The Geography of World Cities

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Introduction

Patterns of urbanization, urban structure, and growth changed fundamentally in the twentieth century. At the dawn of the twenty-first century, the majority of human beings dwelled in urban expanses on six continents. This distribution of population is a radical shift from prior centuries when the majority of people lived in rural areas. Another result of twentieth century economic growth is the evolution of the world city. World cities are a product of the globalization of economic activity that has characterized post-World War II capitalism. Globalization, as a process of economic transformation, has been defined by Tilly (1995) and similarly by Giddens (1990:64) as “an increase in the geographical range of locally consequential social interactions, especially when the increase stretches a significant proportion of all interactions across international or intercontinental limits.” These processes involve the movement of capital, goods, labor, information, and services across country borders usually by transnational or multinational corporations (Dicken 2003:198). But it is also a social process that transforms current social conditions into one where international interconnections of economy, production, capital flows, and perspective are commonplace (Steger 2003:7–8). The mechanism of globalization also produces geographical effects that can materialize in social and production processes such as space–time compression, which compacts time and space and forces increases in economic and social response time to a stimulus that supports the concentration of interacting economic, political, and communication activities within the common confines of particular cities (Agnew 2001; Sheppard 2002). World cities are created as capital and services tend to concentrate in preferred locations, often cities with comparative advantages or initial advantages in an expansive world economy. As a result, wealth and information tend to concentrate in specific urban locations, producing world cities that are more highly integrated into the global capitalist system.

World cities have existed historically in some reduced form, usually as imperial capitals. For example, in the classical and medieval European realms, Rome (300 BCE–400 CE) and Constantinople (400 CE–1400 CE) were similar to world cities in their respective reigns of preeminence but they were rare in their time. Prior to 1500, several cities in Europe such as Bruges, Ghent, Genoa, and Venice all achieved high levels of interconnection through trade and financial exchanges that were inordinately large for the time (1200–1450 CE) (McNeill 1974; Braudel 1984; Abu-Lughod 1989). At later times, Antwerp, Amsterdam, Paris, and London all achieved prominence as imperial centers during the European colonial expansion that coalesced into the nascent Europe-centered world-system (Wallerstein 1980; Braudel 1984). As imperial centers and capital cities, Amsterdam, Paris, and London, in particular, were densely interconnected with their colonies through trade, information, and military networks that had global extent. As such, these cities had initial advantages of extensive communications interconnectivity with the remainder of the world as well as cosmopolitan prestige and functional expertise. These cities were also the headquarters of numerous corporations that conducted international business ventures.

The recent rise of numerous, exceptionally large and economically integrated cities containing significant fractions of human population with high levels of information exchange are a new phenomenon. World cities are functions of augmented scales of interaction. Cities began to expand during the Industrial Revolution in Europe in the nineteenth century through the demand and mobilization of labor from the rural countryside into the industrializing cities and continued to enlarge until the onset of World War II (1939–45). Postwar urban development occurred through several economic generating processes. World cities are the culmination of these postwar urbanization mechanisms coupled with the rise of transnational corporations that have served to concentrate unprecedented population and economic power/potential, producing very large urban complexes that serve larger global markets than previously necessitated by national/state economies alone (Taylor 2000). World cities exhibit characteristics previously found in primate cities but with influence extending far beyond the range of the metropolitan state. The potential for both human development advantage and disadvantage is historically unprecedented in these new and highly interconnected urban amalgams.

To get some idea how world cities evolved within the modern world economy, an exploration of the development of human settlement systems and the rise of urban structure must be explored. This will place the phenomenon of world cities in a proper historical, geographic, and developmental context so as to better comprehend the role such cities will continue to play in the changing world economy. A description of the development of settlement systems will be followed by a discussion of the processes of early settlement and city evolution through time. This will lead to modern models of urban structure primarily developed by geographers in the twentieth century to explain urban concentrations and the development of the larger-scale structure of urban hierarchies – of which world cities reflect a shift from national/state-level urban hierarchies toward world-level hierarchies. A discussion of path dependence will follow to help provide a framework of explanation for the rise of world cities. A concluding discussion of newly emerging urbanization patterns will complete this essay.

Human Settlement Systems in World-system History

Concentrations of human populations in built artificial environments have existed since the seventh millennium BCE (Mellart 1967:49–53). Such concentrations or “cities” serve a multitude of purposes for human populations but one advantage is the minimization of search costs for human interaction. Such interaction has served many needs, such as economic, personal, societal, and political. While world cities continue to exploit this interaction advantage and capitalize on interactions of global extension, the search costs associated with the concentration of technical and political expertise within the city continues to provide a dominant advantage at these localities. In general, human settlement systems are usually understood to include the systemic (regularized) ways in which settlements (hamlets, villages, towns, cities) are linked with one another by trade and other kinds of human interaction.

It should not be presumed that settlement systems are contained within separate polities. (Polities are organizations with a single authority that exercises sovereignty over territory or a group of people. This includes bands, tribes and chiefdoms, states and empires.) The relationship between settlements and polities is a fundamental aspect of all social systems. The territorial boundaries of polities are rarely coterminous with the interaction networks in which settlements are embedded, and so patterns of interaction and the division of labor among settlements must be studied internationally in all social systems. Settlements are rarely ever intelligible without knowing their relations with the rural and nomadic populations that interact with them. The spatial aspects of population density are the most fundamental variable for understanding the constraints and possibilities of human social organization.

Some theories of human innovation and social evolution claim that the discovery and implementation of new cultural, organizational, and productive technologies are regularly related to settlement systems and their interaction networks. The recent influential text by world historians John R. McNeill and William H. McNeill, The Human Web (2003), employs what can be called a cybernetic perspective to explain innovation. Much of what we consider to be new emerges at important nodes in communications and transportation networks. This is a perspective that was originally developed by Amos Hawley, who contended that innovation occurred at major communications network nodes (in cities) where different kinds of information crossed paths, enabling the recombination of elements to produce new ideas and institutions. David Christian's excellent Maps of Time (2004) employs a similar notion of hubs that are the loci of innovations.

One idea of development, proffered by Chase-Dunn and Hall (1997), is that semi-peripheral societies have often expanded networks, made larger states, and innovated and implemented new techniques of power and new productive technologies that have transformed the very logic of social change. Semiperipheral societies are those that are less well connected than the older core polities in an interpolity system of allying and fighting polities. All world-systems are composed of multiple interacting polities.

The hypothesis of semiperipheral development asserts that semiperipheral regions in core/periphery hierarchies are fertile sites for innovation and the implementation of new institutions that sometimes allow societies in these regions to be upwardly mobile and/or to transform the scale (and sometimes the qualitative nature) of institutional structures. This is not simply the notion that core traits diffuse toward the periphery but, rather, the idea that semiperipheral innovation enables upward mobility and occasionally transforms the system. Semiperipheral capitalist city-states have successfully exploited opportunities to accumulate wealth from trade and the production of commodities within the world-system so that some have risen to become hegemonic.

The semiperipheral development hypothesis presumes a cross-cultural conceptualization of core/periphery hierarchies in which more powerful societies importantly interact with less powerful ones. The idea of core/periphery hierarchy was originally developed to describe and account for the stratified relations of power and dependency among societies in the modern world-system. The comparative world-systems approach developed by Chase-Dunn and Hall (1997) distinguishes between core/periphery differentiation, in which there is important interaction among societies that have different degrees of population density, and core/periphery hierarchy, in which some societies are dominating and/or exploiting other societies. It is not assumed that all world-systems have core/periphery relations. Rather this is a research question to be determined in each case.

The Measurement of Settlement Size Hierarchies and Spatial Pattern of Urban Structure

Geographers, historians, and economists have developed models of urban structure and patterning incorporating population location/movement and the location of economic activity to be able to rationally explain and predict urban growth and allocate resources so as to implement equitable distributions. The resulting models served to illustrate the importance of the interactions between specific geographic location, population concentrations, and economic activity.

Early Urban Theorizing: Von Thunen, Christaller, and Losch

The early models of cities examined the pattern of activities in and around the urban area. These models are primarily descriptive of local urban form and seek to explain pattern in terms of the economic phenomenon of production cost and market pricing. Markets are assumed to be located at the greatest concentrations of population, where demand is expected to be maximized. An early descriptive model of the relationship between an urban market and an adjacent agricultural hinterland is the Von Thunen model, which can be expressed as a relation between the productive value of the land around the city/market and the market price of agricultural commodities constrained by distance and transport cost from the source location to the market. The basic model can be expressed as:

[image]

The Von Thunen model is useful as it can be implemented as either a proscriptive or a hypothetical model of expected hinterland land use given a single or multiple urban market (cf. Van Valkenburg and Held 1952: map A105; Sinclair 1967). The Von Thunen model illustrates the relationship between urban land and rural hinterland patterning, market value and cost, and transport costs as a function of distance to market. As such, the Von Thunen model was the first step in examining regional urban patterns. However, it originally only described the pattern around a single city as specified in the title of the exposition: “The Isolated State” published in 1826 (Hall 1966). As such, it is of limited use in helping explain patterns of many urban centers and the interactions among the cities that produce regional urban hierarchies.

The approach of Christaller and Losch was to describe not just single cities but the spatial distributions of cities related to urban size and functions (Haggett et al. 1977:139–53; Hoover and Giarratani 1984:204–5). The Christaller framework extends some of the ideas of the Von Thunen model into the realm of regional urban patterns and hierarchies. Christaller (1933; 1966) was concerned with service provision in cities contingent upon population size and the separation distance of the cities (i.e., urban “packing”). As an extension of Von Thunen, the spatial organization of a city that provides a single good is a function of the demand for that good by the local and surrounding population. As such, the demand is dependent upon the market price of the good in the city and the cost of travel to obtain the good. Then if we add more goods and more urban centers, the “packing” of these urban centers in a regional hierarchy is going to be a function of population, number and type of services provided, and demand for those goods and services as a function of separation distance (i.e., “packing” distance). However, the separation distance needs to be explained in terms of the demand for the goods offered in the urban centers and the surrounding population.

The spatial demand curve is a mathematical description of the distance decay relationship between consumer demand and distance, and can provide the basis of minimal spacing among cities in the presence of landscape homogeneity. Given that in the Christaller framework city packing is going to be a function of spatial demand, then competitive advantage in the hierarchy will be based on premier location within the service area. Cities that are located earlier in the hierarchy possess an initial advantage of location since any additional cities entering the hierarchy will be constrained by the previously located cities. Thus, regional hierarchies do not just have a spatial pattern but a time pattern of formation into hierarchies as well. Christaller discovered regular patterns of places in regional urban hierarchies as well as the interaction among levels of the hierarchy exhibiting a log-normal or non-linear relationship (Christaller 1966). As such, Christaller described the growth of urban hierarchies as “a centralizing process rather than simple segmentation” (Bodley 2003:73). This relationship suggests the possibility for inordinate advantages to be accrued at urban centers that are larger – hence higher in the regional hierarchy –than those lower in the order. This is due to the fundamental economic relationship in size and spacing of cities that defines the hierarchy.

These hierarchies are described as central place systems since the various cities between orders interact through the expanded provision of goods and services as one moves up through the hierarchy (from smaller to larger urban centers). In this way, in the Christaller central place system, cities will interact vertically across orders but not horizontally, because each city in the same hierarchical order provides the same goods and services, resulting in no demand for interaction. The work of August Losch changed this hierarchical arrangement by defining an urban hierarchy which permits cross-order linkages within the hierarchy: he does not build his model based just on consumers but also on producers and the local demand for intermediate goods and commodities (Losch 1954; Pred 1971; Dicken and Lloyd 1990:30–8, 71–5). This factor becomes crucial in modern theories of agglomeration and urban hierarchy such as those developed by Fujita and Thisse (2002).

Quantitative Revolution and the Rise of Spatial Analysis and Urban Economics

The quantitative revolution in the social sciences in the 1960s changed the way analysts approached urban analysis and planning. Locational analysis was a product of the onset of regional science in the late 1950s and the work of luminaries such as Walter Isard. One of the significant contributors to urban location theory was William Alonso, who extended the work of Von Thunen by developing an analytically rigorous quantitative theory of land rent (Alonso 1964). This work utilized one of the central spatial concepts of locational analysis, namely distance as a basis of incorporating space into an essentially economic model. Alonso's model provided an analytical framework for evaluating the trade-offs in residential, business, and agricultural location using land rent and travel costs as primary determinants. The other spatial concepts employed in locational analysis were direction, diffusion, and spatial pattern. The ideas of region, hierarchy, and the components of the landscape such as nodes and networks were composed into a singular opus by Peter Haggett and called Locational Analysis in Human Geography (Haggett 1965). This book was a core text that underwent several revisions and additional authors to become a central text in the rise of spatial analysis in the 1970s and 1980s. Haggett (1965) emphasized the construction of landscapes from movement through networks to nodes where differential economic growth processes created hierarchies. These hierarchies created and functioned using surfaces or fields of interaction which led to region building through habituation of interaction. Surfaces also represented potential for interaction and were characteristic of developed landscapes.

Chicago School and Urban Analysis

The core of urban geography developed in the 1960s to influence urban planners and geographers through the 1980s. This development took place at the University of Chicago, primarily under the direction of Brian Berry and his graduate students, but also was influenced by Edward Taafe at Northwestern University. The Chicago School made use of statistical analysis and mathematical models to develop rigorous quantitative studies of urban form and relationships (Berry and Horton 1970). One of the culminations of the work of the Chicago School was the urban pattern of core and commuter flow-based suburban hinterland. Berry and Horton (1970) identified a central core or central business district in each urban center that provided services and served as a commute destination for employment provided by suburbs and hinterland counties. This model provided a dominant urban paradigm that is still in use in 2000.

Los Angeles School and Postmodernism

The Chicago School used a positivist scientific approach to describe urban form and provide solutions to urban problems. The Los Angeles School that arose during the mid-1980s was influenced by postmodern thinking (Harvey 1990; Johnston 1997:271–81). The perspective of the Los Angeles School provided a significant challenge to the analytical approach of the Chicago School: whereas the Chicago School based its model of monocentric urban form on the city of Chicago, the Los Angeles School based a polycentric, minority-dominated pluralistic structure on observations of the city and metropolitan area of Los Angeles (Soja 1989; Dear 2000). Edward Soja and Michael Dear argued that Los Angeles would be representative of the “city of the future” where no particular group or life path dominates and similarly no particular economic activity or industry dominates the city functions. Dear (2005) states that the Los Angeles School does not seek to replace the Chicago School but to provide a wider range of “space–time geographical prisms” in which to view and interpret urbanism and to provide more and broader paradigms for analysis and interpretation. As such, Los Angeles is not the only model of urbanism but just one model of urbanism – indeed, as is Chicago.

World City Hierarchies

The previous perspectives serve to provide tools for analysis of world cities. As world cities interact at the global level and form world-scale hierarchies, the frameworks of Christaller and Losch may be of some benefit. The idea of world cities and a world city hierarchy originated with John Friedmann (1986), who presents the world city hypothesis. The world city hypothesis outlines how the international division of labor is linked to the urbanization process. The world economy has localized specific production functions in different cities integrated with the world economy at different scales such as global, national, regional, and local, reflecting the hierarchy of urban places. As a result, Friedmann ranked major cities and divided them based on the position in the world economy hierarchy; as such, he examined primary and secondary cities in the core and semiperiphery (Friedmann 1986:72). He then examined information and capital/trade flow linkages between core cities and semiperipheral cities to establish regional interdependences in the world city hierarchy. Regional hierarchies materialized: an Asian core centered on the primary city of Tokyo and the secondary city of Sydney; a North American core centered on New York, Los Angeles, and Chicago as primary cities with San Francisco, Houston, Toronto, and Miami as secondary cities. A third European regional core hierarchy materialized with London, Paris, Frankfurt, Rotterdam and Zurich as primary cities linked to the secondary cities of Madrid, Milan, and Vienna. A hierarchy also exists for the semi-periphery of the world economy located in South America (e.g., São Paulo, Buenos Aires, and Caracas), Africa (e.g., Johannesburg), and Asia (e.g., Singapore, Bangkok, Hong Kong, Manila, Taipei, and Seoul).

The distribution, type, and order of connections among cities reflect the dual geography of the country hierarchy in the world economy (see Arrighi and Drangel 1986; Dezzani 2001; Babones 2005). Core states exhibit more and higher-order centers in the hierarchy than do the semiperiphery, which in turn contains more and higher-order centers, in general, than does the periphery. As such, the hierarchy of world cities is reflective of the relative position and magnitude of national economies, though this duality should not be considered strict. However, the proportion of world cities within a hierarchical region of the world economy is proportional to the contributions to the world economy by that region in the hierarchy. Changes in world city distribution relative to the world economic hierarchy may reflect fundamental redistributive changes of national economies across the hierarchy. However, as world city economies transcend local, regional, and national economies, changes to world city position in the hierarchy may not reflect any net change in the metropolitan state economy. These speculations can provide research questions to further explore the relationships between world cities and their residential economies.

Many configurations, all reflecting strong similarities, are permissible depending on the criteria of classification and the city or flow attributes used. Air passenger flows among cities, locations, or headquarters of major corporations, shared locations of legal and financial services are all characteristics that are consistent with the definition of world cities and may be used for analysis and classification. In general, world cities exhibit some specific roles that are reinforcing in the interconnected, globalized world economy; they serve as centers for political administration and power, information production, routing and processing, large corporations devoted to commodity trade and foreign investment, investment and commercial banking and other financial services, consumption – particularly of luxury goods for the resident elite population –mass consumption, advanced professional services (legal, business, medicine, higher education, high technology), and art and design (Taylor 2003; Taylor and Lang 2005). These characteristics are common across cities and time periods (1970s to 2000s) and represent not only persistence of characteristics of world cities through time that maintain the hierarchy but also the initial advantage that created the differential centers that constitute the hierarchy. As with the Christaller and Losch central place hierarchies, the quality and type of services offered at a center defines position of the center in the hierarchy.

The New Geographies of World City Hierarchies

Given the development of world cities, what is the relationship between the size of settlements and political power in intergroup relations? Under what circumstances does a society with greater population density have power over adjacent societies with lower population density, and when might this relationship not hold? What does the development of urban areas suggest about the evolution of human society overall?

Settlement Size: Hierarchy and Power

The spatial aspect of population density is one of the most fundamental variables for understanding the constraints and possibilities of human social organization. Population density is often assumed to be a sensible proxy for relative societal power. Indeed, Chase-Dunn and Hall employ high relative population density as a major indicator of core status within a world-system. The settlement size distribution is an important and easily ascertained aspect of all sedentary social systems. And the functional differences among settlements are a basic feature of the division of labor that links households and communities into larger polities and interpolity systems. The emergence of social hierarchies is often related to size hierarchies of urban centers. In addition, the building of monumental architecture in large settlements has been closely associated with the emergence of more hierarchical social structures like complex chiefdoms and early states, so this is an empirically useful pattern that allows us to compare preliterate systems with those for which we have documentary evidence.

Results from urban geography suggest that a spatial size hierarchy is related to the distribution of functions across settlements and transportation costs. Goods and services that can easily be distributed across a whole region from a central point will be located in the largest central settlement, whereas products that cannot easily be stored or transported will be produced locally in all the smaller settlements. The existing range of goods and the demand generated by relative positional scarcity creates the space economy.

Why should a city system have a steeper size distribution when there is a greater concentration of power? The simple answer is that large settlements, and especially large cities, require greater concentrations of resources to support their large populations. This is why population size has often been used as an indicator of power. But these resources may be obtainable locally and the settlement size hierarchy may simply correspond to the distribution of ecologically determined resources. People cluster near oases in a desert environment. In such a case it is not the political or economic power of the central settlement over surrounding areas that produces a centralized settlement system, but rather the geographical distribution of necessary or desirable resources. In many systems, however, we have reason to believe that relations of power, domination, and exploitation do affect the distribution of human populations in space. Many large cities grow even larger because they are able to draw upon far-flung regions for food and raw materials. If a city is able to use political/military power or economic power to acquire resources from surrounding cities, it will be able to support a larger population than the dominated cities can, and this will produce a hierarchical city size distribution.

The relationship between power and settlement systems is contingent on technology as well as political and economic institutions. Thus the relationship between urban growth and decline sequences and the growth/decline sequences of empires varies across different systems or in the same regional system over time as new institutional developments emerge. We know that the development of new techniques of power, as well as the integration of larger and larger regions into systems of interacting production and trade, facilitate the emergence of larger and larger polities as well as larger and larger cities. Thus, there is a secular trend at the global level and within regions between city sizes and polity sizes over the past six millennia.

Studies by Chase-Dunn et al. (2005) of the relationship between the rise and fall of empires and the growth/decline phases of the largest cities in the same regions have found differences in the temporal relationship between the growth and decline of largest cities and largest empires. Partial correlations that take out the long-term trend show that the medium-term relationship between city and empire growth is significantly positive in Mesopotamia (2800–650 BCE), South Asia (1800 BCE–1500 CE), and Europe (430 BCE–1800 CE), but not in Egypt, West Asia, and East Asia.

Historically, in the regions in which there are significant correlations, this is sometimes due to empires building their own big capital cities; but, at other times, a big city appears in the region that is outside of the largest empire. This suggests that regions go through general phases of expansion and contraction in which both cities and empires grow and then decline, and this supposition is confirmed by the finding in all regions of high partial correlations between the growth/decline phases of largest and second largest cities, and, rather surprisingly, a similar set of significant positive partial correlations in all five regions studied between the growth/decline phases of largest and second largest empires. This latter is surprising because territorial growth is usually a zero sum game among adjacent empires, and yet the medium-term temporal correlations are positive, indicating that empires get larger and smaller together within regions. This is strong evidence that regions experience cycles of growth and decline that affect both cities and states.

Cities and Social Evolution

George Modelski's World Cities: 3000 to 2000 (2003) examines human social evolution over the past 5000 years by focusing on the growth of the world's largest cities, and also presents the results of a huge empirical effort to expand our knowledge of the population sizes of the largest settlements since the Bronze Age. The growth of cities is a useful indicator of world-system evolution because the ability of a society to produce and maintain a large settlement is a major accomplishment. We can trace the emergence of social complexity by knowing where the largest human settlements are at any point in time. Beginning with Uruk, Modelski traces the emergence and spread of large cities from Mesopotamia and Egypt to East Asia, South Asia, Europe, and the Americas.

Regarding the city population data, Modelski has extended and improved the work of that most intrepid coder of city sizes, Tertius Chandler. For the period 3000 to 1000 BCE Modelski defines world cities as those that reach a population size of 10,000 or more. In the following period (1000 BCE to 1000 CE) cities must be at least 100,000 in population size to count as world cities. And from 1000 CE the cut-off point is one million. Modelski observes the phenomenon, also noticed by Roland Fletcher, that a few cities are the first to reach a whole new scale, and then a size ceiling is encountered during which cities in other regions catch up to the new level. The current maximum seems to be around 20 million and the phenomenon of catching up is now occurring. Some of the world's largest cities are in countries such as Mexico, Brazil, India, and China.

Modelski's study of the phases of urbanism shows that urbanization has been neither random nor linear. Instead it has followed a recurring pattern of rapid growth followed by slow growth or decline. A phase of fast growth concentrated in one or a few regions is followed by slower growth and the diffusion of large cities to other areas. Rapid and concentrated growth is followed by leveling off and dispersal due to various countervailing forces. These forces emerged from what Modelski terms the “center–hinterland” divide of a regional world-system. The first growth phase emerged in a center that eventually encountered limits to growth from resource exhaustion, environmental stress, and failures of knowledge. The leveling process occurred as these limits were reached, weakening the old center. Incursions from the hinterland increased, taking advantage of the center's weakness. This allowed the semi-hinterland, a region adjacent to the old center with smaller cities, to catch up to the urban scale of the old center.

Modelski also compares his phases of urban growth with existing estimates of overall population size and growth. He finds that the overall population growth phases correspond in time with the urban expansions of the three eras. This study leads to what he calls a “manifest case of evolution.” The three phases of urbanization correspond to periods of world-system evolution: cultural, social, and political. The ancient cultural phase saw the creation of a learning structure based on cities, writing, and calendars, resulting in a platform for sustained and intensified human interaction on a large scale. The classical social phase brought about a more extensive, inclusive, and integrated system. Expanding during Karl Jaspers' Axial Age, the cities of the classical period can be grouped according to the world religions that dominated social structures during that era. The modern political phase poses choices regarding an evolutionarily stable structure of world organization. Modelski predicts that the future fourth phase will be an economic one that will see a stabilization and consolidation of the material foundation of world society.

Path Dependence in the Formation of World City Urban Hierarchies

The spatial structure of world cities has been addressed in a variety of ways. Friedman's (1986) original classification was relatively straightforward, using characteristic rankings to arrive at his hierarchy. Current studies such as those of Taylor (2004), Taylor and Walker (2001), and Taylor et al. (2002a; 2002b) use R-mode and Q-mode analyses on 55 cities and 46 global firms as well as principal components to evaluate a variety of characteristics simultaneously for 123 cities and 100 global service firms. These studies provide sophisticated information on the geographical structure of hierarchy. One of the findings is that firms interact preferentially to produce a complex order that serves to reinforce position in the hierarchy. These preferential interaction arrangements at specific city locations lead to statistically distinguishable patterns in the hierarchy. These distinguishable patterns will be called “states” of the hierarchy system. These states or arrangements of firms and cities may be used to help explain how the pattern in the world-system hierarchy is derived. Using connectivity as situational measures of interconnection, Taylor et al. (2002b) demonstrates a non-linear power law relationship of world cities between global connectivity and city rank in the hierarchy that may be linked to firm sharing across cities (Taylor et al. 2002b:2373, fig. 1). This relationship is similar to the rank–size power law of urban hierarchies usually called Zipf's law. The Zipf power law of urban hierarchy is very consistent over many cases and comes very close to a “general” law of the social sciences (Fujita et al. 1999). Zip's law is an empirical relation that can be stated as:

[image]

where Ci is the city size for city i (measured by population), k is a constant, and Ri is the hierarchical rank for city i such that rank 1 is given to the largest city, rank 2 to the second largest, and so on down to the smallest city. A rank–size distribution exists when the second largest settlement is one-half the size of the largest; the third largest is one-third the size of the largest, etc. “Urban primacy” is said to exist when the largest city in a region is larger than would be expected based on the rank–size or log-normal distributions. Empirical studies have shown that many city size hierarchies approximate the rank–size rule, but some are flat (as with a one-tiered size distribution) and many are primate. The law states that there are competitive advantages to firms that locate in larger cities. Partially, this is a function of the necessity for strong local economies for firms competing over greater distances, but this condition is not sufficient to generate a power law relationship. In general, it is very difficult to explain how such a power law arises from economic and settlement behaviors (Fujita et al. 1999:217–19).

How did world cities come to be world cities? This is a vital question considering the influence world cities exert over economies, politics, and the growth of the world economy. One way to approach this issue is to return to the introduction and attempt to identify likely world cities from past conditions. A world-system approach is useful as it implies a continuous set of economic and political processes operating over a long time frame (say, since the sixteenth century). Then, we can assume that some analog of world cities existed in the past and we might consider if it would have been possible to predict likely candidates in the current state of the world economy.

The world city hierarchy can be said to exhibit hysteresis since there exist several states of the system at any given time and the number of states may change independent of inputs to the system. The “memory” of the system is independent of the rate of change of the system and can only be known for specific observations in time. As such, the world city hierarchy may be said to be path dependent in that it may have been possible to predict some cities in the hierarchy but, for example, the rise of Washington DC or New York in the twentieth century could not have been predicted from conditions in 1720, while the role of London might have been possible, provided the system did not alter significantly (i.e., dependence on prior conditions). What is important is that the configuration of the world city hierarchy cannot be known except as a probability or likelihood at any point in time. Thus, each time configuration of the hierarchy can only be specified precisely by tracing back along the path of development and evaluating the hierarchy at each time period and documenting the changes. One means of describing such change is through Markov chain probability models (Fingleton 1999; Dezzani 2002).

Arthur (1994:99–109) describes a series of models that can be used to assess patterns of urban formation subject to firm location decisions. This problem is closely related to the agglomeration economy/urban location problem outlined by Fujita et al. (1999) and Fujita and Thisse (2002). This problem can be stated as delineating the relationship between the increasing returns to scale and formation of external economies derived from agglomeration (benefits to co-location of firms) and the position of the city in the urban hierarchy. Arthur (1994) outlines three cases: (1) location under independent preferences by firms termed “pure necessity”; (2) location by spin-off or “pure chance”; and (3) location under agglomeration economies or “chance and necessity.”

The results for the pure necessity model suggest that with some variation hierarchies do not arise since deviation from initial regional preferences by chance does not dominate the process. As a result, hierarchies are deterministic or predetermined by the initial firm preferences (Arthur 1994:101–2). In this case paths are set by firms' initial preferences for location. The results from the second case show that firm location is highly path dependent but the locational patterns/hierarchies that form settle down into constant proportions and the proportions cannot be predicted. Any given outcome in this “spin-off” model is equally likely to occur. So stochasticity dominates the path and the history of firm locational choices early on is the primary determining factor for the resulting regional hierarchical pattern (Arthur 1994:103). In the third case, if by chance and firm selection a region comes to gain a slight advantage, that advantage can induce a multiplier effect that reinforces the location and enhances the position of the region in hierarchy formation. From then on, additional firms will choose the dominant region and increasing levels of clustering will take place, enhancing the rank in the hierarchy. Thus, in the model of unbounded agglomeration economies, monopolies of firm locations and industry domination appear to occur (Arthur 1994:105). Given these models, the most likely basis for world city formation is through the development of agglomeration economies and increasing returns to scale for firm size and quantity as well as the time-dependent probability path for firm concentration. The formation of external economies that may lead to localized specialization of services, such as the concentration of legal services, may also be attributable to agglomeration economies. However, these possible factors for world city formation should be examined through hypothesis validation in years to come.

Explanations for world city formation will be forthcoming but will likely be derived from path and agglomeration arguments since firm concentration and interaction are very likely to be dependent upon path dependence, as well as agglomeration influences such as increasing returns and the formation of external economies that may serve to segment the global urban hierarchy.

Emerging Patterns of World Cities in the World-system

The Rise of the Contemporary World City Network

The role of city systems in the reproduction and transformation of human social institutions has been altered by the emergence and predominance of capitalist accumulation. Whereas most of the important cities of agrarian tributary states were centers of control and coordination for the extraction of labor and resources from vast empires by means of institutionalized coercion, the most important cities in the modern world have increasingly supplemented the coordination of force with the production of commodities and the manipulation of money. Obviously, military force is still an important element of power in the modern world-system. But the uses of military power have been fundamentally altered by the predominance of capitalist accumulation.

The long rise of capitalism was promoted by semiperipheral capitalist city-states, usually maritime coordinators of trade protected by naval power. The Italian city-states of Venice and Genoa are perhaps the most famous of these, but the Phoenician city-states of the Mediterranean exploited a similar interstitial niche within a larger system dominated by tributary empires. The niche pioneered by capitalist city-states expanded and became more predominant, in the guise of core capitalist nation-states, in a series of transformations from Venice and Genoa to the Dutch Republic (led by Amsterdam) and eventually the Pax Britannica coordinated by the great world city of the nineteenth century, London. Thus did capitalism move from the semiperiphery to the core, constituting a world-system in which the logic of profit making had become more important than the logic of tribute and taxation. In 1900 London was still the largest city, but New York was coming up fast.

Within London the political and financial functions were spatially separated: empire in Westminster and money in the City. In the twentieth century hegemony of the United States these global functions were located in separate cities (Washington DC and New York). Thus the role of cities in world-systems changed as capitalism became the predominant mode of accumulation over the last 500 years. In earlier world-systems the biggest cities were empire cities that depended upon the ability of states to extract resources using institutionalized coercion (armies, bureaucracies, etc.). Capitalist cities existed, but they were in the semiperipheral spaces between the large tributary empires. With the rise of Europe we have capitalist cities becoming predominant. This is especially obvious with the rise of Amsterdam, London, and New York – the world cities of the capitalist era.

Nevertheless, the relationship between power and size continued to operate (until recently) in the modern system. The city size distribution of the interstate systems is almost always flatter than the size distributions of settlements within a single polity, because the multicentric political structure of interstate systems affects the size distribution of settlements. The Europe-centered city system was never steeper than the log-normal distribution and it was occasionally much flatter. The periods of flatness mainly correspond with times of political decentralization in which there was an absence of a hegemonic core power. One possible explanation for the recent descent into flatness of the world city size distribution is the declining hegemony of the United States. But there are also other possibilities, such as the 20 million-size ceiling posited by Fletcher (1995).

The great wave of globalization in the second half of the twentieth century has been heralded (and protested) by the public as well as by social scientists as a new stage of global capitalism with allegedly unique qualities based on new technologies of communication and information processing. Some students of globalization claim that they do not need to know anything about what happened before 1960 because so much has changed that the past is entirely non-comparable with the present. Most of the burgeoning literature on global cities and the world city system shares this breathless presentism. It would be good for all concerned to recall that social systems have exhibited waves of spatial expansion and an intensification of large interaction networks, followed by contractions, over the long historical term. The real question is which aspects of the most current wave are unique and which are functional repetitions of earlier oscillations. The only way to sort this out is to compare the present with the past.

According to the theorists of global capitalism, especially Saskia Sassen in Global Cities (1991), it was during the 1960s that the organization of economic activity entered a new period expressed by the altered structure of the world economy: the dismantling of industrial centers in the United States, Europe, and Japan; accelerated industrialization of several Third World nations; and increased internationalization of the financial industry into a global network of transactions. With the emerging spatial organization of the new international division of labor, John Friedmann (1986) enumerated a set of world city hypotheses concerning the contradictory relations between production in the era of global management and political determination of territorial interests.

Sassen and others have further elaborated a set of global city hypotheses. Global cities have acquired new functions that go beyond acting as centers of international trade and banking. They have become: (1) concentrated control locations in the world economy that use advanced telecommunication facilities; (2) important centers for finance and specialized producer service firms; (3) coordinators of state power; (4) sites of innovative post-Fordist forms of industrialization and production; and (5) markets for the products and innovations produced. These structural shifts in the functioning of cities have impacted both international economic activity and urban form. During the 1990s New York became specialized in equity trading, London in currency trading, and Tokyo in bank deposits.

The most important assertion in the global cities literature is the idea that such cities are cooperating with each other more than the world cities did in earlier periods. The most relevant earlier period is the Pax Britannica, especially the last decades of the nineteenth century. If this hypothesis is correct, the division of labor and institutionalized cooperative linkages between contemporary New York, London, and Tokyo should be greater than were similar linkages between London, Paris, Berlin, and New York in the nineteenth century.

Another important hypothesis of the global cities literature is based on Sassen's observations about class polarization and the casualization (informalization) of work within globalizing cities. The research of Gareth Stedman Jones (1971) on Irish immigration into London's East End in the mid-nineteenth century shows that a somewhat similar process of “peripheralization of the core” was occurring during the Pax Britannica.

It is important to study changes in the global city-size distribution because we are interested in the relationship between cities and power, and because the apparent flattening of the global city-size distribution discovered in the 1980s raises interesting questions about the upper limits of the sizes of megacities. Why did the global city-size distribution flatten out after 1950, modifying a pattern that had existed throughout the British and US hegemonies in which the most powerful country had the largest city and there was a hierarchy of city population sizes revealed by the world's largest cities? Roland Fletcher contends that contemporary institutional and infrastructural inventions only allow for megacities to function at maximum populations of around 20 million and this serves as a ceiling which has allowed cities in the non-core to catch up in terms of population size with the largest cities in the most powerful states. This may be what has produced the flat global city-size distribution that emerged after 1950. Another possibility that could account for cities in the semiperiphery catching up with core cities is differences in the demographic transition. Most core countries have achieved a replacement fertility rate, but semiperipheral regions still have a higher fertility rate and faster population growth. This could be a factor in allowing semiperipheral cities to catch up to core cities as regards population size.

The Political Geography of the World City Hierarchy

As the world city network grows and intensifies, the territorial state has remained fundamentally static. The economic processes of globalization, which has contributed significantly to the rise of the world city, have essentially bypassed the traditional state to focus on the importance of concentrated interconnections and business-related central resources found in the very largest and most interconnected cities. Taylor (1995) elaborated on the cyclical contention and cooperation that exists between states and cities at different times and argued that the current post–Cold War phase has demonstrated a return to an antagonism among states and cities owing to the rise of importance of certain cities and urban regions in contemporary globalization. This has also led to a concentration of political influence in the world cities, in particular at the expense of territorial states, owing to the spatial concentration of economic potential and elite-class inhabitants in these cities (Taylor 2000; 2005; Agnew 2005:161–2). This process of economic potential and political power consolidation has further augmented the centrality of world cities in the world economy.

During the post–Cold War phase of globalization cities have served as the place where the aggregate nexus of flows of transnational capital, information, and multi-state political influence coincide (van der Wusten 2007). In this way, world cities have come to exhibit trans-state interactions and have thus gained political influence beyond the territorial border of the enclosing state. As a result, new political geographies are forming that are centered on world cities rather than states (Taylor 2005). Whereas states are immobile and confined by their boundaries, world cities can act more flexibly across state borders with many degrees of freedom owing to the numerous, dense network connections maintained among these cities in the global urban network. Political space is created by social, political, and economic practice but it also serves to constrain or facilitate subsequent utilization; the current space of state territoriality is delineated by interstate conflict and cooperation and the interaction of state governments. This modern relationship was originally established by the Treaty of Westphalia (1648) and still tends to dominate other forms of political geographies such as the network-framed structure of world cities or the hierarchical world-system architecture (Agnew 2005:160–1). However, territorial political spaces and the geographies they reflect tend to form antagonistic relations with political geographies that are not based on the same criteria (i.e., state territoriality). This is compounded by the permeability of territorial state boundaries and the lack of control over many of the flows that characterize globalization processes such as people (labor), goods and commodities, capital, ideas, communication, services for which transnational liberalism, the prevailing paradigm of globalization, has encouraged states to unilaterally and multilaterally encourage such movements. These flows have helped create the world city hierarchy and network structures while at the same time may be diminishing traditional state territorial (Westphalian) sovereignty (Taylor 2004, 2005).

One aspect of this territorial conundrum is the creation and reinforcement of a transnational elite class connected and communicating through the networks that link the world cities in the global urban hierarchy. While corporations are resident in specific countries, the level of interconnection among world cities reinforces a set of common practices and political orientations that transcend the territorial states reinforced by imperfect competition (Agnew 2005:162). This phenomenon augments a global corporate elite class that collaborates and cooperates in economic activity and induces a common political orientation that is global in perspective rather than being tied to territorial states of residence, thus mitigating a common “community of interest” centered on world cities. This community cannot then be influenced, regulated, or controlled by traditional states. The political geography of world cities then cannot be described by particular interests of territorial states, which is also the primary emphasis of most modern social sciences.

The high density network connections that help identify world cities are a product of the global market demand to annihilate space so that production time to market is reduced, coupled with “just-in-time” manufacturing, potentially leading to a wider variety of goods that may satisfy much more extensive markets (Harvey 1990; Agnew 2005). Under these conditions, the value of space is maximized as local variability: cities or regions that can concentrate the means of product design, manufacture, and marketing possess real advantages over others. The diminishing importance of territorial state boundaries owing to transnational markets further augments the locational advantages of “well connected” urban centers; increasing returns from many interdependent co-located activities leads to rapid capital and influence accumulation and growth of these cities (Taylor 2005). While world cities exhibit well-defined advantages in the global economy and are politically more adaptive than states, in the long term they may prove to be unsustainable concentrations of humanity that are less well adapted to changing climatic and environmental conditions. Such a condition may oscillate the political and economic advantage back in favor of the territorial state.

Cities and the Future

Large cities are not all the same. Many in the non-core have huge slums where life is tenuous. Inequalities within and between countries have increased during the most recent wave of globalization, just as they did in the nineteenth century wave. The low-density suburban sprawl that has taken over the process of urban growth in the core is immensely expensive in terms of resource use. Urbanization has a huge direct effect on the environment, as cities absorb heat from the sun and then release it, and humans use energy in cities, all of which contribute to global warming.

While core cities have deindustrialized, large cities in the semiperiphery have industrialized and are now the new sites of intense labor struggles. The global “reserve army of labor” (rural people still not employed in the formal economy) is still large, but continued economic expansion and globalization will eventually incorporate everyone, and the long-run tendency for wages to rise will continue, eventually causing another crisis for capitalism.

Peter J. Taylor suggests that globalization has decreased the importance of nation-states and increased the importance of cities, and that this may be a good thing because cities are more easily governable by communities of citizens. Human settlement systems have been strongly involved in the processes of social evolution for thousands of years both as cybernetic nodes of innovation and in the process of semiperipheral development. Regarding the latter, we can expect that new forms of governance relevant to the emergent problems of the twenty-first century will likely be invented and implemented in the cities of some of the semiperipheral countries, especially Brazil, India, Mexico, and China. Curitiba, Brazil has already demonstrated a new form of sustainable urbanism that will become increasingly relevant as the natural resources that have been the basis of sprawl become depleted. Democratic socialist regimes that come out of the new labor movements of the semiperiphery are likely to be important supporters of transnational social movements that will contest neoliberal (and neoconservative) global governance and push toward a new kind of globalization from below. The cities of the semiperiphery are fertile spaces for finding solutions for our increasingly urbanized planet.

One aspect of world city research is certain: fully identifying the new political economy and political geographies of world cities is a promising research trajectory that should occupy social science into the foreseeable future.

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