5	-3.4
Poland ²	6.5	-2.1	-7.8	-	-0.2	2.6	-0.7	4.1
Central, Capital	11.1	-1.0	-9.0	-4.6	1.3	2.3	-0.1	3.8
Middle	4.7	-1.6	-14.2	-11.6	0.1	3.8	-0.1	4.9
Middle East	3.5	-5.7	-20.7	-22.8	-1.0	12.2	-2.2	12.6
Middle West	6.6	-2.2	-10.6	-6.9	-0.6	1.9	-0.7	3.9
North	6.2	-2.1	-1.5	-2.4	-0.9	0.6	-1.0	2.3
Northeast	6.2	-1.2	-4.6	-7.4	0.6	3.4	0.1	5.0
South	4.5	-1.2	4.5	-1.9	-0.5	0.0	-0.5	1.3
Southeast	6.4	-2.7	-11.7	-10.1	-0.5	4.2	-1.0	4.9
Southwest	6.0	-2.7	-2.4	-2.9	-0.9	0.3	-1.6	2.3

Note: All figures computed using annual growth trends (exponential curve algorithm ($y=b*m^x$)).¹GDPpc between 1993 and 1996. Inequality measures between 1992 and 1996. ²All figures between 1995 and 1999.

Source: Computations from LIS micro data; WIIW (2002).

It is important to note that the national trends in income inequality and poverty diverged. This could be due to the time periods under examination and differences in the economic cycles. Nonetheless, at first sight, Prague and the Warsaw region stand out as having the highest rates of annual growth. In fact, annual economic growth in the Warsaw region was nearly double the rate in the country as a whole. This confirms our earlier findings that capital cities tended to be the largest beneficiaries of the transition. The annual increase in both poverty and inequality in Prague was only half that recorded in the whole country, while the least dynamic region in the Czech Republic

(south Moravia) witnessed an above-average increase in inequality and the highest rise in poverty throughout the country. This suggests that higher economic growth is associated with a slower growth of poverty and inequality in the Czech Republic. However, the more recent results for Poland point in the inverse direction: inequality and poverty decreased nationwide between 1995 and 1999, but they increased most in the least dynamic region (Central East) and least in the Warsaw region. Examples from other regions, such as North Bohemia in the Czech Republic and the North East in Poland, qualify these findings further. In both regions the economy grew per capita by as much as in the whole nation but the performance of indicators of inequality and poverty was well below the national average. Some of the explanation is given in the 6th to 9th columns of Table 2, which shows trends in the upper and lower part of the distribution. In the economically less dynamic regions of Central East and Central in Poland, and South Moravia and East Bohemia in the Czech Republic, the higher incomes lost relatively more in the Polish regions and gained relatively less in the Czech regions than in other regions in their countries. The lower incomes tended to lose less in these same regions in the Czech Republic and gain more in Poland relative to the other regions. In fact, the less well-off did best in the region with the lowest reported rate of economic growth, the Central East in Poland. To the contrary, the top income segment in the dynamic region of Prague gained much less than the top in the rest of their country, while the poorer segments lost less or as much as elsewhere in the Czech Republic. These few figures seem to challenge the conventional assumption according to which inequality in dynamic regions of CEE countries increases mainly because the 'rich get richer' and it increases in regions lagging behind mainly because the 'poor get poorer'.

Simple bivariate correlations between regional economic growth and the measures of income inequality and poverty did not show any significant correlation (tables not reported). However, for a number of reasons including varying starting conditions across regions and the impossibility to identify trends below the surface of averages and other measurement issues, finding no correlation between growth, inequality and poverty across regions is not the same as saying that there is no impact of economic growth, as Ravallion (2001:11-14) rightly points out. However, for a sound and thorough evaluation we would need to include more regions and counties in our analysis.

4 Conclusions

This paper has shed some light on the effects of regional economic change on poverty and inequality within four Central and Eastern European nations. But this is only a start. Much remains to be accomplished in our research. For instance regional growth should be linked to regional change in inequality in a consistent and exhaustive way. And economic change needs be linked to demographic change (emigration, immigration and fertility) within declining and growing regions. Finally, it is our long-term goal to link

regional economic and social change to health outcomes and schooling patterns (see for example Stewart 2002). Still, our initial results are promising and sensible. The following preliminary findings emerge from our analyses:

- (i) We find that capital cities and major urban areas are mainly winners, while regions which are longer distances from central cities and which are further from their richer western neighbours characterize losers. This has led to rising differences between rich and poor regions as well as greater inequality within regions.
- (ii) We show that the contribution of intraregional inequalities to overall inequality largely outweighs the interregional contribution and, contrary to conventional wisdom, the latter is less important in CEE countries than in some of the western EU countries.
- (iii) In the three EU candidate countries included in our analysis, inequality was higher in capital cities than within the nations as a whole, but the inverse was true for the Russian Federation.
- (iv) The urban–rural gap seems to have increased in all countries.
- (v) Variations in poverty and inequality across and within regions are considerably higher in the Russian Federation than in the three EU candidate countries. In these three countries, variations are somewhat but not considerably higher than in western EU countries.
- (vi) With the notable exception of the Czech Republic, regional disparities in the rate of poverty are lower when a local poverty threshold is adopted.

While these results are somewhat tentative at this time, they point to both winners and losers in the changeover from planned to market economies in the four countries. They also suggest that the transition may have exacerbated regional differences and that national and international authorities need to pay greater attention to regional disparities within and across nations as they design economic and social policies.

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