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Rethinking human capital, creativity and urban growth

Michael Storper and Allen J. Scott***

Abstract

Do jobs follow people or do people follow jobs? A number of currently prominent approaches to urbanization respond to this question by privileging the role of individual locational choice in response to amenity values as the motor of contemporary urban growth. Amenities, it is often said, have an especially potent effect on the migration patterns of individuals endowed with high levels of human capital. However, these approaches raise many unanswered questions. Theories that describe urban growth as a response to movements of people in search of consumer or lifestyle preferences can be questioned on the grounds of their assumptions about human behavior, as well as their silence in regard to the geographical dynamics of production and work. We argue that a more effective line of explanation must relate urban growth directly to the economic geography of production and must explicitly deal with the complex recursive interactions between the location of firms and the movements of labor. In this context, we also offer a reinterpretation of the currently fashionable notions of 'creativity' and the role of skilled labor in cities.

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1. The enigma of urban growth

One of the most complex enigmas of contemporary social science concerns the causes of urban growth and associated spatial patterns of population movement. This enigma can be expressed in various ways, but one version that crops up periodically in the literature is framed by the question: do people move to jobs or do jobs move to people (cf. Muth, 1971; Mazek and Chang, 1972)? A long tradition, going back at least as far as Weber (1899), sees urban growth as an outcome of industrialization (in the broad sense) and concomitant processes of local economic development. In recent years, an alternative body of research has risen to a position of prominence in which regional economic development processes are treated not so much as the driver of urbanization, but rather as effects of population dynamics. We draw special attention to three principal claims set forth in the latter line of research. The first of these claims is that spatial patterns of human capital can be directly accounted for in terms of preference-seeking on the part of individual workers. The second is that this preference-seeking is

*Department of Geography and Environment, London School of Economics; Master of Public Affairs, Sciences Po, Paris; School of Public Affairs, University of California, Los Angeles.
**Department of Geography, University of California, Los Angeles.

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focused on the qualitative attributes of places, and above all on the amenities that they offer. These claims lead on to a third contention, namely, that workers selectively migrate to cities that are favored with relevant amenities and that this then accounts for urban growth. In particular, places that can attract workers with high levels of human capital, it is said, will grow with special rapidity because of the entrepreneurial, creative and innovative energies that these workers carry with them.

Our objective in this article is to examine these claims in more detail, to highlight what we take to be their essential shortcomings, and then to lay out an alternative theoretical framework for approaching issues of urban growth. We begin with an admittedly lengthy review of recent arguments that amenity-driven population dynamics are critical to explaining urban growth. This review is necessary in order to pinpoint the essentials of these arguments and to initiate a critical rethinking of the question of how cities grow. Our own argument is that the key to this question can be found in the spatial logic of productive activity and that individual choices about residential location are profoundly shaped by the possibilities and constraints created by this situation.

2. Amenities, human capital and urban growth: three approaches

2.1. Background

Human capital figures as one of the central elements of modern economic growth theory. In the Romer–Lucas model, long-run growth is rendered possible by increasing returns to scale, whose source is identified as knowledge. For its part, knowledge has a tendency to grow indefinitely, for it can be endlessly re-used, is extremely leaky (and hence its circle of users continually expands), and can be combined and recombined in virtually unlimited ways. This endogenous growth theory raises the empirical problem of the specific conditions that enable knowledge to increase over time. One major line of explanation centers on the embodiment of knowledge in better educated, more productive people, and this is the human capital branch of growth theory most closely identified with Lucas (1988). Other branches emphasize the productivity of the R&D sector, cognitive capacity, institutional arrangements (with both positive and negative effects) and a host of additional possible influences on the accumulation, application and diffusion of knowledge (see Jones, 2004, for a review of microeconomic aspects, and Lundvall, 1992 for institutional dimensions).

Knowledgeable people, of course, are not evenly distributed in geographic space. In a multi-region open economy with high levels of population mobility, the map of human capital is constantly being reshaped by labor migration. In addition, human capital is in part created *in situ* by means of education, training, on-the-job learning and broad processes of socialization. Human capital may also be created via interactions between appropriately matched or complementary individuals. In turn, the resulting stock of human capital of a city affects its economic performance in a variety of ways. There can thus be no denial of the importance of investigating the forces that influence the movements of people, that contribute to changes in the geographical distribution of human capital, and that hence might play a role in local economic growth. But how should we investigate these matters? The theories that have become prominent in the urban growth debate in recent years all suggest that the locational choices of individuals with high levels of human capital are made principally in response to features of the urban environment that we can generally call 'amenities'. Three notably influential

contributions along these lines include (a) Florida's 'creative class' theory, (b) the research of Glaeser and a number of co-workers focusing on a widely ranging set of amenities—both social and natural—that they claim underlie urban growth and (c) Clark's notion of the city as an entertainment machine.

2.2. Technology, talent and tolerance: the creative class

Florida (2002, 2003, 2004) has proposed that attracting and retaining a 'creative class' is fundamental to regional economic dynamism. Florida's identification of the creative class with 'people who add economic value through their creativity' is explicitly intended to go beyond approaches based on traditional human capital indices (Florida, 2004). The creative class is defined by procedures that variously entail (a) sorting out relevant occupations on the basis of workers' educational levels, (b) combining these with occupations characteristic of 'knowledge intensive sectors', (c) including additional occupations representing workers who operate 'in unique ways to fit the situation' and who 'exercise a great deal of judgment' and finally (d) adding in 'artistic' occupations. Thus, the method comes at 'creativity' from several directions (education, sector, vocation) to yield a set of occupations that then identify the 'creative class' and its 'super creative core'. There is now a literature that attempts to compare the performance of creative class variables defined in this manner to standard education-based variables in accounting for urban growth. In statistical terms, most analysts conclude that creative class variables perform only marginally differently—sometimes slightly better, sometimes slightly worse—from the standard measures (Wojan, Lambert and McGranahan, 2007; Rauch and Negrey, 2006; Donegan et al., 2008).

Florida elaborates a theoretical model which holds that the presence of the creative class in any given place leads to local 'creativity', and this then positively affects regional economic growth in the form of high levels of innovation and the expansion of creative and technology-intensive sectors. Florida claims that creativity is the result of 'social interaction', 'authenticity' and 'identity', which together generate the 'power of place' and hence regional dynamism (Florida, 2002, ch. 12). The notion that interaction among individuals leads to positive growth effects is, of course, consistent with the wider literature on learning and knowledge spillovers in local labor markets. Most research on this matter suggests that people learn from one another within structured production communities, as represented for example by distinct spatial clusters of employment or patenting activity (e.g. in information technology; pharmaceuticals/life sciences; financial services) (Feldman, 1994; Acs, 2002; Sonn and Storper, 2008). Florida implies that the basis for creative interaction is established simply by the co-presence of creative people in any given locality, and—unlike most theories of innovation—pays no attention to any additional processes that channel and stimulate such interaction.

By contrast, Florida is quite clear on how and why creative people congregate together in the first place. The basic variable at work in this regard is the amenities to be found in any given locality. The principal amenity said to act as a magnet for the creative class and to enhance creativity in general is tolerance. Since tolerance cannot be observed directly, it is indicated, according to Florida, by diversity, which in turn is measured by a composite index of the incidence of bohemians (artists), gays and foreign-born in the population. Individuals in these groups are seen as basic tracking molecules, symptomatic of an atmosphere of openness, forbearance and possibility (i.e. tolerance) that is claimed to be especially attractive to the creative class. Diversity and

tolerance are yet further intertwined in that the latter is said to be associated with low barriers to entry for recent immigrants because it reduces the likelihood of potential social and cultural frictions. The basic notion behind all of this refers back to the classics of urban sociology, notably Tönnies (1887, 1957), to the effect that there is something about a climate of openness in cities that frees individuals from the chains of tradition or anxieties about being judged, and that encourages people to be more imaginative and inventive.

Florida draws on this notion, and Jacobs' (1969) extension of it, to claim that a particular group—the 'creative class'—will converge on places where diversity and tolerance abound. The accumulation of high levels of human capital in these places in turn incites creativity (through interaction), and creativity then leads on to regional economic dynamism in the guise of job growth and rising per capita income.

2.3. Glaeser and Co.: neoclassical resurgence

A second major branch of the amenities and human capital theory of urban growth has emerged from the work of Edward Glaeser and his colleagues. In a summary statement, Glaeser (2005a) suggests that two factors, skills and climatic amenities, are of paramount importance in urban growth. Climatic amenities are identified primarily in terms of warm dry winters, but other amenities may also play a role, thus potentially offsetting the role of climate. Glaeser (2005a, 1) argues that in cold places, 'attracting growing numbers of high-skilled workers requires that government provide high-quality public schools, safe streets and neighborhoods, and reasonably priced housing in cost-effective and equitable ways'. Moreover, consumer amenities are becoming increasingly important in all types of places, for 'places oriented to consumers have grown relative to places organized around production' (Glaeser, 2005a, 1).

This large body of work is based on econometric analyses in which the many different forces that are thought to influence urban growth are simultaneously considered. We should note straight away how different factors are integrated into the explanatory models. First it is assumed that there is a traded sector of the economy in which individuals trade wages for goods, and an untraded sector comprising amenities that individuals can access free of charge. Second, markets for products, labor and land clear to equilibrium. The latter proposition means that background complexities residing in the space-economy of production are neutralized, in the words of Shapiro (2005, 4), by the assumption of 'a world of identical firms', and 'equilibrium in production, which requires that all firms be indifferent between locations'. Third, however, random shocks (due to technological change, for example) do occur from time to time so that periodic adjustments come about in the choices made by individuals and firms.

Hence, after the 1940s, the invention of air conditioning and medical advances in the treatment of tropical diseases 'tilted growth toward warmer metropolitan areas' in the United States (Glaeser and Tobio, 2007). Concomitantly, the development of new truck and car transport technologies essentially liberated cities from the constraint to be located near railway lines, coasts and rivers (Glaeser and Kohlhase, 2004). Taken together, these developments encouraged individuals to vote with their feet for warm and dry winters, thus leading to the first economic stirrings of the modern Sunbelt. Initially, the Sunbelt cities provided abundant access to land and this, combined with

the private passenger car as a preferred mode of transport, helped to generate low-density suburban life-styles focused on single-family housing. There can be no dispute that cities everywhere in the United States were marked by high levels of suburbanization in the decades following World War II. Glaeser, however, specifically claims that preferences for suburbanization or 'sprawl' helped further to shift inter-metropolitan growth patterns to Sunbelt cities not only because of cheap and abundant land and hence relatively low house prices, but also because of rising distaste for commuting by means of the antiquated public transport systems characteristic of the cities of the Northeast (Glaeser and Tobio, 2007).

If Sunbelt cities became attractive because they have dry, sunny climates and sprawling suburbs, urban growth has nonetheless rebounded in other parts of the country where what Glaeser and Gottlieb (2006) call 'consumer cities' offer amenities such as diversified entertainment opportunities, cultural facilities or high quality restaurants (Glaeser, Kolko and Saiz, 2001). That said, access to the amenities and consumption opportunities of most of the large, dense cities in the north and east of the United States was until recently much devalued on account of their high rates of violent crime (Glaeser et al., 2001; Glaeser and Gottlieb, 2006). Over the 1970s and much of the 1980s, then, the growth of Sunbelt cities remained largely unchallenged. Once crime rates were brought down in the large dense cities of the north and east, their amenity value (notably for individuals with high human capital) once again began to rise, leading to discernible urban resurgence in that part of the country (Glaeser and Shapiro, 2003). Hence, Boston's population declined from 1950 to 1980, but since then a resurgence has occurred because skilled (educated) people are attracted to the city's now rising amenity values and 'higher skills have a much greater impact on growth rates in cold-weather metropolitan areas than in warmer areas' (Glaeser, 2005a, 4; Glaeser and Berry, 2005).

Simultaneously, at least some of the bloom has seemed to come off much of the Sunbelt. Over the 1980s and 1990s, productivity growth in the South slowed (but this is not explained) while housing supply growth continued apace, leading to concomitant reductions in the relative prices of houses in the Sunbelt. The decline in relative house prices is interpreted as indicating that the amenity value of the Sunbelt's sunshine has weakened in recent years. We are not told exactly why appreciation for sunshine appears to have diminished in this way. One possible explanation could be that the effect of climatic variables is now outweighed by the generalization of sprawl to the suburbs of northern metropolitan areas (for example, average density in the Boston and Washington, DC metropolitan areas is now lower than that of Los Angeles). Glaeser and Tobio (2007) argue, as well, that perhaps the old metropolitan areas of the Northeast became newly attractive because the lower crime rates have reduced the social cost of access to their central city consumption opportunities. However, Glaeser, Gyourko and Saks (2006) caution that house prices remain higher in the cities of the Northeast than in warmer and newer urban areas because no-growth movements in older cities restrict housing supply.

Another reason why the highly skilled appear once again to prefer northern and eastern cities, is that skilled workers may be more productive when surrounded by their peers (Glaeser, 1999; Glaeser and Maré, 2001; Glaeser and Shapiro, 2003). Thus, 'cities exist in part to facilitate learning between individuals who come into contact with one another' leading in turn to an urban wage premium (Glaeser, 2005a, 18). There is unquestionably a kernel of truth within this statement but we again

suggest that its edge is lost by reason of the wider theoretical vacuum within which it is presented.[1] As it is, Glaeser goes on to caution that some of the wage premium may be dissipated in the form of higher housing prices. The growth of 'skilled cities' is therefore a delicate, knife-edged phenomenon: the skilled will only continue to congregate together in particular places if they can gain access to specifiable consumer benefits, which entails maintaining an adequate supply of relevant amenities and keeping crime rates low, but this process of congregation will be undercut if workers' wage gains are taxed away through higher housing costs. All in all, then, the work of Glaeser and company argues that the geography of urban growth depends ultimately on complex tradeoffs across a palette of amenities and consumer preferences, including climate, various dimensions of the quality of life, housing costs and opportunities for wage-enhancing interaction. From these analytical materials, our authors then derive a picture of a spatially variegated landscape of portable skills, and, as a consequence, wide differentials in patterns of urban growth in the United States.

2.4. The city as sand box

A third version of the amenities-and-human capital theory of urban growth can be found in the economic sociology literature, exemplified by Clark et al. (2002), who claim, bluntly, that 'amenities drive urban growth'. By amenities they mean specifically urban 'attractions' such as parks, museums, art galleries, orchestras, signature buildings and so on. They begin by asserting that in regard to processes of urban economic growth, 'there is a relative decline in the explanatory power of classical variables affecting the economic base (like distance, transportation costs, local labor costs and proximity to natural resources and markets)' (Clark et al., 2002, 497). It follows that in a 'post industrial' and global environment, 'the informational city implies the city of leisure' (497), and this is based on the circumstance that there is a general 'rise in leisure pursuits compared to work'. Leisure activities in turn require a network of amenities in the form of relevant infrastructures and services, and the whole is sustained by the 'more affluent as a new class'.

The same attractions transform these cities into 'entertainment machines' reflecting the ways in which global media 'redefine consumption desiderata' (Clark et al., 2002, 494). The authors link this latter point specifically with urban economic performance through amenity-based tourism. The main driver of social and urban change today is the rise of the individual consumer, and this is also reflected in 'a decline in large bureaucratic decision-makers in both the public and the private sector' (497). Clark et al. then somewhat paradoxically suggest that civic leaders and non-governmental organizations react negatively when their cities lag in the creation of amenities and entertainment, and that in these circumstances they will tend to push for more aggressive development. An important goal of such development is to reconstitute the city as a 'global democracy'. In other words, local political agendas compete to keep up with the democratizing culture of globalization—sometimes described as consumer-driven and at other times as leadership-driven —and this is reflected in how well

1 In other words, and to anticipate some of our later argument, the statement is undermined by the failure to carry the insight further forward by relating it to the concrete characteristics of production and work in given areas and the path-dependent dynamics of urban growth. Note also that the statement fails to relate skilled worker interactions to the clustering of firms, a point to which we return below.

city-regions supply world-class amenities. In this manner, the modern metropolis proceeds through a metamorphosis from the rather desolate type of sandbox, as envisioned by Sternlieb (1971) just after the peak of the post-war economic development cycle, into an updated version now dedicated to play, distraction and self-absorption. It is the recent and greatly expanded demand for these benefits that converts amenities into the primary motor of urban growth today.

We should point out that it is far from our intention here to deny that there has been a notable expansion of different kinds of leisure facilities and other attractions in many cities of late years. However, Clark et al. go well beyond this uncontroversial point to claim that such facilities are the principal way that cities nowadays become viable participants in the globally competitive race for resources and inward investment.

3. Puzzles and paradoxes of amenities-based theories of human capital accumulation, creativity and urban growth

Though there are several detailed points where we have little disagreement with these approaches, we part company from them in regard to their basic theoretical assumptions, and above all in regard to their overwhelming emphasis on the force of sovereign individual locational choices in relationship to amenity values as the key generator of patterns of urban growth (and decline). We now turn to a brief statement of what we take to be some of the more glaring gaps in these approaches, after which we proceed with an attempt to reconstruct the theory of urban growth on what we take to be more secure foundations.

First of all, the accounts that we have examined are in essence devoid of any consistent analytical description of the factors underlying the origins of urban centers. We make this point at the outset, because any approach to urban dynamics that is not clearly linked to a basic logic of genesis and early growth must be deficient with regard to its central conceptual capabilities, in the sense that explanation will now be confined to marginal or intermediate adjustments, as opposed to core processes. Accordingly, important forces endogenous to urban growth will be systematically underestimated. The types of models examined above implicitly and necessarily assume the pre-existence of urban centers because this is the condition for subsequent amenity-induced adjustments to occur. But what accounts for the existence of these cities to begin with? If we consider only natural amenities such as sunshine, then it is necessary to explain why, at certain moments, they move up or down in preference rankings. These observations lead to several questions to which any viable theory must offer a response. At what point do individuals recognize a place as offering this or that amenity, and at what point does such recognition begin to spark off growth? How does a sufficient concentration of skills offering an effective opportunity for interaction emerge in the first place? More crucially, how and why do specialized accumulations of highly skilled individuals (such as actors and directors in Hollywood, or semiconductor engineers in Silicon Valley) come to characterize individual places—as opposed to accumulations of randomly assorted members of the creative class? In the light of these questions, and in anticipation of the later discussion, we for our part submit that an economic geography of urban growth that takes seriously the spatial logic of production can simultaneously account for how, from small initial events, clusters of economic activity grow and evolve on the basis of various kinds of external economies and how they then are

reinforced through circular and cumulative growth (see, for example, Scott and Storper, 1987; Storper, 1988, 1989; Arthur, 1990; Fujita, Krugman and Venables, 1999; Feldman and Braunerhjelm, 2006).

A second weakness in each of these theories concerns the identification of the preferences that are held to motivate locational choice and urban growth. All of them select observable characteristics of places (warmth, diversity, low-density, high-density, cultural amenities, tolerance) and then proclaim that these features must coincide with the ordered preference structures of those who have chosen to live there. How can we be sure that the purported preferences are real (and not just self-affirming inductions from correlation coefficients) and that they really underlie the alleged resulting action? In brief, these theories are open endemically to what Joan Robinson (1962) referred to as the 'impregnable circularity' of certain neoclassical lines of reasoning: For example, if we observe a significant tendency for individuals of type x to live in proximity to attributes of type y it follows that the same individuals must have a 'revealed preference' for y; revealed preference then accounts for their presence in proximity to y; how do we know this? *Because they live close to y*. In order to move from tautology to verification we would need to complete at least two additional steps. First, we must have some assurance that real preferences coincide with so-called revealed preferences. Second, and more significantly, we need to scrutinize the conditions under which distinctive bundles of opportunities and constraints are created, and that hence make it possible (or not) for individuals to engage in this or that form of action. We shall pick up on this issue again in the next paragraph, but for now we can simply aver that however much individuals prioritize say, sunshine, in their ordered preference functions, they cannot make it a permanent part of their lives if they do not simultaneously have opportunities for earning a living.[2]

Our third major line of critique turns upon a set of issues that can best be elucidated by considering the historical geography of the American space-economy in the 20th century. In the 1920s, the Manufacturing Belt flourished as a major regional concentration of industrialization and urbanization. We might make the (far from implausible) supposition that many of the inhabitants of this region, had they been asked, would have expressed a strong preference for warmer over colder winters. Obviously, practical satisfaction of any preference for warm winters could only be obtained by migrating to other parts of the country. Why then did significant out-migration from the Manufacturing Belt to the Sunbelt only begin in earnest in the late 1950s? Glaeser's answer to this question entails consideration of the fact that air conditioning had not yet been invented so that that despite the warm winters of the Sunbelt, the high summer temperatures were a disincentive to migration. Since we are playing fast and loose with preference structures in relation to technology, we might offer the observation that the 1920s represents a period in which the widespread advent of central heating had not yet occurred and that a felicific or utility-maximizing calculus of the type that underlies Glaeser's models should surely therefore have resulted in

2 A further critique of economists' treatment of tastes and preferences can be made on the grounds that these are in any case highly endogenous, and that if some individuals move from one place to another in order to change their situation, others simply adapt to their current circumstances through processes of socialization and habituation (see Trigg, 2001).

much higher migration rates to the Sunbelt, especially those with the optimal combination of winter and summer weather. As it happens—and for reasons that have absolutely nothing to do with climate—a number of Southern cities flourished remarkably well before the development of air conditioning. For example, Charleston attained its peak population rank in 1790, Norfolk in 1800, Richmond in 1820, and New Orleans in 1840.

We may ask, in addition, why was it that during the post-war years when preferences for warm winters, abundant land and cheap housing were operative according to Glaeser et al., all places endowed with these assets did not grow equally? What we observe is that over the 20th century there have been many different developmental episodes in different Sunbelt cities. Thus, San Francisco and Los Angeles can be counted among the top 20 US cities as early as 1910; Houston followed in 1940, and Dallas in 1950; San Diego and Atlanta entered the top 20 in 1970. Even today, rates of growth among the different cities of the Sunbelt are quite uneven, as are income levels. In addition, some cities in the north and east started to do very well from 1990 to 2000, after a long period of decline in employment opportunities. Glaeser's work asserts that this state of affairs can be accounted for in terms of declining marginal utility in regard to warm winters and because skilled individuals now want to interact creatively with one another. The timing of these alleged preference shifts is evidently not seen as being in any sense in need of explanation. Invocation of decreasing crime rates in the growth of the Northeast in the 1990s appears to be yet another case of special pleading. Although on average crime rates declined nationally, and declined more in certain Rustbelt cities (but not all) than in the Sunbelt, it must be remembered that even with decline, the murder rates in Dallas, Houston and Phoenix remain substantially lower than those of New York, Chicago and Philadelphia (Travis and Waul, 2002).

Our fourth and final point concerns the argument marshaled by Florida about the relations between talent, tolerance and technology on the one hand and successful cities on the other. Tolerance is critical here because Florida sees it as a primary preference on the part of the creative class (the source of talent and technological innovation), and hence as a major factor in guiding decision-making and behavior of members of this class in regard to residential location. An obvious and immediate response to this idea is to ask, how and when did tolerance, or its suggested operational expression, diversity, become a functioning preference for people with talent, and with what degree of confidence can we subscribe to Florida's hypothesis (including the notion that a tolerant milieu is conducive to creativity)? No doubt most of us would have little difficulty in accepting the claim that tolerance for cultural diversity and minority lifestyles is much greater now in many American metropolitan areas than it was, say, half a century ago. But this same tolerance is also accompanied by huge overlays of indifference, narcissism and separation, or, at the very least, an exaggerated possessive individualism of the sort that has so often been ascribed to urban elites in contemporary America (cf. Macpherson, 1964). Inferences based on diversity measures, moreover, are highly sensitive to the spatial scale of data analysis. Most of today's great city-regions are marked by social diversity at the regional scale, but they are equally marked at the more detailed scale by deeply rooted local spatial segregation along the lines of class, color and lifestyle as well as by much inter-group conflict and increased political polarization (Bishop, 2008). The very same talented individuals who are claimed to be so motivated by tolerance and the quest for diversity typically live for the most part in

upscale and relatively homogeneous neighborhoods, often in the suburbs[3] and in any case significantly removed in social and spatial terms from the populations that are supposed to offer what we might call 'diversity externalities'. Even the much-vaunted gay communities that play such a prominent role in Florida's vision of the vibrant city are significantly set apart from the rest of urban space in most large American cities. This is probably why Florida and his co-workers seem now to be abandoning their earlier faith in the proposition that talent is associated with the diversity index (Florida, 2002). In a recent paper (Knudsen et al., 2008, 472), they note 'the insignificance of both the bohemian and gay indices' in accounting for regional innovation patterns in the US, and instead align themselves with Glaeser on the importance of interaction among skilled workers, as measured by employment density.

While clearly the presence of appropriately skilled and talented people is essential to innovation, it strains credulity to suppose that members of the creative class move about the economic landscape as though they were principally in search of amenity-based gratification. Equally, we dispute the idea that bringing them together in particular places is sufficient in and of itself —and in the absence of further enabling conditions—to generate innovation and innovation-led growth in different sectors of the economy. In fact, innovation processes are always grounded in a much wider historical and geographic frame of reference. The relevant question to ask here is what specific circumstances sustain and account for the different kinds of innovative impulses that prevail in different places and time periods (e.g. religious painting in 15th-century Florence, textile machinery inventions in 19th century Lancashire, advances in microelectronics in Silicon Valley from the 1960s onward, the sustained creativity in mechanical engineering in Bavaria, the elaboration of complex financial instruments in the City of London today, and so on)? And, as a corollary, why do some places remain leaders, over long periods of time, in production and improvement of specialized goods, services, knowledge or cultural activities, while others flourish for brief periods and then eventually stagnate and decline?

4. Reconstructing theory: urban growth and the dynamics of the space-economy

4.1. The geographical dynamics of production, work and residence

All economically advanced societies are marked by high levels of urbanization. The short-hand reasoning underlying this observation is that the productivity of capital and labor is greatly enhanced where selected units of each come together in geographic space to form interconnected systems or agglomerations of firms and workers. In these agglomerations, productive activity (industrial, service, retail, etc.) is functionally fragmented into complex divisions of labor, and then brought back together again through processes of economic coordination—in the form of traded and untraded interdependencies—between firms and within labor markets. These processes are especially forceful in the case of activities with high levels of mutual complementarity but whose interactions incur high costs per unit of distance.

3 A point supported by Glaeser's (2005b) work. Note the difference between Glaeser's view that key amenities sought by the skilled involve suburban sprawl, and that of Florida, where the skilled look principally for urban vitality and diversity.

They are further undergirded by the emergence of localized external economies of scale and scope and lumpy infrastructures. The resulting agglomerations form a complex organizational and spatial mosaic, and are, in addition, caught up in long-distance inter-agglomeration trading relationships. The size, density and sectoral features of these agglomerations vary enormously from one case to another depending on their detailed economic lineaments. Moreover, in response to this primary form of agglomeration, additional clustering comes about by the establishment of households in the labor catchment areas of production centers. A host of other social and political phenomena (transport networks, socially distinctive neighborhoods, institutions of governance and so on) emerge within these nuclei of economic and social activity, thus restructuring and reinforcing the urbanization process as a whole. In the absence of this basic dynamic of agglomeration (and the concomitant spatial unevenness of economic activity), cities as we know them would probably be little more than, say, basic service hubs, or simple aggregations of like-minded individuals, or specialized centers of administrative activity, but in any case, strictly limited in size and overall complexity.

As they start to grow, these agglomerations assume a characteristic developmental dynamic that we can identify, following Hirschman (1958) and Myrdal (1959) as a process of circular and cumulative causation. Growth of output has a positive impact on further output growth (via increasing returns to scale in the production system) and hence on the expansion of the labor market; expansion of the labor market in turn influences output levels through the home market effect as well as through positive impacts on learning and innovation in relevant technology fields; and so on, in round after round of path-dependent urban expansion. A corollary of these remarks, by the way, is that cross-section regression analyses of urban growth are always deeply problematical because they suggest unidirectional and synchronic patterns of causality, whereas causalities are in practice both multidirectional and diachronic. To be sure, cities sometimes decline, as for example, when markets for their products dry up, or when their industrial base is subject to employment-reducing technological or organizational change. Cities are also sites of negative externalities that may impede local growth, and local governments typically engage in urban planning interventions in the attempt to reduce obstacles to continued expansion. However, there is nothing inevitable about growth or decline. Thriving urban areas grow over long periods through processes of successful market contestation and sectoral succession, facilitated by relevant adaptations within the local labor market and overarching institutions. Sectoral succession compensates for slack in the economic base resulting from employment losses in older sectors due to waning competitiveness or relocation. The degree to which any particular city manages these transitions with success is highly variable, thus leading to very different outcomes on population, income, and growth from one urban area to another (Storper, 2008).

As noted, the urban economy as a whole is a multifaceted phenomenon that incorporates not only grids of specialized and complementary firms, but many other elements, such as skilled and unskilled labor, social networks, institutions of collective order, and so on, and it could not, indeed, survive without them. All that being said, we want to avoid the agnostic position that simply characterizes urban growth as a chicken and egg problem in which everything depends more or less on everything else in an inter-temporal sequence that has no decipherable privileged moments. On the contrary, and to repeat, the basis of the urban dynamic resides in the formation of localized

economies of scale and agglomeration processes in relationship to the ongoing organizational and geographical fragmentation of production. These processes operate right from the earliest moments of urban development. The interesting theoretical question about the genesis of cities, is not so much where the initial seed of development is planted (e.g. at a concentration of resources, via an initial technological/commercial breakthrough, or, more challengingly for our purposes, at random) but how the seed then unfolds in a process of growth and development. As we have implied above, the answer to this question can best be found by conceptualizing the process in terms of the gradual emergence of an organized production system that is increasingly locked into the initial location by its own expanding stock of agglomeration economies in a temporal dynamic of circular and cumulative causation. This process is rather like the logic of self-fulfilling prophecies as described by Krugman (1991). Only if the urban economy is thought of in these ways can we account for one of the central, long-term paradoxes of modern economic development, namely, the fact that high-cost, high-wage cities continue to grow, even in the face of enormous long-term reductions in transport and communications costs.

High-wage metropolitan areas in developed economies continue to grow over the long run precisely because their internal economic synergies remain at a high pitch (including their capacity to sustain elevated levels of innovation in products, services and techniques) while external markets become ever more accessible through ongoing declines in unit trade costs. Thus, while human capital and skills are most certainly indispensable to urban growth, they clearly cannot be taken as basic independent variables that precede economic development in either the order of analysis or the order of time; and it follows that they do not constitute original moments of urban genesis. Furthermore, it is now obvious that any reasoned discussion of the role of human capital and skills in urban growth must take directly into account their specific substantive content in relation to local productive activities. In other words, we typically do not observe in empirical reality agglomerations of arbitrarily assorted workers (whether members of the creative class or not), but rather clearly selected types of workers and skills, associated with definite sectors or activities, in particular places. This sorting is primarily an outcome of local productive specialization.

Two important corollaries of these remarks follow at once. In the first place, if we are correct in our claim that it is production and jobs above all that drive urban prosperity, then it follows that the supply of social, material and economic amenities will be very largely endogenous to the urban growth process rather than an exogenous driver. In the second place, and concomitantly, should we actually observe a genuine causal relationship (as opposed to a statistical artifact) linking amenities and in-migration to cities, then we would also expect the relationship to be of marginal importance when compared to the dynamics of job creation.

4.2. The changing structure of the American space-economy over the 20th century

One of the most striking illustrations of our theoretical framework can be found in the contrasting fortunes of the cities of the Manufacturing Belt and the Sunbelt in the United States over the 20th century. Much recent work by economists and others has approached this issue as either a function of changing factor mobility (e.g. Kim, 1995; Kim and Margo, 2004), or, as we have seen, as a reflection of shifting tastes and

preferences (Glaeser et al., 1992; Glaeser and Tobio, 2007). Actually, we have some sympathy for the changing factor mobility approach. High mobility costs in the earlier part of the 20th century helped to anchor growth in the dominant Manufacturing Belt, whereas falling mobility costs in the latter part of the century certainly contributed in part to the growth of the Sunbelt. But this approach fails signally to problematize the wider locational dynamics of production, and overlooks entirely what must surely be seen as one of the most critical episodes in the historical geography of the United States, namely, the crisis of the mass production system that lay at the core of the Manufacturing Belt, and the resulting near-collapse, in social and economic terms, of many of that region's principal cities.

Consider, to begin with, the long development of the Manufacturing Belt itself. During the early period of intense industrialization of the United States in the second half of the 19th century, manufacturing underwent a complex series of organizational and locational transformations. Geographical centers of gravity formed around networks of industries and local labor markets, initially on the East Coast. With each new wave of industrialization, additional centers sprang up on the basis of specific manufacturing sectors, leading to the growth of numerous specialized industrial cities between the East Coast and the Mississippi River and generally north of the Ohio River. This powerful, multi-centric system continued to grow throughout the first several decades of the 20th century. For the system to develop, moreover, labor was required, and large influxes of workers to the cities of the Manufacturing Belt occurred both from other parts of the United States (notably the South) and from various parts of Europe, but there is no evidence to suggest that these migratory patterns occurred spontaneously in advance of production. The Manufacturing Belt reached its apogee in the long post-War boom from the late 1940s to the early 1970s, a period when the classical mass production system entered into its most dynamic phase of development. This system of economic activity was based on large-scale capital-intensive lead plants linked to lower tiers of direct and indirect input suppliers, thereby forming growth poles in industries like cars, machinery, domestic appliances, electrical equipment and so on (Perroux, 1961). These growth poles constituted the economic backbones of the large metropolitan areas that flourished in the Manufacturing Belt over this period. However, industrial decentralization, which began relatively unobtrusively in the 1930s and 1940s as the textile industry restructured and moved from New England to cheap labor sites in the Southeast, grew ever more intense with each following decade. By the early 1970s, the Manufacturing Belt started to enter into a period of crisis marked by systematic overcapacity and severe slowing down in the rate of productivity growth. The lowering of transport costs, in concert with the consolidation of units of production into larger branch plants, made possible an acceleration of industrial decentralization processes, so that that during the 1970s, the formerly thriving manufacturing cities of the northeast and Midwest were faced with greatly intensified job loss and decay. At this stage, the Manufacturing Belt came more commonly to be known as the Rustbelt.

This same period was also marked by a definite shift in the character of economic growth. By the early 1970s, the mass production system was starting to recede from its formerly dominant role as a leading edge of employment, growth and innovation, to be succeeded by what has variously been called the new economy, post-fordism, flexible production, the knowledge economy, cognitive capitalism and so on (Scott, 2007). This new economy draws its motive force from digital technologies in production

and communication and a wide array of new skills directed to producing streams of diversified outputs in sectors such as high-technology manufacturing, business and financial services, health care, consumer services, fashion-oriented production, media and other cultural industries. Some of the first stirrings of this new economy could be observed in the dramatic emergence of a series of high-technology production centers in the US Sunbelt, above all in California over the 1960s and 1970s. We have elsewhere referred to this moment in the historical geography of the United States as one in which a 'window of locational opportunity' seemed to open (Scott and Storper, 1987). The existing factor stocks, production networks, skills and other resources of the cities of the Manufacturing Belt, built up over decades of mass production, were of little practical relevance to many of the new technology-intensive industries, even though there was at first some growth of these sectors in certain Northeastern cities, as, for example, in the case of semiconductors and computers in Boston. In fact, existing assets such as a large blue-collar labor force and traditional political machines in many ways discouraged local growth of these new sectors in older manufacturing regions. Instead, fresh rounds of agglomeration and growth, not only in high-technology industry, but in a number of other sectors far removed from the central logic of mass production, now started to occur in selected parts of the Sunbelt.

The 1980s, then, represented a period in which a wide swath of Sunbelt cities boomed, while many cities of the Northeast and Midwest stagnated and declined. Certain Sunbelt cities grew above all on the basis of agglomerations in new technology sectors such as electronics, aerospace, biotechnology, software, financial and business services, tourism and so on (not to forget the renewed boom in the long-established entertainment industry of Los Angeles as described by Storper and Christopherson, 1987). At the same time, other Sunbelt cities, and certain small towns and rural areas, initially prospered as standardized branch plant operations continued to decentralize from the Manufacturing Belt to pockets of low-wage workers in the Sunbelt, though much of this particular investment stream was increasingly being redirected offshore. It stretches the imagination to attribute either of these mechanisms of growth to independent migratory movements of individuals prompted by the search for amenity values, though it was most assuredly accompanied by in-migration of workers with forms of human capital well-matched to local economic needs (as well as a huge inflow of unskilled migrants into the low-wage sweatshops and service jobs that were also being created at this time in large Sunbelt cities). In view of these remarks, any positive correlations that might be observed between the migratory movements of workers and winter temperatures must be for the most part epiphenomenal, except perhaps for the case of retirees and the independently wealthy, most of whom are free from the necessity of holding down a regular job (cf. Chen and Rosenthal, 2008).

Some of the most dynamic sectors of the new economy also agglomerated selectively in some old cities of the Northeast. Of late years, this process has been especially evident in New York, Boston and Chicago, all of which have significantly benefited from recent bursts of expansion in various technology-intensive, financial, media and fashion sectors. In New York, the revival of growth was based on already well-established activities such as business services and commodity trading, and hence, as well, on pre-existing organizational and business networks and their dependent pools of labor. Accordingly, New York was able to capture new rounds of innovation and expansion in financial services over the 1980s and 1990s as the new economy gathered momentum. In turn, additional workers flocked in to take advantage of expanding employment

opportunities, and the increasing income from this process certainly generated surging demand for amenities such as high-grade restaurants and cultural services. New York has recovered to a remarkable extent from its dilapidated state in the mid-1970s, but migration to amenities has not been the principal driver of this transformation. Rather, it was the restructuring of the local economy, aided by digital technologies, trade liberalization and financial globalization that promoted the basic economic turnaround of New York.[4] In a similar manner, the recent expansion of restaurants and cultural attractions in London, and the upscaling of many of its formerly neglected neighborhoods, has certainly been a consequence of major injections of income due to the expansion of the financial services industry. Thus, rather than denying the role of amenities, our theory argues that they are an intermediate outcome in a larger causal sequence.

5. Human capital, 'creativity' and urban growth

Despite our earlier critique of analytical approaches based on the notion of revealed preferences, we do not propose to plunge into the opposite error of claiming that individual locational choices have no role in collectively shaping urban growth. Many individuals unquestionably have strong preferences for warm winters or upscale urban amenities or certain kinds of social diversity, and they are frequently prepared to act on the basis of these preferences. The point, however, is that while human actions always shift patterns of opportunities, they are also always played out in the context of pre-existing sets of opportunities, as well as in the context of many intertwined preferences within the consciousness of any given individual. Among the preferences in addition to those for amenities—generally construed—that play a role in individuals' locational decisions we must surely count those for relevant employment and remuneration. Better yet, and in the language of neoclassical theory itself, any utility-maximizing calculation must always be subject to feasibility constraints, which in the present instance includes the need to keep body and soul together. In other words, most migrants—unless they enjoy a private income or are able to capitalize on some purely personal talent that can be practiced anywhere—are unlikely to be able to move in significant numbers from one location to another unless relevant employment opportunities are actually or potentially available.

As we have written, accelerated urban growth in the Sunbelt was not unleashed by warm winters acting through the medium of individual tastes and preferences, but rather by the profound economic restructuring of the Manufacturing Belt, and then, more importantly, the emergence of major new growth centers at Sunbelt locations relatively untainted by older forms of industrial development and working-class norms of job performance and labor organization. Once strong processes of development started to emerge at different places in the Sunbelt in this manner, the way now became clear through preferential sorting for many individuals to act upon a desire for warm winters, though it is no doubt the case that many others with no distinct preferences in

4 Glaeser (2005c) writes about New York's resurgence by referring to it as a knowledge crossroads over many cycles of economic development in the context of technological change, but makes little reference to the organizational and locational dynamics of production systems involved in specific forms of knowledge production.

this regard (perhaps even an aversion) have also been drawn into the region's orbit of economic opportunities. The urban environment, in short, offers a structured set of intertwined benefits and costs, and as a result, the preferential selection of certain subsets means that we automatically gain others, whether we want them or not (Storper and Manville, 2006). In any event, inflows of people certainly made Sunbelt places more attractive for new firms, which in turn attracted more inflows of people, and so on, in repeating rounds of circular and cumulative causation. This process, however, does not proceed *ad infinitum*, for it depends ultimately on the central driving force of the production system. Thus, crises of growth occur in regions, not because available inflows of people cease, but because the supply of jobs dries up, whether because of internal or external factors. It follows that correlations of population growth with the observed hedonic attributes of places cannot provide us with the tools for working out a plausible explanation of the causes of development at these places in the past, nor—as we shall see—for effectively manipulating the levers of their future expansion.

We should add that members of the so-called 'creative class', i.e. individuals endowed with high levels of human capital are no doubt especially unlikely to shift location in the absence of relevant employment opportunities (which is not the same as saying that they are relatively immobile). These are individuals who have by definition invested considerable resources and time in acquiring know-how, skills and qualifications, and they are presumably unwilling to dissipate their investments in this respect by moving to places where their personal assets are systematically at risk or undervalued in the local job market. Such individuals typically choose to locate on the basis of some sort of structured match between their talents and the forms of economic specialization and labor demand to be found in the places where they eventually settle. By the same token, there can be no reason to suppose that Silicon Valley, Hollywood, or the City of London came into being because massive numbers of the creative class located there in advance of clusters of firms in semiconductors, film-making or finance, respectively. There were certainly a few small innovative firms and their employees in Silicon Valley in the 1950s and 1960s, just as there was a small cluster of temporary studios and associated workers in Los Angeles some time between 1905 and 1915 (Scott, 2005). In neither place was there anything that could be identified as a future labor force of computer engineers or movie-makers seeking, say, tolerance or even interaction with other individuals like them. Additional semiconductor engineers subsequently gravitated to Silicon Valley, would-be actors and directors to Hollywood, and financial analysts to London because that is where their talents could be effectively deployed and rewarded in growing specialized clusters. Moreover, in all these cases, much human capital has also no doubt been endogenously created via the acquisition of agglomeration-specific experience (learning by doing, career ladders), as well as by education and training programs that themselves evolve in response to the demands of local production systems.

These remarks lead on to one last major point about the contemporary urban economy, and, concomitantly, about the rise of so-called creative cities. We acknowledge that cities are frequently intense foci of creativity in the sense that they are places that periodically generate technological innovations and economically useful knowledge, as well as new trends, sensibilities, fashions, perceptions and movements (Hall, 1998). Moreover, the dense many-sided human interactions of cities make possible historically and geographically specific forms of learning and innovation. Thus, in Detroit in the mid-20th century, enormous amounts of creative energy were invested in

mechanical inventions as applied to the car industry, just as in Hollywood in the 1920s and 1930s much innovative labor was invested in improving technologies of cinematography as well as in the development of story-telling conventions, acting styles, photographic techniques and cinematographic practices, and so on. In short, innovations in urban areas typically bear a structured relationship to local forms of economic specialization, whether these be semiconductor engineering, hedge fund operations, fashion design or the commercialization of human experiences. They can also result from selective forms of cross-fertilization among cognate domains of activity, as among fashion, design, the arts and media. The literature on regional innovation systems has, along these lines, demonstrated the existence of many specific sectoral, technological or institutional channels of knowledge spillover and innovative interaction (Acs, 1992; Jaffe et al., 1993; Feldman, 1994; Currid, 2006; Scott, 2006).

Thus, as the new economy emerged after the 1980s, based largely on technology-, design- and service-intensive sectors, it generated a new division of labor, with a much greater role for cognitive skills than in the previous post-war period (cf. Levy and Murnane, 2004). These developments in turn have been accompanied by new rounds of creativity and innovation in activities like management, finance, consumer relations, cultural and symbolic conception, and so on, and much of this innovation has occurred in their agglomerated urban productive centers. Like urban growth itself, these different innovative impulses cannot be accounted for simply by invoking the naked power of human capital, even though specific kinds of human capital and individual talent are essential for their materialization. Rather, they are embedded in wider social processes that channel their energies into substantive outlets, and that give them opportunities for concrete expression. By the same token there can be no sustainable argument in favor of the view that gathering members of the creative class together in one place will in and of itself transform that place into a creative city. These broad remarks are reflected in the contemporary urban hierarchy where many non-routine, highly skilled labor-intensive tasks in the division of labor—those most closely related to innovation—locate in major metropolitan areas, while routinized and capital-intensive operations are increasingly being relegated to smaller cities and low-wage countries (Scott, 2008).

6. Implications for research and urban policy agendas

Many of the ideas about amenities, consumer cities, entertainment machines, and the creative class that we have outlined above are being increasingly invoked to justify certain types of urban policies and to de-emphasize others (see, for example, Florida, 2003, 2004, 2005; Glaeser, 2005a). All of them explicitly claim that strategies to provide amenities will raise rates of growth and per capita incomes. Glaeser (2005a) specifically recommends that policy-makers focus on investments in K-12 education, low tax rates, crime reduction and new housing development as ways of luring the highly skilled into particular cities; Florida advocates building 'diverse, tolerant communities'; and Clark stresses the importance of facilities that provide amusement and distraction. All of these things may be worthwhile in and of themselves, but for all the reasons laid out above, they are unlikely to have purely autonomous effects on urban growth or per capita income.

Our analysis has identified three principal deficiencies of these theories that render them particularly suspect as foundations for policy formulation. First, they fail to

pinpoint the basic sources of urban dynamism, which lie in the selective geographical matching of productive resources, skills and institutions of coordination. Second, and concomitantly, they mistakenly identify amenities as significant drivers of urban growth. Third, they are silent on the critical issue of the differentiated path-dependent trajectories of urban systems, and so they radically depreciate the intertwined limitations (through localized lock in) and opportunities (through collective readjustment of accumulated assets) that policy-makers must take into account in seeking to guide future developments. In a nutshell, recourse to amenities-based theories as a guiding principle for urban growth policy is ill-advised because these theories manifestly fail to address the basic issues of building, sustaining and transforming regional ensembles of production activities and their attendant local labor markets. We have written at length elsewhere about the kinds of policy measures that we believe can contribute significantly to these goals (Storper and Scott, 1995). Our overall approach to these issues revolves around the central need to shore up agglomeration economies in both the static and dynamic sense, which entails, in turn, collective action to internalize externalities, to build effective norms of economic interdependence, and to avoid adverse path selection. Thus, detailed attention must be paid to actual and potential failures of the critical machinery of the urban production system as it is embodied above all in inter-firm networks, local labor markets and regional innovation processes. There can be no boilerplate approaches to the resolution of these failures, and each case needs to be treated with all due respect to its historical, geographical and sectoral specificity. Thus, policies directed to the upgrading of local productive forces need to be framed in relation to where we start in regard to productive capabilities, the availability of relevant factor supplies, and institutional arrangements in relation to wider economic conditions.

There are, then, strong reasons for believing that policy frameworks derived from the research that we have criticized here will in all likelihood be ineffective if not counterproductive. But the potentially negative influence of these frameworks on urban policy agendas also go well beyond local economic development issues in the narrow sense (cf. Jones and Baumgartner, 2005). The emerging new economy in major cities has been associated with a deepening divide between a privileged upper stratum of professional, managerial, scientific, technical and other highly qualified workers on the one side, and a mass of low-wage workers—often immigrant and undocumented—on the other side. The latter workers are not simply a minor side-effect of the new economy or an accidental adjunct to the creative class. Rather, high-wage and low-wage workers are strongly complementary to one another in this new economy (Levy and Murnane, 2004; Malanga, 2004; Autor, Katz and Kearny, 2008). The low-wage segment of the labor market is itself one of the critical foundations of urban life today and hence of current patterns of growth, not only because workers in this segment carry out basic production activities such as electronics assembly or garment making, but also because this is the sphere of the janitors, security guards, transport workers, short-order cooks, child-minders and so on, who maintain the networks, infrastructures and services that help to keep the entire urban system in operation. The economic and social predicaments that flow from this kind of labor market segmentation are especially evident in large, economically dynamic metropolitan areas today, and this state of affairs is often expressed in a tense political milieu marked by collisions over social and economic opportunity, the quality of citizenship and political participation, schools, the environment, and neighborhoods. The resulting tensions occasionally explode in

outbreaks of violence and social disorder such as the Los Angeles riots of 1992 and the widespread disturbances in Paris toward the end of 2005. The literature criticized in this article points directly and indirectly to policy advocacies focused on investment in upscale amenities, prestigious urban image creation and programs calculated to appeal primarily to highly educated and high-income individuals. Taken together, these advocacies largely ignore the urban economic and social divide, and, in practice, may well contribute to its exacerbation.

As we noted at the outset, urban growth is a complex enigma for social science. It is certainly bound up in various ways with the exercise of individual preferences, but equally certainly, it cannot be reduced in essence to these preferences (much less to preferences for amenities), for we can only derive human action out of preferences in the context of their reflexive relations to the wider dynamics that shape the concrete opportunities for and limits on behavior. In the matter of urban growth, this means that we need to take very seriously indeed the logic and dynamics of economic activity, and especially of locally agglomerated systems of production and work. Research that seeks to understand this enigma requires theories, modeling strategies, and use of evidence that can seize its practical complexities and hence generate meaningful advice for policy-makers.

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