Peak and pine: re-scaling, uneven spatial development, and territorial cohesion in Europe, 1980-2015

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**Abstract:** This paper engages with the key theoretical points of reference in the literature on state re-scaling by interrogating the soundness of their fundamental assumptions and questioning the validity of the propositions made. The paper traces back the notion of re-scaling to David Harvey, Henri Lefebvre, and Neil Smith's Marxist conceptualizations about the role of space, capital, and the state in the production of uneven, spatially-imbalanced urbanization. The paper further investigates the core assumptions of the neo-Marxist literature on state re-scaling, principally associated with Bob Jessop and Neil Brenner. It distils the central hypothesis of re-scaling theory to the claim that radical spatial governance reforms initiated by Conservative New Right governments in the UK and across the post-1980 Europe have led to regional imbalances, divergence, and ever-growing spatial polarization across the continent. Following a brief highlight of the emerging criticism of the scalar turn literature, the paper examines the cause and effect relationship posited by re-scaling theorists against two bodies of urban and regional statistical analysis. This study's

major finding is that – in striking contrast to North America – the vast volume of evidence analyzed here cannot substantiate the core re-scaling hypothesis of rising spatial imbalances and economic divergence in the post-1980 Europe. The power of re-scaling theory to predict, convince or inspire appears significantly compromised as a result.

**Keywords**: re-scaling; scalar turn; capitalism; capitalist state; convergence; divergence; territorial cohesion; uneven development; urban growth; radical political economy; Marxist geography.

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### Introduction

Over the last twenty five years, political, economic, and urban geographers – inspired by charismatic interventions of Smith (1992) and Swyngedouw (1997) – have dispensed a great deal of effort into the study of geographical scales as socially constructed, structured, and reproduced phenomena of the so-called neoliberal age. The expanding literature on the social production of geographical scale under capitalism has generated a number of outstandingly novel concepts. Furthermore, this *scalar turn* in human geography has illuminated the complexity of the causal forces lying behind the social construction of geographical scale. Perhaps, most significantly, the central hypothesis that has emerged from the scalar-turn literature is that geographical scale and the re-scaling of contemporary capitalism would have "the most obvious and far-reaching causal impacts" leading to politically significant outcomes (Brenner 2001, 601). In particular, it has been argued that the creation and reorganization of scalar hierarchies "by the agents of transnational capital and US-dominated global neoliberalism" (Brenner 2001, 608) should lead to ever rising socio-spatial polarization and marginalization, with especially devastating consequences for European territorial cohesion.

This paper's primary research aim is to engage with the key theoretical points of reference in the literature on state re-scaling by interrogating the soundness of their fundamental assumptions and questioning the validity of the propositions made. First, the paper traces back the notion of re-scaling to David Harvey, Henri Lefebvre, and Neil Smith's Marxist conceptualizations about the role of space, capital, and the state in the production of uneven, spatially-imbalanced urbanization. Consequently, the paper moves towards the core assumptions of the neo-Marxist (or Marx*ian*) literature on state re-scaling principally associated with Bob Jessop and Neil Brenner. It distils the central hypothesis of re-scaling theory to the claim that radical spatial governance reforms initiated by Conservative New Right governments in the UK and across the post-1980 Europe have led to regional imbalances, divergence, and ever-growing spatial polarization across the continent. Following a brief highlight of the emerging criticism of the scalar turn literature, the paper examines the cause and effect relationship posited by re-scaling theorists against two bodies of urban and regional statistical analysis, emanating from a set of international urban and regional statistics collected during a pan-European COST Action project in 2009-2013. This study's major finding is that – in striking contrast to North America – the vast volume of evidence analyzed here cannot substantiate the core re-scaling hypothesis of rising spatial imbalances and economic divergence in the post-1980 Europe. The power of re-scaling theory to predict, convince or inspire appears significantly compromised as a result.

## Uneven development and the production of urban space under capitalism: a Marxist perspective

The early 1970s saw the emergence of a spatially-sensitive or *geographical* political economy – a new cross-disciplinary branch of knowledge, originating primarily out of the classical Marxist tradition in Human Geography, Political Sciences, and Sociology. The main subject matter of geographical political economists concerns modern capitalism recognized as a spatially uneven, highly variegated, and crisis-driven social formation. Undoubtedly, it was the dramatic end of *Les Trente Glorieuses* – the 'thirty glorious years' of Europe's extraordinary economic expansion and structural change following the end of World War II –

that had provoked the publication of the first two hugely influential volumes on spatiality and the urban form in contemporary capitalism: *Social Justice and the City* by Harvey (2009; originally 1973) and *The Production of Space* by Lefebvre (1991; originally 1974).

Lefebvre's core thesis was that "(social) space is a (social) product" (Lefebvre 1991, 26) and that the underpinning of social relations was spatial: as such they had "no real existence save in and through space" (Lefebvre 1991, 404). He conceptualized a threefold development process, encompassing quantitative growth ("the expansion of the productive force"), *urbanization* ("the formation of massive units of production and consumption"), and *spatialization* – "a calibrated spatial support" provided by the state to underpin the social relations of production and re-production (Lefebvre 2003, 85). The capitalist class was the key driver of the process, argued Lefebvre, as the bourgeoisie through its political creation – the state – attempted to prevent the inevitable (to him) collapse of capitalism by organizing and maintaining a *hierarchical stratified morphology* of space defined as a homogenous, yet fractured and unequal reproduction of the relations of domination and control (Lefebvre 2003, 94). Through the policies and practices of spatialization, the modern state could temporarily stabilize capitalism across the entire grid of social space by ensuring that definite spatial forms (e.g. neighborhoods and villages) composed of discrete units (rooms, huts, buildings) were nested within each other in a Russian Doll-like hierarchical stratified order of cities, regions, nation-states, continents, and the planet.

Harvey's 1973 contribution echoed many of the themes touched upon by Lefebvre, but it was in his *Limits to Capital*, first published in 1982, where Harvey (2006) provided a comprehensive Marxist geographical treatment of the uneven spatial economy of capitalism. Harvey's reading of capitalism was of a crisis-prone economic system geared towards continuous accumulation of capital through profit and investment, with a tendency towards over-accumulation. The absorption of surplus capital value was defined as the system's

central problem, with crisis describing phases of devaluation and destruction of the everincreasing quantities of surplus value that could not be profitable re-invested. Harvey's major contribution to geographical political economy was his conceptualization of *spatial circuits of value* (an idea mentioned in passing by Lefebvre) that flew from the primary production and consumption of goods, services, and labor power, towards the secondary circuit of investment of surplus value into fixed capital, physical infrastructures, and the built environment, and, finally, into the tertiary circuit of investment into social, technology, and science infrastructures, public administration, and the military (Harvey 2006). By switching and "freezing" surplus capital in time (via long-term public infrastructure projects) and in space (via the local built environment construction or through overseas investment), its owners were said to be able to achieve the so-called *spatial fix* – a temporary alleviation of the profitable surplus absorption problem (Harvey 2006, 417).

Although both Lefebvre and Harvey had touched upon a hierarchical stratified morphology of the politicized space earlier, it was Smith in *Uneven Development* (2010, originally 1984), who made most progress in trying to elucidate the *multi-scalar* nature of capitalist development, oscillating between powerful forces causing geographical differentiation (i.e. economic divergence) and an equalization of economic differences (i.e. convergence). For Smith (2010, 180), the separation of absolute spaces into particular (urban, national, global) scales of human activity was a central *requirement* for capital, as the following lengthy quote attests to:

"Behind the extant pattern of uneven development lies the logic and the drive of capital toward what we shall call the 'seesaw' movement of capital. If the accumulation of capital entails geographical development and if the direction of this development is guided by the rate of profit, then we can think of the world as a 'profit surface' produced by capital itself, at three different scales. Capital moves to where the rate of profit is highest (or at least high), and these moves are synchronized with the rhythm of accumulation and crisis. The mobility of capital brings about the development of areas with a high rate of profit and the underdevelopment of those areas where a low rate of profit pertain. But the process of development itself leads to the diminution of this higher rate of profit [...] Capital attempts to seesaw from a developed to an underdeveloped area, then at a later point back to the first area which is by now underdeveloped, and so forth. To the extent that capital cannot find a spatial fix in the production of an immobile environment for production, it resorts to complete mobility as a spatial fix; here again, spatial fixity and spacelessness are but prongs of the same fork [...] And whatever the limits placed upon it, the uneven development of capitalism will continue to be driven on by the opposing tendencies of equalization and differentiation, and the seesaw movement of capital that results" (Smith, 2010, 197-199, 202).

### The "new political economy of scale": statehood, capital, and class

Following the collapse of state socialism in Europe in 1989-1991, Marxist geographical political economy has arguably lost (some of) its allure. The analytical prowess of this perspective was eventually restored under the guise of a "new political economy of scale" by Jessop (2002) in *The Future of the Capitalist State*. Having abandoned the classical Marxist account of universally "late capitalism" as its terminal phase (see Mandel 1978), the new political economy of scale have also tried to distance itself from the French neo-Marxist regulation approach or *Régulation* theory as its main framework of analysis (Jessop and Sum 2006). More importantly, this new strand of geographical political economy has gone much further in its analysis of the contemporary condition than the usual critical geography argument about "neoliberalism" – allegedly a single hegemonic project aimed at restoring the power of the transnational capitalist class through deregulation, privatization, marketization, fiscal austerity, and harsh zero-sum interspatial competition (see Birch and Mykhnenko 2010; Brenner and Theodore 2002; Harvey 2005; Peck and Tickell 1994).

Following Swyngedouw (1997), Jessop defined the fundamental post-1980 changes in Western economies as a process of *state re-scaling*, gradually transforming the post-war "Keynesian Welfare National State" (KWNS) into a post-1980 "Schumpeterian Workfare Post-National Regime" (SWPR). As a stylized model of the post-war state in western Europe and the industrially advanced Anglophone economies, the KWNS (or "North Atlantic Fordism" in the Regulation School parlance) was characterized by several distinctive features, including: a) economic policies explicitly aimed at full employment achieved through the Keynesian public management of aggregate demand, and the provision of infrastructure supportive of mass production and consumption; b) social policies aimed at generalizing the norms of mass consumption through collective wage bargaining, public assistance, and social welfare rights; c) a relative primacy of the national scale, with the national territorial state assuming the chief responsibility for economic and social decisionmaking; and d) a statist *dirigiste* mixed economy, with the public sector and state institutions expected fully to compensate for market failures. Emphasized by economic geographers (though not by Jessop himself), the centralized political regulation of the KWNS was complemented by a program of spatial socio-economic integration (dubbed 'spatial Keynesianism'), with most countries seeing dramatic growth in public spending in lagging regions, leading to a decline in social-spatial inequalities (Lobao et al. 2009).

Following a series of economic, fiscal, social, and political crises that had shaken the West in the 1970s, the North Atlantic Fordism was damaged as an accumulation regime and de-legitimized as a mode of regulation. Jessop (2002) suggested that the SWPR would consequently rise as a mode of regulation fit for a newly-liberalized and globalizing economy. The SWPR's main characteristics include: a) a distinctive set of economic policies focused on Schumpeterian creative destruction, innovation, competitiveness, and supply-side measures to promote a knowledge-based economy; b) social policies aimed at enhancing territorial competitiveness through a downward pressure on wages, a curtailment of welfare rights, and a rise in low-wage, low-skill employment opportunities (hence *workfare*); c) a "light touch" public governance regime to correct (but not to compensate) for market and state failures; and, finally, d) a fundamental *relativization* or fragmentation of scales in

economic and social policy – upwards (towards Europeanization), downwards

(decentralization), and sideways (via public-private partnerships).

Nevertheless, Jessop (2002, 211) maintained that in the continuing restructuring of capitalism, the national state would retain its central, generic political function as an ultimate "apparatus of cohesion" (see Poulantzas 2008, 249), securing the solidity of a class-divided social formation. Moreover, it was up to *individual* capitalist states to reformat the spatio-temporal dynamics of globalization to their own benefit by:

"establishing new scales of activity (and dismantling others) and thereby rescaling and rearticulating various state powers, institutional forms, and regulatory capacities and creating the possibility for themselves and other actors to 'jump scales' in response to specific problems. They are promoting the space of flows by organizing conditions favourable to the international mobility of technologies, industrial and commercial capital, intellectual property, and at least some types of labour power. And, conversely, they are engaged in complementary forms of *Standortpolitik* and other forms of place-based competition in the attempt to fix mobile capital in their own economic spaces and to enhance the inter-urban, inter-regional, or international competitiveness of their own place-bound capitals" (Jessop 2008, 193).

## The re-scaling of Europe: divergence, polarization, and uneven urban development?

For Brenner (1999), the new capitalist matrix has comprised of newly-created *subnational* state spaces in the form of global cities, city-regions, and local-regional geographical scales of state power. Like many Marxist geographical political economists before him (Harvey 1996; Smith 2003), Brenner has argued that the re-scaling of the modern statehood was becoming a key *capital accumulation strategy*: instead of eroding state territoriality and precipitating a withering away of the state as such, the purported reconfiguration of the national scale was creating a *city-centric* capitalism. In *New State Spaces*, Brenner (2004) further developed his scalar-turn thesis, using the example of western Europe to argue that the contemporary transformation and reworking of national statehood proceeded primarily

through urban policy and the regulation and governance of capitalist urbanization. No single scale had replaced the national scale as the primary level of political and economic organization, but rather one was witnessing "a wide-ranging recalibration of scalar hierarchies ... throughout the state apparatus as a whole, at once on supranational, national, regional *and* urban scales" (Brenner 2004, 3; emphasis in the original).

Overall, the re-scaling theorists have undertaken a fundamental revision of the original Marxist canons by enriching their conceptual toolkit, whilst keeping the perspective on spatialization developed in the previous decades. Nonetheless, they have maintained that all mayor types of spatial restructuring, including a) the re-scaling of *statehood*, b) the re-scaling of *capital accumulation*, c) the re-scaling of *urbanization* processes, and d) the re-scaling of contentious *politics*, should be considered exercises of political power on behalf and in the interest of global capitalism run by the transnational capitalist class. As emphasized by Brenner (2004, 16): "*It is no longer capital that is to be molded into the (territorially integrated) geography of state space, but state space that is to be molded into the (territorially differentiated) geography of capital.*"

Given the constitutional and administrative territorial rigidity of federal systems in North America and Australia, it was Europe, where the combined effects of the various rescaling processes should have most prominently manifested themselves (Jessop 2009). The new urban hierarchy of Europe, as envisaged by the scalar-turn literature (see Figure 1), was depicted as a multi-scalar geographical *force field* (Brenner 2004, 190) – an evolving system of multi-level relations and interdependencies between cities and city-regions. According to Brenner, Europe's new urban hierarchy has positioned cities and urban regions across two overlapping dimensions. First, cities were sorted according to their place within global, European, and national scalar divisions of labor, defined by the dominant structures of economic specialization and the production system. These ranged from the high-end knowledge-based economy to the bottom of the peripheralized production systems, lacking

any competitive industrial infrastructure. Second, the standing of European cities in the

hierarchy depended on their position within corporate control and management networks (see

Dunford and Kaukalas, 1992; Massey, 1995).



Peripheralised structures of production: some generic office-based services; lack of any competitive industrial infrastructure

Figure 1. The changing European urban hierarchy: spatial scales and structures of

production.

Source: Derived from diagrams in Brenner 1998, 19, and Brenner 2004, 191.

This emergent European hierarchy of urban positions was presented as a dynamic phenomenon based on qualitatively different national, regional, and local state strategies aimed at inserting major urban economies most profitably into the global and supranational circuits of capital (Brenner 2004; Brenner and Theodore 2002; Paul 2005; Smith 2002). As the arrows in the diagram indicate, cities may descend the hierarchy as their local economies suffer de-industrialization, deskilling, and peripheralization. Conversely, a city may move upwards within the hierarchy by creating a brand new path through a simultaneous process of services upgrading and manufacturing deskilling. This structural adjustment strategy was usually associated with a rise in high-tech employment, as new corporate headquarters, highend knowledge-intensive industries, and chief management functions were being attracted to the city. Finally, cities may also improve their *absolute* fortunes through upgrading the existing industries, including high-tech manufacturing, alongside the development of other high value-added activities. Nevertheless, this final scenario may not lead to any *relative* improvement in a city's position in the urban hierarchy: Fordist cities have to run to stay still (Birch and Mykhnenko, 2009; see also Turok and Mykhnenko, 2008).

Despite the arrows in Figure 1 pointing both ways (except for post-Fordist cities), the overwhelming majority of European cities were apparently locked in to a failing development trajectory, unable to "engender either a sustainable regime of economic growth or a territorially cohesive framework of political regulation at any spatial scale" (Brenner 2004, 300). Thus, the core hypothesis of the geographical political economy of scale has been that the re-scaling of statehood and turbo-charged territorial competition unleashed upon Europe would ultimately lead to *economic divergence*, with a new European socio-spatial "mosaic" being characterized by "intense economic dynamism within a select group of powerful, globally interlinked cities, regions, and industrial districts and by enhanced stagnation, marginalization, and exclusion within many of Europe's older industrial cores and

underdeveloped, peripheral zones" (Brenner 2004, 258; see also Deas and Giordano 2003; Jones 2001; MacLeod 2002; Swyngedouw 2000; Swyngedouw et al. 2002; Weber 2002). Accordingly, it should be inevitable for marginalized cities gradually to become the most numerous category within the changing European urban hierarchy, as more urban areas lose their competitive edge and fall to the bottom of the pecking order. Noticeably, after the global financial crisis of 2007-08, the originally bleak scenarios of unfettered interspatial competition and ever growing levels of territorial polarization (Petrella, 2000) were reconfirmed as still commanding "considerable plausibility" (Brenner 2009, 130).

### The scalar turn, scalar traps, and an anti-scalar backlash

Since the late 1990s, the neo-Marxist literature on new state spatialities and state re-scaling has matured into a real – albeit short-lived – scalar turn in social sciences (Jessop 2009; Jones 2001; MacLeavy and Harrison 2010). Yet even within human geography, it has generally received a mixed bag of responses, ranging from adulation to denunciation. Amongst the latter, one has to mention especially a series of post-modernist post-structuralist attacks alongside a similarly hostile rejection of state re-scaling by some Marxists. Post-structuralist geographers have called for the abolition and elimination of scale as such, seeing it as a "mind trap", supposedly imposing a repressive hierarchy of power upon the people seeking emancipation from it (Collinge 2006; Jones et al. 2007; Marston et al. 2005; Woodward et al. 2012; cf. Jonas 2006, 2012; Leitner and Miller 2007). In turn, revolutionary Marxists have denounced the new political economy of scale for apparently misreading the dialectics of Lefebvre, for having too deep a root in the "structuralist-functionalist" regulation approach, and for the "empiricist" and "positivist reification" of the categories scale, capital, and state (Charnock 2010a). Yet despite these vocal demands for re-scaling theory to be abandoned as

"inherently flawed" (Charnock 2010b, 87), academic output on state re-scaling has continued unabated (see Bialasiewicz et al. 2013; Haarstad 2007, 2014; Haarstad and Fløysand 2007; Li et al. 2014; Oliveira and Breda-Vázquez 2010; Oseland et al. 2012; Perkmann, 2007; Pugalis and Townsend 2013).

Gradually, the re-scaling hypothesis has been put under closer scrutiny. Some have found the re-scaling theorists' account of the post-1980 social changes rather dubious and unconvincing, and their main claim of a fundamental state re-scaling in western Europe to be grossly exaggerated, if not entirely trivial, compared with the radical and longstanding character of decentralized forms in the USA (Cox 2009, 118). The one-dimensionalism of capitalist accumulation has also been questioned, not least by the key theorists of state rescaling themselves (see Jessop et al. 2008). Furthermore, a number of empirical studies of new state spatialities have refuted rather crude instrumentalist explanations of state re-scaling as a (transitional) capitalist class project: the spatial logic of capitalism, evoked by Marxist geographical political economists, has been found lacking an adequate explanation of the real-life phenomena. Keating and Wilson (2014) discovered how Europe's big business on many occasions has turned out to be hostile to state re-scaling initiatives, fearing a potential fragmentation and distortion of markets, multiplication of regulation, and the loss of administrative simplicity. Territorial interests and the interests of European capital have often collided, with the latter losing the contest (Keating 2014). Thus, as concluded by Gibbs and Jonas (2001, 274), "state territorial structures are neither fully determined by, nor indeed are necessarily functional to, the needs of (regional, national, global) capital" (see also Lobao and Adua 2011).

Most significantly for the purpose of this study, economic geographers have begun rigorously testing the hypothesis of state re-scaling's allegedly detrimental impact on territorial cohesion and spatial inequalities in Europe (Rodríguez-Pose and Gill 2005). As

revealed by Ezcurra and Pascual (2008), Lessmann (2009, 2012), and Rodríguez-Pose and Ezcurra (2010), the devolution of fiscal power to subnational governments has been negatively correlated with the level of regional inequality across the industrially-advanced Western economies; that is, at least in rich countries, a higher degree of decentralization and the re-scaling of statehood is associated with *lower* regional disparities. Nationally, Torrisi et al. (2015) found no evidence of the post-1996 devolution in Italy leading to an increase in regional disparities; quite the contrary, they registered a *reduction* of regional disparities in disposable household income per head over the period 1995-2007 (for the UK evidence, see Pike et al. 2012). Charron (2016), using aggregated regional-level data from the EU members states between1995-2008, most recently further confirmed the positive relationship between the downscaling of state capacity and territorial cohesion, with decentralization resulting in lower regional inequalities.

Going further down the scale towards the individual level of interpersonal income distribution, Tselios et al. (2012) pointed out that greater fiscal decentralization in western Europe has been unambiguously associated with *lower* income inequality within regions. Furthermore, they discovered, "against the views that worse-off regions would be disadvantaged because of capacity and funding constraints", that "it is precisely these less well-off regions which seem to be benefiting the most from the inequality-reducing effects of fiscal decentralization processes" (Tselios et al. 2012, 1296). Amongst the mechanisms explaining Europe's regional *convergence rather than polarization*, one ought to mention the ever-present role of the state and the large size of general government, as despite the conventional wisdom, public expenditure has not declined over the last two decades (Martinez-Vazquez and Timofeev 2009). As maintained by Storper (2016, 243), the data simply do not support the claims made in the literature that state re-scaling is associated with blanket "neo-liberalization" and the collapse of spatial Keynesianism.

# Territorial cohesion in the post-1980 Europe: examining the re-scaling hypothesis once again

Following the critical assessment of the core postulates of the neo-Marxist geographical political economy of scale, this paper further interrogates the re-scaling hypothesis against a specially collected body of evidence (stretching from 1980 to 2015) on regional economic growth across the EU and its major global economy counterparts, including Australia, Japan, South Korea, member states of the North American Free Trade Agreement area (NAFTA), the European Free Trade Association (EFTA), and the so-called BRICS economies of Brazil, Russia, India, China, and South Africa. Consequently, this study moves down to the local scale of European municipalities in order to investigate the actual workings of Europe' urban hierarchy, following the fall of state socialism in 1989-1991. The main data sources used in this section include the two that were specifically procured for this study – the COST Action TU0803 Mapping Urban Shrinkage in Europe Database (Sousa et al. 2011) and the European Regional Database (Cambridge Econometrics 2015), in addition several openly available international datasets, including on Foreign Direct Investment (UNCTAD 2016), General and Regional Statistics (Eurostat 2016), and Regions and Cities (OECD 2016).

One of the key predictions of re-scaling theory about Europe's spatial economic development trajectory is that local socio-economic imbalances in per capita incomes should increase over the medium- to long run, with rising levels of polarization, peripheralization, and marginalization impacting the majority of cities and regions across the continent. The opposite – convergence – occurs when economic disparities decrease. The literature on regional convergence / divergence usually focuses on the following two concepts of convergence: *beta*- and *sigma*-convergence, respectively:

- <u>β-convergence</u> detects possible *catching-up* processes, measuring the speed of convergence, when poor regions grow faster than rich regions, whereas
- <u>σ-convergence</u> measures income (or wealth) inequality as the *dispersion* (variability) of per capita income between regions at a given point in time. A fall in the spread of average per capita incomes between regions over time, thus, indicates the occurrence of convergence (Molle 2007).

#### Assessing regional imbalances in Europe and beyond, 1980-2015

First, this study turns to the evidence on  $\beta$ -convergence within the European Union's current 28 member states (MS), comparing their gross domestic product (GDP) growth rates and the accumulation of foreign direct investment (FDI) stock in its older, pre-2004 enlargement MS (the EU-15), and its newer, post-2004 MS (the EU-13). Table 1 shows that over the period 1995-2005, the EU's newest east and south European MS were growing 1.6 times faster than their west European counterparts. During 2005-15, the rate of the EU-13 catching up process increased to 3.3 times, despite a general slowdown in absolute growth rates across the EU-28. During the period 1994-2014, the newer and poorer MS were able to attract the FDI at a rate 7.6 times faster than the EU's older and wealthier MS. As a result, during the last twenty years, the relative share of the EU-13 in the total bloc's output had doubled from 4% to 8% respectively. At the same time, the evidence also indicates a gradual shift of surplus labor force from the formerly communist East to the West, with the EU-13 share of the total economic area's workforce declining by 1.5% between 1995 and 2015. The influx of the FDI from the EU-15 to the EU-13, on the one hand, and the out-migration of labor in the opposite direction, on the other hand, have led to an even faster rate of equalization (i.e. convergence) of wages across the continent than the GDP figures portrait.

**Table 1**. Beta-convergence: annual growth rate of real GDP per capita, accumulation of FDI stock (US dollars, current prices, millions), share of EU-28 total GDP (Euro, current prices), and share of EU-28 total working age population (15-64 years), 1990s-2010s.

|  | EU-15                 | EU-13   | EU-28        |  |  |  |  |  |  |  |  |  |  |
|--|-----------------------|---------|--------------|--|--|--|--|--|--|--|--|--|--|
| Real annual change in GDP per capita, %          |                       |         |              |  |  |  |  |  |  |  |  |  |  |
| 1995-2005  | 2.57                  | 4.05    | 2.67         |  |  |  |  |  |  |  |  |  |  |
| 2005-2015  | 0.82                  | 2.70    | 0.96         |  |  |  |  |  |  |  |  |  |  |
| FDI stock, current U                             | J <b>S\$ millions</b> |         |              |  |  |  |  |  |  |  |  |  |  |
| 1994   | 1,100,773             | 20,439  | 1,121,212.16 |  |  |  |  |  |  |  |  |  |  |
| 2004   | 3,666,260             | 313,943 | 3,980,203.46 |  |  |  |  |  |  |  |  |  |  |
| 2014   | 6,798,328             | 961,100 | 7,759,428.40 |  |  |  |  |  |  |  |  |  |  |
| Percentage of EU-28 total GDP                    |                       |         |              |  |  |  |  |  |  |  |  |  |  |
| 1995   | 95.9                  | 4.1     | 100.0        |  |  |  |  |  |  |  |  |  |  |
| 2005   | 93.7                  | 6.3     | 100.0        |  |  |  |  |  |  |  |  |  |  |
| 2015   | 92.0                  | 8.0     | 100.0        |  |  |  |  |  |  |  |  |  |  |
| Percentage of EU-28 total working age population |                       |         |              |  |  |  |  |  |  |  |  |  |  |
| 1995   | 77.1                  | 22.9    | 100.0        |  |  |  |  |  |  |  |  |  |  |
| 2005   | 77.6                  | 22.4    | 100.0        |  |  |  |  |  |  |  |  |  |  |
| 2015   | 78.6                  | 21.4    | 100.0        |  |  |  |  |  |  |  |  |  |  |

Source: elaborated from Eurostat (2016) and UNCTAD (2016).

Turning to  $\sigma$ -*convergence*, one has to mention it can be measured by half a dozen different indicators, ranging from very basic, like the coefficient of variation of regional GDP per head, to extremely sophisticated ones (see Monfort 2009, for the non-parametric estimation of density functions based on Gaussian kernels and Markov chain analysis). Since 2007, Eurostat – the EU Statistical Agency – has been calculating a specially-derived indicator that records the differences between regional per capita GDP and the national (or supra-national) average, and makes them comparable between countries (or trading blocs). In this section, we have used the *Eurostat dispersion* formula to search for the evidence of  $\sigma$ -convergence across the EU at its three main sub-national scales, using the standard classification of national units of territorial statistics (NUTS; see European Commission, 2011).

NUTS is a hierarchical classification operating with three spatial scales:

- NUTS Level 1 covers major socioeconomic regions, with the average population size ranging between 3 to 7 million (e.g. Northern Ireland in the UK);
- NUTS Level 2 covers basic regions for the application of regional policies (typically 800,000 to 3 million inhabitants; e.g. Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest in Belgium);
- NUTS Level 3 covers small regions for specific analyses (typically 150,000 to 800,000 inhabitants; e.g. Pas-de-Calais in France).

The  $\sigma$ -convergence evidence generated in this study (see Figure 2 and Table 3) cover all three NUTS levels for the period 1980-2012. For example, for the EU-27, the dispersion D of the regional GDP of NUTS-2 regions is defined as the sum of the absolute differences between regional and EU-27 GDP per capita, weighted on the basis of the regional share of population and expressed as a percentage of the EU-27 GDP per capita, as follows:

$$D = 100 \frac{1}{Y} \sum_{i=1}^{n} |(y_i - Y)| (p_i / P)$$

In the above equation:

- $y_i$  is the regional GDP per capita of region i
- Y is the trading bloc average GDP per capita
- p<sub>i</sub> is the population of region i

P is the population of the trading bloc

n is the number of regions in the trading bloc.

The value of the dispersion of GDP per capita is zero, if the values of regional GDP per capita are identical in all regions of the EU-27, and, all other things being equal, it will show an increase, if the differences in per capita GDP between the regions increase. A value of 30% therefore means that the GDP of all regions of a given economic area, weighted on the basis of the regional population, differs from the average value by 30%.

Taking the entire period of state re-scaling into consideration from 1980 onwards (with 2012 being the latest year for which consistent data are available), Figure 2 reports an overall *decline in regional disparities* across all three scales both in the EU-15 and the EU-27 areas, with the EU-15 NUTS-1 regions registering a very modest decrease of 0.8%, NUTS-2 regions – 1.0%, and NUTS-3 regions – 1.3% accordingly. Across the EU-27 area, with 1994 and 2012 being the earliest and the latest available indicators, a decrease in regional disparities was much more impressive, registering 5.1% in NUTS-1 regions, 4.8% in NUTS-2 regions, and 3.8% in NUTS-3 regions.

The re-unification of Germany and the incorporation of its poor eastern regions in the early 1990s had significantly decelerated the process of convergence within the old EU-15, whereas the advent of the global financial crisis in 2007-08 seemingly suspended the reduction in regional disparities throughout the single market. However, the national accounts data for 2012-15 and the latest forecasts at the MS level suggest that this interruption might only be temporary and that there could already have been a resumption of the process of convergence in the mid-2010s. As Table 1 confirms, in the long run, convergence has mostly

been a result of the least developed regions in Europe catching up, rather than growth decelerating in the more developed ones (see also European Commission 2014; Monfort 2009).



**Figure 2.** Sigma-convergence: dispersion of regional GDP per inhabitant in the European Union of 15 and 27 members states, NUTS Levels 1-3, constant Euro in 2005 prices, 1980-2012, %

*Notes:* Scale between 0% = perfect equality and 100% = perfect inequality.

Source: Table 2.

The evidence presented so far does not support the re-scaling hypothesis of worsening spatial disparities in Europe; if anything, regional income and, thus, economic activity, is much *more evenly* spread across the continent now than it was back in 1980, at whatever spatial scale one

chose to adopt. At the urban scale, by 2015, five cities of the former communist eastern Europe managed to move up above the EU-28 average level of per capita income (measured in purchasing power standards), with Bratislava becoming Europe's sixth most affluent cityregion (at 186%), Prague appearing at the ninth place (173%), and Bucharest at the fortyseventh (129%), jumping well above Madrid, Hannover, and Berlin (elaborated from Eurostat 2016).





Source: Elaborated from Eurostat (2016) and OECD (2016).

Table 2. Dispersion of regional GDP per inhabitant in the European Union of 15 and 27 members states, NUTS Levels 1-3, constant Euro in

2005 prices, 1980-2012, %

| 1980  | 81                 | 82      | 83   | 84   | 85   | 86   | 87   | 88   | 89   | 1990 | 91   | 92   | 93   | 94   | 95   | 96   | 97   | 98   | 99   | 2000 | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 2010 | 11   | 12   |
|-------|--------------------|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| EU-15 | CU-15 NUTS Level 1 |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 23.8  | 22.4               | 21.9    | 21.7 | 22.0 | 21.9 | 22.1 | 21.6 | 21.4 | 21.1 | 21.6 | 20.7 | 21.5 | 21.8 | 21.7 | 21.5 | 21.3 | 21.3 | 21.1 | 21.4 | 21.5 | 21.3 | 21.2 | 21.0 | 20.8 | 20.9 | 21.0 | 21.5 | 22.0 | 21.4 | 22.2 | 22.8 | 23.0 |
| EU-15 | EU-15 NUTS Level 2 |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 25.4  | 24.1               | 23.8    | 23.7 | 24.0 | 23.9 | 24.0 | 23.6 | 23.0 | 22.8 | 23.1 | 22.4 | 22.9 | 23.3 | 23.2 | 23.1 | 23.1 | 23.0 | 22.8 | 23.1 | 23.1 | 23.0 | 22.9 | 22.6 | 22.5 | 22.5 | 22.5 | 22.8 | 23.1 | 22.8 | 23.4 | 24.0 | 24.3 |
| EU-15 | 3U-15 NUTS Level 3 |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 30.7  | 29.4               | 28.9    | 28.5 | 28.5 | 28.3 | 28.2 | 27.8 | 27.3 | 27.1 | 27.0 | 26.4 | 26.6 | 27.2 | 27.1 | 27.3 | 27.3 | 27.5 | 27.5 | 27.7 | 28.0 | 28.1 | 27.7 | 27.5 | 27.4 | 27.5 | 27.5 | 27.8 | 28.2 | 28.1 | 28.7 | 29.0 | 29.5 |
| EU-27 | EU-27 NUTS Level 1 |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       |                    |         |      |      |      |      |      |      |      |      |      |      |      | 42.2 | 41.9 | 41.5 | 41.4 | 41.3 | 41.3 | 41.1 | 40.6 | 39.9 | 39.3 | 38.7 | 38.2 | 37.7 | 37.2 | 36.8 | 36.4 | 36.8 | 37.0 | 37.1 |
| EU-27 | NUTS               | Level 2 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 1    |      | L    |
|       |                    |         |      |      |      |      |      |      |      |      |      |      |      | 43.8 | 43.6 | 43.3 | 43.1 | 43.0 | 42.9 | 42.8 | 42.3 | 41.7 | 41.0 | 40.5 | 40.0 | 39.5 | 39.1 | 38.8 | 38.3 | 38.7 | 38.9 | 39.0 |
| EU-27 | NUTS               | Level 3 |      |      |      |      | •    |      |      | •    |      |      |      |      |      |      |      |      |      |      |      |      |      |      | •    |      |      | •    | •    |      |      |      |
|       |                    |         |      |      |      |      |      |      |      |      |      |      |      | 44.4 | 44.2 | 43.9 | 43.8 | 43.8 | 43.9 | 43.9 | 43.5 | 42.8 | 42.2 | 41.7 | 41.3 | 40.8 | 40.6 | 40.3 | 40.0 | 40.3 | 40.5 | 40.6 |

Notes: Scale between 0% = perfect equality and 100% = perfect inequality. '...' – no data.

Source: Elaborated from Cambridge Econometrics (2015).

What is even more striking – and further damaging for the reputation of re-scaling theory – is both the direction of Europe's convergence trajectory and the scale of regional inequalities in the EU in contrast to other world's major economies. Looking at  $\sigma$ convergence, the evidence (see Figure 3) points to a dramatic *decline in regional disparities* between 1995 and 2012 across the EU-27 by as much as 12.1%, in South Africa by 9.9%, Brazil by 8.9%, China by 6.3%, with the EFTA and Japan registering more modest decreases of 1.2% and 1.1% accordingly. At the same time, regional disparities have risen significantly in the NAFTA area by 15.7% (!), in Russia by 6.6%, South Korea (6.0%), Australia (5.8%), and India (5.2%). The growing gap between the levels of regional disparities registered in the NAFTA nations and those of the EU looks particularly salient.

Thus, if state re-scaling has indeed occurred at the European level, then on the evidence presented here it has led to a *decrease* rather than an increase in regional disparities, at least, in the medium term. Whereas if, as the scalar turn literature implies, the re-scaling of modern statehood has been a universal phenomenon, affecting all capitalist states, then the evidence suggests it has had *no tangible impact* on regional inequalities. Either way, the re-scaling hypothesis cannot be proven on the basis of this study's empirical findings presented so far. By contrast, orthodox urban and regional economics' models shed more light on these spatial equalization results.

Dating at least from Hoover (1948), Myrdal (1957), and Hirschman (1958), economists generated a whole host of local and regional economic growth theories, progressing far beyond Smith's rather simplistic – albeit elegant – see-saw analogy. In this context, neo-classical theories of inter-regional *self-balance* provide a rather more adequate and persuasive explanation of long-term regional economic convergence through "spread", "spill over", "trickle-down" effects (Aoyama et al. 2011, chapters 3.3 and 4.1; Dean et al. 1970; McKee et al. 1970). Driven by the unhindered flows of capital and labor in the opposite directions, labor-rich (and capital-poor) low-wage regions tend to entice capital with a promise of higher profits, whilst capital-rich high-wage regions tend to attract extra labor resources (whilst losing capital). Working on the (very likely) assumption that capital is more mobile than labor, over the long run, a poor and capital-importing region should experience faster output growth and catch up with its high-wage, capital-exporting neighbor, thus, generating convergence (Borts and Stein 1964; McCann 2013, Chapter 7.2; Meade 1962; for a review, see Harris 2011).

Based on free market-driven flows of surplus capital *and* surplus labor in the opposite directions, the EU single market has evidently become a powerful driver of regional convergence (Table 1; see also European Commission 2014, 200-206). Further confidence in this regard is drawn from the fact that unlike the EU, the 1994 North American Free Trade Agreement has facilitated closer economic ties between Canada, Mexico, and the US only through increases in trade and FDI; it does not allow for the free movement of people. And, as Figure 3 shows, it is only the EU and the EFTA – with their four single market freedoms of movement over borders of goods, capital, services, *and people* – that have seen their regional disparities decline.

An alternative – state interventionist – explanation preferred by the European Commission (2014) highlights that NAFTA does not have a regional development policy, thus, making it much harder for Mexican regions to benefit from trade and capital integration. By contrast, since 1988, the EU with its Cohesion Policy and affiliated structural investment funds has been actively intervening into the lagging and least developed regions (Faludi 2010; Molle 2007). The public funding allocation to the European Structural and Investment Funds and Cohesion Policy instruments has grown from Euro 75 billion to 454 billion between the periods 1989–1993 and 2014–2020, with 73% of the total amount going to the poorest regions in the EU-13 (European Commission, 2016). A comprehensive review of

over 50 major studies on the economic impact of EU Cohesion Policy conducted by McCann (2015, 62-70) concluded favorably on the policy's role for catching-up growth. For example, the estimated impact of the Cohesion Policy investment to be made through the period 2014–2020 would lead the EU-13 GDP to be 2.6% higher by 2023 compared with the baseline non-intervention scenario; the largest impact is expected on Poland's GDP, which will rise by an estimated 3.6% above what it otherwise would have been in the absence of Cohesion Policy (European Commission 2014, 266-269).

To sum up, the established view amongst state re-scaling theorists that none of the EU policies have been construed as a *genuinely* compensatory, territorially redistributive counterbalance mechanism, posing "much of a threat to the prevalent competition-based, competitiveness-oriented model of European interscalar relations" (Brenner 2004, 302), is unsustainable. EU Cohesion Policy in its current form may not adhere fully to the vision of a strategic interventionist spatial policy framework that was called for more than two decades ago (Amin and Tomaney 1995). Nevertheless, the tension within the EU polity, between the pursuit of market-led solutions and active state intervention in favor of economic expansion and socio-spatial justice remains as real now as it was back then (see Farole et al. 2011). And persistently to ignore this opportunity, not to mention the very tangible territorial cohesion results achieved in the course of European integration, means aiding the menacing portrayal of Europe as a "failed neoliberal project" that must be destroyed (Elliot 2016; see also van Apeldoorn et al. 2009). The UK Brexit experience will undoubtedly provide a good litmus test of how socially progressive such political posturing has been.

# Examining urban disparities: local growth and shrinkage in Europe since the fall of communism

As discussed above, the basic geographical political economy conceptualization of (un)even development is that of an observed phenomenon as a powerful process that acts on and between different spatial scales. Thereby, the development of a basic unit (in this case a municipality) shapes the evolution at the next spatial scale (regional), which, in turn, feeds back on the development at the basic unit (top-down) as well as nationally (bottom-up). Having examined the European territorial cohesion trends from 1980 onwards at four different scales (from the MS down to the NUTS-3 level), this section ultimately zooms into the local scale of municipalities or local administrative units (LAU). This study uses municipalities as the smallest spatial entities which are set in relation to larger ones. The upper LAU level (LAU-1, formerly NUTS-4) is defined only for some MS. The lower LAU level (LAU-2, formerly NUTS-5) consists of over 120,000 municipalities or equivalent local authority units across the EU. For example, in the UK, LAU-1 covers 406 lower tier authorities, districts, individual unitary authorities, and local enterprise companies (Scotland), whilst LAU-2 comprises of 10,310 wards (European Commission 2011). Here we use population change as the only available and accessible indicator of growth at the ward level across the continent (see Pumain 2006; Resende 2013). Population change has a long pedigree of usage for spatial analysis, as an indicator of individual behavior at the scale of households and other economic agents (Beauregard 2009; Turok and Mykhnenko 2007). This section is based on the COST Action TU0803 database (Sousa et al. 2011), containing absolute population figures from national statistical offices for 92,773 municipalities (LAU-2) inhabited by 511,924,257 people across the EU and associated countries; 7585 of these LAU-2 are cities and urban areas with 5,000 residents and above.



Figure 4. Annual population development across Europe, municipalities, 1990-2010.

The local scale evidence analyzed in this study is rather conclusive with regard to the rescaling hypothesis about the ever-polarizing European urban hierarchy: the vast majority of European cities have been *growing* rather than shrinking throughout the 1990s and 2000s. Amongst all municipalities in the dataset, both rural and urban, 62% (57,365 LAU-2 with 343,709,083 inhabitants in total) have enjoyed a rise in population between 1990 and 2010; only 38% (35,408 LAU-2 with 168,215,174 population) have reported a population loss. Figure 4 indicates that shrinking municipalities primarily cover vast rural areas in northern, eastern, and southern peripheries of Europe.

| Total population  | EU-1:     | 5  |      |        |      |     | EU-13 + associated countries |      |       |    |         |    |  |  |  |  |
|-------------------|-----------|----|------|--------|------|-----|------------------------------|------|-------|----|---------|----|--|--|--|--|
| (2010)            | Shrinking |    | Stab | Stable |      | ing | Shrin                        | king | Stabl | e  | Growing |    |  |  |  |  |
|                   | No.       | %  | No.  | %      | No.  | %   | No.                          | %    | No.   | %  | No.     | %  |  |  |  |  |
| 5,001 - 10,000    | 236       | 12 | 202  | 11     | 1469 | 77  | 168                          | 36   | 116   | 25 | 179     | 39 |  |  |  |  |
| 10,001 - 25,000   | 264       | 13 | 268  | 13     | 1564 | 75  | 261                          | 45   | 128   | 22 | 190     | 33 |  |  |  |  |
| 25,001 - 50,000   | 145       | 15 | 141  | 14     | 710  | 71  | 114                          | 53   | 52    | 24 | 48      | 22 |  |  |  |  |
| 50,001 - 100,000  | 73        | 13 | 121  | 21     | 373  | 66  | 91                           | 70   | 19    | 15 | 20      | 15 |  |  |  |  |
| 100,001 - 200,000 | 39        | 13 | 44   | 15     | 209  | 72  | 45                           | 71   | 13    | 21 | 5       | 8  |  |  |  |  |
| 200,001 - 300,000 | 23        | 20 | 27   | 24     | 64   | 56  | 11                           | 55   | 7     | 35 | 2       | 10 |  |  |  |  |
| 300,001 - 500,000 | 13        | 24 | 11   | 20     | 31   | 56  | 9                            | 56   | 6     | 38 | 1       | 6  |  |  |  |  |
| > 500,000         | 12        | 20 | 13   | 21     | 36   | 59  | 6                            | 50   | 3     | 25 | 3       | 25 |  |  |  |  |
| Total             | 805       | 13 | 827  | 14     | 4456 | 73  | 705                          | 47   | 344   | 23 | 448     | 30 |  |  |  |  |

Table 3. Cities: urban growth, shrinkage, and stability in Europe, 1990-2010

*Note*: 'shrinking' refers to urban population change rate below -0.15% p.a; 'stable' refers to urban population change rate between +0.15% and -0.15% p.a; 'growing' refers to urban population change rate above +0.15% p.a.

Specifically for the urban scale, this paper presents the breakdown of population change data by city size, growth trajectories (shrinking, stable, or growing), old, new, and associated MS, in absolute numbers and percentage terms. Table 3 shows that of 7585 cities across Europe, 65% registered strong population growth over the period 1990-2010, further 15% maintained their population levels, and only 20% experienced shrinkage. Whilst only 30% of cities in central- and south-eastern Europe (the EU-13 plus Associated MS) have registered population growth, 73% of cities in western and northern Europe have appeared in that category. As east European workers move westwards, their home cities have had to adjust to a smaller labor pool, whilst attracting capital from the West. The data presented in Figure 4 and Table 3 further corroborate the earlier evidence (see Table 1) about the gradual process of *economic convergence*, proceeding through the outflow of Europe's surplus labor resources from the poor to the rich localities, regions, and countries, whilst surplus capital travels in the opposite direction.

### Peak and pine: re-scaling theory and Europe's territorial cohesion

Despite its huge acclaim and a recent resurgence in interest amongst critical social theorists (see Soja 2010), the theory of state re-scaling under contemporary capitalist conditions, created by Marxist geographical political economists in the late 1970s – early 1980s, and further augmented by neo-Marxist scholars two decades later, has not fulfilled its promise. As argued by Beauregard (2012, 479), Marxist political economy – as the mother of *critical* 

*theory* as such – has been all about exposing the mere "appearances" and "hidden mechanisms" of injustice and mystification, highlighting the gap between "society as it is from society as it could be." Yet even most sympathetic readers of Harvey, Smith, Jessop, and Brenner ought to concede that the empirical observations of Europe's post-1980 and post-1990 spatial economic development trends can hardly be explained, if at all, by the general rules of re-scaling theory (see Overman 2014). And despite the often acknowledged – and cherished – epistemological, ontological, and methodological differences between positivist and post-positivist science (cf. Blaug 1992 and Sayer 2000), to many concerned observers radical political economy has become nothing more than an indiscriminate critique of private enterprise under an "ominous, anti-liberal, anti-capitalist drumbeat" (Storper 2016, 258).

The central proposition of the scalar-turn literature since the early 1970s has been that the re-scaling of contemporary capitalism is becoming the key *accumulation strategy* of the ruling class. It was often claimed that the creation and re-organization of scalar hierarchies in Europe by the agents of transnational capital and US-dominated global neoliberalism had to result in ever rising urban and regional imbalances and a decline in territorial cohesion. However, the evidence pieced together in this study for the period 1980-2015 has shown that - unlike the North American experience – the creation of new state spaces in Europe have coincided with a decline in socio-spatial disparities, with the poorest regions catching up fast in terms of economic development. Furthermore, the territorial structures of political power in Europe and beyond appear to be highly *un*determined and potentially dysfunctional as far as the perceived needs of (global) capital are concerned. The concreteness of European territorial cohesion trajectories post-1980 presents an unsolvable anomaly for re-scaling theory for, as recently argued by Peck (2016, 316), "Beyond the simple tropes of seesawing or slash-and-burn dynamics, which in their own away appeal to pendular metaphors that are

actually rather inapt for what are always historically cumulative, non-repeating patterns, dealing with (combined and) uneven development calls for the kind of epistemological gymnastics that many prefer not to attempt." With the validity of re-scaling theory being fundamentally challenged, and its potential for collective progressive action severely compromised, is this not the right time to bring down the curtain on the scalar turn?

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