

## THE ECOLOGY OF GLOBAL ECONOMIC POWER: CHANGING INVESTMENT PRACTICES TO PROMOTE ENVIRONMENTAL SUSTAINABILITY

Saskia Sassen

This paper explores how we can use the “power of power” to address environmental challenges and to institute changes. Rather than confining power to its destructive role, the effort here is to reconceive of such power as also representing critical capacities for redressing that destruction. Some of the key features of economic globalization could, in principle, facilitate the task of reallocating a good share of investment capital to environmentally sound projects rather than to the destructive large-scale projects so typical today. A similar repositioning is critical for cities, a second important source of environmental damage; the specific features of cities also represent possible solutions to that damage. This paper examines how the power of global corporate capital and the power of major cities, both representing destructive forces, can be conceptualized as sources of solutions.

Goal 7 of the United Nations’ Millennium Development Goals (MDGs) is to “ensure environmental sustainability.” What is often left out of the picture is that the organizational architecture of the global economy itself, characterized as it is by a highly concentrated command structure that controls growing shares of worldwide investment capital, could be used to meet this goal. This enormous concentration is a key element in thinking about transforming the uses and aims of this investment capital, a task that would seem almost impossible if investment capital were widely diffused among small investors. One of the targets identified in MDG 7 is to “integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources.” With respect to the “Global Partnership” to achieve the MDGs that is prescribed by MDG 8, it is important to recognize that economic globalization could, in principle, accommodate a

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broader range of forms of state participation than we usually think of.<sup>1</sup> The possibilities for such heightened state participation in the governance of the global economy are generally not recognized by analyses that conclude that privatization and deregulation bring about a declining significance of the state. State institutions remain extremely important for the implementation of new environmentally sound regulatory criteria and standards and for development assistance. But the questions of global corporate capital and of major cities cannot be reduced to questions of state regulation.

Humankind increasingly relates to the various stocks and flows of environmental capital through cities and vast urban agglomerations. Thus cities generally are part of the larger project of establishing sustainable economic practices. Technical developments have radically transformed the relationship between humans and the rest of the planet, making urbanization the center of the environmental future. Further, rural populations increasingly have become consumers of products produced in the industrial economy. The rural condition has evolved into a new system of social relations that diverges profoundly from older rural economic cultures, which worked with biodiversity. These developments all signal that the urban condition is a major factor in any environmental future. When it comes to using the power of power to advance particular parts of the larger project, the particular types of cities that become strategic are global cities.

Cities and urban regions are a type of socio-ecological system marked by a whole new set of interrelations between, on the one hand, constructed features and material practices and, on the other, various ecological systems. In the current stage, the systemic characteristics of this interrelation are mostly in the form of environmental

**Markets enable sustainable development by mobilizing capital that greatly surpasses foreign aid.**

damage. A growing number of researchers and activists are calling for the need to use and build upon those features of cities that can make cities into a socio-ecological system, with positive outcomes for environmentally sensitive

growth and development. Specific features of cities with such positive potential are economies of scale, density and the associated potential for greater efficiency in resource use and lower priced options, and dense networks of communication that can serve as facilitators to institute new practices. The indicators associated with MDG 7, which measure progress towards environmental sustainability, also recognize the importance of urban centers by emphasizing the improvement of living conditions for “slum dwellers.”

## THE POWER OF MARKETS

Markets are crucial institutional components in both developed and developing economies and have been proposed by many as one of the ways to address the environmental challenges we confront. Markets are often seen as enabling sustainable development in poorer countries, as they can mobilize forces and capital that greatly surpass foreign aid. If one could institute environmentally sound modes of conducting our economies and our lives through the use of markets, so the argument goes, most negative environmental outcomes could be made into undesirable costs. Without too much fundamental change, production, distribution and consumption could be reoriented towards environmentally sound choices, because these would be the less costly ones. It is important to understand the underpinnings of this view.

In discussing the market, its logics and its boundaries, it is useful to contrast with what has been described as a “steady-state” paradigm more attuned to environmentally sound logics.<sup>2</sup> Both are forms of economic thought and both entail a concept of capital and pricing. Yet they constitute their analytic ground in sharply different ways. A comparison is useful to ground the effort of this paper in broadening the analytic terrain within which we understand existing arrangements, notably the fact that a limited number of firms account for a vast proportion of the “use” of our environmental capital, and that cities are a key source of environmental destruction.

The ecosphere provides at least four categories of goods and services to the economy: material and energy resources, waste assimilation, life-support services and aesthetic and spiritual values.<sup>3</sup> Markets deal reasonably well with only the first of these, which are mainly non-renewable resources. Many of the biophysical stocks, flows and functions associated with the others are difficult to quantify and price, and others are simply invisible to conventional analysis.<sup>4</sup> It is important to note that some stocks, such as the ozone layer, that are today valued highly by the market had not previously been recognized by economists at all.<sup>5</sup> The steady-state paradigm asserts that efforts to derive hypothetical values for natural income and capital stocks—essential inputs to conventional analyses—are undermined by this lack of information.

Notwithstanding these limitations, markets remain today and in the foreseeable future the main institutional dynamic through which economic activities get articulated and economic value constituted. Thus it is important to understand what it is that markets can and cannot do, and can and cannot register, especially since urban economies pivot on markets. One of the most useful analyses for the purposes of the subject at hand is the classic study by William Rees.

Rees compares the economic paradigm underlying neoclassical economics with the steady-state paradigm underlying ecological economics.<sup>6</sup> A key feature of neoclassical economics is that it treats the economy as separate from and independent

To achieve environmental sustainability, proper valuation of natural capital must be central to economic development.

of nature; analytical models usually lack any physical representation of the material and energy transformations and the structural time-dependent processes of the ecosphere.<sup>7</sup> Ecological economics, on the other hand, sees the economy as a dependent, integral sub-system of the ecosphere that should be analyzed as an “extension of human metabolism. Crucial to sustainability is understanding the physical/material transformations that bind the economy and ecosystems, maintaining essential ecosystem functions, and recognizing the lags and thresholds characterizing ecosystems behavior.”<sup>8</sup>

Starting points for neoclassical economics are the flows of exchange value between firms and households (and, I would add, increasingly in today’s models between firms as well). For ecological economics, the key issue here is the unidirectional and irreversible flows of energy/matter from nature through the economy and back in degraded form as waste. This means that ecological economists must factor in the actual stocks and flows of environmental capital and register levels of depletion and time frames for renewability.

When it comes to the role and ecological efficacy of markets, neoclassical economics posits that free markets stimulate (through raising scarcity value and corresponding prices) both the conservation of depletable assets and the search for technological substitutes; free markets and technology can thus help to decouple the economy from nature. This is a crucial issue in this model. For ecological economics, markets work as described for a limited range of familiar non-renewable resource commodities, but prices for renewable flows are inadequate indicators of ecological scarcity. Market prices reveal only exchange value at the margin and do not reflect the size of remaining natural capital stocks, whether there are critical minimal levels below which stocks cannot recover, or the ultimate contribution of such stocks to human existence or survival. Most important, there are no markets for many biophysical goods, notably the ozone layer, and essential life-support systems, such as photosynthesis and waste assimilation, which have enormous positive “economic” value. Proper valuation of such natural capital should be a central consideration for economic development if environmental sustainability is to be achieved.

On the substitutability of natural capital, another crucial issue, neoclassical economics posits that natural capital and manufactured capital are near perfect substitutes. Technology can make up for any depleting resource; thus exhaustible resources do not pose a fundamental problem. For ecological economics, natural capital is complementary to and often a prerequisite for human-made capital. Given the market’s failure to factor in the variables mentioned in the preceding paragraph, standard measures of scarcity (prices and costs) may fail absolutely to

induce either conservation of vital stocks or technological innovation. Further, ecological economists argue that it is unlikely that we will design technological substitutes for many ecospheric life-support functions.

For neoclassical economics, growth in both poor and rich countries is essential, and is the only practical way to alleviate poverty and to address material inequities among countries. For ecological econom-

ics, growth cannot be relied on as the only means to solve poverty. It will require significant inter- and intra-national redistribution of wealth and access to nature's services. Political, social and economic reforms are required

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**We cannot reach sustainability through more growth—the global economy is already running a massive ecological deficit.**

to institute the needed changes, including effective education of the public on sustainability issues. As for the ecological impacts of growth, neoclassical economists find that growth in the developing world will increase the market for the products of the developing world, which will in turn give the latter the money for the rehabilitation and future sustainable use of natural capital.

These differences in economic approaches to poverty alleviation should be taken into account when considering how environmental sustainability figures into the overall agenda of the MDGs. According to Rees, there is a tendency to see depletion of natural capital and local pollution as a third world problem.<sup>9</sup> For ecological economics, we cannot reach sustainability through more growth. The global economy is already running a massive hidden ecological deficit attributable mostly to developed countries, and “material growth based on current economic assumptions and technology does not provide the surpluses needed to rehabilitate natural capital, but rather depends on its further depletion, increasing the sustainability deficit and leading to accelerated ecological decline.”<sup>10</sup>

For neoclassical economists there are practical limits on human population growth, but no constraints on economic growth (i.e., on per capita GDP). Technology is generally seen as able to substitute for depleted natural capital; over time the economy can be dematerialized by increases in economic and technological efficiency. For ecological economists there are real biophysical constraints on both population and material throughput growth; humankind must live on the natural income generated by remaining stocks of natural capital. Total human impact or load is a product of population multiplied by average per capita material consumption, including waste output, and cannot be reduced below critical maximum safe levels by efficiency gains in the foreseeable future. This is a radically different position than that of neoclassical economists. For the latter there are no limits to regional or global carrying capacity; trade can relieve any locally significant limiting factors, and technological advances can replace more general scarcities. For ecological econo-

mists, carrying capacity is finite and declining and should become a fundamental component of demographic and planning analysis. Trade and technology appear to increase only local carrying capacity, while actually reducing it on a global scale. According to ecological economists, today all trading regions exceed their own ecological carrying capacity, become dependent on imports of depletable resources and ultimately reach the same limiting factor.

A crucial measure used as a welfare indicator in much research is GDP. GDP or per capita GDP, though imperfect, is understood to correlate well with standard measures of population health and is seen as the best overall measure we have of human welfare. For ecologists, GDP is inadequate as a measure of social and ecological welfare. It says nothing about the distribution of the benefits of growth. Worse, it includes both the depreciation of manufactured capital and the defensive expenditures against pollution or other ecological decline as positive entries, and says nothing about the depletion of natural capital.<sup>11</sup> GDP can continue to increase, creating the illusion of increasing well-being while economic, ecological and geopolitical security are all being eroded. Herman Daly captures this in his notion of “anti-economic growth,” or growth that makes us poorer.<sup>12</sup> Currently there are indicators for each MDG intended to help quantify progress, but the ecological erosion that is a byproduct of advances towards some of the Goals could actually entail greater global impoverishment.

For neoclassical economists, deregulation, global markets and free trade will enhance economic efficiency and contribute to greater social equity and international security through expansive growth in world product. For ecological economists, on the other hand, these three types of development will indeed raise growth, but under current assumptions and terms of trade they will also increase income disparities and accelerate the depletion of natural capital. This, in turn, will reduce ecological and geopolitical security. Such outcomes are clearly at odds with the unifying purpose of improving human welfare that is advanced by the MDG agenda.

One of the most significant contributions to the sustainability debate from neoclassical environmental economists, as distinguished from mainstream neoclassical economists, has been the shift from treating natural resources as mere free goods of nature to recognizing that “resources” comprise a unique class of productive capital, capable of producing a stream of income indefinitely into the future. This shift enables greater analytic rigor by elevating so-called natural capital to the same theoretical status as the more familiar man-made capital and human-social capital (knowledge, social infrastructure, etc.). There seems to be general agreement that no development path is sustainable if it depends on the depletion of productive assets. From the perspective of capital theory, society can be said to be economically sustainable if it passes on an undiminished per capita stock of capital from one generation to the next.<sup>13</sup> Ecologists and economists are debating various interpretations of a “constant

capital stock” condition for sustainability. The major disagreement centers on the degree to which manufactured capital can be substituted for natural capital.

Traditional environmental economists assume close substitutability and favor a weak sustainability criterion in which the aggregate stock of manufactured and natural capital must be held constant.<sup>14</sup> A weak sustainability criterion holds that natural capital assets can be depleted, but part of the return is invested in creating an equivalent value of manufactured capital. Ecological economists, on the other hand, generally regard natural and manufactured capital to be complements rather than substitutes, and that there are many essential life-support services for which there is little chance that technology can find adequate substitutes. This is a strong sustainability criterion. Both renewable natural capital and manufactured capital need to be held intact separately.<sup>15</sup> The constant capital stocks criterion implies that humankind must learn to live off the interest generated by remaining stocks of essential natural capital.<sup>16</sup>

## Prevailing market systems fail to measure ecological scarcity.

A key issue raised by a market approach is the assumption that prices can provide an adequate measure of ecological scarcity. Yet for many researchers today the key to sustainability is not the money value but the absolute stocks and flows of natural capital. Thereby an increase in the price could create the illusion of a constant stock, albeit a more highly priced one, even as the stock is increasingly depleted. Thus prevailing systems of prices, market incentives and costs fail absolutely to measure ecological scarcity or to determine the appropriate levels of natural stocks. The risks of their depletion are unacceptable in certain cases—we may not even know exactly which natural stocks are at risk, and there may be no possibility for a technical substitute. Some environmental economists have argued that “conserving what there is” could be a sound, risk-averse strategy.<sup>17</sup>

### GEOGRAPHIES OF POWER AS SPACES WITH THE RESOURCES FOR CHANGE

Here I want to use these alternative economic valuations of natural capital assets to argue that the concentrated command structures that control much of global capital should not only be seen as power, but also as concentrations of resources needed to institute new rules for the use of capital. The effort is to detect the conditionalities for dislodging corporate capital from its current market understandings to a more ecological one, as per the analysis in the preceding section. There are at least two distinct sets of issues here.

One concerns the actual organizational and command architecture of the global economic system. Here the key is that it is highly concentrated and consists of a complex set of operations largely located in a network of global cities. This network today includes about 40 cities, albeit with enormously varied levels of power, some

full-fledged global cities and others with global-city functions. This network of cities constitutes the strategic geography for the management, servicing, financing and designing of what we call the global economic system.<sup>18</sup> This is, we might say, the wholesale side of the global corporate economy, as distinct from the consumer side, which is far more dispersed and less strategic in its geography of operations, i.e., the

## The development community must consider global economic governance.

geography of a firm's service outlets and sales points. One of the mechanisms for the expansion of the global economy is the inclusion of more and more countries as these deregulate and privatize and thereby have something to "offer" to investors. The leading financial and business centers

in these national economies become the nodal articulators of national economies (through specific sectors and firms) with the global economic system. Further, the extent of cross-border transacting among cities in this network and the range of economic sectors involved have both increased significantly.<sup>19</sup>

The second set of issues concerns the participation of national states in the governance of the global economy. Here the key issue is that although the state has lost many forms of regulatory power, it still plays a far more important role in the governance of the global economic system than is suggested in mainstream accounts about globalization and the hypermobility of capital. Hence, states could introduce more environmentally sound policies regarding global investment patterns than analysts and government officials often think they can. There are two aspects that need distinguishing when it comes to state participation in the governance of the global economy. On the one hand, the current condition—marked by deregulation, privatization, and what I conceptualize as the partial "denationalization" of state functions—is but one possible mode of several through which nation-states can be articulated within the global economy; there are other possible ways of participation, some of which would enhance state authority.<sup>20</sup> On the other hand, even if this current condition could not be changed, there still is room for new forms of participation by the state as well as new forms of cross-border state collaboration in the governing of the global economy.<sup>21</sup> Both of these would require administrative and legal innovations. Although the cultivation of such global economic governance is absent from dialogue on the MDGs, it is important for the development community to consider more innovative options involving states.

I want to argue that three features of the global economy suggest a possibility of using the influence of existing power systems to begin such a process of reorientation. First is the fact that the geography of economic globalization is strategic rather than all-encompassing, and that this is especially so when it comes to the managing, coordinating, servicing and financing of global economic operations. If it were only natural resources that have such a strategic geography, the options for using the



power of power would be severely curtailed. The fact that it is strategic is significant for a discussion about the possibilities of regulating and governing the global economy. Second, the center of gravity of many of the transactions that we refer to in the aggregate as the global economy lies in the North Atlantic region, a fact which also facilitates the creation and implementation of convergent regulatory frameworks and technical standards. Hence developing alternative regulatory framings and standards should be enabled by the fact of this concentration in the North Atlantic. This geographic imbalance at the same time reflects the imbalance in the relative levels of economic development and power among different regions. If the geography for the management and financing of globalization were a diffuse condition at the planetary scale—one involving countries and regions with a much broader range of differences than those evident in the North Atlantic, and involving countries with limited resources to develop many of the more technical innovations—the question of its regulation might well be radically different. Third, this strategic geography for the management of globalization is partly embedded in national territories, that is to say, global cities. The combination of these three characteristics suggests that states may have more options to participate in governing the global economy than much of the focus on the loss of regulatory authority allows us to recognize.

There are sites in this strategic geography where the density of economic transactions and the intensity of regulatory efforts come together in complex, often novel, configurations. I will briefly focus on two here. They are foreign direct investment, which mostly consists of cross-border mergers and acquisitions, and the global capital market, undoubtedly the dominant force in the global economy today. Along with trade, they are at the heart of the structural changes constitutive of globalization and the efforts to regulate it. These two processes also make evident the enormous weight of the highly developed North Atlantic region in the global economy. The key implication for our purposes here is that this is a crucial and concentrated target for pushing global economic actors to change the environmentally damaging practices of business transactions that are becoming increasingly global in scope.

Both foreign direct investment and the global capital market bring up specific organizational and regulatory issues. There is an enormous increase in the complexity of management, coordination, servicing and financing for firms that are operating worldwide networks of factories, service outlets and/or offices, and for firms operating in cross-border financial markets. For reasons I discuss later, this has brought about a sharp growth in control and command functions, and their concentration in a cross-border network of major financial and business centers. This in turn contributes to the formation of a strategic geography for the management of globalization, and hence development. Nowhere is this as evident as in the structure of the global capital market and the network of financial centers within which it is located.

By locating environmentally damaging operations in the developing world, developed countries undermine progress towards the MDGs.

While this strategic geography of globalization is partly embedded in national territories, this does not necessarily entail that existing national regulatory frameworks can regulate those functions. Regulatory functions have shifted increasingly towards a set of emerging or newly invigorated cross-border regulatory networks and the development of a whole array of standards to organize world trade and global finance. Specialized, often semi-autonomous regulatory government agencies, and the specialized cross-border networks they are forming, are taking over functions once enclosed in national legal frameworks, and standards are replacing the rules of international law. These specialized cross-border networks can emerge as a helpful institutional framework for implementation and monitoring of environmental standards by firms, given the cross-border nature of so many environmental conditions and the global scale at which many of the relevant firms and markets operate. A true “global partnership for development” is necessary for the efficient, equitable functioning of this borderless economic network.

The empirical patterns of foreign direct investment and global finance show that their centers of gravity lie in the North Atlantic region. The northern transatlantic economic system (particularly the links among the European Union, the United States and Canada) represents the major concentration of processes of economic globalization in the world today. This holds whether one looks at foreign direct investment flows generally, at cross-border mergers and acquisitions in particular, at overall financial flows or at the new strategic alliances among financial centers. By the beginning of the 21st century this region accounts for two-thirds of worldwide stock market capitalization, 60 percent of inward foreign investment stock, 76 percent of outward investment stock, 60 percent of worldwide sales in mergers and acquisitions (M&As) and 80 percent of purchases in M&As.<sup>22</sup> There are other major regions in the global economy: Japan, Southeast Asia and Latin America. China is a rapidly growing economy and Japan remains enormously rich. However, neither of these approximates the economic and regulatory power of the North Atlantic at the current time. Except for some of the absolute levels of capital resources in Japan, they are dwarfed by the weight of the North Atlantic system.

Western Europe and the United States still invest more in developed countries, even though we can see a growing and complex use of less developed countries in the international organization of the production by global companies. Yet the environmental impact of their investments in the South is in many cases far larger than it is in the North—many of these investments support projects that have been shown to produce much environmental damage, and it is not uncommon for firms in the

North to locate their more environmentally damaging operations in the South. In this way, economic activities of the developed world—architects of the MDG agenda—actually undermine the ability of developing countries to meet targets such as the MDGs.

In order to capture the impact of the largest transnational corporations (TNCs), it is important to understand that many of the actual operations of these firms take place outside the country of nationality and include many locations in the South. The transnationality index shows us the high levels of foreign operations by these firms (the index is an average based on ratios of the share that foreign sales, assets and employment represent in a firm's total of each). If we consider the world's top 100 TNCs, the European Union has 48 of these firms and the United States 28; many of the remaining ones are from Japan. Thus together the European Union and the United States account for more than two-thirds of the world's 100 largest TNCs. The United States, the United Kingdom, France, Germany and Japan together account for three-quarters of these 100 firms—a trend evident since 1990.<sup>23</sup>

This heavy concentration in the volume and value of cross-border transactions raises a number of questions. One concerns its features, the extent to which there is interdependence, and in that sense the elements of a cross-border economic system. If there is considerable interdependence in the North Atlantic system, then the question of regulation and governance might well be different than if globalization for each of these major regions has meant in practice strengthening its ties and presence in their respective zones of influence. The United States and Western European countries have long had often intense economic transactions within their zones of influence. Some of these have been reinvigorated in the new economic policy context of opening to foreign investment, privatization and trade and financial deregulation.

In my reading of the evidence, both the relations with their respective zones of influence and the relations within the North Atlantic system have changed. We are seeing the consolidation of a transnational economic system that has its center of gravity in the North Atlantic system—both in terms of the intensity and value of transactions, and in terms of the emerging system of rules and standards. This system is articulated with a growing network of sites for investment, trade and financial transactions in the rest of the world. It is through this incorporation in a hierarchical global network that has its center in the North Atlantic that the relations with their zones of influence is now constituted. Thus, while the United States is still a dominant force in Latin America, several European countries have become major investors in Latin America, on a scale far surpassing past trends and often surpassing the volume of capital and transactions of US firms in Latin America. And while several Western European countries have become leaders in investment in Central and Eastern Europe, US firms are playing a role in this region they never had before. In a similar vein, Japan plays a significant role, mostly as a capital exporter,

in this North Atlantic system, though its influence over the Southeast Asian region has diminished in the 1990s.

What we are seeing today is a new grid of economic transactions superimposed on the old geo-economic patterns. The latter persist in variable extents, but they are increasingly submerged under this new cross-border grid that amounts to a new, though partial, geoeconomics. In my own research I have found that these new configurations are particularly evident in the organization of global finance and, though to a lesser extent, in direct foreign investment, especially cross-border mergers and acquisitions. Global trade is far more diffuse and de-centered than global finance; and though foreign direct investment is, in turn, more diffuse than global finance, it is still less so than global trade.<sup>24</sup>

The presence of systemic conditions in the new geo-economics is a significant factor for the question of regulation, and hence for the key issue here—how to redirect significant components of global investment towards more environmentally responsible projects and development initiatives. The orders of magnitude and the intensity of transactions in the North Atlantic system facilitate the formation of standards even in the context of what are, relatively speaking, strong differences between the United States and Continental Europe in many of their institutional frameworks. The challenge then is how to implement standards that are environmentally sound. The architecture for imposing such environmental standards on firms worldwide would be embedded in the architecture of the global economic system itself, with its center of gravity in the North Atlantic.

If the strategic central management functions—both those produced in corporate headquarters and those produced in the specialized corporate services sector—are located in a network of major financial and business centers, the question of regulating what amounts to a key part of the global economy is not the same as it would be if the strategic management and coordination functions were as distributed geographically as the factories, service outlets and affiliates of all the firms involved. However, this regulation is evolving along more specialized and cross-border systems than is the case with most conventional regulatory systems. Similarly, a crucial issue for understanding the question of regulation and the role of the state in the global capital market is the ongoing embeddedness of this market in a network of financial centers operating within national states, not offshore. This is not sufficiently recognized in studies that emphasize deregulation and liberalization; and it is important for the analysis here because it allows for targeting. Further, this locational embeddedness of key components of the global economy is also evident in the fact that the global financial system has reached levels of complexity that require the existence of a cross-border network of financial centers to service the operations of global capital. Each financial center represents a massive and highly specialized concentration of resources and talent in very specific locations; the network of these centers con-

stitutes the operational architecture for the global capital market. The North Atlantic system contains an enormous share of the global capital market through its sharp concentration of leading financial centers. Further, as the system expands through the incorporation of additional centers into this network, the question of regulation also pivots on the existence of dominant standards and rules—those produced by the economies of the North Atlantic.

This is, then, the strategic geography for the management of the global economy and for the disposition of key portions of our environmental capital. In some ways it is an extension of the early Western colonization period, but on such a different scale and with such higher levels of institutionalization that we need to recognize its specificity and how its dynamics influence socioeconomic development. This strategic geography also signals the existence of a hierarchy of responsibility and power: decision-makers and professionals in charge of developing and instituting the complex technical systems involved tend to be concentrated in the leading global cities. These actors have the power to make a difference for the environment by changing their own modes of and criteria for operating. In turn, it would also suggest the validity of a distinction between North and South, developed and developing countries, regarding environmental obligations and responsibility for damages.

A few actors could make a difference for the environment by changing their own modes of operating.

This amounts to a highly concentrated management of a very large share of worldwide capital. This capital can and has been deployed for projects that we think of today as environmentally destructive, and therefore at odds with Millennium objectives aimed at ensuring environmental sustainability. A few institutions can cause significant depletion of often non-renewable stocks of specific forms of environmental capital. At the same time, this also suggests that a few institutions can make an inordinate difference in terms of altering these patterns of investment. This is a very different type of analysis from the far more common view that focuses exclusively on the hypermobility of capital and the resulting ineffectiveness of state regulation—even if the will were there.

One important question is whether this concentrated power to manage the decisions to invest worldwide—the strategic geography of global economic decision-making—can also become the site of concentrated efforts to alter the criteria. It is not an endless array of small, dispersed investors. The growing concentration—through the institutionalizing of small-scale individual investments into global funds and the concentration of firms through M&As and strategic alliances of markets—creates a parallel landscape of density and scale economies. We need to think of this concentration as facilitating the work and mobilization of resources necessary to change how markets operate, how new legal regulatory frameworks influence price inputs

and outputs and how the desirability of an investment is evaluated. We should not simply see it as a type of power that renders ineffective any contestation. It is, then, in the space of power constituted by the network of global cities that we need to concentrate one of the key struggles to attain more environmentally sound economic practices, where the “global partnership” between the developed and developing world can be shaped to promote responsible investing and trading patterns. While such a specific project encompasses a minority of firms and markets, it is those that account for the majority of global investments and set the standards for what is a desirable investment.

### SCALING AS A STRATEGY FOR USING POWER

Beyond the global geographies of concentrated power described above, there is a multiplicity of scales at which effective action can take place. Here I will confine myself to one of the most complex of these scales, the city. There is also a diversity of geographic scales at which different kinds of city-related ecological questions operate

**Environmental standards are subordinated to supposed requisites of global trade.**

and/or become present and recognizable to us. For the majority of those writing about the ecological regulation of cities, the strategic scale is the local one (Habitat II; Local Agenda 21).<sup>25</sup> For a minority of others, the ecological regulation of cities today can no

longer be separated from wider questions of global governance.<sup>26</sup> Beyond cities, this latter position is also emerging in more general analyses about what is represented as the “economy and the environment.” Thus Esty argues that environmental regulation can only be effective at the global scale.<sup>27</sup>

The city is a key scale for the implementation of a broad range of environmentally sound policies, and it is a site for struggles over environmental quality and quality of life for different classes. Air, noise and water pollution can all be partly addressed inside the city, even when the policies involved may originate at the national or regional level. But while in the recent and not so recent past such environmental struggles could largely be scaled at the city level, today there are at least two major conditions that set limits to that scaling. First, the current phase of economic globalization puts a new set of pressures on cities as part of the overall race to the bottom. The World Trade Organization’s subordination of environmental standards to what are presented as “requisites” for global trade illustrates this well, as do most of the international trade agreements. Further, privatization and deregulation reduce the role of government, especially at the national level, and hence weaken its extant mandatory powers regarding environmental standards. The second major condition is global ecological change, notably ozone depletion and climate change, which will require efforts at the national and international scale, even when

much of the implementation will take place at local levels.

Many goals can be achieved at the local level. Local authorities are in a strong position to pursue the goals of sustainable development as direct or indirect providers of services, as regulators, as leaders, as partners and as mobilizers of community resources. For instance, instituting a sustainable consumption logic can be aided by

**International agreements are needed to demonstrate commitment to sustainability.**

zoning and subdivision; regulations; building codes; planning for transport, water and waste; recreation and urban expansion; local revenue raising (environmental taxes, charges, levies); and the introduction of environmental considerations when designing budgets, purchases, contracting and bidding.<sup>28</sup> The local scale also is crucial when it comes to international and national standards. It is likely that these standards are better implemented and enforced at the local scale. Each local combination of elements is unique—as is its insertion within local and regional ecosystems—and thus we need the optimal use of local resources. Some authors emphasize the importance of knowledge and skills linked to the local and regional ecological carrying capacity.

However, there are limits to what can be done at the local scale. This might be especially the case in the developing regions of the South, where the power of local governments and their resources severely limit their capacity to act on goals such as sustainable development. Although the trend towards the decentralization and increasing transparency of urban governments since the late 1980s has generated important mechanisms for raising their prominence and authority, most local authorities have limited funds.<sup>29</sup> The combination of greater responsibilities and no additional funds has made many local governments even more dependent on higher levels of national government support or on foreign aid transferred through the latter. While privatization has become one mechanism of reducing responsibilities and obtaining a one-shot infusion of funds, it often means that the new owners are interested only in those aspects of environmental responsibility that can be charged to users who can pay. All of these variables contribute to the difficulty of developing long-term plans for the intelligent and responsible use of environmental capital.

International agreements of a variety of sorts are crucial. Among these are agreements that set enforceable limits on each national society's consumption of scarce resources and their use of the global sink for wastes. These standards would overwhelmingly affect the North given its extreme concentration of consumption of such resources. The North has been very effective at implementing policies that restrict the effects of environmental damage directly felt in major urban areas and water systems. However, this is a radically different variable from that of its level of consumption of resources. It is at this juncture that international agreements will be

necessary to demonstrate commitment to abiding by the same principles of sustainability that are featured in development objectives.

Further, international agreements are also necessary to prevent some countries and cities from taking advantage of others that are instituting environmentally sound policies, and to avoid free-rider problems. Implementing such policies is likely to raise costs, at least for the short term, thereby possibly reducing the “competitiveness” of such cities and countries, even if in the long term this is likely to enhance their competitiveness. In addition, countries and cities that succeed in instituting such policies should not have to absorb the costs of the absence of such policies in other countries. This will at times require policies that restrain the transfer of environmental costs to other locations. For example, the vast fires to clear big tracts of the Indonesian forests in order to develop commercial agriculture (in this case, palm oil plantations geared to the world market) have regularly produced thick smoke carpets over Singapore, a city-state that has implemented very stringent air pollution controls at often high tax costs to its inhabitants and firms. Countries that institute sound environmental policies should be rewarded rather than penalized, especially in the developing world, where environmental considerations might initially impair much-needed economic growth.

Michael Redclift posits that we cannot manage the environment at the global level. Global problems are caused by the aggregation of production and consumption, much of it concentrated within the world’s urban centers.<sup>30</sup> For Redclift, we first need to achieve sustainability at the local level; he argues that the flurry of international agreements and agencies are international structures for managing the environment that bear little or no relation to the processes through which the environment is being transformed.

Not everyone agrees. Thus David Satterthwaite argues that we need global responsibilities and cannot do that without international agreements.<sup>31</sup> And Esty argues that increasingly the only effective way is to operate at the global level and override boundaries, just like nature and pollution do.<sup>32</sup> Nicholas Low notes that we have a global system of corporate relations of which city administrations are increasingly a part.<sup>33</sup> This complex cross-border system is increasingly responsible for the health and destruction of the planet. Today’s processes of development bring into focus the question of environmental justice at the global level, which was at the national level, if at all, in the early industrial era. Low has shown us how the “spatially-fetishized notion of the individual city” handed down from another era has led us to focus on city competitiveness and city marketing, rather than on networks of cities that could collaborate in their efforts to govern the operations of global capital.<sup>34</sup> Cities must be viewed in their global economic context, and the problematic of cities must be reconfigured and placed in a context of global governance.

I would make two observations here. One is that what we refer to or think of as



the local level may actually entail more than one scale. For instance, the operations of a mining or manufacturing multinational corporation involve multiple localities, scattered around the globe. Yet these localities are integrated at some higher organizational level into what then reemerges as a global scale of operations. Much cleanup and preventive action will indeed have to engage each locally produced set of damages, but the global organizational structure of the corporation involved needs to be engaged as well. The second observation is that an enormous share of the attention in the literature on urban sustainability has been on how people as consumers and as household-level decision-makers damage the environment. When considering the urban context, individuals and households are by far the most numerous units of analysis. Yet there are clearly shortcomings to this focus. In terms of policy it leads to an emphasis on household recycling activities without addressing the fundamental issue of how an economic system prices modes of production that are not environmentally sound. In this regard, an urban focus can easily leave out global economic and ecological systems that are

deeply involved yet cannot be addressed at the level of households or even of many individual firms. For instance, those who insist that greenhouse gas emissions will have to be controlled at the local level are, in many ways, right. However, these emissions will also have to be addressed at the broader macro levels of our economic systems. In this way, the environmental focus of MDG 7 makes this goal unique and perhaps more far-reaching. Pursuit of this Goal cannot be limited to national strategies, but must include cooperative standards that reflect the global nature of environmental impacts.

**MDG 7 is far-reaching due to the global nature of environmental impacts.**

These various questions can be analytically conceived of as questions of scale. Scaling can be seen as one way of handling what are now often seen as either/or conditions: local vs. global, markets vs. non-market mechanisms, green vs. brown environmentalism. I have found some of the analytic work on scaling being done among ecologists very illuminating in the effort to conceptualize the city in this context. Of particular relevance is the notion that complex systems are multi-scalar systems as opposed to multilevel systems, and that the complexity resides precisely in the relations across scales. In complex systems, these relations across scales are grounded in close relations between broad overarching events and specific details.<sup>35</sup> Some ecologists find that tension among scales is a feature of complex ecological systems, a condition that would certainly seem to hold for cities. Understanding how tensions among scales might be operating in the context of the city might strengthen the analysis of environmental damages associated with urbanization and the ways in which cities are also the source for solutions. It is important for ecologists, therefore, to address the scale issue in order to avoid descriptions at a single level.

Understanding ecological systems through the lens of a single scale creates an unwieldy and complicated mess.<sup>36</sup> One could clearly make a parallel argument for the case of cities, particularly in the insistence on emphasizing the local scale for research and implementation.

A crucial analytic operation involved here is giving spatio-temporal scaling to the object of study. This also entails distinguishing that object of study from contextual variables, which in the case of cities might be population, economic base, etc. Executing such analytic operations would help us avoid the fallacy of holding “the city” guilty of environmental damage. Eliminating cities would not necessarily solve the environmental crisis. We need to understand the functioning and the possibilities for changing specific systems of power, economic systems, transportation systems and so on that entail environmentally unsound modes of resource use. The fact that these various systems amalgamate in urban formations is an analytically distinct condition from the systems involved. The distinction between specific systems and background or contextual variables also helps us avoid the fallacy of seeing “the city” as a container and a bounded closed unit. In my research on cities and globalization, I instead conceptualize the city as a multi-scalar system through which multiple highly specialized cross-border economic circuits circulate. This idea can be applied to cities and the environmental dynamic. In this case, the city is a multi-scalar system through which multiple specific socio-ecological circuits function. It is not a closed system. Cities are amalgamations of multiple “damage” circuits, “restoration” circuits and policy circuits.

There are specific issues raised by research on ecological systems that point to possibly fruitful analytic strategies to understand cities and urbanization processes both in terms of environmental conditions and in terms of policy. One of the reasons this may be helpful is that we are still struggling to understand and situate various types of environmental dynamics in the context of cities and how to engage policy. When it comes to remedial policy and cleanup, there is greater clarity in understanding what needs to be done. But understanding the city as a broader system poses enormous difficulties precisely because of the multiple scales that are constitutive of the city, both as a system of distributed capabilities and as a political-economic and juridical-administrative system. That is to say, the individual household or firm or government office can recycle waste but cannot address effectively the broader issue of excess consumption of scarce resources; the international agreement can call for global-level measures to reduce greenhouse emissions but depends on individual countries and individual cities and individual households and firms to implement many of the necessary steps; and the national government can mandate environmental standards but depends on systems of economic power and systems of wealth production to validate them.

A key analytic step is to decide which of the many scaled ecological, social, eco-

conomic and policy processes are needed to explain a specific environmental condition—whether negative or positive—and design a specific action or response. Another analytic step is to factor in the temporal scales or frames of various urban conditions and dynamics: cycles of the built environment, of the economy, of the life of infrastructures and of certain types of investment instruments. The combination of these two steps helps us deconstruct a given situation and to locate its constitutive conditions in a broader grid of spatial, temporal and administrative scales.

The connection between spatial and temporal scales evident in ecological processes may prove analytically useful to approach some of these questions in the case of cities. What may be found to be negative at a small spatial scale or a short time frame may emerge as positive at a larger scale or longer time frame. For a given set of disturbances, different spatio-temporal scales may elicit different responses from ecosystems. Using an illustration from ecology, we can say that individual forest plots might come and go but the forest cover of a region overall can remain relatively constant. This raises a question as to whether a city needs a larger system in place that can neutralize the impact on the overall city system of major disturbances inside the city. One outcome of the research by ecologists in this domain is that movement across scales brings about change as a dominant process: It is not only a question of bigger or smaller but rather that the phenomenon itself changes. Unstable systems come to be seen as stable; bottom-up control turns into top-down control; competition becomes less important. This also is suggestive for thinking about cities as the solution to many types of environmental damage: What are the scales at which we can understand the city as contributing solutions to the environmental crisis?

An important issue raised by scaling in ecological research is the frequent confusion between levels and scales: What is sometimes presented as a change of scales is actually a translation between levels. A change of scale results in new interactions and relationships, often in a different organization. Level, on the other hand, is a relative position in a hierarchically organized system. Thus a change in levels entails a change in a quantity or size rather than the forming of a different entity. A level of organization is not a scale, even if it can have scale or be at a scale. Scale and level are two different dimensions.

Relating some of these analytic distinctions to the case of cities suggests that one way of thinking of the city as multi-scalar is to note that some of its features, notably density, alter the nature of an event. The individual occurrence is distinct from the aggregate outcome; it is not merely a sum of the individual occurrences, that is, a greater quantity of occurrences. It is a different event. The city contains both, and in that regard can be described as instantiating a broad range of environmental damage that may involve very different scales and origins yet are constituted in urban terms: for example, CO<sup>2</sup> emissions produced by the micro scale of vehicles and coal

burning by individual households become massive air pollution covering the whole city with effects that go beyond CO<sub>2</sub> emissions per se. Air- and water-borne microbes materialize as diseases at the scale of the household and the individual body and become epidemics thriving on the multiplier effects of urban density and capable of destabilizing operations of firms whose machines have no intrinsic susceptibility to the disease.

A second way in which the city is multi-scalar is in the geography of the environmental damages it produces. Some of it is atmospheric, some of it internal to the

**Environmentalists often must pursue remedial measures that diminish the sense of urgency regarding broader conditions.**

built environment of the city, as might be the case with much sewage or disease, and some of it in distant locations around the globe, as with deforestation. For these reasons, MDG 7 influences many of the other Millennium Development Goals, and the need for international coordina-


tion to realize environmental sustainability is a factor in the realization of other development objectives as well.

A third way in which the city can be seen as multi-scalar is that its demand for resources will tend to produce a geography of extraction and processing that spans the globe, though it does so in the form of a collection of confined individual sites that are distributed worldwide. This worldwide geography of extraction and processing instantiates, in particular, specific forms inside the city (e.g., furniture, jewelry, machinery, fuel). The city is one moment—the strategic moment—in this global geography of extraction, and it is different from that geography itself.

The fourth way in which the city is multi-scalar is that it instantiates a variety of policy levels. It is one of the key sites where a very broad range of policies—supra-national, national, regional and local—materialize in specific procedures, regulations, penalties, forms of compliance and types of violations. These specific outcomes are different from the actual policies as they get designed and implemented at other levels of government.

Important also is the need to factor in the possibility of conflicts in and between spatial scales. Environmentalists can operate at broad spatial and temporal scales, observing the effects of local activities on macro-level conditions such as global warming, acid rain formation and global despoliation of the resource base. Environmentalists with a managerial approach often have to operate in very short time frames and confined levels of operation, pursuing cleanups and remedial measures for a particular locality—remedial measures that may do little to affect the broader condition involved and may, indeed, diminish the sense of urgency about larger issues of resource consumption, thereby delaying much-needed responses. Economists or firms will tend to emphasize maximizing returns on a particular site

over a specific period of time rather than consider more long-term impacts.

Cities are complex systems in their geographies of consumption and waste production, and this complexity also makes them crucial to the production of solutions. Some of the geographies for sound environmental action in cities will also operate worldwide. The network of global cities becomes a space at the global scale for the management of investments, but also potentially for the re-engineering of environmentally destructive global capital investments into more responsible investments. This network contains the sites of power of some of the most destructive actors, but potentially also the sites for demanding accountability of these actors. The scale of the network is different from the scale of the individual cities constituting this network. The city is a multi-scalar system in the double sense of what instantiates there and of the different levels of policy frameworks that operate in cities. These different policy levels require a coordination of regulatory efforts by the agents investing in global development. Cities, therefore, are crucial in the implementation of cohesive sustainable development strategies. The circular logic environmentalists want to introduce in the functioning of cities, such as maximum re-use of outputs to minimize waste, will entail spatial circuits that operate at different scales. Some will be internal to households, others will be citywide, and yet others will go beyond the city and run through places around the globe. The global nature of environmental sustainability requires that this development goal be considered in conjunction with the global partnership that is also proposed in the MDG agenda. This means that indicators for progress toward the goal of ensuring environmental sustainability should be reconsidered to accommodate measurements of impacts beyond the local level. 

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## NOTES

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