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Uneven Spatial Development: a review of theories and methods

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1 Introduction

Studies analysing uneven development from a geographical perspective gained traction in the 1980s, following the economic crisis of the 1970s after decades of economic growth in countries of the 'Global North'. Young geographers of the UK played a central role in this respect, with Neil Smith's "Uneven Development: Nature, Capital and the Production of Space" published in 1984 becoming a pillar and influencing scholars also outside the discipline of geography. It is reasonable to conclude that the policies of Thatcher fuelled an interest in, understanding of, and critique of uneven development, whether termed 'regional', 'geographic', 'spatial', or 'territorial.' In the words of Ray Hudson and Jamie Peck:

> "For once the miners had been defeated and the National Union of Mineworkers marginalised, then the attack on the post-war settlement, on the achievements of what, following Timothy Mitchell (2011), we might denote as a form of "carbon democracy", could be pursued with greater vigour as the boundaries of the state were selectively rolled back. One effect of this, coupled with the priority given to financial services and the City of London, was to inscribe regionally uneven development even more deeply into the landscape of capitalism in the United Kingdom as Thatcherism sought to sharpen and re-define socio-spatial divisions within the Divided Realm" (Hudson in Hudson and Pickles 2019, p. 34 35).

> "If I think back to when I started my graduate studies, which was in Manchester in the mid-1980s, the sense was that uneven development was right there, all about, and everywhere; it was not just an atmosphere, or some dusty concept, but a fact of life. You did not have to spend time in the library to understand that uneven spatial development was something to be taken into account. This, after all, was Margaret Thatcher's second term, London-centric project that it was, which was already starting to feel like an -ism." (Peck in Peck et al. 2022, p. 1394).

Notwithstanding scholarly studies charting and criticising uneven spatial[1] development, the roll-out of Neoliberalism, as those structural changes were conceptualised, transformed economies and societies of the Global North and beyond. Most likely it also had an impact on 'uneven development'-studies, as indicated by Jamie Peck:

> "It was not that researchers in regional studies and economic geography ceased to 'believe' in uneven development, but it would assume a more taken-for-granted status as the focus shifted to the dynamics of growth (and growth regions), to the economics of agglomeration, clustering, and institutional performance, and to the networked capacities of global corporations" (Peck et al. 2022, p. 1398).

[1] In the literature, geographical, regional, spatial, and territorial are used, In this study we simplify by just using 'spatial'.

However, in the wake of the global financial crisis of 2008, and Piketty's groundbreaking "Capital in the Twenty-First Century," documenting rising inequalities in Global North countries, an interest in uneven spatial development resurfaced. Recently, Chanchel and Piketty (2021) have shown that while between-countries and within-countries inequalities increased in the period 1820 to 1910, within-countries inequality dropped from 1910 to 1980, but increased in the period 1980 to 2020. For the two periods after 1910, the between-countries inequality showed an opposite pattern. The two authors conclude that 20th Century colonial capitalism and 21st Century neo-colonial capitalism involve similar levels of inequality. These studies are not about 'uneven (spatial) development', though, but nevertheless, the documentation of rising economic inequality substantiates a renewed focus on uneven (spatial) development. Furthermore, the message of Peck et al. (2022) is that in recent years studies of uneven spatial development have broadened to include new perspectives compared with the last couple of decades of the 20th Century.

The aims of this working paper are to (i) *document this emerging diversity, but also tracing different approaches over time*, as well as (ii) *documenting the methodology and methods applied for making the studies of uneven development operational*.

When addressing theoretical approaches, the paper is aiming at painting the broad picture. In this way, readers adhering to different perspectives may find references for more in-depth studies. The theoretical section is taking a thematic and geographical focus, ultimately seeking to enhance the understanding of processes of uneven spatial development, thereby also improving competencies in conducting research.

Secondly, the methodology/methods section presents studies applying quantitative and qualitative methodology, and furthermore, charting the use of different methods for analysing uneven development. The reason for this focus is that making theories of uneven development operational for analyses at different spatial scales is a central task within this field of study.

Overall, the literature review consists of four steps: (i) formulating search terms and strings; (ii) conduct searches in some relevant databases; (iii) remove not-relevant publications; and (iv) systematize relevant publications. Chapter 2 presents points (i) to (iii), while the fourth point on theory is presented in chapters 3 to 8, and the empirical basis in chapters 9 to 13.

The chapters on theory (Part 1) start with outlining main theoretical approaches, and thereafter addressing central approaches: trade theory, unequal exchange, geographical economics versus economic geography, critical and Marxist approaches, and the recently emerging uneven and combined (spatial) development approach. The chapters on methodology/methods (Part 2) start with presenting the overall structure of empirical/case studies, continuing with chapters on advanced quantitative statistics, descriptive statistics, qualitative studies, and document studies. Chapter 14 presents concluding comments on the two main parts.

Importantly, this review is about the concept of "uneven (spatial) development"; that is, publications actively applying or referring the spatial dimension. Many studies and publications, for instance within economic geography (or geographical economics), are dealing with spatial development without explicitly applying the term 'uneven' as part of 'development'.

2 Method

2.1 The search for relevant publications

Possible search terms were formulated in the first step, together with search limitations. On this basis search strings were constructed, as presented in Table 2.1. Preliminary tests were conducted, using the selected databases. Since publication hits were not very high, search strings were simplified; that is, the strings were restricted to main terms together with limitations on publications and language.

How search strings are constructed differ between the four databases. Furthermore, for the three first databases listed in Table 2.1, exporting publication hits to EndNote was possible, while the hits for the last one (JSTOR) was stored and handled as files in 'workspace' on JSTOR's homepage.

After removing duplications and not-relevant publications, about 450 remained. When downloading publications for review, some other relevant ones appeared, and those were included in the study, adding around 30 publications. For sure, there are other relevant publications, but the about 480 publications should be sufficient to meet the aims of the review.

Table 2.1: Terms for search in databases

Main terms	(Uneven [spatial or territorial or geographical or regional or local or community or urban or rural] development) *OR* (Uneven [spatial or territorial or geographical or regional or local or community or urban or rural] and combined development)
	AND
Sub-terms	Industrial or economic or socio-economic or welfare or socialism or capitalism or neoliberalism or Marxism or poverty or centre–periphery or sustainable
	AND
Search limitations	*Type of publications*: International journals with peer review / International book publishers *Language*: English *Geography*: The whole world or the Global North *Time period*: No limit or after 2000 or after 2010 (contingent on number of articles/books)
Databases	• Academic Search Ultimate via Ebscohost • Scopus • Web of Science • JSTOR

2.2 Review of relevant publications

Some publications are mainly theoretical while others are mainly case studies, mostly one or two/three countries. About 70 per cent of the studies belongs to the case study category, and many of these just refer to the concept of uneven spatial development as a background or that the study confirms the hypotheses of uneven spatial development. Of course, there is no clear-cut division between theoretical and empirical papers, but the papers reviewed in the theoretical chapters are mainly

addressing or engaging with uneven (spatial) development from a theoretical perspective.

When it comes to methodology/methods chapters (Part 2), studies on countries in Europe make up the largest share. This may be due to concept and theory of uneven spatial development originating in Europe but may also be facilitated by a stronger political focus on regional inequalities; for instance, exemplified by the cohesion policy of the European Union. Perhaps more surprising is that China is in second place. One reason for China's position may be a political focus on uneven spatial development: for instance, at the 15th National Party Congress in the mid-1990s, Premier Li underscored that "uneven regional development reflected in severe poverty among some urban and rural residents" (Ash 1998, p. 446) was one of the important problems confronting China.

Part 1 Theoretical approaches to uneven (spatial) development

3 Main theoretical approaches

Christophers (2009) systematised central strands of thought and approaches under the umbrella of uneven (spatial) development: one main category comprises studies adhering to or falling under *Classical political economy and Neoclassical economy*, tracing its roots to Adam Smith and David Ricardo, and with trade flows exacerbating existing inequalities emanating from differing internal territorial characteristics. For Smith those characteristics were linked to physical geography, policy, and demography, while Ricardo singled out production and export of subsistence goods. More recently, in the 1970s and 1980s mathematical and statistical advances made it possible to conduct better analyses of uneven development, but still, the basis for those studies was trade flows exacerbating existing differences. However, since the 1980s studies opened for imperfect competition and increasing returns to scale, with the economist Paul Krugman playing a central role and explicitly applying the concept of uneven spatial development. Also, human geographers made contributions to this research, bringing amongst other historical-geographical paths, agglomerations and competitive advantages, clusters, and cities and regions to the table, but not systematically applying the concept of uneven spatial development. Michael Storper, though, occasionally did so (1992, 2011). Within, this approach, the work of Krugman stands out for further review, thereby also allowing to contrast Krugman's 'geographical economics' to human geography's 'economic geography'.

The other main strand of thought in Christophers (2009) study is made up of studies adhering to *Marxist and Critical political economy perspectives*. *One sub-category* under this umbrella is considering *uneven spatial development as an outcome* of economic, political, and social processes and structures, comprising three theoretical approaches. The first is Andre Gunder Frank's[2] dependency theory claiming that rich countries need poor countries as bases for capital accumulation, and concomitantly causing underdevelopment of the group of poor countries; that is, a sort of uneven development. The next is a theory of unequal exchange (Emmanuel 1972), with trade exacerbating uneven development through transfer of value from low-wage to high-wage countries. Third, building on both dependency and unequal exchange is the World-system theory of Immanuel Wallerstein[3]. The world-system comprises core and periphery countries, and in-between semi-periphery countries represent a sort of stabilizing entity. From a geographical perspective, position in the world-system produces differences regarding economic progress, alluding to uneven spatial development. Of the two last strands of thought, the work by Emmanuel on unequal exchange and uneven development linked with trade stands out, thereby also allowing a comparison with Krugman who also builds on trade but from a different strand of thought.

[2] Frank A.G. 1966. *The Development of Underdevelopment*. New York: Monthly Review Press.
[3] Wallerstein I. 1974. *The Modern World-System*. New York: Academic Press.

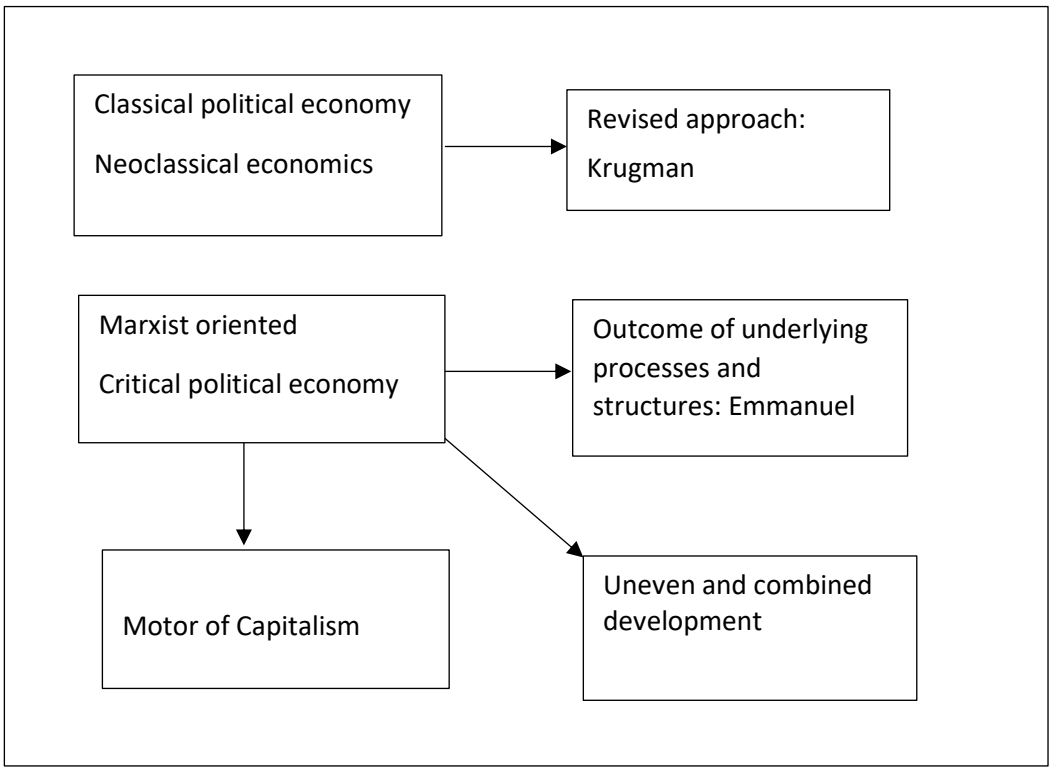
The second *sub-category* considers *uneven spatial development as a motor of capitalism*. This strand of thought traces its roots back to Karl Marx, and even more so to Vladimir Lenin and Rosa Luxemburg; the two latter more directly addressing the spatial dimension. Researchers within this tradition have played a central role in studies of and conceptualising uneven spatial development: Neil Smith and David Harvey have over the years been central contributors, but also Ray Hudson and Costis Hadjimichalis have made considerable contributions. A central idea is that uneven development is embedded in the (re)production of spatial scale; framing and framed by the production and circulation of surplus value (capital accumulation under capitalism).

During the last 15 years the concept of uneven and *combined* development has surfaced, with many publications dealing with theoretical issues. This strand of thought is not addressed by Christophers (2009) but will be added as a *third sub-category* of the second main strand of thought. It should be noted, though, that some of the early contributions did not distinguish that clearly between 'uneven' and 'uneven and combined', as for instance Neil Smith in his book firstly published in 1984. The 'uneven and combined' approach traces its roots to Trotsky and his analyses of the Russian revolution. Many of the contributions on 'uneven and combined' come from scholars outside of human geography, especially the field of international relations and the discipline of political science. Several contributions engage in a discussion of the writing of Trotsky. A central issue for debate has been whether the theory of uneven and combined (spatial) development is transhistorical or embedded in specific historical-geographical (or historical materialist) paths. In recent years, and within the field of human geography, Michael Dunford together with Chinese colleagues (2017, 2021) have been active, paying particular attention to the spatial dimension. In addition, Neil Smith (2006) explicitly addressed the concept of 'uneven and combined spatial development' in a book focussing Trotsky's concept of 'permanent revolution'.

Harvey (2019/2005, p. 55-57) presented a different classification of main approached, consisting of four ways of thinking about uneven spatial development: (i) historical/diffusionist perspective considering advanced capitalist countries as forerunners, and uneven development as "the product of a differentiated diffusion process from the center that leaves behind residuals from preceding eras or meets with pockets of resistance towards the progress and modernization that capitalism promotes"; (ii) constructivist perspective wherein "powerful nations engaging in imperialist, colonial or neo-colonial exploitation of territories (----) lie at the root of the uneven geographical development"; (iii) environmental perspective under which "human adaptations to variegated environmental possibilities underlie territorial specialization, division of labour and the creation of distinctive regional way of lives albeit within a framework of continuous capital accumulation"; and (iv) geopolitical perspective considering "uneven geographical development as an unpredictable outcome of political and social struggles between territorially organized powers operating at a variety of scales."

The classification of Christophers (amended with the uneven and combined' approach) is used in this review, and Figure 3.1 presents the category structure.

Figure 3.1: Categories and sub-categories of uneven development



4 The geographical economy of Krugman

Already in 1981 did Krugman publish a paper on “Trade, accumulation and uneven development.” Following the tradition of conventional economics, he formulated a simplified two-sector model based on several assumptions (Krugman 1981, p. 150):

> “(---) two regions, North and South (---) identical in the sense that technology and behavioral relationships are the same (----) the regions also have equal labour forces and that these labor forces do not grow over time.
>
> Each region will be able to produce two goods, a manufactured good M and an agricultural product A, and to trade at zero transportation costs. There will thus be a single world price of manufactured goods in terms of agricultural products, P_m. Agricultural products will be produced by labor alone; we will choose units so that one unit of labor produces one unit of agricultural goods.
>
> The growth sector, however, is manufacturing. Manufacturing will require both capital and labor. It will be assumed that, *from the point of view of an individual firm*, the unit capital and labor requirements are fixed[4]. In the aggregate, however, unit capital and labor requirements will not be constant; instead, in each region they will be decreasing functions of the region’s aggregate capital stock.”

Going on to discuss external economics, Krugman concluded that (op cit. p. 151):

> “More generally, the essential argument in any theory of an unequalizing spiral must be that a region with already developed industry has an advantage in industrial production over a region without, and it is hard to see how to model this except in terms of external economics.”

Regarding the demand side, Krugman (op cit. p. 152) made two assumptions for making the algebra easier: “First, saving behavior is classical: all profits and only profit is saved. Second, a fixed proportion μ of wages will be spent on manufactures, 1-μ on agricultural goods.” Furthermore, due to external economies of manufacture production (op cit. p. 153):

> “whichever country has the larger capital stock will have a higher profit rate and will therefore grow faster. The result is an ever-increasing divergence between the regions, which ends only when a boundary of some kind has been reached.”

Krugman then went on to discuss international investments in light the of the work of Hobson (Imperialism: A study, 1902) and Lenin (Imperialism, the highest stage of capitalism, 1939), illustrating how the two-stage model of capitalist system (traditional with export of goods, and modern with monopolises and export of capital)

[4] “The fixed-coefficient assumption is made for analytical simplicity, not because it plays any central role. There is nothing in this paper fundamentally opposed to capital-labor substitution, or to the theory of marginal productivity.”

connects to his two-sector model of agriculture and manufacture, potentially alluding to a North-South imperialism. Lastly, Krugman discussed extending the model to three sectors; centre, semi-periphery, and periphery, concluding that refining assumptions is possible, but still, the extremely simple model was capable of illustrating basic processes of uneven (spatial) development. In Sheppard's (2012) reading, though, such approaches have not had any significant impact on mainstream economic theory.

Reviewing the development of international trade and increasing returns, Krugman (2009) emphasised that the simplicity of the new model was necessary because it aimed at presenting the effect of what previously was left out in trade theories: the possibility for intra-industry specialisation due to economies of scale. Eventually, the new trade theory conquered the old one, but still geography was not addressed properly. In the simplified model of a single producer serving two markets and deciding on the location of factories, fixed costs (F) on units produced (S) in the two markets make transport costs the central factor, leaving out market structure and demand elasticity. It took another decade to come up with an improved model that in a better way incorporated geography (Krugman 1991). Although also pointing out the role played by 'forward linkages' for the existence of agglomerations through lower costs of living for workers living close to factory concentrations, according to Krugman (2009, p. 568), the crucial insights are:

> "(i) A self-sustaining concentration of production in space can occur if economies (F/S) are large, transport costs low, and enough production is mobile. (ii) Which location gets the concentration of production is arbitrary and can be presumed to be a function of initial conditions or historical accident."

In the words of Krugman (op cit. p. 568), "This "core-periphery" model, essentially a model of agglomeration, was the starting point for the new economic geography." What he terms *the new economic geography* (NEG) subsequently fostered more advanced work, rediscovering Alfred Marshall's "Principles of Economics" from 1890 on localisation, identifying knowledge spillovers, labour market pooling, and specialised suppliers.

5 The unequal exchange and trade approach

Applying a Marxist perspective, Arghiri Emmanuel (1972, 1975) analysed international trade through a theory of unequal exchange, arguing that "the price is no longer the datum and the wage unknown; it is wage that is the datum and price the unknown (----) *One is not poor because one sells cheaply, one sells cheaply because one is poor*" (Emmanuel 1975, p. 32). Furthermore, bringing geography to the table, Emmanuel (op cit. p. 33) wrote:

> "Low wages give rise to a transfer of value from backward countries to the advanced countries and this loss reduces, in its turn, the material potential of a future improvement in their wages. It provides, on the contrary, recipient countries with the necessary potentiality for employers' concessions which further widen the gap between national wages. This widening of the gap worsens the inequality of exchange, and eventually, the resulting value transfers. The poorer one is, the more exploited one is, and the more exploited one is the more impoverished one becomes: as in the relations between proletarians and capitalists within a nation, likewise between countries; poverty conditions exploitation and exploitation reproduces through its effects its own condition."

Emmanuel (op cit. p. 34) then formulated the following theorem of unequal exchange which he went on to prove mathematically:

> "If the wage is exogenous (institutional, independent variable), and if a tendency exists for the formation of a general International rate of profit, then any autonomous variation in the wage-rate in one branch or in one country will entail a variation in the same direction of the respective price of production and a variation in the opposite direction of the general rate of profit."

Two of the premises of the theorem are critical for his argument: (i) autonomous and exogenous variations of wages and (ii) equalisations of profits and a general, and worldwide rate of profit. For the first premise, Emmanuel argued (op cit. p 41-42):

> "The wage as the price of the labour force, is not a price in the same way as other prices. Representing the portion of the national income accruing to the working class, it is not only the price of a commodity, but, at the same time, the necessary and sufficient constituent element of distribution, the income of non-workers being a residue. It constitutes one of the main elements of political strife within the capitalist system. As such, it is fixed in an extra-economic, hence exogenous, way."

Turning to unequal exchange and uneven development, Emmanuel (1975) underlined that unequal exchange between countries cause gains or losses due to disparity of wages, thereby being connected to increase or decrease of workers' unproductive consumption; thus, not connected to any process of development. Under capitalism, development; that is, accumulation and investment, comes from profit not from wages and increasing wages lowers

the profit. Workers in one country may increase their wages through trade, but according to Emmanuel this is not development:

> "the acceleration or the slowing down of development is not the effect of the inequality of the exchange. Both inequalities, that of development and that of exchange, are, jointly, the two effects of a common primary cause: the wages gap." (op cit. 61)

The processes linking development to wages are (i) extensive processes, with market size being proportionate to wage levels, making it difficult for low-wage countries regarding capital transfers, and (ii) intensive processes, with investments directed at labour intensive and unskilled workers in low-wage countries, thereby keeping wages low. Both the extensive and intensive processes are cumulative, with low-wage countries in a disadvantaged position.

Sheppard (2012) is critical of Emmanuel's take on unequal exchange and international trade. For instance, although wages are central for his empirical argument, the theory of unequal exchange does not depend on wages but rates of exploitation, and a country does not necessarily lose labour value through trade although it experiences higher exploitation and lower organic composition, as assumed by Marx. The value theory of Marx does not cater for geographically variegated labour values, and labour values are not independent of prices of production when rates of profit equalise; that is, Marx' non-spatial theory of value does not handle capitalist space economy. Sheppard (2012, p. 57–61) presented four propositions for a geographical theory of global trade; three of which relates to the spatial dimension and the last (fourth) to the 'more-than economic':

"Proposition 1: incorporating transportation as an endogenous sector of commodity production can undermine central claims of existing mainstream and Marxisant trade theories." (p. 57–58).

"Proposition 2: By attending to the sociospatial positionality of territorial units geographical political economy can contribute to theorizations of periodic restructurings of trade relations and uneven geographical development." (p. 59).

"Proposition 3: Entanglements of economy and space require an out-of-equilibrium theorization of trade and uneven development, incorporating evolutionary and historical perspectives." (p. 59).

"Proposition 4: Entanglements with the noneconomic profoundly complicate theorizations of trade, in important, ill-understood ways." (p. 61).

According to Sheppard, the four propositions are starting points for countering the free-trade doctrine, moving beyond simple protectionism, but also recognising that the answer is not any ban on trade. Instead, it is about developing trading movements as alternatives to free market capitalism.

6 Geographical economics versus economic geography

Krugman (2009) uses “New Economic Geography” (NEG) for his own approach, but several scholars within the field of Human Geography label his approach as Geographical Economics (GE) to distinguish it from Economic Geography (EG) within the field of Human Geography. When comparing GE to EG, Martin and Sunley (1996 p. 269) emphasised that:

> “it is impossible here to talk about economic geography as a whole; we have therefore selected two relevant areas of work, namely the recent literature in industrial geography on regional agglomeration and recent writing on theorizing the geography of trade.”

Nevertheless, Martin and Sunley (1996) identified some basic differences between the two disciplines. One pertains to methodology, with GE dominated by formal models supported by mathematical proofs, while the various types of political economy dominating EG consider GE as riddled by insufficient understanding of geographical and historical context. Furthermore, the GE of Krugman, in spite of some ambiguities, argues for a continuity regarding the forces driving capital’s agglomeration, while the EG generally is focussing on historical patterns of restructuring, making how change is theorized and explained decisive.

Within the ‘new industrial geography’ of the 1990s flexible specialization and the rise of new industrial districts were central components. Martin and Sunley (1996) looked at the three issues of (i) treatment of industrial market structure; (ii) externalities; and (iii) nonmarket transactions and relations when contrasting EG and GE. The overall differences together with the two approaches’ treatment of externalities are presented in Table 6.1 below, taken form Martin and Sunley (op cit. p. 270 and 272).

Table 6.1: Comparison of GE/Krugman and EG/New industrial geography

	Overall comparison	
Dimensions	Krugman and GE	New industrial geography/EG
Externalities	Marshallian, especially labour pooling, and specialist suppliers. "Pecuniary" market-size effects.	Marshallian trio: labour market; specialist suppliers; and technological and knowledge spillovers.
Agglomerations	Local clusters, and interregional centre-periphery pattern.	Industrial districts, craft-based High-tech, and financial centres.
Competition	Imperfect: monopolistic and oligopolistic; economies of scale.	Competitive flexible specialization; economies of scope.
Transfer costs	Transport, including trade barriers.	Transactions costs.
Technological spillovers	Not typical, but important in some industries; local and international.	Local and fundamental to innovatory success in high-tech clusters.
Labour market pooling	Strategy of insurance against risk (both employers and employees).	Form of local social embeddedness.
Social and cultural characteristics of clusters	Difficult to formalise and assumed a priori; best left to sociologists.	Key preconditions for successful localization.
	Treatment of externalities	
Type of externality	*Application to agglomeration*	
Marshallian external economics	Local clusters of industry associated with market-size effects (labor pooling and specialist suppliers) and with internal economies.	Districts associated with vertical distintegration and transaction costs; and technological spillovers important.
Knowledge and tech spillovers under imperfect competition	Important in some industries, but not typical and difficult to model- "too fashionable	(Not typical; where present large producers tend to adopt decentralized and flexible organizational form
Pecuniary externalities (demand and supply spillovers)	Regional specialization and concentration on a grand scale (center-periphery) through interaction of market size, demand, and transport costs	(Typically regarded as Marshallian; much more emphasis on nonmarket conditions)

In a later paper, Martin (1999) was fully dismissive of the GE approach in relation to the use of uneven regional development, and he takes stock with Krugman's use of Kaldor (op cit. p. 77):

> "In his quest for economic 'rigour', Krugman's mathematical formalisation of the processes of industrial agglomeration and uneven regional development has taken the 'new economic geography' well away from the richness of Kaldor's original approach, back into the cul-de-sac of regional science. Kaldor, one suspects, would have been extremely sceptical of the unrealistic, deductive model-building that is the hallmark of the 'new economic geography'."

Furthermore, in concluding Martin (op cit. p. 84) stated that GE and Krugman should be applauded in arguing that space matters, but goes on to state that:

> "their version (and vision) is a case of mistaken identity. (….) For what they have been working at is not economic geography, but a revamped regional science and regional economics. And as with regional science, the 'new economic geography' contains too little region and too much mathematics. (----) Abstract models attached to the real economic landscape by the thinnest of conceptual and empirical threads do not, in my view, offer particularly convincing or reassuring material from which to weave policy prescriptions."

Sheppard (2011, p. 327), on the other hand, when considering bases for dialogue between GE and geographical political economy, wrote that "Since mathematics can be used as effectively for theorizing geographical political economy as for theorizing geographical economics, this should provide a basis for such mutual recognition—although this has remained difficult to date." Notwithstanding, Sheppard is clear on differences between GE and geographical political economy, with the latter conceptualising capitalism as an instable economic system; capitalism as just on way of organising societies; geography as produced alongside economic activities, also forming development trajectories; and economic processes as embedded and co-evolving with biophysical, cultural and social processes.

Addressing the spatial dimension, Sheppard (op cit. p. 323) laid out the differences between Krugman's GE and geographical political economy in this way:

> "In the spirit of August Lösch, Krugman (1993)[5] insisted that geographical economic theory focus on isotropic spaces, in order to account for the production of 'second nature': the morphogenesis of heterogeneous spatial economic landscapes form a uniform spatial backcloth. Geographical political economists share his concern for produced geographies, but insist that integrating already existing geographical unevenness into the analysis, again, can make a significant difference. It has been shown, for example, that markets do not function in the ways presumed by mainstream microeconomic theory in the presence of spatial heterogeneity."

Hadjimichalis and Hudson (2014) also engaged with the discussion on GE, or what they term New Economic Geography (NEG), but in addition, they are critical of the New Regionalism (NR[6]) of Human Geography. From their point of view both GE and NR appear as treating local and regional problems from a perspective that:

> All cities and regions can become 'winners', finding a successful niche in the globalizing economy – provided that they adopt appropriate institutional arrangements, appropriate social attitudes and successfully utilize their resource endowments, whatever they may be. While not eliminating problems of uneven development in

[5] Krugman P. 1993. First nature, second nature, and metropolitan location. Journal of Regional Science, 33: 129–144.
[6] Among the proponents of NR, Hadjimichalis and Hudson list Michael Storper, Allen Scott, Ash Amin, and Bjørn Asheim.

> the same way as the neo-classically informed theories (---) the problems of uneven development can apparently, so it is claimed, be eliminated via institutional innovation and modernized social attitudes to development. (Hadjimichalis and Hudson 2014, p. 212)

Due to the focus on cities and regions, in a European perspective, the regulatory role of nation-states and EU institutions are ignored, thereby for instance failing to consider the Eurozone as a spatial arena for capital accumulation based on uneven development. Furthermore, according to Hadjimichalis and Hudson (2014, p. 214):

> "Perhaps the biggest failure of the neo-classical, NEG and NR approaches is their failure to develop a systemic view of capitalism and as a result their neglect of periodic capitalist crises (---) as a necessary and recurrent feature of capitalist development (---) The issue is the forms and places in which it [crisis] emerges, the distribution of its effects across social classes, groups and places, and the capacity of states selectively to mitigate its effects, privileging some places/social groups over others. (---) The failure of NR and NEG approaches to appreciate the centrality of capitalist crisis seriously weaken their explanatory power and so practical utility."

In discussing measures for coping with regional imbalances in the UK, especially the South–North divide, Martin (2015, p. 262) voices similar criticism at the approaches of new spatial economics and regional studies, stating "what we need is an 'evolutionary-historical geographical political economy' within which our various partial theories and explanatory schemas could be given coherence and focus." Part of this would be a focus on dynamics and the path-dependent nature of uneven spatial development, but also considering uneven adaptability of city and regional economies.

7 Uneven spatial development as inherent to capitalism

Under this umbrella there are several scholars that over a long period of time have been addressing uneven spatial development. Doing justice to their whole authorship on the topic is beyond the scope of this working paper. The aim, here, is to present essential reasoning and arguments.

Neil Smith (1984/2010 p. 206) summarised his understanding of uneven spatial development under the heading of 'The Restructuring of Capital?' in this way:

> "Uneven development is both the product and the geographical premise of capitalist development. As product, the pattern is highly visible in landscapes of capitalism as the difference between development and underdeveloped spaces at different scales: the developed and the underdeveloped world, developed regions and declining regions, suburbs and the inner city. As the premise of further capitalist expansion, uneven development can be comprehended only by means of a theoretical analysis of capitalist production of nature and space. Uneven development is social inequality blazoned into geographical landscape, and it is simultaneously the exploitation of that geographical unevenness for certain socially determined ends."

On the issue of 'articulation of modes of production', Smith argued that although such articulations are prior to uneven development under capitalism, the logic of uneven development is prior to any articulation of modes of production; that is, specific modes do little in identifying any general theory of uneven development.

Smith (2006, p.188) stated that "a contemporary theory of uneven development finds its starting point in Marx"; that is, the basic contradiction of a "constant tendency for differentiation rooted in the division of labour and opposite tendency toward universalisation that finds its apotheosis in the tendency toward an equalisation of the profit rate." Smith then went on to explicitly spatialise the temporality of the differentiation–equalisation contradiction:

> "In search of profit and driven to compete, capital concentrates and centralises not just in the pockets of some over the pockets of others but in the places of some over the places of others. Integral to the spatial differentiation of rents, wages, production costs and so forth are differentiated systems of financial circulation and of social reproduction, and all are built in various ways into the geography of capitalism. Of course, capitalism did not sprout on an undifferentiated plain (----). The differentiation of places, one from the other, is less and less a question of locational and natural endowment and increasingly the product of a spatial logic as inherent to this mode of production as Marx's temporal theory of capitalist crisis."

After discussing equilibrium and spatial scales, Smith (1984/2010, p. 197–198) outlined the spatiality of uneven development:

> “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 separate 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 areas where a low rate of profit pertains. But the process of development itself leads to the diminution of this higher rate of profit. (----)
>
> At the opposite pole, that of underdevelopment, the lack of capital or its persistent overflow leads to high unemployment rates, low wages, and reduced levels of workers’ organization. Thus the underdevelopment of specific areas leads, in time, to precisely those conditions that make an area highly profitable and hence susceptible to rapid development. (----)
>
> To the extent that capital cannot find a spatial fix in 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. Capital seeks not an equilibrium built into the landscape but one that is viable precisely in its ability to jump landscapes in a systematic way. This is the seesaw movement of capital, which lies behind the larger uneven development process.”

In the afterword of the 3rd edition of his 1984-book (2010), Smith emphasised that the aim of ‘Uneven development’ was to meld nature, space, and social processes at multiple scales. He admitted that production of nature at that time did not resonate well with Marxist historical social change, contending that it seems obvious around 2010. However, Smith (2010, p. 246) distanced himself from the constructionist approach:

> “While the “production of nature” thesis certainly stresses the veins of social agency that run through nature, it is not in any way assimilable to, or to be confused with, the constructionist paradigm that has become fashionable since the 1980s. (---) This [constructionism] creates its own kind of nature-washing in which the power of nature is discursively washed out, at least washed to the margins.”

In a special issue of the journal New Political Economy (2011, vol. 16, issue 2), Smith’s 1984-book is critically discussed, with Smith responding and agreeing that the theory of uneven regional development was not fully-fledged but more of a work in progress. One of the critical issues focussed on the body (from a feminist perspective), but Smith (2011. P. 262) stressed that:

> “It is not so much the body per se that is the issue for me (----) but the more or less fungible social relations within which social

> bodies and their meanings (----) are variously made, and conversely how these bodies themselves (not to leave behind the mind) can collectively transform social relations."

Gentrification was addressed by Smith, but he argued that gentrification had turned into a global and systemic rather than local and incidental event, referring the remaking of cities like Beijing, Shanghai, and Mumbai: "Gentrification is a central part of this localisation of uneven development and of global struggles, yet this process has itself transformed (and not just an increase in scale)." (Smith, 2011, p. 263). The response ends by stating that "we need to understand the varied patterns and processes of uneven development across geographical scales" (p. 264), and in this regard it will be necessary better to understand how states have been central in rolling out neoliberal institutional changes, as well as how institutions at global scale.

David Harvey owns a central position within Marxist oriented geography and beyond. His catalogue is large, with many books. However, uneven spatial development was not any prominent topic in any of the chapter of the book "David Harvey – A Critical Reader" published in 2006. Tellingly, Gregory (2006, p 23) stated that Harvey in his 2005-book on Neoliberalism paid "closer attention to uneven development and to variations in neoliberal programmes beyond the United States, but even here his analyses of (for example) China or Mexico remain at an aggregate, macro level," questioning how his approach may account for the fractured spaces of neoliberalism. However, part 1 of the 2000-book on "Spaces of Hope" is about 'Uneven geographical developments', first arguing that "The Manifesto of the Communist Party" from 1848 by Marx and Engels in spite of some ambiguities, tells that capitalism relies on "the possibilities inherent in geographical expansion, spatial reorganization, and uneven geographical development" (Harvey 2000, p. 23). On this basis, Harvey was heading 'towards a theory of uneven geographical development' through two fundamental components: (i) the production of spatial scales, and (ii) the production of geographical difference.

On the production of spatial scales, Harvey (2000, p. 75) wrote "what happens at one scale cannot be understood outside of the nested relationships that exist across a hierarchy of scales." Furthermore, scales are produced in an interaction with what Harvey terms 'natural processes scalars.' Adding to this, technology and political economic conditions, as well as class formations and struggle are impacting and impacted by the scales of human activity. Moreover, scales constellations change over time.

Regarding the second component, Harvey (2000, p. 77) stated that "geographical differences are much more than mere historical-geographical legacies", but "reproduced, sustained, undermined, and reconfigured by political-economic and socio-ecological processes occurring in the present"; that is, they are not static but on the contrary volatile and in motion at all scales. This leaves an impression "of global anarchy rather than of the working out of systemic forces of production of uneven geographical developments."

Bottom line, it is critical to think "about differentiation, interactions, and relations across and within scales" (op cit. p. 79), avoiding being locked into one specific scale and "treating the differences at that scale as the fundamental line of political cleavage;" not everything is determined at the global scale. Understanding uneven spatial development enables a better analysis of contradictions in globalised capitalism, thereby enabling political action.

A more elaborated take on uneven spatial development was presented by Harvey some years later under the title of 'approaching a theory of uneven spatial development'. Basically, Harvey here did embed uneven spatial development in his understanding of Marxist theory and identified four essential elements that together form the structure of a theory (Harvey 2019/2005, p. 56): The first element is "the material embedding of capital accumulation processes in the web of socio-ecological life"; the second is "accumulation by dispossession (----) under which pre-existing assets are assembled (----) and put into circulation"; the third is "the law-like character of capital accumulation in space and time"; and the fourth is "political, social and 'class' struggles at a variety of geographical scales."

Under *the material embedding of social processes in the web of life* "uneven geographical developments reflect the different ways in which different social groups have materially embedded their modes of sociality into the web of life, understood as an evolving socio-ecological system." (p. 58). In this perspective the circulation of capital is as much an ecological variable as circulation of water, and embeddedness of the social and ecological is central in relation to the web of life and thus theorising of uneven spatial development.

Accumulation as dispossession: Harvey (op cit. p. 67) stated that "favourable natural conditions make surplus generation easier but the class appropriation and centralization of surpluses depends entirely upon political developments and the formation of class powers." Natural resources are unevenly distributed; hence, accommodating for a certain type of uneven spatial development alongside and in combination with societal resources. In addition, and not less important, appropriation of assets within the capitalist system is a source of accumulation, for instance between sectors or territories and regional configurations of capital.

Capital accumulation in space and time, with accumulation based on growth, exploitation, technological development, and restrained by class struggle, but nevertheless within a contradictory and unstable systems causing (overaccumulation) crises. Pertaining to uneven spatial development, several elements, or theoretical steps apply:

Market exchange (comprising labour, production, and commodities) is developing within the time and costs of transportation, producing specific historical-geographical conditions of spatio-temporal structures for capital accumulation. Here the annihilation of space through time fosters the production of uneven spatial development. The *coercive laws of spatial competition* (op cit. p. 74–75) are fostering competition, with capitalist producers seeking "higher profits by adopting superior technologies and organizational forms", but temporally this is due to catching-up and leapfrog development, hence producing "perpetual instability within the geographical landscape of capitalism". Competition pushes "capitalists into territorial specialization", and facilitating *geographical division of labour,* and through circular and cumulative causation "capital rich regions tend to grow richer while poor regions grow poorer. The tension between geographical centralization and dispersal is omnipresent within the geographical landscape." (p. 75). *Regionality* is produced through investments in built environments, and "modes of consumption here become geographically differentiated according to concentrations of wealth and power", and hence, "the differentiated world of consumer power and consumption preferences here enters in as a major determinant of uneven geographical development," (op cit. p. 78) also paving the way for regional class alliances. However, regionality is always under production.

Lastly, the *geopolitics of capitalism* is formed through the contradiction between territorial (polities) and capitalistic (economics) logics of power. Overaccumulation difficulties pushes capital to seek for spatial fixes, and this may require opening territories for capital and labour. Spatial fixes are undermined by competition between regional class alliances and adjustment internal political structures, and "regions are forced into some hierarchy of powers and interests such that the richer regions grow richer and the poor languish in indebtedness." Furthermore, geopolitical struggles may enter the global scale, possibly causing large-scale upheavals and violent outcomes.

Neil Brenner (2011) addressed the critical-geographical literature, and building on David Harvey and Neil Smith, he identified four key macro-theoretical aspects of uneven spatial development: (i) originating from underlying tensions within capitalism comprising a drive for overcoming space and the immobility of spatial structures that are necessary for this drive; (ii) the contradictory tendencies between spatial mobility and fixity, and between geographical differentiation and universalisation; (iii) the annihilation of space by capital and capital's embeddedness of socio-spatial configurations causing continuing restructuring; and (iv) exploiting the spatial fix of previous investments or opening for restructuring; thereby fostering periods of stability and crisis-driven transformation.

Next, Brenner (2011, p. 138–139) turned to Lefebvre[7] for disentangling production of modern socio-spatiality, outlining four intertwined processes:

- Place-making, with geographical proximity; social relations embedded in particular locations; and areal differentiation. This has in several ways produced uneven spatial development, like:
  - Residential segregation and functional differentiation of urban space, and new urban infrastructures for production and social reproduction.
  - Increasing urban–rural divide through rapid industrialisation, fuelling urbanisation and peripheralization/underdevelopment of rural spaces.
  - The global periphery becoming sites for primary extraction, processing, and export; producing uneven spatial development at a global scale.
  - Industrial restructuring producing new forms of differentiation across the global system.
  - Local resistance to globalising processes, causing an element of friction into capital's process of creative destruction.
- Territorialisation, with enclosure, bordering and parcelisation of social relations, mediating uneven spatial development in several ways:
  - Consolidation of an interstate system, with territory taken-for-granted, and patterns of uneven spatial development have been conceptualised in territorial terms.
  - The modern interstate system providing a relatively fixed/stable framework for capital circulation.
  - Territorial borders of states and intra-state boundaries foster place-based inequalities and organise conditions for capital circulation.
  - The capacity of state institutions to mobilise political strategies influencing uneven spatial development within and beyond their borders.

[7] Lefebvre H. 1991. *The production of Space*. Cambridge MA: Blackwell.

    - Social movements trying to modify existing forms of uneven spatial development within the frames of overlapping state institutional arenas.
- Scaling with vertical differentiation of social relations (local to global), with different forms of concrete scalar differentiations, manifesting in concrete historical periods:
    - The world market at the global scale; the politico-institutional hierarchies of the territorial state; the institutionalisation of the urban and regional scale; an articulation of uneven spatial development at several additional scales, from the neighbourhood to the supranational.
    - Scaling processes comprising differentiation of scales framing uneven spatial development; scalar division of labour within particular configurations; scalar fixes emanating from durable scalar division of labour; rescaling processes destabilising existing spatial fixes; merging politics of scale following struggles to reorganise different functions.
- Networking, with interconnections across geographical entities and organisational units, possibly influencing patterns of uneven spatial development through:
    - Crosscutting place-based territorial and scalar patterns of uneven spatial development, and internal stratification and external exclusion of existing networks.
    - Capital accumulations; globalisation of the interstate system; and social movements.

Brenner's contribution is elaborating on the four intertwined processes underlying socio-spatial configuration of uneven spatial development, but also his focus on networking should be noted.

Eric Sheppard (2012, p. 327), when discussing economic geography and geographical economics, summarised a perspective on uneven spatial development within the field of geographical political economy in this way:

> "Since uneven geographical development always accompanies capital accumulation, differently positioned territories are motivated to seek alternative development paths, notwithstanding the beliefs of those who have prospered that others should follow what they imagine to have been their recipe for success. Put otherwise, territories' future trajectories cannot be deduced from their place-based attributes, but are shaped just as much by their positionality within broader economic systems; uneven connectivities with other places (greater connectedness need not reduce inequality); and their embeddedness within multi-scalar economic, political, cultural and biophysical processes."

In later articles Sheppard (2015, 2019) has elaborated on the dimensions of connectivities and positionality in relation to globalizing capitalism, including the role of uneven spatial development. Addressing 'thinking geographically' in relation to globalising capitalism, he presented six propositions (2015, p. 1124–1129):

(i) "Capitalism's spatiality disrupts the ideal of market equilibrium." (p. 1124).
(ii) The spatiotemporal production and circulation of commodities is productive of sociospatial inequality (uneven geographical development) and conflict. (p. 1124).

(iii) Geographies of politics and governance coevolve with those of globalizing capitalism. (p. 1125).
(iv) Biophysical and sociocultural processes exceed and shape globalizing capitalism, notwithstanding attempts to enrol them into market logics. (p. 1126).
(v) Uneven geographical development undermines developmentalist discourses and imaginaries. (p. 1127).
(vi) Alternatives are ever-present and necessary. (p. 1129).

The second and fifth of the six propositions directly relate to uneven spatial development. For the second Sheppard (op cit. p. 1125) stated that improving accessibility is central, but still:

> "capitalism's emergent spatiotemporalities increase the likelihood that individual capitalists' profit-enhancing strategies backfire, undermining the possibility of harmonious equilibrium. (---) conflicts associated with the politics of production underlie such unharmonious, uneven spatial dynamics of commodity production. At scales ranging from places of production to regional and national territories, such conflicts of interest destabilize any economic equilibria that happen to be achieved. (----) There is a leitmotif, however: Globalizing capitalism (re)produces sociospatial inequalities".

For the fifth proposition Sheppard (op cit. p. 1127) is critical of the claim "that a territory's developmental possibilities depend on its place-based characteristics—culture, governance, and physical geography (climate, access to navigable water, topography, resource endowments). Causality runs from place-based characteristics to economic outcomes: reducing geographical thinking to methodological territorialism". Likewise, he is critical of 'methodological territorialization' reducing differences between places to the temporality, and development along the track of 'North Atlantic capitalist economies.' Sheppard (op cit. p. 1128) argues that:

> "The connectivities between places are often uneven, reinforcing rather than mitigating geographical inequality (within and between places). Further, even as communications costs fall, unevenly and with reversals, inequalities in relative locational advantage—between central and peripheral places—are not melting away into a flattened world".

Indirectly, also the other propositions relate to processes of uneven spatial development; shaping and being shaped by them. In Sheppard's perspective, connectivities and positionality play important roles. He returned to this in a study of Jakarta (Sheppard 2019, p. 7):

> "Yet, a neglected driving force of such uneven geographical development, at least until recently, is the inequalizing effects of the asymmetric more-than-economic connectivities linking places. Accounting for these entails taking seriously the socio-spatial positionality of places and their inhabitants, and how these are shaped by, and shape, such connectivities. I call this connectivity-based thinking."

Elaborating, Sheppard draws attention to the fact that capitalist connectivities require infrastructure for communication and transportation of commodities and monetary flows. Furthermore, “as they coevolve with Capitalism, these infrastructures shape Capitalist uneven geographical development, favouring some locations relative to others (also in a supposedly post-geographical world of cyberspace),” and in addition, “the Capitalist connectivities made possible by these infrastructures tend to favour some bodies and places (prosperous and powerful centres of calculation) at the expense of others” (op cit. p. 7). Importantly, connectivities are not unidirectional, but may go to and forth between peripheries and cores, although the main tendency may be that connenctivities are favouring certain bodies and places. Notwithstanding, Sheppard contend that the development of ‘raggedy fringes’ may cater for more-than-capitalist conditions and configurations, exemplified by Jakarta and Indonesia. In the article he highlights three examples of such raggedy fringes: “more-than-Capitalist ‘informal’ economic practices in the domain of civil society; more-than-Capitalist state-led practices; and more-than-Capitalist biophysical processes – also offering positional conjunctural analysis as a means to interrogate how they work Geographically” (op cit. p. 8).

Sheppard paid most attention to informality, identifying five types: (i) unregulated activities; (ii) illegal activities; (iii) diverse property rights; (iv) communal activities; and (v) household reproduction. These were exemplified by fields like production, labour, consumption, exchange, accessibility, and waste. When it comes to uneven spatial development, the reasoning is that: “informal activities dialectically co-evolve with ‘formal Capitalist practices, each influencing the other via the raggedy fringes where ambiguity rules: where the formal and informal are almost impossible to distinguish from one another (and the rule of law fails)” (op cit. p. 12), producing particular spatialities:

> “On the one hand, as for Capitalism, there is an uneven geography to informality – one that shapes the dialectical relations between formal and informal economic activities, mutually determining their nature, overlaps and spatio-temporal evolution. It may well be correct to argue in general that ‘capitalist economies constituted solely via wholly legal activities are the exception rather than the rule’ (Hudson, 2018, p. 3), but the condition ‘especially in particular spaces of the global economy’ (p. 3) repays close attention. On the other hand, the dialectical coevolution of Capitalism and informality is itself spatial and temporal, redolent of geographical dialectics, produced space–times, and unexpected outcomes.

When analysing the uneven spatial development emanating from the informal–formal interplay and the raggedy fringes, Sheppard introduced a positional conjunctural approach; that is, examining constellation of different forces and what happens in specific historical periods, adding the socio-spatial positionality of a place and events happening there. This will allow for moving beyond conventional images of capitalist development, the raggedy fringes. In concluding Sheppard (2019. p 21) states:

> “I also have reiterated my argument that the uneven geographical development dynamic endemic to globalizing Capitalism necessitates the search for alternatives to European-style

> Capitalist development. Yet, the core of my argument is that Capitalism's fringes should not be reduced in our minds to its passive outsides, whose putative enrolment into globalizing Capitalism – enabling its reproduction – is inevitable. Rather, they are raggedy fringes, inhabited by more-than-human agency that is capable of disrupting this reproduction. Further, I argue that recognizing such agency requires us to shift our optic, loosening theoretical blinders that we have come to take for granted. Thinking through Jakarta, the raggedy fringes that matter are the hybridity of Indonesia's political economy, informality and biophysical processes."

As such, uneven spatial development of the raggedy fringes may differ from those theorised under capitalist economies of the Global North, but Sheppard emphasises that the "dialectic relations with Capitalism are crucial to understanding how it coevolves with its outsides" (op cit. p. 21).

In a commentary, Dunford (2019, p. 36) concluded that it is difficult to disagree with Sheppard's approach and analysis but found it surprising that Sheppard has not engaged with the concept of uneven and combined development; a concept that would open a road for examining "the ways in which the interconnectedness and interactions of different societies shape and combine with their unevenly developed internal structures to drive the evolution of comparative development and power."

Yeung (2019), in another commentary to Sheppard, considered the 'connectivity-based thinking' and 'the asymmetric more-than-economic connectivities' to be significant theoretical contributions. Still, Yeung presented three critical questions (p. 30): (i) the use of 'more-than' may fail to observe changes in the core; that is, possibly "run the risk of excluding the possibility of thinking 'out of' (---) this object/category to envision true alternatives that can emanate from these raggedy edges."; (ii) the focus on informality leaves the two other dimensions of state-led development and commodification of 'cheap nature somewhat underdeveloped, and thus also the interaction between the three dimensions; (iii) although not doubting the importance of physical and financial infrastructures, Yeung (p. 30) "do think that understanding this crucial connectivity of place-based practices with those at other spatial scales (e.g., national and international) requires us to take account of diverse actors and their power geometries."

Other contributions: *Marion Werner* (2019) examined three approaches to global production networks (GPN) and the geographies of uneven development. The first is a mainstream position considering uneven development as a contingent outcome of global market integration; a 'dark side' effect. Here, the work of Coe and Yeung (2015) stands out, with its claim of being a 'GPN 2.0'; a dynamic theory contributing to explain patterns of uneven territorial development, with value-capture trajectories as a central mechanism. Werner, though, argued that beyond empirically presenting new geographies of uneven development, GPN-studies through its firm-centrism and rejection of hierarchy in global economy fail to engage with macro-scale global inequalities.

The second, Marxist oriented approach considers uneven development as emanating from unequal value distribution and mechanisms of reproducing global inequality. The approach is tracing its roots to World-system theories, with a focus on core and periphery, or core–semi-periphery–periphery. Core-like functions are

concentrated to the core and the opposite for peripheral functions, and those concentrations provide more returns to the core. Studies of global production aim for better understanding patterns of global inequality within the context of global hierarchies. Werner emphasised that macro-scale analyses of uneven development have a character of (complex) totality which should not mean that the 'whole' governs its parts.

The third, neo-Marxist approach, according to Werner (2019, p. 954) conducts "studies of global production that contribute to our understanding of uneven development as a complex totality through the study of regional conjunctures." Applying a conjunctural approach means paying attention to "cultural formations and an attendant openness to political outcomes, not as unbridled contingency but rather as a mix of both conditioned and indeterminate forces." Moreover, combining studies of the emerging Global South restructuring and long-time peripheries of Global North would strengthen studies of the uneven spatial development pf global production networks. In Werner's opinion, conjunctural analyses historicising regional change provides "useful corrective to macro-scale approached". Nevertheless, she also ads that macro-scale approaches should not totally be rejected; it is not any zero sum.

In a recent work, Werner (2022) using the case of the herbicide glyphosate[8], addressed the socionature of global production networks, also visiting the topic of uneven development; that is, taking "inspiration from macro historical approaches to uneven development such as ecological exchange, along with debates on the commodification of nature." (p. 235). In concluding, Werner highlighted that the mechanisms of coordination and combination related to supply chains in producing uneven development, appeared as incomplete when including socionatures, arguing that (op cit. p. 241):

> "An open dialectical understanding of the interactions between nature and these institutional arrangements would eschew totalizing assumptions of peripheralization, on the one hand, and descriptions of network particularity, on the other. The challenge of balancing these many moving parts (labor, the state, nature) in such an analysis, and identifying the most salient elements, can be met by taking a conjunctural approach to a given set of supply chain relationships and building these out through relational comparison (Hart, 2018). Such work is imperative as the cascading ecological and social crises that mark our era demand new approaches to how goods are produced, consumed, and wasted."

Charnock and Starosta (2018) argued that uneven development should focus on labour and the transformation of productive subjectivity of the international working class. The authors wrote (op cit. p. 327) that "the process of the production of relative surplus-value on a world scale leads to historically changing constellations of the international division of labour", and concretely:

> "the global transformation of socio-ecological metabolism on the basis of the fragmentation of the productive subjectivity of the

[8] Glyphosate was commonly known as the product Roundup, produced by Monsanto, and heavily used in farming for protecting the produce against weeds.

> international working class has in recent years resulted in the contemporary form of a “new” international division of labour (NIDL). The inner, worldwide dynamics of this NIDL are mediated by a variety of specific national and regional forms of the capital accumulation process, such that each particular concrete national space of capital accumulation and societal reproduction bears its own empirically distinctive attributes in terms of institutional forms, labour markets, distributions of income and wealth, and, of course, competing ideologies and political cleavages.”

Lastly, *Tickamyer and Patel-Campillo* (2016), with a primary focus on the sub-national scale within the field of sociology, paid attention to the definition of ‘region’ when it comes to uneven development. Reviewing different approaches, they find a variety of how the ‘region’ is understood, defined, and made operational.

8 Uneven and combined (spatial) development

Several publications are addressing uneven and combined development (UCD) without explicitly referencing the spatial dimension, and a large proportion of the articles belongs to the scholarly field of International Relations (IR). The historical roots of UCD goes back almost a century to Trotsky, but the current discussion is a relatively recent theoretical endeavour. Systematising the publications, the following thematic categories emerge: (i) discussing UCD as transhistoric versus historic-geographic context, as well as the correct interpretation of Trotsky (and Lenin, Marx, et cetera); (ii) criticism of UCD; (iii) a focus on the spatial dimension, also comprising publications by human geographers; (iv) a focus on geopolitics/-economics/-cultural aspects; and (v) UCD and Eurocentrism.

8.1 UCD as transhistoric or historic-geographical

Most of this discussion has taken place during the last 15 to 20 years and is dominated by IR-scholars. Justin Rosenberg is the main proponent of the transhistoric perspective, while the historical-geographical perspective has been voiced by other scholars, as Anievas, Allison, Ashman, and Waring. A full understanding of this discussion would require a working paper of its own. Rosenberg (2013a, p. 569-570) have been critical of what he terms the 'internalism' of social sciences; that is, the tendency to explaining "social phenomena by reference to inner characteristics alone of a given society or type of society" which "has prevented theorisation of the space of inner-societal relations" and "thereby deprived the social sciences a proper understanding of the international dimension of their subject matter." Rosenberg's claim is that Trotsky's theory of uneven and combined development provides a road for counteracting this tendency. He outlined Trotsky's three-fold premise of non-identity. From the idea of dialectics, it follows that A=A never is fully valid; that is, "to their equation real world objects with each other (classification); (---) to their equation with themselves (their identity over time); and (---) to their correspondence to the concepts by which these objects are figured in the mind," which Rosenberg terms partiality of time, space, and its object (op cit. p. 575). Then Rosenberg went on to disentangle a fourth dimension of non-identity from Trotsky's writing; the element of numerical multiplicity:

> "(---) even if two instances of something were completely identical, they would still not actually be each other. And, co-existing therefore, they might potentially affect each other. Thus, over and above any qualitative multiplicity of properties (variation), the quantitative multiplicity of being, (the condition of more-than-one) has a potential significance of its own." (op cit. p. 581).

The fourth element of numerical multiplicity is arising from its interaction with other processes, which is the element of 'combination', producing new tendencies within a given developmental logic, but, also, "it is unevenness between societies, and never just regional variation within them that produces the full phenomenon of combined development." (Robinson 2013, p. 582). Furthermore, it is the fourth element of non-identity "that transforms a generic argument about the dialectical nature of reality

into one which is uniquely focussed upon 'the international' as a theorisable dimension of historical change." (op cit. p. 583).

Allison and Anievas (2009) argued that Rosenberg is conflating 'general abstraction' with theory which they consider as not synonymous, making them disagree with UCD as a transhistorical theory of the inter-societal, as well as equating UCD with the multiplicity–anarchy–competition of realism. In their view UCD represents a "truly transhistorical phenomenon, its distinct causal determinations, articulated and expressed through inter-societal competition, are only fully activated under the specific socio-historical conditions of generalized commodity production." (Allison and Anievas 2009, p. 47).

Similarly, Anievas (2014, p. 53) concluded that "While uneven and combined development represents a truly *transhistorical* phenomenon, its distinct causal determinations, articulated and expressed through intersocietal competition, are in every instance historically specific to and variable across any given mode of production." This is only fully working out under the specific sociohistorical that are found under conditions of capitalistic production. Otherwise, it appears as context specific. They add that this does not rule out UCD in precapitalist times, but that it would be qualitatively different; claiming that "Uneven and combined development is, then, *not a theory in itself.* It is, rather, a methodological fix in the larger research program of historical materialism."

Waring (2023) claimed that Rosenberg's concept of international conflates multiple concepts, thereby just focusing on the societal-cum-political multiplicity and, furthermore, building on a narrow concept of territoriality. Therefore, Waring (op cit. p. 153) claims that:

> "a more useful definition of society would retain the necessary feature of territorial definedness (encompassing both fixed and itinerant forms of territoriality) and make political definedness a possible feature of society. This modification enables us to distinguish between the multiplicity of societies—which would include non-sovereign groups within and across states, as well as nomadic groups—and the multiplicity of hierarchical, sovereign polities. In some cases, societal and political boundaries are co-extensive; in others, societal boundaries draw lines distinct from political boundaries."

Waring distinguished between social, societal, and political, and arguing this opens for addressing collective subjectivity in relation to societal and political conditions, for instance members of different societies from across territorial polities form common groups. Such constellations have to be analysed within the frames of dialectics of UCD, according to Waring.

Rosenberg (2022) responded and rejected criticism claiming his approach on UCD is not a real theory; being unhistorical; and that the terms of advanced and backward makes it Eurocentric. On the contrary, Rosenberg (op cit. p. 287) did contend that "UCD, then, is not just a mid-range theory – of national transitions to capitalism, for example. Rather, it is an alternative way of thinking about social reality and how we understand it." Moreover, "its unique focus on the interactive multiplicity of social formations and its eye for how spatiotemporal unevenness

overdetermines the causal and constitutive structure of the social world." In addition, it addresses the problem of internalist character of social and cultural explanations.

8.2 Criticism of UCD

UCD and Marxism: George Novack addressed Trotsky's theory of UCD in "Understanding history" (1972), presenting uneven and combined development as a 'law'. Romagnolo (1975) criticised Novack and Trotsky's theory of UCD for violating the central Marxist theorem of material forces of production by introducing social relations of production as a governing factor; that is, UCD as Novack presented, is based upon "the external relations of exchange and commerce as the determining factor in the life of social formation", and "reducing an explanation to the contingency of history, to commerce and the 'fortuitous combination of elements is not science" and has little in common with the science of historical materialism." (Romagnolo, 1975 p. 21). Novack (1976 p. 100) responded that "neither contention [about historical materialism and the focus on exchange] is factually correct (---) these two elementary Marxist principles only provide the points of departure and serve as guidelines for analyzing historically developed social formations in their full concreteness." Novack is critical of Romagnolo stating the exclusivity of industrial production as the source of exploitation, adding that (op cit. p. 105):

> "money lending and merchant capital employ the method of exploitation (---) without engaging in the distinctive capitalist mode of production (---) Romagnolo forgets that, on top of the direct exploitation of one class by another, there exists the economic, political, military and cultural domination of one country - and even one continent - by another they constitute a combined formation."

Nevertheless, the issue on UCD and mode of production also has surfaced more recently. Barker (2006) touched upon the issue after stating that UCD needs to specify scales of development, the entities being considered, social needs promoting interactions, forms of combinatory relations, and social dynamics forming combined development, concluding that "if 'combined development' in general refers to the social integration of apparently discrete entities, it needs further specification through conceptual integration with a theory of modes of production." (op cit. p. 79.

Ashman (2009) criticised Rosenberg's concept of transhistoric, as well as pointing to limits in Trotsky's analysis regarding differences in how capital restructures social relations. But he also focussed the role of the Marxist concept of mode of production, emphasising:

> "how 'science' lies not in the development of descriptive transhistoric general abstractions but in the development of determinate abstractions (which are both abstract and concrete) and in the interaction of tendencies and counter-tendencies (which arise from the relations and processes these determinate abstractions seek to grasp) in historically particular circumstances." Ashman 2009, p. 32).

Ashman argued that UCD should be situated within a capitalist mode of production and the importance of capitalist determinacy of UCD. Following this, UCD functions, first, as a mediating level between "the abstract concept of capitalist mode of

production and a concrete social formation or society", and, second, addressing "particular societies at particular points in time and how the amalgam of the archaic and the contemporary' shapes them," thereby considering UCD as "a necessary stage on the journey that can be illuminating at the level of both the world economy and a specific society." (op cit. p. 43), but the mode of production appears as the fundamental driver.

Trotsky's 'whip of external necessity': Reviewing this concept, Oliveira (2021) referred to interpretations made by several recent authors: Morton (2011, p. 12) stating that UCD "compels, 'under the whip of external necessity' states in the periphery to engage in developmental catch-up with their more advanced counterparts"; Rosenberg (2013b, p. 196) embedding the concept in the combined character of development and relating it to 'advanced' societies pressuring 'backward' ones to enter disruptive modernisation in catching-up efforts; not as a "straightforward acceleration of an ultimately unidirectional developmental process" but instead mediated by societies dominant political groups. A similar understanding has been voiced by Matin[9] and Anievas and Nişancioğlu[10]. Oliveira (2021, p. 282) underlined that geopolitically, the whip of external necessity has lost some of its importance while economic whips are on the increase: "Hence, that crack of the economic whip must be taken as the starting point for UCD-IPE analysis (---) the whip of external necessity manifests itself in the form of decentralised and faceless international economic pressures, potentially affecting all countries." Oliveira underlined that the market itself is not the source of agency, but "better described as a 'turbulent' process in which 'order is achieved through the collision of disorders'." In concluding Oliveira (2021, p. 290) pointed at policy capabilities and class configurations as more important than differences under stages of development, and the role played by economic shocks, exaggerated by a "turbulent international competition among owners of capital" and reshuffling the political game, "potentially catapulting to power marginal political forces that are quick to recognise the changing tides and appropriate popular dissatisfaction with clear messages."

Oksanen (2023, p. 164), on the other hand, argued that the normative dimension of the UCD is thin, and in order to remedy this it is necessary for UCD to let go of "causally concepts, like the 'whip of external necessity', which constrains the scope of normative analysis by confining it to sovereign states," thereby allowing the "inclusion of stateless peoples as entities and agents of global politics." To do so, Oksanen draws on Enrique Dussel's[11] liberation philosophy and its focus on groups that are marginalised by dominant political and economic structures. Combining UCD's theory of societal multiplicity with Dussel's liberation philosophy provides:

> "the capacity to perceive the all-pervasive influence of intersocietal interactivity and the unevenly realised dominant structures of the states-system and global capitalism. LP's concept of exteriority, on the other hand, allows seeing the suppressed social formations and economic systems beneath these dominant structures. U&CD enables longitudinal historical narratives focused on the uneven

[9] Matin K. 2013. Recasting Iranian modernity: International relations and social change, Iranian studies. London: Routledge.
[10] Anievas A. and Nişancioğlu K. 2013. What's at stake in the transition debate? rethinking the origins of capitalism and the 'Rise of the West', Millennium: Journal of International Studies, 42(1): 78–102.
[11] Dussel E. D. 2011. Politics of Liberation: A Critical Global History. Translated by Cooper, Thia. London: SCM Press.

> and combined unfolding of the formation of novel forms of exterior societal agency." (Oksanen 2023, p. 180–181.)

UCD and critical realism: Cooper (2013) first discussed potential contributions by critical realism, as it has been presented by the writings of Roy Bashkar and Andrew Sayer, to the field of International Relations, before addressing critical realism and Marxism. In short, Cooper (op cit. p. 584) thinks critical realists "correctly argue that the contingent aspect is an ever-present dimension to social change, but they have also argued that it is an 'external' relation." This latter relation is in Cooper's view a weakness, and he proceed with laying out how UCD contributes by treating "contingent outcomes as a necessary dimension of the internally related social process (---) [thereby] offering "one possible resolution to the problem of necessity ad contingency in historical change." (op cit. p. 595).

8.3 UCD and the spatial dimension

Barker (2006, p. 85) finalised his paper on moving beyond Trotsky for extending UCD by stating that "I should have liked to say something about combined and uneven development as it applies to the *geography* of capitalism (but see, for example, Smith 1984; Harvey 1996)." Others, though, have theorised the spatial dimension under UCD. Hudson (2016, p. 282) argued that UCD means "that development in a place partly depends upon its connections to other places as well as its institutional arrangements and endogenous endowment of human and natural resources" varying over time. Playing a central role in this respect is the interaction between different modes of production forming specific combined and uneven development. For the capitalist mode of production, Hudson highlighted the interaction between differentiating and equalising tendencies. Within the frames of supra-national policy bodies, nation-states will try to facilitate equalisation through different development policies, but some nation-states are more powerful than others.

Studying state capitalism and UCD Alami and Dixon (2023) addressed the spatial dimension, arguing that "state capitalism studies can be revitalised by redressing some of their geographical shortcomings, including methodological nationalism and other forms of territorial traps," with UCD contributing to "grasping the inner nature of the new state capitalism as a variegated, world-historical phenomenon." (op cit. p. 75). Drawing on Peck[12], state capitalism/UCD is seen as a relational and flexible categorical construct, allowing for dialectical analyses of "cumulative unfolding of different modalities of state intervention across, scale and time, by tracing the various forms of interconnections between them," (op cit. p. 75), an 'uneven and state capitalist development'. Elaborating, the authors stated that "State capitalism must always be defined, characterised, and explained with reference to concrete historical-geographical capitalist transformations, and in relation to inherited geographies of state intervention into social and economic processes." Rejecting mechanical-abstract metaphors like Neil Smith's 'see-saw motion', they contend that "What is required instead, is a characterisation of state capitalism's rise in its concrete historical and geographical fullness, by locating it in the historical developmental trajectory and geographical remaking of global capitalism." (op cit. p.

[12] Peck J. 2019. Problematizing capitalism (s): Big difference? Environment and Planning A: Economy and Space 51(5): 1190–1196.

85). Moreover, geo-institutional differences are systemically produced as well as constituting state capitalism, and “part and parcel of a relational whole” (op cit. p. 86).

Regarding the spatial dimension Alami et al. (2023, p. 624), held that spatiality is endogenous to and a constitutive dimension of state capitalism; that is,

> “(1) state capitalism as space-dependent, meaning that it is conditioned by geographical unevenness (----); (2) the reproduction of state capitalism through sociospatial processes and relations; and (3) the production of distinctively state-capitalist geographies, including scalar configurations, territories, built environments and geographical landscapes, (---) which in turn condition the uneven geographical development of state capitalism.

The authors argued that state capitalist studies will gain from exploring the role of space-as-process, and doing so using the three tools of (i) relationality, understood as active forces entering configuration of political-economic actors, organisational forms and restructuring processes; (ii) scale, understood as the spatial granularity under which specific processes and entities are spatially constituted; and (iii) territory, understood as modes of socio-spatial organisations as well as a technology of power, geo-historically varying.

Finally, Alami (2023) is outlining ten theses of state capitalism, of which the following relate to geography, and presenting a framework of the geographies of UCD. In general, geography appears as resulting from state capitalist processes, while the previous articles underlined geography/space as part and parcel of state capitalist processes.

Thesis 3: “the landscapes of present-day state capitalism are made of multifaceted, multilinear and interactive state transformations, which unfold in an uneven and combined manner.” (p. 765).

Thesis 4: “the currently unfolding historic arc in the trajectories of state intervention must be seen as the political form of these (geographically uneven) determinate transformations of capital accumulation.” (p. 766).

Thesis 5: “contemporary state capitalism develops in combinatorial forms, with cascading impacts across geographic space and policy domains.” (p. 766).

Thesis 6: “state capitalist impulses catalyse struggles over the political legitimacy of emergent and reconstituted landscapes of state intervention, and over the definition of the relations between the state qua public and the private, in the process remaking the terrain of struggle itself.” (p. 766).

Thesis 7: “legitimacy struggles contain material, discursive and ideological dimensions. They take place at home (at a range of scales, from central to local levels of government) between various social actors with divergent interests.” (p. 766).

Thesis 8: “multifaceted legitimacy struggles are essentially a component of the broader material conflicts between and within states, classes and sections of capital which shape the evolving landscapes of state capitalism.” (p. 767).

Thesis 9: “these impulses entail a complex reconfiguration of political authority, sovereignty and territoriality, which is irreducible to a unidirectional (inside/out, or vice versa) movement.” (p. 768).

Firmly rooted in the discipline of human geography, Dunford and Liu addressed UCD, arguing that (2017 p. 83) although UD is a central concept in urban and regional research, it has neglected interactivity, connectivity, and political multiplicity; dimensions that UCD is paying more attention to by combining analyses of “dynamic change over historical time and comparative differences across geographical space.” Nevertheless, in its focus on international relations UCD lacks:

> “a developed theorization and detailed empirical analysis of differential industrialization, urbanization and connectivity and of the role of capital accumulation: of, in other words, the objects of urban and regional research which can themselves be examined in the light of U&CD. For these reasons there are important potential synergies between these two fields of study.” (op cit. p. 72).

Analysing industrialisation and urbanisation, Dunford and Liu identify geographical differences, indicating a law of uneven development (UD), but this they stated, is an empirical generalisation not fully specifying causal mechanisms. Adding the ‘combined’ dimension of UCD helps by focussing interdependencies and connectivity, pushing others to engage in catch-up efforts. However, still there is a lack of fully revealing underlying causal mechanisms. For instance, differentiated investments act as a driver of UCD, but “the specific ways in which these drivers operate and evolve depend on their geographical and economic, political/institutional and cultural settings.” (op cit. p. 78). Multi-scalarity and processes of capital accumulation, comprising circulation of money, people, goods, income, and wealth, foster widening and reduction of all types of disparities. In short:

> “Acting at multiple geographical scales and changing over the course of time, the relative weight of mechanisms of differentiation and equalization drive comparative development, while the combination of inherited conditions with whatever is in advance at any point in time gives rise to complex articulations of modern and non-modern modes of production and ways of life and multi-linear development.” (op cit. p 83).

Drawing on insights from UCD and the field of regional and urban studies, analyses of spatial disparities are better equipped to disclose causal mechanisms at multiple historical-geographical scales, as for instance how “the asymmetric integration and interaction of national models of development and the way they interact with global processes modifies their internal dynamics and generates international/sub-national disequilibria.” (op cit. p. 83).

8.4 UCD and geopolitics

Within UCD a geopolitical economy approach has surfaced, building on the concept of materiality of nations, thereby relating to specific spatial scales. Emphasising that for Lenin and Trotsky the combined dimension of UCD first and foremost referred to states, and then state-directed development of the forces of production under the

'whip of external necessity', Desai (2015 p. 451 and 452) argued that "geopolitical economy insists that nations are material products of UCD, specifically of combined development", and "in putting the international struggle between dominant and contender powers and class struggles within them in a single frame, geopolitical economy seeks to relate the economic roles of capitalist states to capitalism's contradictions."

Pratschke (2015, p. 460), also writing within the field of geopolitical economy, emphasised that when "theorising the state (---) the latter must be situated within a complex set of relationships involving accumulation and competition that are articulated across different levels of the social order." Furthermore, "the challenge is thus to integrate these determinations within broader Marxist theory, maintaining a coherent account of competition, crisis and the state at the national and international levels." The author identifies three determinations; the first is

> "rooted in the competitive logic of capitalist accumulation, which contributes to its contradictions and crises. This includes various forms of class struggle. (---) the second determination helps to define their form, via the concept of direct influence. (---) the third serves to establish limits on state policies. (----) All three determinations have temporal and multiscalar dimensions, whereby strategies are formulated within the constraints of past strategies and within the context of existing structures and relationships. Crucially, strategies are influenced by the actions taken by other states" (op. cit. p. 460)

There are conflicts between states, and states form alliances to cope with capitalist crises. Geopolitical competition at the international level unfolds and develops from processes, contradictions, and struggles. In studying geopolitical competition, Pratschke also emphasised the need for theoretical tools and concepts, highlighting the agency of state managers, as well as the role of state strategies for development processes.

Kurecic (2015) focussed the concept of geoeconomics as rivalries within geopolitical economy, with various resource conflicts emanating. The message of UCD theory means that the international political economy is riddled by uneven development, with the combined dimension facilitating developmental trajectories, including (proxy) wars, crises, and radical changes. Resources facilitate UCD processes. In defining the concept of geoeconomics, Kurecic builds on Sparke[13], stating that the concept deals with 'the positioning of specific regions within global flows', and relates geopolitical phenomena to a wide array of economic imperatives and ideas. Going further, Kurecic distinguished geopolitics from geoeconomics, with the first focussing (in)direct control of territories, while the latter connects with (national) resource management. UCD processes are decisive for the world economy and politics, with dominant and powerful states trying to uphold the status quo and contender states trying to become dominant states through combined development. Geoeconomic rivalries fuel conflicts (and possibly wars) which may cause heavy damage to involved states.

Leigh (2021, p. 186), on the other hand, made the case for studying geoculture: "the socially shared ideas by which people understand and act upon the world" within the frames of UCD. Moreover, geocultural feedback is presented as a mechanism for

[13] Sparke M. 1998. From Geopolitics to Geoeconomics: Transnational State Effects in the Borderlands. *Geopolitics* 3(2): 62–98.

accessing “causal and constitutive dynamics of ‘the international’ as major source of cultural transformation.” (p. 201).

8.5 UCD and Eurocentrism

Several authors have criticised UCD for Eurocentrism. Shilliam (2009, p. 69) did not directly address Eurocentrism, but pointed out that the UCD debate has been addressing European history, neglecting that the “Atlantic slavery and the racialisation of the New World identity might be the fundamental vector through which to explore the special quality of international sociality on the making of the modern world.” Furthermore, the intensity of the modernization wave of the modern West “was differentially spread across the already uneven geocultural and geopolitical terrain that constituted the Atlantic world. (----) the deepest world-historical stratum of ‘unevenness’ and ‘combined development’ is to be found in New World slavery” (op. cit. p. 83)

Gámez (2023) criticised UCD for applying Eurocentric epistemologies when analysing capitalist modernisation, leaving out indigenous and racialised people; race and coloniality should be at the centre of UCD. Taking Latin America (Abya Yala) as a case, the author is referring Blaser et al.[14], understanding differences ‘as being a matter of location rather than discrete essences’, and ‘a precondition for the very existence of the web of life.’ In concluding, Gámez (op cit. p. 215) emphasised “that any critical analysis of state power and administration that does not account for colonialism and modern imperialism is bound to have a limited picture of the uneven and combined power relations of the present.”

Anievas and Nişancioğlu (2015, p. 52), aimed at formulating a non-Eurocentric and agent-sensitive approach when studying capitalism and its origin and development, and “what matters then is not the primacy of productive forces, but how their adoption and adaptation is plugged into and related to other aspects of social assemblage (---) productive forces cannot be understood as uniform and equalizing, but multilinear and uneven.” Therefore, UCD appears as historically delimited, “corresponding to specific epochs or conjunctures characterised by different modes production that animate the broader dynamics of such historical temporalities (op cit. p. 58)

Tüyloğlu (2022, p. 314) aimed at moving beyond a UCD perspective of modern Europe versus the non-European world, arguing “that primary unevenness and its resultant European whip of external necessity should be conceptualised beyond the singular linear cause and effect trajectory running from the ‘West’ to the ‘Rest’.” In doing so, the author applied historiogeography for framing unevenness as both geographical and temporal, thereby differentiating between early-late developing nations and late-late developers. However, Tüyloğlu (op cit. p. 327) held that “There is no escape from the power-laden and historically consequential West/East binary. We need, however, to be mindful of and historically attentive to what it obscures from view;” that is, “intersocial relations of the non-European world can potentially have more actual relevance than immediately visible to us.”

[14] Blaser M., Ravi de Costa R de., McGregor, and Coleman W. D. 2010. Reconfiguring the Web of Life: Indigenous Peoples, Relationality, and Globalization. In Blaser M. Ravi de Costa R de., McGregor, and Coleman W. (Eds.) Indigenous Peoples and Autonomy: Insights for a Global Age, Vancouver: UBC Press.

Zeglen (2023, p. 184) stated that “unless the role of the cultural in UCD is adequately theorised, UCD cannot fully overcome Eurocentrism,” then progressing by developing a non-Eurocentric theory of UCD by applying Althusser’s theory of ideology: “an ideology must come to function as the dominant ideology that synchronises all the different elements with their own temporalities to a common temporality so that the mode of production is able to reproduce itself.” (op cit. p. 188). The ideology, then, is ‘ideology of nationalism’, which forms material conditions under capitalism, and:

> “It is no more possible to entirely escape from temporal ideology than one can completely escape from the political or economic. But to grasp temporal ideology is to also imagine the possibility for a different temporality that more justly mediates intersocietal interactions. As Althusser[15] (2005, 232) argues, ‘the existence and recognition of [ideological] necessity enables us to act on ideology and transform ideology into an instrument of deliberate action on history’.”

[15] Althusser L. 2005. *For Marx*. London Verso.

Part 2 Empirical bases for and case studies of uneven spatial development

9 The structure of empirical and case studies of uneven spatial development

Table 9.1 presents a structure of scientific papers comprising case studies and quantitative analyses of uneven spatial development. The following conclusions emerge:

- European studies account for 37 per cent of all studies, followed by Chinese studies and North America studies, respectively with about 20 and 15 per cent, in total accounting for more than 70 per cent of all reviewed studies.
- As much as 87 per cent applies the theory of uneven spatial development, while the uneven and combined development is used by the remaining 13 per cent, indicating that currently the latter is more prevalent in theoretical studies.
- The uneven spatial development approach is even more prevalent among studies on North America, Europe, China, and South and East Asia whereas uneven and combined development figures more in studies on South America and Africa.
- 46 per cent refers uneven (and combined) development a few times, often just as a theoretical background and/or to tell that findings confirm the theory's prediction about development being uneven. Another 30 per cent refers the concept about ten times, while the remaining 23 per cent more extensively deals with the concept, discussing the empirics and the theory.
- Both the uneven spatial development and the uneven and combined development are found in all three categories, but the latter is found more often in the category extensively using the concept, while the uneven development is more often found in the first category with few references. This may be due to the uneven and combined being more extensively discussed theoretically during the last 10 to 15 years.

The structure emerging from the descriptive statistics of table 9.1 may be biased by the review being restricted to English language papers. This is perhaps mostly the case for the distribution of studies on different geographical regions. In addition, English speaking journals have been dominated by English speaking countries, but recent years have seen a broader geographical distribution within those journals. A review including other languages might provide a different picture, but that is beyond the scope of this review.

Table 9.1: Geographical pattern, theoretical perspective, and importance of uneven spatial development of reviewed studies.

	Studies		Theory (%)		How much UD/UCD (%)		
Regions	N	%	UD	UCD	1–6	about 10	15 +
Africa	21	8.0	76.2	23.8	38.1	19.0	42.9
China	52	19.8	88.5	11.5	48.1	30.8	21.2
Europe	96	37.4	91.7	8.3	46.9	29.6	23.5
India	8	3.1	87.5	12.5	50.0	25.0	25.0
Middle East	8	3.1	62.5	37.5	50.0	50.0	0.0
North America	39	14.9	94.9	5.1	56.4	35.9	7.7
South America	17	6.5	64.7	35.3	41.2	23.5	35.3
S-E Asia	17	5.0	100.0	0.0	38.5	38.5	23.1
Global	5	2.3	60.0	40.0	0.0	50.0	50.0
All	262	100.0	87.4	12.6	46.2	30.9	22.9
How much	N	%	UD	UCD	Mix		
1–6	121	46.4	94,2	5,8	0,0		
About 10	80	30.7	88,8	8,8	2,5		
15 +	60	23.0	66,7	31,7	1,7		

In addition to the dimensions presented in table 9.1, looking into what types of analyses have been conducted in relation to uneven (and combined) spatial development dimensions broaden our understanding of this research field. Because of overlap between approaches and grey zones between categories, rough percentages are presented:

Primary and secondary data: Most studies rely on secondary data, as public statistics or research conducted by others, amounting to close to 80 per cent, whereas primary data is used in about 25 per cent of the studies. Of the geographical areas, Europe and partly South America have a higher share of secondary data, whereas studies on China and North America single out with a larger share of primary data studies.

Descriptive and advanced statistics: Most studies including statistical analyses apply descriptive statistics, about 40 per cent. Some sort of advanced statistics is applied by about 25 per cent of the studies. Of course, some analyses make use of both, and about 10 per cent appears to do so. There are differences between geographical areas, and of the areas with most studies, China singles out with a higher share for both descriptive and advanced statistics, about 50 per cent for both categories. For Europe, the share of is lower for descriptive statistics (about 40 per cent) and on average for advanced statistics. North America has an even lower share on descriptive statistics (about 30 per cent) and about the same as the average for advanced statistics. The number of studies is low for both South America and South and East Asia (17), but the low share of about 5 per cent and 10 per cent should be noted.

Document studies: About 60 per cent of all studies includes document studies; that is, using data and referring findings from other scientific studies and other types of reports when analysing uneven (and combined) spatial development. North America

and South America studies single out with a higher share based on document studies (about 80 per cent). On the other hand, the share among African studies is about 40 per cent.

Qualitative studies: In general, close to 10 per cent includes qualitative analyses, with North America singling out with almost 20 per cent.

The *spatial scale of studies* differs from the local to the global. Close to 40 per cent of the studies is focussing regions within countries. A local perspective is present in about 10 per cent of the studies, while about 5 per cent is addressing the national scale. Adding to this, the combination of local and regional, as well as regional and national, is found in close to 10 per cent of the studies. Of the remaining studies, the international scale is found in a little more than 10 per cent of the studies and the combination of national and international is about 7 per cent. Other combinations cater for about 8 per cent.

The dimensions presented above give rise to more combinations than is possible to address here. The following categories emerge as interesting: (i) Quantitative studies based on advanced statistics, conducted in China, Europe, and North America; (ii) studies based on descriptive statistics, conducted in different geographical areas; (iii) document studies based on data and findings from existing research and other reports conducted in different geographical areas; and (iv) Qualitative studies based on primary data and conducted in Europe, North America, Middle East, and China.

For all four of these categories, studies referring uneven spatial development and uneven and combined spatial development, as well as with few and many references to the theory, will be considered included.

10 Quantitative studies applying advanced statistics.

Relatively, a large share of studies on China employed advanced statistics. Commonly, secondary data, like Censuses and data at the regional scale of provinces, were used in those studies. In a study of uneven regional development in China in the period 1952–2000, Ho and Li (2008) applied provincial data (secondary data) for calculating regional inequalities on GDP per capita and using four measures on inequality: (i) Gini; (ii) decomposable generalised entropy, together with (iii) urban–rural inequality, and (iv) inland–coastal inequality. The inequality data were then analysed through *root tests without structural breaks*: (i) the Augmented Dickey-Fuller correcting for higher-order serial correlations (natural logs of the four inequality measures); (ii) Phillips-Perron with non-parametric correction of autocorrelations; (iii) Dickey-Fuller Generalised Least Squares (modified Dickey-Fuller test). Next, *root tests with structural breaks* were conducted, following Zivot-Andrews of selecting break points that should be correlated with the data and endogenous, ending up with the cultural revolution and the market reforms as structural breaks. This article is an example of studies with just a few references to spatial uneven development: "The regional inequality is severe since regional development is uneven due to various initial conditions (e.g., different geographies) and government policies." (Ho and Li 2008, p. 245), The authors conclude that:

> "The transition from a planned economy to a market economy in China resulted in remarkable economic growth. This article investigates one dimension of the economic development: rising regional inequality. We find that the regional inequality measures are trend stationary with structural breaks. The presence and timing of breaks in our data are consistent with the historical events of economic development in China" (op. cit. p. 256).

In short, the authors do not engage with theories or mechanisms of uneven spatial development, and the conclusion just refers regional inequality. On the other hand, the method may be of interest for quantitative analyses.

Chen et al. (2023) analysis of the period 1999–2017 also belong to the category with just a few references to uneven spatial development, but in addition to trends in GDP per capital, the paper is addressing trends in investments per capita, and human capital per capita. The authors (op. cit. p. 5) claim that drawing on the "innovative geo-visualization approach introduced by Rey et al. (2011)[16]," the study "employs circular histograms to reflect the information of movements on a directional Moran scatter plot, and it is a unique combination of quantitative geography and directional statistics (Murray et al. 2012)[17]." More in detail, the method is summarised:

> "The technique, coined Directional LISA, is entirely original in conjunction with the study of local indicators of spatial association (LISA) with each individual movement in the distribution of income,

[16] Rey S.J., Murray A.T., and Anselin, L. 2011. Visualizing regional income distribution dynamics. Letters Spatial Resource Science. **4**(1): 81–90.
[17] Murray A.T., Liu Y., Rey S.J., and Anselin L. 2012. Exploring movement object patterns. Annals Regional Science. **49**(2): 471–484.

> providing insight into its space–time dynamics. In this context, the statistical associations between a province and its neighbors concerning their space–time co-movements are explained by spatial dependence (---) vector arrows are standardized to the origin and retain only the information about their length and direction to facilitate comprehension (----) illustrates the notion of co-movement in the Standardized Dynamic Moran Scatter Plot" (op. cit. p. 5).

Concluding, the authors (op. cit. p. 14) underline the three findings of a "strong convergence in income and investments across Chinese provinces, but not in human capital (…) the pivotal role for spatial dependence in shaping the observed convergence (----) evidence that most western provinces show a catching-up process in income." The authors argue that these findings lend weight to investments having a positive impact on adjacent regions, thereby contributing to balanced development and reducing income gaps.

Feng et al. (2022) adopt a political economy perspective on uneven spatial development in China, combining the framework of production, building on Marxist oriented literature, like David Harvey, and a framework of exchange, building on theory of underdevelopment and in particular the theory of unequal exchange by Arghiri Emmanuel. The theoretical basis of the paper argues that value production and value transfer explain regional disparities in value-added of work, leading to differences in GDP per capita. Using public statistics (secondary data) the paper employs Input-output tables for calculating value added and "correlation coefficient between value production gap of unit of working time, value transfer per unit working time and per capital GDP in 2002, 2007 and 2012." (op. cit. p. 58). Next, the paper addresses value flow and uneven development dynamics amid capital accumulation, applying Foley-Michl accumulation equation. The paper concludes that:

> "China's regional disparities result mainly from the value productivity gap. Amid the dynamic evolution, with a capital accumulation biased towards less developed regions, the trend of reducing regional disparities contained in the accumulation-production interaction has exceeded the "polarization effect" brought about by the accumulation-exchange interaction after 2007, narrowing regional disparities in development. The accumulation biased towards less developed regions is the result of market logic and government behavior together" (op. cit. p.66).

This paper belongs to the upper category of how much the theory of uneven spatial development is used: relating to theory and referring the theory in the conclusion.

Li and Fang (2014) conducted a multi-mechanism analysis on regional inequalities in China at the county level by integrating GIS technology and spatial panel data models, using public, secondary data. The variables are (i) *socio-economic factors*: fixed asset investment per capita, labour force participation rate, marketization (stable nighttime light, industrialisation (share of output of secondary industries), and decentralisation (local financial expenses per capita); (ii) *environmental factors*: average elevation, water resources per capita, and urban built-up area; (iii) *locational factors*: distance to nearest port city, distance to nearest prefecture level city, and road density, and (iv) policy factors: national strategies and regional

policies, state-level economic development, location in urban system for each year and quantified for counties.

Regional inequalities are measured by using the (i) coefficient of variation, (ii) Gini coefficient, and (iii) Theil index. The data is checked for autocorrelation and collinearity, and a principal component analysis is used to analyse the factors to estimate the importance of mechanisms of regional inequality. Concluding, the authors (op. cit. p. 179) write that:

> "Regional inequality in China between counties has been a serious problem since 1992, but this problem has been gradually alleviated in recent years, mainly due to the policies for inequality reduction proposed by the central government. (---) we have confirmed the significance of spatial effects in regional inequality. (---) The essential productive factors (investment and labor force), industrialization, decentralization and marketization are significant mechanisms causing regional inequality. (---) Industrialization plays the most important role (---) The influence of decentralization has increased with local government's development efforts. (---) environmental factors have a moderately significant impact on regional inequality. The expansion of urban built-up areas has exerted a strong influence on the uneven regional development. (---) location and transportation play an indispensable role in regional inequality. (---) the distribution of policy in spatial units has become one of the most important mechanisms underlying regional inequality."

This paper belongs to the middle category of how much uneven spatial development is integrated, but without engaging with its theoretical basis. Still, the concept of uneven spatial development is referred in the concluding section.

Tan and Ludwig (2016) stand out with using primary data through a survey among companies on business-to-business electronic commerce, randomly selecting 1 000 respondents from business directories in the three regions of Yangtse River Delta, Pearl River Delta, and West Region, published by China Telecom Ltd. The response rates were between 16 and 18 per cent which is similar with other company surveys. About half of the respondents came from manufacturing and service industries, and small, medium, and large companies accounted for about 40, 50, and 10 per cent, respectively.

The study constructs a set of composite variables for the regression analysis The dependent variable is "Internet-based electronic data interchange" (I-EDI), and the independent variables are (i) company size; (ii) educational level of managing director; (iii) relatively high-context, least economically developed part of West Region; (iv) the relatively low-context, most economically developed part of Pearl River Delta region; and then composite variables are (v) awareness; (vi) human resource; (vii) business resource; (viii) technical resource; (ix) preparation governance and commitment; (x) perceived external e-readiness government, market, and support industries; (xi) interorganisational cooperativeness; (xii) relative power dependence and cooperativeness; (xiii) hypothesised interaction effects between region and interorganisational cooperativeness, West Region and Pearl River Delta region respectively; and (xiv) hypothesized interaction effects between

region and relative power dependence and cooperativeness, West Region and Pearl River Delta Region, respectively.

The authors are framing e-readiness to China's uneven spatial development, concluding that:

> "overall, companies operating in the PRD [Pear River Delta] are more likely to adopt e-commerce than those operating in either the YRD [Yangtse River Delta] or the WR [West Region]. (---) we attribute these results not only to differences in economic development between these regions but also to cultural aspects. With their greater exposure to Western business culture, companies in the PRD exhibit a relatively low- context business culture, which in turn enhances their likelihood of adoption. (---) We find that in the PRD, companies are even more likely to adopt Internet-based EDI [Electronic Data Interchange] if they also experience high levels of cooperativeness with their business partners. (---) companies in the WR are particularly likely to adopt this technology if they also experience high power dependence on an external partner" (op. cit. p. 430)

Chen and Zhang (2023) used nighttime satellite images of light intensity of the ASEAN countries to analyse regional inequality and uneven spatial development for the period 2000 to 2018. For linking nighttime light intensity and national income (GDP per capita), the authors in the first regression used a two-way fixed effects model. Since there is heteroskedasticity and autocorrelation in the cross-sectional correlations, feasible generalized least-square (FGLS) method was used to create a more flexible covariance structure. When calculating regional income inequalities, both the Theil T index and a population-weighted Gini coefficient were used. The following variables were used in the analysis: (i) log of average nighttime light luminosity; (ii) the number of top-coded pixels (log); (iii) the number of unlit pixels (log); (iv) log of land area (km2); population density (person/km2); (v) share of arable land in land area (%); (vi) the predicted GDP per capita based on luminosity (log); (vii) log of GDP per capita in statistics; share of urban population in total population (%); (viii) share of the value added from the services industry in GDP (%); (ix) share of oil rents in GDP (%); (x) share of mineral rents in GDP (%); (xi) share of foreign direct investment net inflows in GDP (%); (xii) share of total trade volume (goods and services) in GDP (%); (xiii) share of paved road in total road length (%); (xiv) share of government expenditure in GDP (%); (xv) and share of tax revenue in GDP (%). (op. cit. p. 726).

First, a FGLS-regression was conducted for the national income variable (GDP per capita) and the variables on nighttime light intensity. Secondly, overall income inequality and inequality among ASEAN countries were calculated (Theil and Gini). Thirdly, factors impacting regional inequality were analysed. The authors concluded that:

> "the trend of regional inequality in the ASEAN region presents an inverted N-shaped change over time. The relationship between regional inequality and economic development also takes an inverted-N shape. (---) the inequality between countries is the driving force of overall inequality. The overall inequality of the ASEAN region is narrowing while inequalities within most

> countries are increasing (---). The multiple regression analysis reveals that economic development, urbanization, openness, transportation, mineral rents and tax revenue are significantly relevant to regional inequality. Specifically, transportation, foreign trade, mineral rents and taxation are negatively correlated with inequality and economic growth has a lagged effect on reducing inequality, while net FDI inflows could enlarge inequality" (op. cit. p.733).

Among studies on *Europe*, Eriksson and Hansen (2013) addressed the role of industry structures, skills, and human capital in relation to uneven spatial development at the local scale of municipalities, focussing knowledge-intensive industries. The analysis used secondary, public data for conducting OLS regression models for two dependent variables: (i) growth in purchasing power 2001 and 2008, and (ii) employment growth for the same period. The independent variables are (i) the ratio of knowledge-intensive industrial activity to manufacturing industries over the period 2001 to 2008; (ii) skills, defined by the ratio of creative class to skilled manufacturing employment over the period; (iii) human capital, defined by the ratio of high education to low education over the period; (iv) four categories of regional size, with the three metropolitan areas in the first category and the remaining three categories according to population and function in the urban hierarchy; (v) control variables: investments per capita, population density, population change, share of public sector employment, and plant competition indicator linked to share of plant with up to ten employees. In concluding the analysis, the authors stated (op. cit. p. 608–609):

> "Both models show the same general pattern: the larger the regions, the better they tend to fit into the dominating theories on regional development, stressing the significance of knowledge-intensive sectors, creativity, and human capital as main drivers for the economy. (---) very unequal preconditions for stimulating regional development (---) our results indicate that sufficient transformational capabilities are present mainly in the larger Swedish regions (---) this implies that the new knowledge economy is characterised not only by a new division of labour, but also by a deepened spatial division characterised by greater regional disparities due to the concentration of job creation in large urban regions."

The study is based on secondary, public data, and directly relating to uneven spatial development but just referring the concept in the beginning of the study, and there are no references to central contributions on uneven spatial development. Several studies on regional development are being used, though, especially within the New Regionalism approach. Eriksson et al. (2017) integrated uneven spatial development more in their comparative study of Denmark and Sweden, using local scale micro-data on full-time workers aged 20–64 years for the years 2002 and 2007, retrieved from Statistics Denmark and Statistics Sweden. Also, this study conducted OLS-regression models. The dependent variables are employment growth, and then seven variables on employment growth in particular sectors: high-technology, medium-technology, and low-technology manufacturing; the KIBS and FIRE sectors of service industries, together with employment in experience economy; and lastly, public sector employment. The key independent variables

were: four regions according to population size, and three urban variables (urban, semi-urban, and large urban but relatively peripheral). Other variables were high education, location quotients of the seven industries, industrial diversity, plant competition, resident/worker ratio, and Gini coefficient of income distribution. The authors presented two main conclusions from the study (op. cit. p. 1773):

> "First, (---) the size and characteristics of regions are important parameters when analysing regional development and prescribing policy recommendations. Our analysis highlights that these differences are strongly related to the type of sector being analysed (---) regional employment levels are not an outcome of a lack of what are seen as growth sectors alone: other parameters are at play as well. (---) Second, looking at changes in employment levels across the national borders of [Denmark and Sweden] (---) we find (---) marked national differences. This raises the question of whether recent Big data approaches actually result in any useful contribution to our understanding of regional economic dynamics at all. This is because the regional context is essential in terms of structure, system, institutions and policy (---)."

Among studies on *North America*, Greenberg (2016) conducted OLS regression on local scale poverty in the Appalachian region, using public census data at 'block group' level; that is, a 'neighbourhood' comprising between 600 and 3000 residents. The study is in the mid-category regarding how much uneven spatial development is used. The dependent variable was the share of the population living below the federal poverty line, accounting for family size and age in 1999. The independent variables are (i) distance to a county seat (kilometre); (ii) distance to a country seat squared; (iii) unemployed (%); (iv) without a high school diploma for above 25 years of age (%); (v) African-American population (%); (vi) distance to a metropolitan area of more than 0.5 million people; and (vii) distance to an interstate exit (kilometre).

The analysis has the following steps: bivariate correlations between distance to a county seat and other variables; regression analyses of poverty and distance to a county seat, controlling for other variables; and predicted curve plots for examining poverty and distance to a county seat for individual subregions in the Appalachian region. The author concluded that (op. cit. p. 206):

> "distance to a county seat is a meaningful predictor of poverty in Appalachia. The results find a U- shaped relationship across the region, indicating that neighborhoods with the highest poverty rates are the closest and farthest from county seats."

According to the authors, two social factors may explain this result: The first is "uneven development policies that marginalized neighborhoods on the periphery of counties," and the second is that "local power dynamics exclude poor, rurally isolated people from social, political, and economic opportunities in the county seat." (op. cit. p. 206). Furthermore, the analysis also disclosed variations among Appalachian subregions, indicating a need for place-based policies.

Silva and Leichenko (2004) follow Krugman's New Economic Geography, with a focus on trade in the US for explaining uneven development in income inequality, using secondary, public data. The paper has just a couple of direct references to uneven spatial development, but indirectly embedded in such theory through

Krugman. The authors formulated the following model: “income inequality = fn(income measures, urbanization measures, manufacturing measures, international trade measures” (op. cit. p. 275), and analysed through income inequality regression. The dependent variable income inequality was using the modified Theil measure, calculating annual changes in interstate inequality, as well as within states; that is, both at a regional and local level, distinguishing between metro and non-metro areas.

The independent variables included two *income measures* (per capita income and per capita squared); two urbanisation measures (metropolitan population share and population density), two manufacturing measures (manufacturing shares of employment and manufacturing earnings per worker); and four international trade measures (export exchange rate, export orientation, import exchange rate, and import orientation).

For international trade, the study used “two price-based measures of states’ involvement in international trade: states import exchange rates and states’ export exchange rates” (op. cit. p. 272) and using manufacturing industries at four-digit level. The import rates were calculated “by the sum of indices of real exchange rates (U.S. dollar/foreign currency) across countries, weighted by each country's share of imports in the industry during that year” and next, constructing “state import exchange rates using the weighted sum of industry import exchange rates with the weights given by the share of the industry in total shipments from the state” (op. cit. p. 273). A similar procedure was used for export exchange rates.

The variables on import orientation and export orientation represented structural measures on regional involvement in trade, indicating industrial specialisation. Import orientation was calculated in two steps: “the national import orientation of each four-digit SIC industry was calculated as the total value of import shipments divided by the total value of shipments in that industry were available in the U.S. market” and secondly, “Import orientation for a state was then calculated as a function of the weighted sum of IMPOR [the national import orientation], weighted by the share of the industry in the shipments from a state.” The international export orientation was also calculated in two steps: “the national export orientation of each four-digit SIC industry was first calculated as the value of export shipments in the industry, divided by the total value of shipments in that industry” and next, “export orientation for a state was calculated as a function of the weighted sum of EXPOR [the national export orientation], weighted by the share of the four-digit SIC industry in total export shipments from the state.” (op. cit. p. 273–274).

For all states as well as state–metropolitan and state–nonmetropolitan areas, the authors concluded that:

> “our results suggest that the inequality-enhancing effects of trade operated most consistently via export and import prices (---) cheaper exports and more expensive competing imports made a state relatively worse off in comparison to other states and increased inequality within a state. (---) Across the census regions, the effects of trade were more mixed. (---) Taken together, our findings are consistent with the prediction of new trade theory, which suggests that regional sources of comparative advantage (e.g. agglomeration economics) may lead to spatial variation in trade-related effects” (op. cit. p. 283).

Park (2012) addressed local labour markets and the uneven geography of racial and ethnic wage inequality, referring uneven spatial development a few times when discussing existing research and processes driving inequalities. The analysis is based on secondary, public data; the 2000 Census Public Use Micro Sample. The study includes (i) wage earning men ages 25 to 64; (ii) comparing native-born; (iii) non-Hispanic blacks; (iv) native-born Latinos; and (v) foreign-born Latinos to native-born, non-Hispanic white men. The spatial scale was 186 U.S metropolitan areas.

The analysis descriptively mapped relative wage-gaps for the three racial/ethnic groups to white males, showing higher inequalities in the largest metropolitan areas, and the whole metropolitan north-east corridor, as well as high inequality throughout the South. In short, inequalities at the regional level. Parks then conducted OLS-regression analyses of the metropolitan areas to reveal any intra-metropolitan inequalities. The dependent variable is logged hourly wage, and the independent variables at two levels. *Level 1*: (i) less than high school education; (ii) high school graduate; (iii) some college; (iv) college graduate; (v) married; (vi) disabled; (vi) work experience (age – years of education); (vii) work experience squared; and (viii) usual hour worked per week. *Level 2*: (i) resident population; (ii) female labour force participation rate; (iii) unemployment rate; (iv) percentage new residents within last five years; (v) wage polarisation (90 percentile/10 percentile); (vi) unionisation rate; (vii) male incarceration rate; (viii) minimum wage; (ix) percentage service employment; (x) percentage low-end service employment; (xi) percentage manufacturing; (xii) percentage durable manufacturing employment; (xiii) percentage public employment; (xiv) percentage population black; (xv) percentage population immigrant; and (xvi) percentage immigrant squared (op. cit. p. 713). Parks concluded that:

> “regulatory context (e.g., unionization and incarceration) matters most for the relative wages of African Americans; both regulatory context and industrial mix influence the relative wages of native-born Latinos; and industrial composition (e.g., nondurable manufacturing and low-end services) matters most for the relative wages of foreign-born Latinos. Notably, the influence of racial labor market institutional projects—whether egalitarian or racist—matters significantly for the economic outcomes of African American workers. These findings underscore that black-white inequality in the United States continues to be most dependent on political and institutional forces (op. cit. p. 720)

Parks also emphasised that unionisation helps increase wages for white and black high school-educated workers, as well as mitigating racial wage inequality. Moreover, higher minimum wages increase relative wages of high school educated whites and native-born Latinos. In addition, local and political regulatory conditions are becoming more important for unionisation and minimum wages.

11 Studies applying descriptive statistics.

Several studies combine descriptive statistics with document studies. Below, studies with a main focus is on descriptive statistics for indicating what types of data are being used.

Awanyo and Attua (2018) addressed the uneven spatial development of Ghana under three decades of neoliberal economic reforms. This is a study with extensive use of and focus on uneven spatial development, descriptively applying secondary data:

First, the study presents several economic indicators on averages for the periods 1983–1986, 1987–1990; 1991–1995, 1996–2000, 2001–2005, 2006–2010, and 2011–2014: (i) real GDP growth (%), national, agriculture, manufacturing, and service; (ii) GDP composition by sector (%), agriculture, manufacturing, and services; (iii) GDP per capita in US$); (iv) exports of goods and services (% of GDP); (v) gross capital formation/gross domestic investments (% of GDP); (vi) gross national savings (% of GDP); (vii) external debt stocks (current billion US$); and (viii) annual inflation, consumer prices (%).

Second, the study presents regional development indicators of Ghana's nine administrative regions: (i) number of manufacturing industries (% of national); (ii) length of standard road per 100 square miles (in miles); (iii) population per doctor in government hospitals (in 1 000); (iv) population density per square kilometre; (v) percentage share of total population; and (vi) percentage urban 1970.

Third, registered projects with foreign direct investments, the nine administrative regions: (i) number of projects with FDI 2007–2015; (ii) percent of national total 2007–2015; (iii) total September 1994–December 2000; (iv) percent of national total, September 1994–December 2000.

Fourth, number of projects with FDI, and estimated values in million US$ for the nine administrative regions.

Fifth, regional development indicators of the nine administrative regions, 2007–2010: (i) population 12 years and above with mobile phones in 2010 (% of national total; (ii) percentage of regional population 12 years and above with mobile phones, 2010; (iii) percentage if 12 years and above using internet (% of national); (iv) Dwelling units with access to pipe-born water (% of regional total); (v) population density per square kilometre; (vi) percentage share of total population; (vii) percentage urban, 2010; (viii) net migration rate (per 1 000); (ix) percentage of household with electricity; (x) proportion of regional trunk roads classified as good, 2007; illiteracy rates (% of regional population 11 years and above), 2010; (xi) percentage of regional population 6 years and above with education beyond basic education levels, 2010.

Sixth, regional patterns and trends of poverty for the years 1991/1992, 1998/1999, 2005/2006, 1012/2013 in %: (i) incidence of poverty; (ii) depth of poverty; (iii) region's national population share; and (iv) contribution to national poverty.

The authors concluded that:

> "The opposing tendencies of universalization/dispersal of capital and concentration of capital under the conditions of neoliberal globalization are highlighting a paradox in Ghana. On the one

> hand, the mobility of capital, particularly external capital, has enabled a historically sustained economic growth over 30 years, and significant decline in the incidence of poverty. (---) On the other hand, this mobile capital, especially FDI, is heavily concentrated in GAR and to a lesser extent in Ashanti Region, largely sustaining historical patterns of uneven regional development. (---) The foundation for uneven regional development laid under the colonial economy thus remains strong, as its legacy of regional conditions of accumulation, capital mobility, and sectoral and spatial division of labor have shaped directionally the distribution of the benefits of growth under neoliberalization" (op. cit. p 188–189)

The findings are embedded in Neil Smith's analysis of capitalist development, and the paper stand out with both theoretical and empirical content.

Hentz (2009) addressed uneven spatial development with Southern Africa security order. The study is a combination of descriptive statistics and document studies. Under the latter are references to statistics, like GDP. Regarding secondary data, the paper presents: (i) exports of 21 types of goods from the common customs area of Botswana, Lesotho, Namibia, South Africa, and Swaziland to the rest of Southern Africa,1992; (ii) percentage of total export and total value, five types of goods, 1992; (iii) sub-sectorial composition of manufacturing in Southern African countries; (iv) Annual averages of FDI to the 11 countries of Southern African Development Community for the years 1983–87, 1988–92, 1993–97.

Concluding, Hentz stated that:

> "Looking at regional interdependence through a non-state centric prism reveals a particular set of security concerns. In southern Africa, the threat to peace is not interstate, but rather intra-regional and, as is argued above, unequal trade may exacerbate the security environment." (op. cit. p. 212). (---) "Because it exacerbates economic inequality, a laissez faire approach (from a FTA to a common market) to regional economic integration, rather than a developmental approach, in an anarchical environment characterised by 'new security' threats fosters insecurity in southern Africa. Functional cooperation may also cause insecurity. Unlike the security communities in the North, interdependence characteristic of insecurity complexes in the South may engender negative externalities. The African security problematique remains regional, and all regional players" (op. cit. p. 213)

In a three-part study on, Saldanha (1999a, 1999b, 1999c) brought the rapid increase in literacy to the table and focussed the residual illiteracy and uneven spatial development in India, at the regional scale (states) and local scale (districts). The author used secondary, public data in conducting descriptive statistics:

First, by applying illiteracy (7 years of age and above) statistics to rank states, establishing the three categories of high-level literacy (10% and above), medium literacy (45 to 69%), and low literacy (44% and below). Then, cross-tabulating literacy in states and districts of states with gender, rural and urban areas, and community (scheduled caste (SC), scheduled tribes (ST), and non-SC/ST) for the years 1981 and 1991. Next, ranking and categorizing districts within the states of

Maharashtra and Goa in high-level, medium-level, and low-level literacy, and doing the same cross-tabulations as for states.

Second, statistics on state level: (i) socio-demographic characteristics (population growth 81-91, sex ratio. Urbanization rate, population density, per cent SC and ST population); (ii) health characteristics (beds/Lakh population, doctors/Lakh population infant mortality, crude death rate/1 000 population, birth rate, expectancy of life-time at birth); (iii) socio-economic characteristics (relative index of development, per capita income, per cent below poverty line, and per cent landless agriculture/labour); and (iv) educational characteristics (primary schools/1000 pop., primary schools 5 km^2, students in primary schools/teachers, per cent trained teachers in primary schools, per cent budgetary expenditures in education, enrolment in primary schools/1000 pop., drop-out ratio class I-V, enrolment ratio class I-V). Then, states are ranked according to literacy rate, and scores on the four characteristics, plus the total score of characteristics. Next, the same characteristics and ranking of scores for the two districts of Maharashtra and Goa.

Third, the study reviewed trends in literacy campaigns, eventually considered in the light of uneven spatial development. Data on target, effective enrolment, achievement level III, per cent effective enrolment/target, and per cent achievement level III/target, and proposes number of neo-literates in Lakhs, enrolment in PLC in Lakhs, participation in PLC in Lakhs, per cent enrolment proposed neo-literates, per cent participation proposed neo-literates, were cross-tabulated with literacy categories at state level and district level within the two states.

The author concluded (Salanha 1999c, p. 2025) that there is “a spatial distribution that closely approximates the uneven development within the country”, then elaborating on differences between the three literacy categories.:

> “The literacy rates in the nine high literacy states suggest a 'saturation effect' with the mean growth rate in the last decadal period being the lowest for all the three categories of states and reaching a low of 6.7 percent. (---) The deprived communities and the rural areas in the high literacy states have a higher growth rate than the respective national means, suggesting a catching up on a backlog. The reverse is true for the low literacy states, regions of 'mass illiteracy' as different from the former regions of the 'residual illiteracy', with the added factor of neglect of female literacy. (---)
>
> In states like Maharashtra which heads the medium literacy states, the tribal stands marginalised and deprived of literacy within the developmental trajectory of the state. The two sectors that show the least growth rates in literacy within this state are the urban and the tribal, ironically the two extremes of a developmental continuum where commerce, heavy industrialisation and urbanisation have a high premium. The stagnation in literation within the urban areas reflects both the inability of educational infrastructure to absorb the neo-migrants from regions of deprivation, as well as the creation of such regions through the exploitation of human and natural resources of the periphery. The wider significance of this polarisation is that it is a close reflection of the distribution of literacy in states/districts of the country, with the added element of gender insensitivity.

> The tragic situation of the low literacy states is illustrated by Uttar Pradesh; a state with the lowest expectation of life at birth, the least number of doctors per lakh of population, one of the lowest sex ratios in the country, and ironically close to the highest birth rate" (op. cit. p. 2025).

Lovell (2000) addressed the relationship between uneven spatial development and inequalities in the labour market of Brazil, with a focus on white and Afro-Brazilian women and men. The study used secondary, public data, and it applied the theory of uneven spatial development as an overall frame. The statistics included: (i) regional distribution of population by colour for the years 1890, 1950, 1980, and 1991 for White, Pardo (brown), and Preto (black) in the regions Northeast, Southeast, South, and Others; (ii) selected indicators of colour and the regions of Sao Paulo and Bahia (completed 12 years and above of education; mean hours worked per week; with work card; with social security; and married); (iii) occupational distribution by sex and colour, and Sao Paulo and Bahia (administrative, professional, clerical, industrial, transport/communication, service, and domestic, plus index of dissimilarity by sex and colour; (iv) average monthly wage by colour and sex, and women as percentage of men, in regions of Sao Paulo and Bahia; (v) average monthly wage by colour, sex, and years of education (0 –4, 5–8, 9–12, 13+) in the regions of Sao Paulo and Bahia; and (v) Differentials in average wage between white men and black men, black women, and white women (aged 18–64). The last category borders advanced statistics, but overall the paper consists of descriptive statistics.

Lovell concluded that "while women and Afro-Brazilians in Brazil's most developed region had the advantage of higher levels of state sponsored work benefits (a work card and social security) and more equitable occupational and wage distribution, they nevertheless experienced the greatest discrimination." On the other hand, discrimination was lowest in "the less developed Northeast where racial and gender gaps in education, occupation and wages were the most severe, discrimination was lowest." (op. cit. p. 291). The reason is that large disparities make discrimination less 'necessary', according to Lovell.

Moldovan's (2018) study applied uneven and combined (spatial) development theory, using secondary, public data in a study of Brazilian capital in a sub-imperial perspective of how capitalism operated in the global south in the wake of the global financial crisis. The focus was on public-sector financial policy. The statistics included: (i) the financial sector, with total assets of each of the 10 largest banks, other institutions, top 10 public banks and top 10 private banks, and their share of the total in the years of 2005 and 2014; (ii) outbound Brazilian FDI each year in the period 2001 to 2012 (Angola, Argentina, Chile, Colombia, Mozambique, and Peru). The paper concluded that:

> "the state directs Brazilian capital beyond the domestic market in a coordinated way to organically concentrate and develop in markets which it experiences competitive advantages in terms of investment and exporting. This process is indicative of a new transformation of the organic compact between state banks and monopoly capital. Simultaneously, the transformation in this financial architecture has resulted in an outpouring of investment into geo-strategic areas around the south. (---) it also appears that

> specific Brazilian capitals can engage from within Brazil to act outwardly with a certain degree of autonomy from non-Brazilian actors. In his way, we can hypothetically see a movement from sub-imperialism to inter-imperialism as the impulses within monopoly capitalism strive past the constraining elements of dependency. (---) The domestic foundations of the Brazilian banking sector were re-organized in the aftermath of the crisis. State involvement and institutional redirection were directly responsible for an immediate rebound in the economy after the GFC. (---) In the case of Brazil, this demonstrates a capacity for statized parts of the economy to support capital in its reproduction abroad, despite vicious struggles in the government. This process of reproduction, however, is not the Bandung spirit manifested in international cooperation, but rather it is the hallmark expansionism of an embodiment of a particular form of imperialism" (op. cit. p. 324–325)

In a study of Thailand Lang et al. (2021) addressed uneven spatial development by focussing urbanisation. The statistical data included: (i) GDP per capita and growth rates for the periods 2000–2005, 2005–2010, and 2010–2015; (ii) urbanisation (population of primate and secondary province, and then primacy ratio, per cent share of urban population of largest city for the years 1990, 1995, 2000, 2005, 2010, 2015, and 2018; (iii) changes in nighttime light by province for the periods 2000–2005, 2005–2010, and 2010–2015; and (iv) ranks size distribution for GDP, nighttime light, population, and road network; and (v) spatial correlations for GDP, nighttime light, and road network for the years 2000, 2005, 2010, and 2015.

The study concluded that:

> "Urbanization in Thailand has been spatially characterized by high levels of uneven regional growth since the 1950s. The most developed provinces are a group of well-industrialized and urbanized economies that have received a great amount of both domestic and foreign investment across Thailand. (---) The majority of hinterland region development has lagged far behind that of the central areas. The industry and infrastructure development of the hinterland regions has strengthened points of weakness in urbanization over the years. (---) Thailand's urbanization lags behind its excessive industrialization, which has led to urban primacy that violates the balanced relationships between industrialization and urbanization. Thailand's economic development has rapidly run ahead of urbanization, which is a discrepancy on the basis of the usual correlation between economic development and urbanization. The disparity in Thailand associated with unsuccessful decentralization policies has led to inequitable economic growth and regional inequality" (op. cit. p. 145).

The study by Hadjimichalis (2009) on uneven spatial development in European regions in the wake of the 2009 financial crisis combined descriptive statistics and document studies. The latter also referred other empirically based scientific papers and policy reports, as for instance in GDP and convergence in European regions.

The spatial scale of the study was countries as European regions, and presenting secondary, public descriptive statistics: (i) global competitiveness 1996–2009 for Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain; (ii) Germany's export value 1995, 2001, 2007 to China, Japan, Southern Europe, and USA; (iii) Germany's trade balance with Greece, Italy, Portugal and Spain, 1995, 2001, 2007; (iv) Nominal unit of labour costs in France, Germany, Greece, Italy, Portugal, and Spain for the years 2000–2011; and (v) Fiscal balance of France, Germany, Greece, Italy, Portugal, and Spain for the years 2000–2009, per cent of GDP.

Hadjimichalis extensively referred and discussed uneven spatial development throughout the paper, and concluded that:

> "On the one hand, traditional economic and regional theorists are too interested in sophisticated forms of mathematical model-building to bother with the messiness of history and geography and they propose policies that are more of the same. On the other hand, NR [new regionalism] theorists are trapped in their de-politicized views; they have been unable to realize the co-optation of their models by dominant neoliberalism and have nothing to say about the current crisis. And both, by promoting competitiveness and the success of a few star regions and cities, pay scant attention to conditions of uneven geographical development across European regions, which, as I argued before, played a decisive role in initiating and maintaining the crisis" (op. cit. p. 270–271).

Furthermore, addressing specific countries, Hadjimichalis claimed that:

> "The Greek dominant classes are not innocent in their economic and regional policies, creative statistics and inefficient public sector. But neither are the European elites, particularly the German ones. Holding German labour compensation increases below productivity rises for the past 15 years (with the help of low wages in eastern regions) was a conscious policy against the German working class and towards a big trade surplus, which led to the big net SE [Southern Europe] deficit" (op. cit. p. 270)

12 Qualitative studies.

There are not so many qualitative studies, just around 20 studies, or around 8 per cent of all studies reviewed. In addition, a few studies indicated 'fieldwork' without any clear qualitative analysis. Qualitative studies are using primary data, sometimes in combination with secondary, descriptive data. Three studies were interpreting and analysing movies, two studies consisted of fieldwork (participatory) observation, and 14 studies comprised interviews, including key informant interviews, focus groups, semi-structured interviews, and structured interviews, but several just stated 'interviews', without specifying interview technique.

In a study of the Manta-Manaus infrastructural corridor project in Ecuadorian Amazonas, Wilson and Bay'0n (2017) conducted 84 semi-structured interviews with actors involved in planning and implementation of the project, as well as representatives of mestizo colonisers, members of indigenous communities. In addition, press reports and internal government documents were used, together with fieldtrip notes. The authors held that:

> "To date, not a single container has made the journey from Manta to Manaus. (---) Manta-Manaus would therefore seem to constitute a classic case of a failed spatial fix, in which overaccumulated capital in the form of oil rents has been channelled into the production of a new economic space that has been rejected by capital. But this is not the whole story. Capital has not simply rejected the project, but has repurposed its infrastructures for the expansion of the oil frontier. Manta-Manaus is therefore functioning to reinforce the economic model that it was supposed to be replacing, and this interoceanic fantasy has itself been materialized by the oil revenues through which rentier capitalism 'casts its spell over audience and performers alike"[18] (op. cit. p. 847–848).

The authors coined the concept of 'fantastical materialism' as central to the process in which "space of capital are conceived, constructed, and brought to ruin (---) This dream has become ensnarled in the material dynamics of uneven geographical development" (op. cit. p. 837). However, with just a few references, the theory of uneven spatial development is an overall frame of the study.

Kreichauf (2017) addressed the urban redevelopment of Detroit. The empirical basis of the study was (i) key informant interviews with representatives of the planning and development department of Detroit city, private real estate investor, a real estate company, a private planning agency, four researchers, and representatives of three activist organisations; (ii) interviews with 23 downtown and midtown residents and 9 shop-owners risking displacement; (iii) participatory observation of usage of public spaces in the redevelopment area; (iv) socio-economic data, city as a whole, and neighbourhoods; and (vi) policy documents.

Kreichauf concluded that Detroit, as a declining city has experienced "regeneration policies that are led by austerity approaches and few developers, resulting in the

[18] Coronil F. 1997. The Magical State: Nature, Money and Modernity in Venezuela. Chicago: University of Chicago Press.

further social polarization of the urban society" (op. cit. p. 92). Then elaborating on Detroit:

> "The case of Detroit exemplifies an urban regeneration process that is one-sided, led by austerity urbanism, and features the unequal spatial distribution of investment. This focuses on central areas and is led by a handful of private investors (*single-interest-led urban regeneration*). They see Detroit's crisis as an opportunity that allows them to reorganize institutional resources and to pick up assets at bargain prices (---). The concentration of investment in these central areas, combined with the city's low land costs, land speculation, and privatization of public services and properties, have resulted in the intensification of social-spatial disparities between Downtown's and Midtown's new urban elites and Detroit's deprived population. (---) Processes such as regeneration, gentrification, neoliberal urban policy, and the emergence of flagship projects can be found in both growing and declining cities. However, the big difference is that methods, dimensions, and composition of actors vary; in shrinking cities, such processes are intensified due to the weaker position of local governments (in Detroit's case, augmented by bankruptcy) relative to cities more centrally connected to primary circuits of capital" (op. cit. p. 92).

Theroetically, Kreichauf embedded his study in uneven spatial development, referring the concept a few times early in the paper.

The study by Fletcher and Toncheva (2021) may belong to the category of document studies because the empirical basis is previous studies, but since those studies are their own work, it is presented here. The two cases were about human–jaguar conflicts in Costa Rica and human–bear coexistence in Bulgaria. The empirical data for Costa Rica comprised semi-structural interviews with representatives of (i) state conservation agencies; (ii) domestic and international NGOs; (iii) eco-tourism operators; as well as (iv) local residents being involved in conservation and eco-tourism work. The empirical data of Bulgaria comprised ethnographic oriented (i) semi-structured interviews selected through targeting different stakeholder categories as hunters, eco-tourism guides, employees in tourism et cetera; (ii) participant observation, including bear watching excursion; and (iii) grounded in own long-term experience as mountain guide in the area. Concluding, the authors stated:

> "We have shown that both extractive forces threatening wildlife conservation and the forms of conservation employed to protect wildlife from these same forces can be understood in relation to how the capitalist imperative to continually accumulate produces distinct constellations of pressures and incentives in different contexts" (op. cit. p. 6).

Then elaborating on the two cases:

> In our Costa Rican case, global integration has currently intensified human-wildlife conflict by opening the Osa Peninsula to penetration by transnational agricultural firms whose colonization

> cannot be successfully countered by efforts to promote neoliberal conservation via ecotourism or PES [payment for environmental services]. In Bulgaria, by contrast, human-bear coexistence around Yagodina village has instead been facilitated by the country's capitalist integration under postsocialism, which, like many other places subject to neoliberal restructuring, has experienced depopulation resulting from diminishing supports for rural livelihoods (de Koning et al., 2021[19]), coupled with novel options for tourism development afforded by newfound access to international travel markets. Our analysis thus reveals that the particular ways that political-economic forces shape human-wildlife interaction are context-specific, requiring attention to the intersection between local realities and global processes" (op. cit. p. 7).

The study belongs to the mid-category regarding use of the concept of uneven spatial development, actively used in both case studies, with both external and internal forces eventually undermining financial support for the livelihood of rural faming in Costa Rica and driving uneven spatial development. In the case of Bulgaria, capitalist expansion following the demise of the Soviet bloc produced uneven spatial development, bringing Bulgaria into a semi-periphery of cheap labour. For both countries, this development impacts on human-animal interactions.

Clark and Pissin (2023) applied interviews that were presented in documentaries on farming in Europe, and then their own interviews with around 12 small-scale ecological farmers in Sweden. The focus was on potential rent versus potential lives under capitalist production. The authors concluded:

> "The objective of rentiers, the extraction of unearned income in the form of potential rents, stands in stark opposition to potentials for autonomy, wellbeing and flourishing of human and non-human lives. The seeking, performative conjuring, 'unlocking' and capture of potential rents come at an inestimable cost of potential lives. We have argued that the uncontained seeking of limitless potential rents exerts unsettling pressures to change in much broader contexts of uneven development than those analyzed in terms of gentrification, often with disastrous social and environmental consequences" (op. cit. p. 1498). (---) "Three empirical touchdowns provide concrete examples of how free-roaming interest-bearing capital in the hands of potential-rent-seeking rentiers have impacted livelihoods and the material bases for whole sectors of economies. They have also highlighted both the need for a politics of limiting the free reign of rentiers, and the capability of self-limitation, for instance among fishermen and farmers." (op. cit. p. 1499).

The study belongs to the mid-category of using uneven spatial development, referring the concept throughout the study, including in the concluding section.

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[19] de Koning J., Hobbis S.K., McNeill J. and Prinsen, G. 2021. Vacating place, vacated space? A research agenda for places where people leave. Journal of Rural Studies 82: 271–278.

13 Document studies.

Several studies are using previously published findings from own and other studies, and commonly, data sources and methods of those studies are not specified, just references. Embarking on reviewing those previous studies is beyond the scope of the review presented here. Suffice to exemplify with a few studies.

Hudson's studies of 1988 and 2002 may serve as illustrations. The 1988-study on 'uneven development in capitalist societies' had sections on changing spatial division of labour, alternative forms of organising production over space among big capitals, and small capitals, with four, three, and seven references, respectively, and five of them his own research. The 2002-study on 'changing industrial production systems and regional development in the new Europe' comprised sections on three industries: clothing, automobile, and steel, referring 20, 25, and 6 studies, respectively. Here, Hudson was (co-)author of eight studies. Many, if not all, of the referred studies are not about uneven spatial development; that is, existing research is synthesised and used for addressing uneven spatial development.

The message of Hudson (1988) was the role of capitalist production in changing division of labour and subsequently making places less profitable for accumulation of capital but still being 'meaningful' places for people. Hudson (2002) concluded that:

> "the increasingly integrated New Europe will continue to be characterized by new forms of combined and uneven development. As such, renewed divergence in the map of regional economic performance and well-being can be expected. (---) there will continue to be great diversity in national and regional economic organization and performance. Understanding this diversity is a central task for analysts of the changing nature of the geographies of production systems and of regional economies in a still enlarging Europe" (op. cit. p. 275–276)

A third example is Dunford et al.'s (2021) study on the longue durée development of China from the year 1500 to the beginning of the 2000s, adopting a global scale perspective of uneven and combined spatial development. The study was drawing on historical and contemporary studies, presented in sections on the early period of technological discovery; growth and crisis; industrial and regional development; reform and opening-up; and China's recent return, with about five, four, ten, eight, and six referred studies. The study concluded that:

> "In the 19th Century a combination of the stagnation of China's Smithian market economy and China's inability to resist colonial powers militarily opened the way to a century of humiliation, crisis, economic decline and spatial economic re-orientation with some development of modern industries and an industrial working class in coastal areas. The arrival of Communism in China was a case of combined development which opened the way to an ultimately successful revolution, the establishment of the new China in 1949 and cooperation with the Soviet Union to accelerate socialist industrialization in the Northeast and parts of Central China. In the 1970s a whip of economic and political necessity in the shape of

> the earlier deterioration in relations with the Soviet Union and a quest for four modernizations to overcome China's continuing relative under-development was associated with the establishment of a new international context in which China could draw on latecomer advantage and institutional capacity to jump steps and embark on an extraordinary wave of catch-up industrial and urban development. As in the semi-colonial phase, combination with inward investment and technology saw the weaving of external relations into the conditions created by China's path, creating complex articulations of traditional, reform and modern structures and relationships and dynamic reconfigurations of regional and urban economies in space and time" (op cit. p. 910–911).

This study extensively applied the theory of uneven development, and argued for the use of uneven and combined spatial development, with a regional and global perspective

14 Concluding

The *section on theoretically oriented publications* (peer reviewed) shows that the field of uneven spatial development is dominated by critical and Marxist approaches. This is not surprising due to the role played by UK scholars having much of their formative years under Thatcher and the emerging neoliberal hegemony. Furthermore, several of those scholars continue to have a central position within the field, still contributing to its development. One example of this is Eric Sheppard, with work on connectivities and positionality as part of conjunctural analyses, and the role played by territories and regions of the 'raggedy fringes', exemplified by Jakarta, Indonesia. Among younger scholars, the work of Marion Werner should be noted; addressing uneven spatial development from the perspective of global production networks and discussing the socio-natural dimension related to uneven development.

In recent years, the concept developed by Trotsky on uneven and combined development has received much attention, but apparently not so much taking an explicit spatial perspective due to dominance of the disciplinary field of 'international relations.' Nevertheless, contributions by Michael Dunford and Ray Hudson contribute to bring the spatial dimension to the study of uneven and combined development, but more work seems necessary in this respect.

Neil Smith's (1984) analysis of uneven spatial development comprised 'nature', but as he later (2010) underlined it was insufficiently theorised. Marion Werner's recent contribution (2022) is useful regarding global production networks but embedding it into uneven spatial development appears in need of further theorisation, and this also applies for uneven and combined development. Werner cites Jason Moore on 'Capitalism in the Web of Life' (2015), but Moore's work could be used more actively for theorising nature as part of uneven (and combined) spatial development.

The section on empirical oriented publications showed that most of these studies were embedded in theories of uneven spatial development. The reviewed studies have been categorised as applying advanced quantitative statistics, descriptive statistics, qualitative studies, and document studies. Most of the quantitative studies use secondary data, often public statistics. Qualitative studies, on the other hand, mostly use primary data, but also in combination with descriptive statistics. Many studies combine different methods, but commonly with an emphasis on one of the categories.

Among studies using advanced statistics (OLS-)regression analyses are common, but also principal component analysis, cluster analysis, and factor analysis. Furthermore, Gini-coefficient and Theil index for measuring inequalities, Kennel's density distribution, convergence technique, local indicator of spatial association, Foley-Michl accumulation equation, unit roots tests, Thiessen polygon, and others. In short, several statistical methods are being used. It also appears that many of these studies just refer uneven spatial development a few times.

Similarly, studies mainly using *descriptive statistics*, apply a diverse range of statistical indicators: (socio-)economic, (socio-)demographic, labour market and industrial composition, transport and communication, et cetera. The choice of indicators is contingent on focus on study, but also access to data. Empirically oriented *document studies* draw upon existing research for analysing uneven spatial

development, with author(s) using own and others' research. Among these studies, scholars are re-interpreting existing findings to discuss and reveal uneven spatial development patterns and processes. In these two categories, several studies have a stronger focus on theory than what appeared to be the case in the category of advanced statistics. Qualitative studies are commonly using primary data in the form of interviews.

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