

“Residential dispersal, job concentration and reconfiguration of postsocialist urban regions”

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Abstract: Under socialist central planning, urban systems were hierarchically organized and cities were characterized by compact morphology and mono-centric organization. City regions evolved around distinct urban centers with compact build up environments and mono-directional commuting to work and services from their rural hinterlands. With the transformation towards capitalism, suburbanization developed rapidly reshaping major metropolitan areas as well as smaller urban regions. Massive residential suburbanization has driven rapid deconcentration of housing and population through spatial dispersal and fragmentation in expanding urban regions of major cities. Furthermore, new suburban job centers begun to effect the internal organization of post-socialist metropolitan areas. Hence we expected that the formerly monocentric and compact socialist city is being rearticulated towards more polycentric and dispersed city regions. Using data on population, jobs and commuting, we investigated the processes of (de)concentration and (de)centralization of residences and jobs in functional urban regions of Prague and Brno between 1991, 2001 and 2011. Somewhat surprisingly, the analysis showed a pronounced duality of residential deconcentration and, on the other hand side, concentration of jobs. While residential suburbanization leads to dramatic deconcentration, the location of jobs and commuting to work driven by the increasing economic role of core cities is leading to growing centralization and concentration of jobs in metropolitan cores. Despite the emergence of new suburban growth job places, the cities of Prague and Brno are increasing their dominance in their urban regions in term of job location and job commuting. Post-socialist metropolitan areas are being reshaped by the duality of symbiotic trends of deconcentration of residences and centralization of jobs. The reality of economic drivers of capitalist spatial economy that favors centralization of jobs and decentralization of residences, thus leading to ever increasing commuting, is undermining the visions of sustainable urban growth, a myth that can hardly be achieved in the context of policies favoring global circulation of investments in free market conditions coupled with locally embedded and spatially fragmented land use planning and decision-making on real estate development.

Key words: post-socialist metropolis, urban regions, deconcentration, centralization, capitalist economy, fragmented government

Introduction

In this paper we investigate processes of (de)concentration and (de)centralization in urban regions of Prague and Brno, two major cities in Czechia. Focusing on changes in the spatial distribution of residences, jobs and commuting flows we intend to capture trajectories in spatial reconfiguration of these two metropolitan areas during the two decade period of postsocialist transformations.

Postsocialist (sub)urban transformation

The decades of planned or 'managed' urbanization during socialism (for detailed accounts see Musil 1980, Smith 1996) resulted in hierarchically organized urban systems. City regions evolved around distinct urban centers with compact build up environments, without suburban residential communities and ribbon commercial developments known from the West (Sýkora and Stanilov 2014). Compact morphology of cities exhibited sharp delineation between urban cores and rural hinterlands (Ioffe and Nefedova, 1998). Most city regions exhibited mono-centric organization with mono-directional commuting from small towns and villages in urban hinterlands to urban cores that concentrated jobs and services (Fuchs and Demko 1978, Murray and Szelenyi 1984).

In short, under the socialist central planning, urbanization took on strikingly different form compared to urban development in capitalist countries (French and Hamilton 1979, Andrusz et al. 1996, Enyedi 1996, Gentile and Sjöberg 2006). With the transformation of former socialist countries towards capitalism, the newly established democratic political regime, quickly introduced market economy principles, rapid openness to the forces of global economy, and neoliberal political culture of enabling rather than regulating market forces, processes of economic and social restructuring were mirrored in the reshaping of landscapes of former socialist cities, city regions and whole settlement and regional systems (Sýkora 2009).

Beside the regeneration and gentrification of city centers and selected nodes in inner cities, suburbanization has become the predominant mode of urban development (Sýkora 1999, Stanilov 2007). It has rapidly developed throughout the region reshaping major metropolitan areas as well as smaller urban regions (Stanilov and Sýkora 2014, Sýkora and Mulíček 2012). The massive residential suburbanization has been driven by rapid deconcentration of housing and population. Its spatial patterning has been characterised by spatial dispersal and fragmentation in the form of sprawl (Stanilov and Sýkora 2012, 214).

The residential suburbanization has been accompanied with the establishment of new suburban shopping parks, warehousing districts and industrial zones. These suburban non-residential developments started to form new suburban employment centers,

which have become one of the key elements contributing to the reshaping the internal organization of postsocialist metropolitan areas.

The dynamics of metropolitan change and the sharp contrast between juxtaposed patterns and underlying forces of urbanization under socialism and capitalism raised expectations about transformations in postsocialist city regions. First of all, despite the slow down in its dynamics since the beginning of economic recession, there is now no doubt about residential deconcentration and transformation from urbanization to suburbanization mode of development within urban regions. However, we also expect that the mono-centric city regions with job and services concentrated in centre and extensive commuting to job from dependent rural hinterlands will be through residential and especially non-residential suburbanization reshaped not only to sprawling but also to more polycentric landscapes of urban regions with new secondary job centers growing in wider suburban hinterland. Altogether, we expect that the formerly monocentric and compact socialist city is being rearticulated towards more deconcentrated, polycentric and postsuburban city regions with dispersed residential development and decentralised employment (Soja 2000).

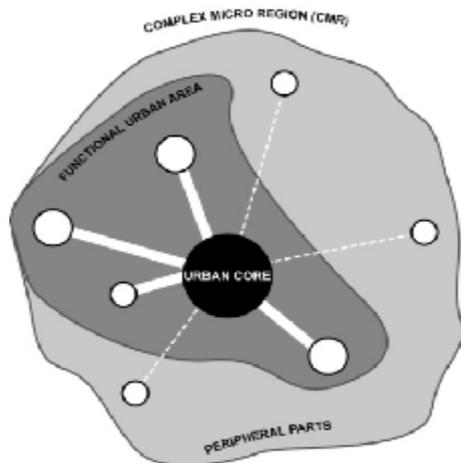
Research focus & methods

Based on the above expectations of transformations in urban patterns, we have formulated a set of research questions, designed research strategy and selected methods of analysis. In general, we were interested whether the socialist mono-centric pattern of urban regions dominated by centripetal orientation on urban cores is being transformed to less concentrated, more decentralized and polycentric urban regional system. Using data on population, jobs and commuting from Censuses 1991, 2001 and 2011, we investigated processes of (de)concentration and (de)centralization of residences and jobs in functional urban regions and commuting-to-work microregions of Prague and Brno, to capture transformations during the period of two decades since the end of communist rule.

Intentionally, we have focused on two major city regions in Czechia: the capital city of Prague and the second largest city of Brno. Both these city regions exhibit monocentric system dominated by the core city and both have been impacted by intense suburbanization and metropolitan decentralization (Sýkora, Ouředníček 2007). The analysis of polycentricity was carried for two levels of spatial extent of city regions, micro-regional space of local labor market area and functional urban area with the most intensive commuting to work (for concept and methods of delimitation see Sýkora and Muliček 2009, Figure 1). Within the scope of micro-regions and functional urban areas we distinguished between cores (the city in its administrative boundaries), suburbs (the zone of intensive commuting to core city at the level of 25 and more percent of economically active residents daily commuting to core) and periphery (the

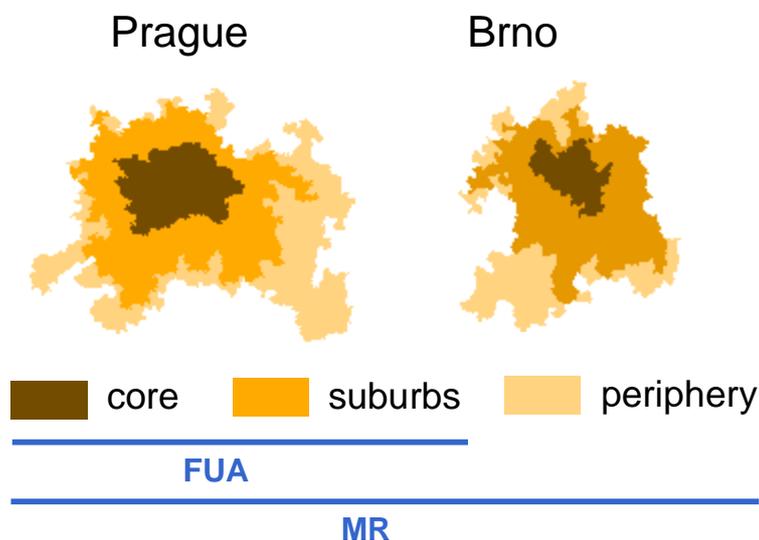
remaining part of commuting micro-region with lower commuting intensities). While core and suburbs compose functional urban areas (FUA), commuting micro-regions (MR) contain in addition also the peripheral zone (Figures 1 and 2).

Figure 1: Scheme of functional urban area and micro-region



Source: Sýkora and Mulíček (2009)

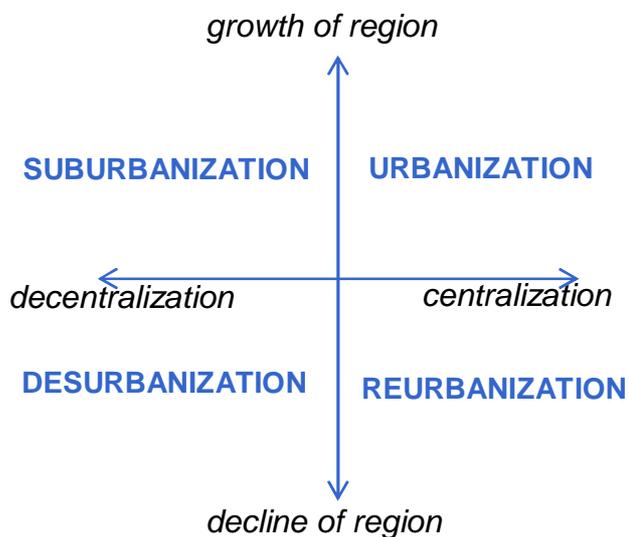
Figure 2: Core, suburbs and periphery: essential spatial elements of micro-regions and functional urban areas (cases of Prague and Brno)



Through the empirical analyses, we addressed several issues. First, we were interested in metropolization of Prague and Brno, in terms whether and how much the urban regions of these major growth poles in Czechia strengthened their position within the

country in terms of population and job concentration as well as destinations of commuting flows. Second, we focused on residential and job (de)concentration, through tracing changes in cores, suburbs and periphery, in functional urban areas (FUA) and micro-regions (MR). Third, having established knowledge about these trends we evaluated forms and trajectories of urbanization for urban regions of Prague and Brno being interested whether they as whole are urbanizing, suburbanizing or deurbanizing (Figure 3, adapted from van den Berg 1982, Hall and Hay 1980). Finally, we investigated whether and how much jobs (de)centralize investigating commuting flows to and from core and within suburbs, and through the analysis of the number of job centers within microregion and proportion on jobs, which they concentrate.

Figure 3: Scheme for discrimination between the processes of urban change within urban region



Source: adapted from Sýkora and Posová (2011)

Strengthening positions and dominating national system

Both Prague and Brno have significantly strengthened their role of major cities in national system, especially as employment centers, through rapidly increasing concentration of jobs to both Prague and Brno metropolitan regions. The proportion of Prague on country jobs increased from 15.4% in 1991 to 20.3% in 2011, and the share of Brno increased from 5.9% in 1991 to 7.2% in 2011 (Figures 4 and 5). The distribution of population according to their place of residents has shown increasing concentration to both Prague and Brno metropolitan regions only in 2001-2011 after population decline in 1991-2001. However, the residential concentration has been very modest in the comparison with jobs. The proportion of Prague on country population increased

from 14.1% in 2001 to 15.0% in 2011, and the share of Brno increased from 5.6% in 2001 to 5,8% in 2011 (Figures 4 and 5).

Figure 4: Proportion of Prague on country population and jobs

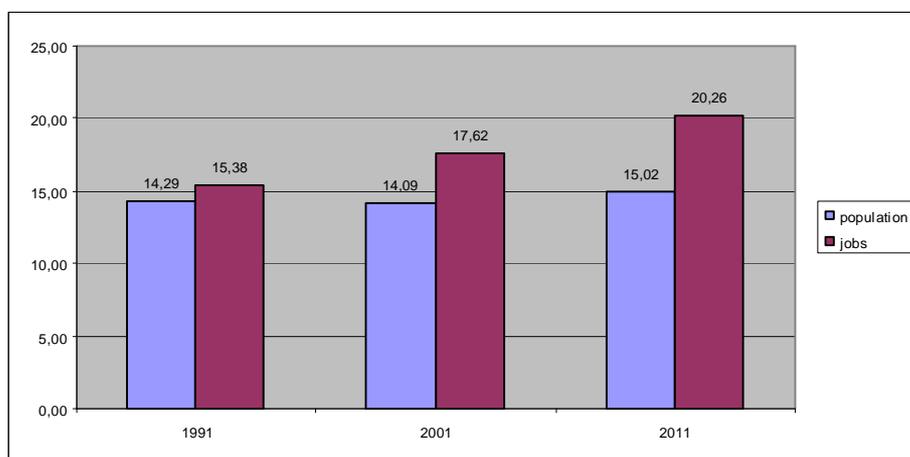
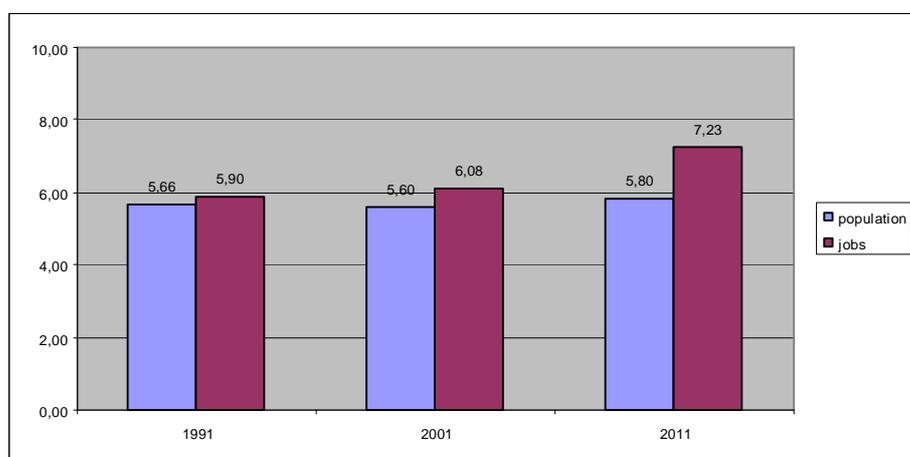


Figure 5: Proportion of Brno on country population and jobs



The growing economic role of both major cities in national system and increasing concentration of jobs strongly affected commuting to work patterns. Prague radically strengthened its position in national urban system. The share on all commuting flows within country increased from 6.1% to 12.9% for flows with the destination in Prague core (The City of Prague itself), from 7.7% to 15.5% for flows with the destination in functional urban region (FUA), and from 8.6% to 16.2% for flows with the destination in micro-region (MR) (Figure 6). In the case of Brno, the share on all commuting flows within country increased from 3.5% to 4.9% for core, from 4.6% to 5.1% for FUA, and from 5.3% to 5.8% for MR (Figure 7).

Figure 6: Proportion of Prague, its FUA and MR on total commuting flows in country

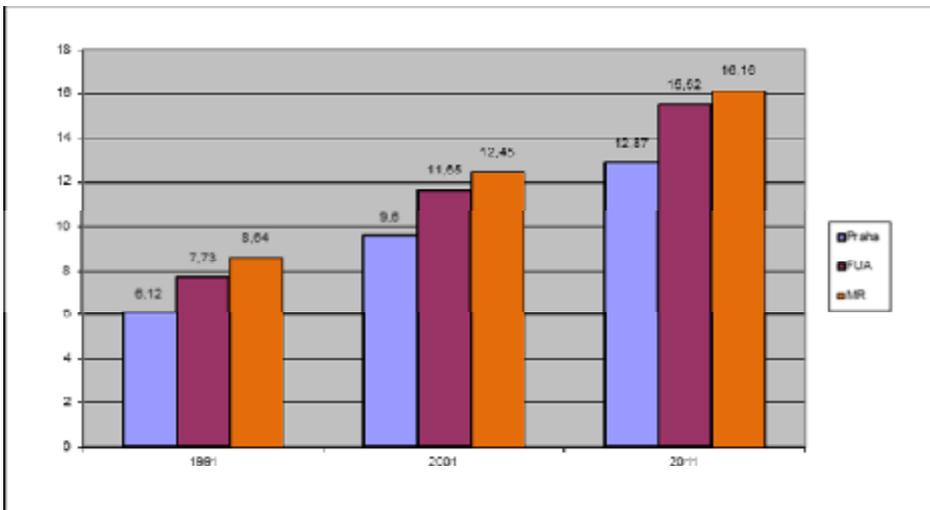
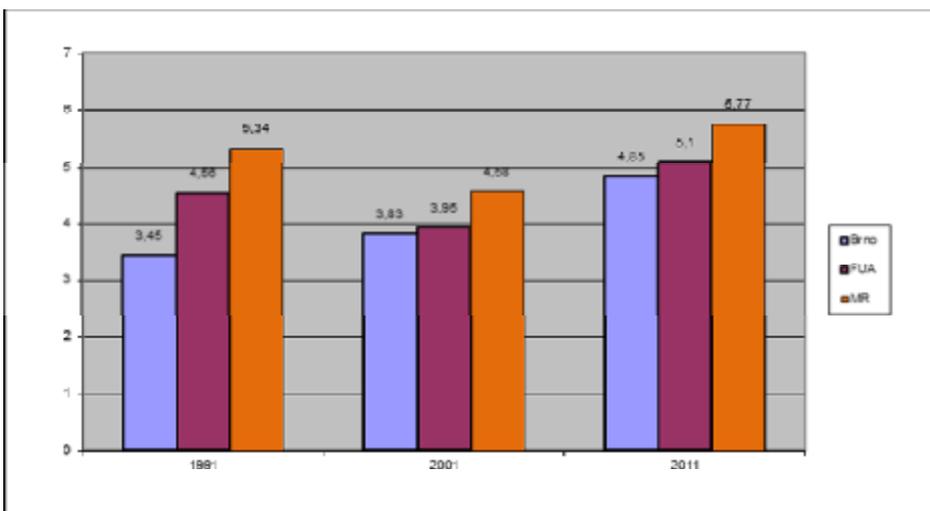


Figure 7: Proportion of Brno, its FUA and MR on total commuting flows in country



Duality of residential deconcentration and job concentration

There has been major difference between the two decades of 1991-2001 and 2001-2011 in terms of population and job growth/decline in Prague and Brno urban regions (Tables 1-4). In the 1990s, population declined by over 3% in cores. Despite growth in suburban zone (7% in Prague and 2% in Brno), population of functional urban regions and micro-regions declined by about 2%, because the dominant role of cores and their high proportion on the total population (see Tables 5 and 6). While the population decline continued in 2000s, it was at slower speed, the overall dynamics of urban regions was shaped by dramatic population growth in suburban zone of Prague (51%),

substantial increases in Prague periphery (18%) and Brno suburbs (14%) and even growth in Brno periphery (5%). This massive increase of suburban population has been reflected in the overall growth of urban regions with about 5% for Prague and 2.5% in the case of Brno.

Table 1: Population change in Prague region 1991-2011

population	absolute change			relative change		
	1991-2001	2001-2011	1991-2011	1991-2001	2001-2011	1991-2011
decade						
core	-45068	-26289	-71357	-3,71%	-2,25%	-5,88%
suburbs	12076	92091	104167	7,15%	50,88%	61,67%
periphery	2215	16103	18318	2,49%	17,69%	20,63%
FUA	-32992	65802	32810	-2,39%	4,87%	2,37%
MR	-30777	81905	51128	-2,09%	5,68%	3,47%

Notes: FUA – functional urban area, MR – commuting microregion

Table 2: Population change in Brno region 1991-2011

population	absolute change			relative change		
	1991-2001	2001-2011	1991-2011	1991-2001	2001-2011	1991-2011
decade						
core	-12124	-7014	-19138	-3,12%	-1,86%	-4,93%
suburbs	3130	18605	21735	2,37%	13,79%	16,49%
periphery	-603	3164	2561	-0,96%	5,10%	4,09%
FUA	-8994	11591	2597	-1,73%	2,27%	0,50%
MR	-9597	14755	5158	-1,65%	2,57%	0,89%

Notes: FUA – functional urban area, MR – commuting microregion

In both city regions, jobs have been, unsurprisingly, declining in their peripheral parts, altogether nearly by 30% during both decades. Job growth concentrated in urban cores. This has been especially truth for Brno. However, with a very different development during the 1990s, with overall job decline in all urban zones, and close to 18% job growth in core during the 2000s (Table 4). Jobs in Prague core and suburbs have been increasing in both decades. However, while suburban growth dominated during the 1990s, the growth dynamics of core and suburb become even in the 2000s (Table3).

Table 3: Job change in Prague region 1991-2011

jobs	absolute change			relative change		
	1991-2001	2001-2011	1991-2011	1991-2001	2001-2011	1991-2011
core	14292	80608	94900	1,98%	10,97%	13,17%
suburbs	9150	8341	17491	15,30%	12,10%	29,25%
periphery	-3523	-6081	-9604	-10,12%	-19,44%	-27,59%
FUA	23442	88949	112391	3,00%	11,07%	14,41%
MR	19919	82868	102787	2,44%	9,92%	12,61%

Notes: FUA – functional urban area, MR – commuting microregion

Table 4: Job change in Brno region 1991-2011

jobs	absolute change			relative change		
	1991-2001	2001-2011	1991-2011	1991-2001	2001-2011	1991-2011
core	-16996	40329	23333	-6,93%	17,66%	9,51%
suburbs	-1019	557	-462	-2,65%	1,49%	-1,20%
periphery	-6771	-1371	-8142	-23,33%	-6,16%	-28,06%
FUA	-18015	40886	22871	-6,35%	15,38%	8,06%
FMR	-24786	39515	14729	-7,92%	13,72%	4,71%

Notes: FUA – functional urban area, MR – commuting microregion

The spatial shifts during the two post-1989 decades can be characterized by several trends. First, while population deconcentrated towards suburbs (Figures 8 and 9), jobs rather concentrated in cores (Figures 10 and 11). In Prague, both cores and suburbs have shown significant job growth dynamics, with that of suburbs outpacing the core. However, the absolute job growth in the core of Prague has been nearly 10 times higher in the 2000s, having only negligibly slower dynamics to suburbs only due to vast majority of jobs concentrated in the core, while weak initial position of suburbs.

Second, if we look on individual zones then while cores have been losing population and gaining jobs, the situation in peripheries was right opaque with gaining population and loosing jobs (Figures 12 and 13). The suburban developments have been most dynamic as well as more ambiguous. While Prague suburbs have massively gaining both population and jobs during the whole period, Brno residential suburbanization has been less dynamic and accompanied with job los in 1991-2011 (Figures 14).

Figure 8: Population change in Prague 1991-2011

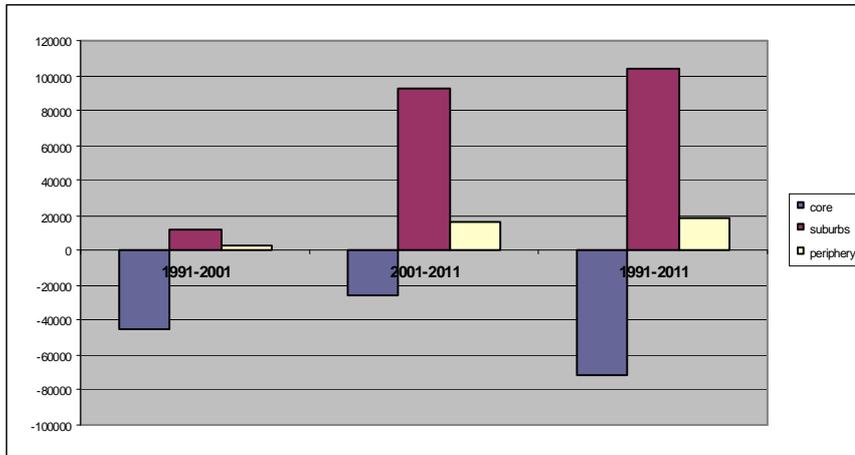


Figure 9: Population change in Brno 1991-2011

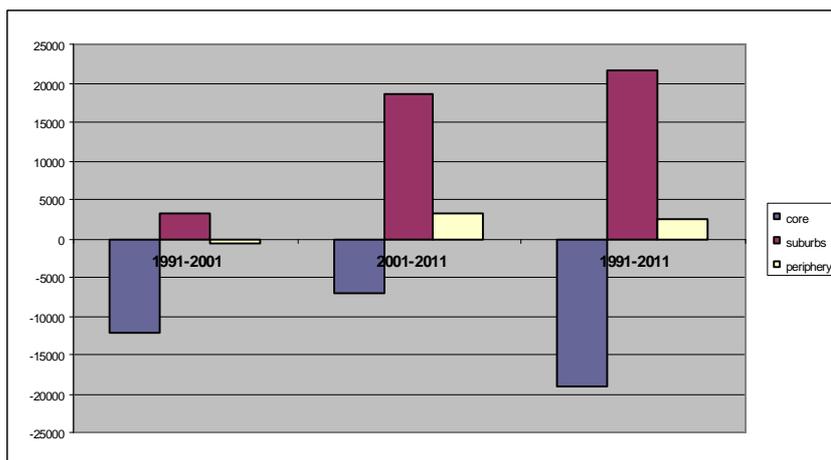


Figure 10: Job change in Prague 1991-2011

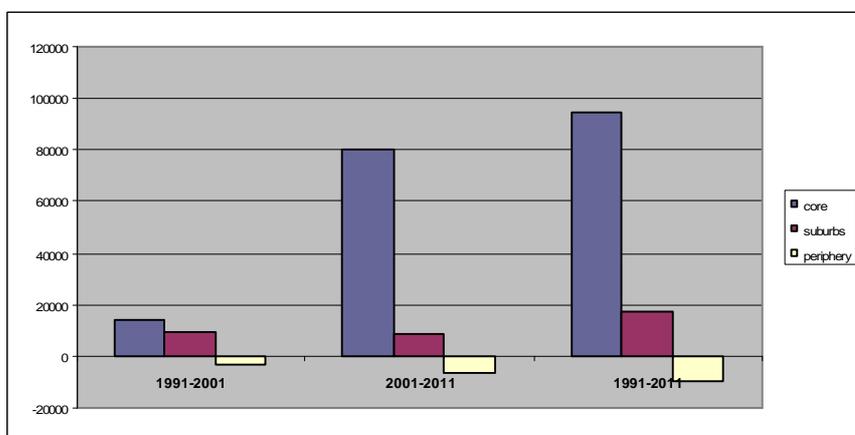
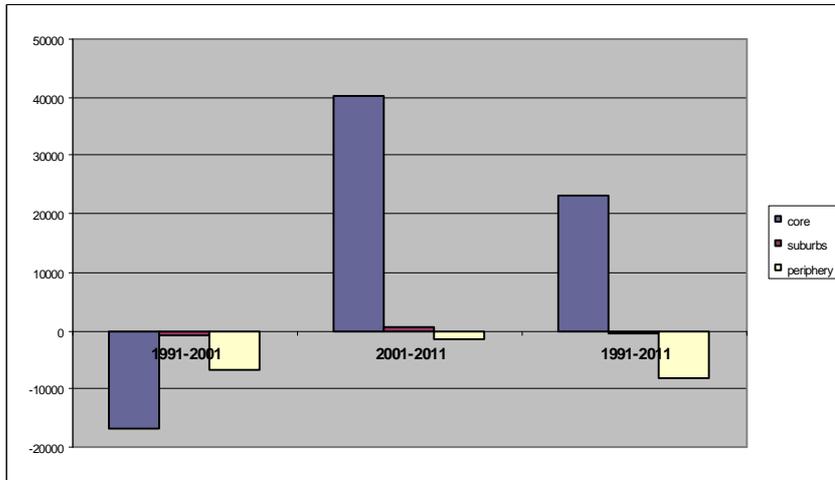


Figure 11: Job change in Brno 1991-2011



Third, the whole city regions have been growing in terms of jobs, less so in terms of population, with Prague urban region showing higher growth rates for both population and jobs (Figure 15). The Figure 15 also shows remarkable difference between suburban population growth of 62% in comparison with only 2% for Prague urban region (16% to 1% ratio in Brno). Despite massive suburban increase, their small share on the total population of urban region brings relatively minor effect for the overall growth. Similarly, yet in opaque vein the relatively deep decline in jobs at periphery (by 28%) has not had any major effect on the overall job change in the whole urban regions.

Figure 12: Cores lose population and gain jobs (1991-2011)

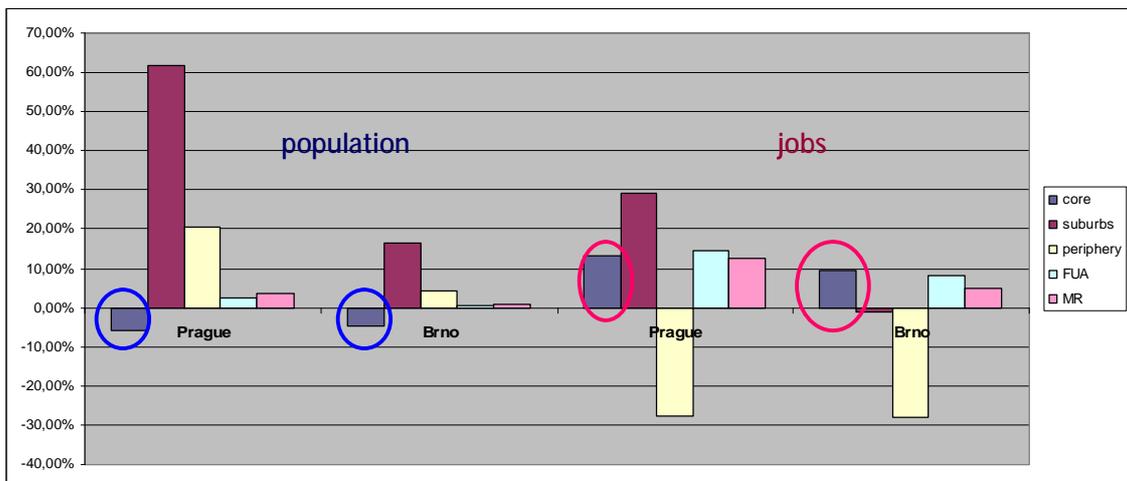


Figure 13: Peripheries gain population and lose jobs (1991- 2011)



Figure 14: Prague suburbs massively gain population and jobs, Brno residential suburbanization slower with job los (1991- 2011)

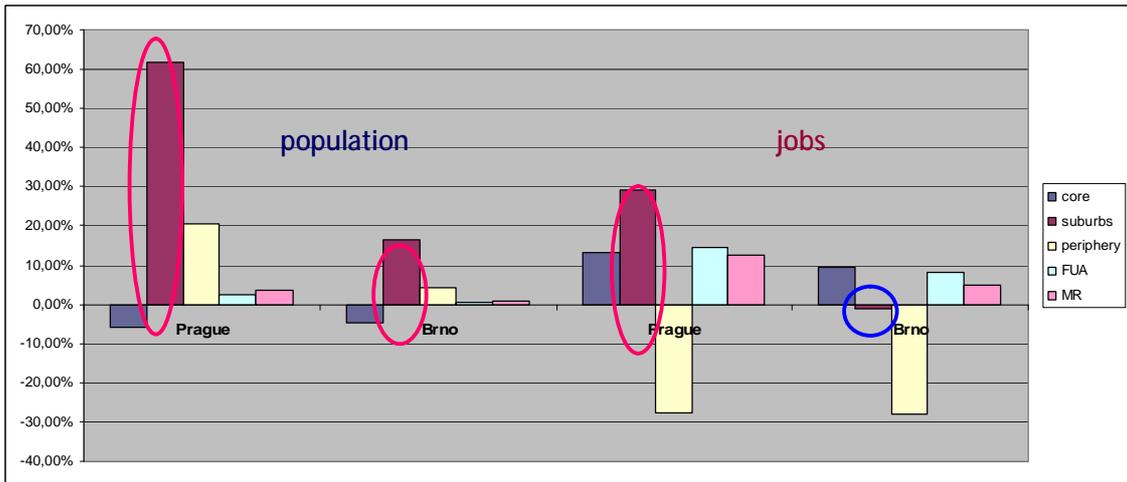


Figure 15: Urban regions grew in population and especially jobs



Trajectories of (de)concentration

Residential suburban growth brought not only deconcentration but also major redistribution of population within the city region, substantially increasing the proportion of suburbs at the expense of core city. In Prague, the share of suburbs grew from 11% in 1991 to 18% in 2011 (Table 5). This trend was less pronounced in Brno with the share of suburban population increasing from 23% in 1991 to 26% in 2011 (Table 5). However, this shift of weight from core to suburbs has happened in different context of the population shrinkage of both urban regions in the 1990s compared with growth of urban regions in the 2000s. Hence, while in the 2000s, we can observe suburbanization of city regions, the situation in the 1990s can be rather captured by concepts of shrinkage and/or deurbanization (Figure 16).

Table 5: Trajectories of (de)concentration in Prague region 1991-2011

year	share of zone on Prague region population			share of zone on Prague region jobs		
	1991	2001	2011	1991	2001	2011
core	82,49%	81,12%	75,04%	88,39%	88,00%	88,83%
suburbs	11,48%	12,56%	17,93%	7,34%	8,26%	8,42%
periphery	6,03%	6,32%	7,03%	4,27%	3,75%	2,75%
FUA	93,97%	93,68%	92,97%	95,73%	96,25%	97,25%
MR	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%

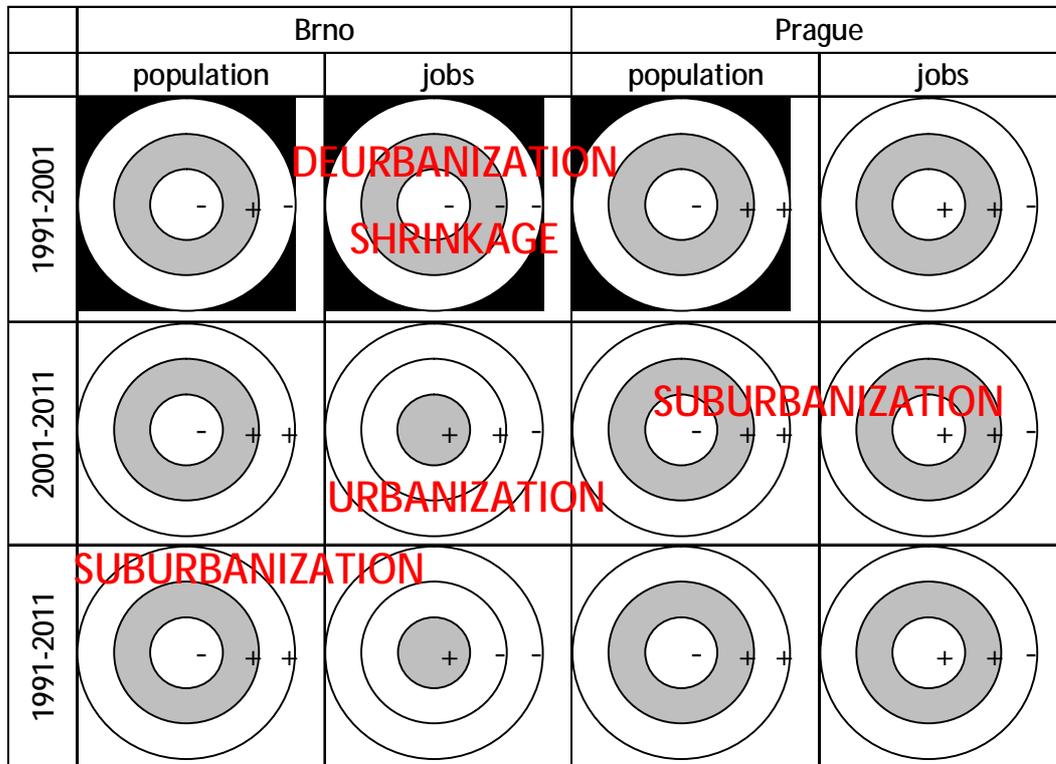
Notes: FUA – functional urban area, MR – commuting microregion

Table 6: Trajectories of (de)concentration in Brno region 1991-2011

year	share of zone on Brno region population			share of zone on Brno region jobs		
	1991	2001	2011	1991	2001	2011
core	66,63%	65,64%	62,79%	78,45%	79,30%	82,04%
suburbs	22,62%	23,54%	26,12%	12,28%	12,98%	11,59%
periphery	10,75%	10,82%	11,09%	9,28%	7,72%	6,37%
FUA	89,25%	89,18%	88,91%	90,72%	92,28%	93,63%
MR	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%

Notes: FUA – functional urban area, MR – commuting microregion

Figure 16: Forms of urban development: Prague and Brno in 1990s and 2000s



The terrain of job (de)concentration is more variegated. In both urban regions, peripheries have been losing their already low shares on jobs. While Brno has shown clear trend of concentration and increasing proportion of jobs in core city, in Prague, suburbs have been leading the dynamics of job growth and decentralization from core (Tables 5 and 6). While Prague core diminished its proportion on the overall number of all jobs in the 1990s, clearly signaling suburbanization, the strong growth of core city made both processes of urban and suburban job growth very alike in 2000s, yet still with suburbanization of jobs as the final outcome (Figure 16). The concentration trend in Brno was in 1990s contextualized in job decline in the whole city region, which can be in this decade seen similarly as in population development as shrinking (Figure 16). The 2000s shown very different development, characterized with centralization within the overall urban region job growth, thus urbanization of the city region.

After shrinkage in 1990s, Brno was both suburbanizing in terms of residences and urbanizing in terms of jobs. Prague urban region shrinkage was limited only to population development in 1990s, while suburbanization became the key trajectory of job redistribution in both decades and especially of population development in 2000s.

Centralization of job markets

Finally, we were interested what proportion of commuting flows finds its destination in the core cities of Prague and Brno and how this proportion has changed between 1991 and 2011. Table 7 documents these proportions for all commuting flows which commence or finish within FUA and MR and also only for flows with the destination within FUA or MR. In all these variants, both core cities have been increasing their share on the commuting flows, clearly showing very significant centralization of commuting to the core cities.

Table 7: Centralization of job markets: proportion of Praha and Brno on commuting flows

	1991	2001	2011
Praha MR all flows	60,88%	68,66%	72,46%
Brno MR all flows	56,24%	59,02%	64,03%
Praha MR destination in MR flows	70,90%	77,06%	79,15%
Brno MR destination MR flows	64,68%	68,63%	71,66%
Praha FUA all flows	70,39%	74,64%	76,98%
Brno FUA all flows	65,15%	66,44%	70,41%
Praha FUA destination in MR flows	77,49%	81,23%	82,08%
Brno FUA destination in MR flows	71,94%	74,69%	77,03%

Commuting to work significantly increased between 1991 and 2001, from 172 thousands to 303 thousands in Prague micro-region, and from 105 thousands to 129 thousands in Brno micro-region (Table 8). Most of this growth has been triggered by flows to the core cities. Commuting flows from core cities have increased in their number, however their proportion on total commuting increased only in 1990s, but declined in 2000s dwarfing against the massive growth of commuting to the center. Other flows, i.e. tangential commuting with start and destination in other municipality than core city, rapidly lost their proportion in both urban regions, clearly showing the dominance of both central places. Suburbs' role in commuting to jobs is growing, yet it is still marginal in comparison with cores. We can observe increasing share of suburbs as the destination of commuting (Table 9). The commuting from suburbs increased only in 2000s in relation to massive residential suburbanization. However, another important trend has been the decline of commuting within suburbs (Table 9) signaling the dominance of core city and centralization of job markets.

Table 8: Cores in commuting flows within urban regions of Prague and Brno (1991-2011)

Praha 1991	no.	%	Brno 1991	no.	%
total flows	171852	100,00%	total flows	104989	100,00%
to the center	104629	60,88%	to the center	59048	56,24%
from the center	14441	8,40%	from the center	9895	9,42%
other flows	52782	30,71%	other flows	36046	34,33%
Praha 2001	no.	%	Brno 2001	no.	%
total flows	237566	100,00%	total flows	110203	100,00%
to the center	163108	68,66%	to the center	65045	59,02%
from the center	25813	10,87%	from the center	12395	11,25%
other flows	48645	20,48%	other flows	32763	29,73%
Praha 2011	no.	%	Brno 2011	no.	%
total flows	303243	100,00%	total flows	129384	100,00%
to the center	219730	72,46%	to the center	82845	64,03%
from the center	28995	9,56%	from the center	14125	10,92%
other flows	54518	17,98%	other flows	32414	25,05%

Note: Proportion of Prague and Brno on commuting flows with start or destination within metropolitan region

Table 9: Suburbs in commuting flows within urban regions of Prague and Brno (1991-2011)

Praha 1991	no.	%	Brno 1991	no.	%
total flows	171852	100,00%	total flows	104989	100,00%
to suburbs	14283	8,31%	to suburbs	9106	8,67%
from suburbs	45659	26,57%	from suburbs	38452	36,62%
within suburbs	13173	7,67%	within suburbs	9852	9,38%
other flows	98737	57,45%	other flows	47579	45,32%
Praha 2001	no.	%	Brno 2001	no.	%
total flows	237566	100,00%	total flows	110203	100,00%
to suburbs	24145	10,16%	to suburbs	10292	9,34%
from suburbs	46206	19,45%	from suburbs	34781	31,56%
within suburbs	10767	4,53%	within suburbs	8741	7,93%
other flows	156448	65,85%	other flows	56389	51,17%
Praha 2011	no.	%	Brno 2011	no.	%
total flows	303243	100,00%	total flows	129384	100,00%
to suburbs	33516	11,05%	to suburbs	13256	10,25%
from suburbs	75852	25,01%	from suburbs	38939	30,10%
within suburbs	11813	3,90%	within suburbs	8154	6,30%
other flows	182062	60,04%	other flows	69035	53,36%

Note: Proportion of Prague and Brno suburbs on commuting flows with start or destination within metropolitan region

Conclusions

Somewhat unexpectedly and surprisingly, the analysis of spatial distribution of population, jobs and commuting flows in 1991-2011 showed a pronounced duality of residential deconcentration and, on the other hand side, concentration of jobs. While massive residential suburbanization has driven rapid deconcentration of population in expanding urban regions, the location of jobs and commuting to work driven by the increasing economic role of core cities is leading to growing centralization and concentration of jobs in metropolitan cores. Despite the emergence of new suburban growth job places, the location of jobs and commuting to work has been primarily driven by the economic dominance of core cities of Prague and Brno.

Post-socialist metropolitan areas are being reshaped by the duality of symbiotic trends of deconcentration of residences and centralization of jobs. The reality of economic drivers of capitalist spatial economy that favors centralization of jobs and decentralization of residences, thus leading to ever increasing commuting, is thus undermining the visions of more spatially balanced, socially equitable and sustainable urban growth based on more polycentric and less centralized pattern with lower volumes of commuting. Such development of Czech urban regions is rather a myth that can hardly be achieved in the context of policies favoring global circulation of investments in free market conditions coupled with locally embedded and spatially fragmented land use planning and decision-making on real estate development.

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