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Using economic geography to reinvigorate land-change science

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ABSTRACT

In this paper we review the implications of neoclassical economic framings within the interdisciplinary field of land-change science. We argue that current pressing global environmental problems, such as land grabs, loss of critical carbon sinks and the increasing importance of corporate actors in land-use decision-making, necessitate a reconsideration of neoclassical conceptualizations of what the economy is, who economic actors are and how they make decisions, and how environment–economy linkages operate in a globalized world. We argue that concepts from economic geography can help land change science move beyond neoclassical framings. The first concept is that the economic (including markets, commodities, and rational decision-makers) is neither separate nor universal, but is historical and socially embedded. The second is to use these notions to understand the spatial organization of economic activity. The framework of global production networks, in particular, will help land change scientists conceptualize and represent teleconnections. Using economic geography to move beyond neoclassical economic framings will bring a fresh approach to economic change that holds much promise for invigorating land change science.

1. Introduction

The growing liberalization of trade and finance over the past decade has accelerated global economic change. New economic possibilities are, in turn, changing the pace, scale, and dynamics by which natural resources—land, minerals, carbon—are metabolized in economic systems. Consider, for example, how the world's most remote forests are increasingly enrolled into carbon offset markets; how the rising demand for meat is concentrated among a burgeoning urban middle class often far removed from sites of production; how foreign capital finances "land grabs" that erratically transform landscapes of smallholder production into "flex crop" monocultures; or how the remittances from low-wage migrants are changing the production possibilities of landscapes half a world away. These examples demonstrate new ways in which environment and economy are interlocked to an unprecedented degree, even as they challenge our basic ways of thinking about those connections. After all, these processes unsettle standard binaries of global/local, exogenous/endogenous, and rural/urban. Further, they destabilize standard categorizations of land-change agents (e.g., households, firms, or policy makers) because real world decisions about resource use are increasingly made by complex webs of actors operating simultaneously at multiple scales.

Land change scientists are well aware of these challenges and the urgent need to address them (Rounsevell et al., 2012). They recognize that fixed categories of "land use" and "land user" are no longer tenable (Rindfuss et al., 2004; Rudel, 2007). Further, they grasp that the land-change science (LCS) community's ability to understand and predict these new economic–environment linkages is essential to the field's future and global relevance (Lambin and Meyfroidt, 2011), especially in the face of growing demand for better climate models and more integrated accounting of land sustainability (Young et al., 2006; Erb et al., 2009). To date, however, hard-won empirical insights regarding these new forms of economy–environment linkages have arguably not been matched with equal efforts to re-conceptualize these linkages. For example, land-change scientists have striven to reconcile orthodox approaches to markets with attention to the role of customs, institutions, heterogeneous users, etc. (Geist and Lambin, 2002). In so doing the field effectively straddles a conceptually wide gulf, yet it continues to rely almost exclusively on neoclassical definitions of what the economy is, who economic actors are, and how those actors, in turn, make decisions about resources. Adherence to neoclassical framings endures despite growing frustration at their inability to accommodate the world's growing complexity. In light of this impasse, some land change scientists have been calling for new approaches to broaden these framings (Rasmussen and Reenberg, 2012).

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In this paper, we argue that one way to answer this urgent need is to gradually replace land-change scientists' reliance on neoclassical economic models with a far more nimble and flexible conceptualization of economic process. Such a re-conceptualization draws from well advanced developments in so-called "institutional" economic geography.[2] That economic geography could, in effect, come to the conceptual rescue of LCS may not come as a surprise. After all, economic geographers and LCS share common interests in how economic processes play out across space and time. Further, the economic geography (EG) literature is known to many in the LCS community, and there have been several calls for greater rapprochement between the two fields (Jepson, 2006; Klepeis and Vance, 2003; Roy Chowdhury and Turner, 2006; Robinson et al., 2007). What has not been explicitly recognized by land change scholars, however, is that economic geographers (and scholars in cognate fields) have spent the past two decades or more specifically innovating beyond neoclassical approaches to economic processes. The result is a conceptual freshness towards economic change that holds much promise for invigorating land change science.

Two contributions of economic geography stand out as especially relevant and ripe for adoption within the LCS community. First is the notion that economic activities are embedded within the sphere of social processes rather than alongside it. We argue that recent developments in LCS to operationalize teleconnections as a concept (Liu et al., 2013; Seto et al., 2012) will benefit from an explicit consideration of how actors, activities and flows across sites are embedded within social and institutional contexts, and in turn, produce dynamic geographies.

Embeddedness fundamentally challenges how we think about space and spatial relationships. Thus—and second—this idea brings with it an understanding of economic agency and the geography of economic activity that is very different from neoclassical approaches, and offers productive avenues for the exploration of environment–economic relationships.

Before we can elaborate further on these points, however, it is incumbent upon us to clearly lay out just how LCS insights have been profoundly shaped—and, we argue, constrained—by neoclassical conceptions of economic process. We do not presume to offer a comprehensive overview of either LCS or economic geography. Rather, we describe what we feel to be key priorities for enriching LCS with EG, based on our own experiences and challenges as LCS scholars.[3]

2. LCS and neoclassical approaches to economic/environmental change

2.1. LCS and scientific advances in economic–environment linkages

Because land-use and land-cover change occur at the interface of social and natural systems, the field of Land Change Science (and specifically the Human Dimensions of Global Change community within it) is inherently interdisciplinary, including among its ranks geographers, ecologists, political scientists, and others (Turner et al., 2007; Lambin and Geist, 2006). The field has also historically been refreshingly multi-method, characterized by rich empirics generated through intimate, long-term engagements with specific spaces and actors. This has fostered the emergence of a comprehensive program of monitoring, modeling, synthesis and scenario-building that underlies the field's interdisciplinary research (Turner et al., 2007) and is arguably its core strength.

To date, the field has made vital conceptual and empirical interventions into the study of global environmental change. Three in particular stand out for their global impact within academic, policy, and popular circles. The first has been to highlight the capacity of local users to sustain resource systems, changing how the international community thinks about the role of local people as environmental managers (Andersson and Ostrom, 2008; Ostrom, 1990, 1994, 2000, 2005; Ostrom and Nagendra, 2006; Oye and Maxwell, 1995; Young et al., 2006). Second, LCS has drawn much-needed attention to the complex webs that span social and ecosystem spaces. For example, twenty years of scholarship on "forest transitions" have shown how economic and political shifts can initiate environmental renewal on abandoned landscapes (Grainger, 1995; Mansfield et al., 2010; Mather, 1992; Mather et al., 1999; Perz, 2007; Rudel et al., 2002; Turner and Robbins, 2008; Walker, 2008). Third, LCS has been central in challenging categorical and aspatial understandings of land cover by emphasizing the patchy, incremental, nonlinear and even reversible ways in which land change occurs over time (DeFries et al., 1999). For example, Drummond and Loveland (2010) illustrate the diversification of eastern U.S. forests, supporting a greater range of users and activities than ever before. Likewise, Irwin et al. (2009) call attention to "urban–rural spaces," where the confluence of transportation improvements, economic restructuring, rising real incomes, and natural amenities lead to qualitatively new types of urban–rural interdependencies.

All of these contributions have been broadly based on conceptualizations of economic change that are characteristically and recognizably "neoclassical." That is, explicitly or not, they are grounded in twentieth century understandings of what counts as economic, specific approaches to studying "economic agents" (Barnes, 1988), and normative explanations about the direction and nature of desirable change. Below, we go over the specific ways in which neoclassical thinking permeates land change science, and reference the ways in which neoclassical framings can straightjacket scientific inquiry in an era of unprecedented economic and environmental change.

2.2. Homo economicus

Central to neoclassical economic analysis is the atomistic, autonomous actor, *Homo economicus*. This actor—whether an individual, a household, or a firm—is understood to weigh the information to which it has access to arrive at an optimal solution given constraints—i.e., individuals or households maximize utility and firms maximize profit subject to their budgets. The fact that these decisions may be made in a "social" context is understood, in the sense that actors make decisions that are influenced by "non-economic" information or pressures, such as the incentives to collude, peer effects, or the effects of familial relationships (Manski, 2000). But such phenomena, often conceptualized generically as "preferences," are generally assumed to be exogenous to the economic moment—important, to be sure, but conceptually *separate* from the economic realm. Thus, social processes are invoked to explain deviation from strictly rational economic behavior. Accordingly, neoclassical analysis draws clear boundaries around the measurement of economic phenomena, and strives for deductive reasoning and the derivation of first principles, abstracted from the contingencies of a given context (Peck, 2005).

Homo economicus is recognizable in LCS's pervasive focus on the decision-making dynamics of land/resource users. To be sure, LCS often complicates standard neoclassical methods by recognizing "bounded rationality" (or the idea that users are rational up to some limit of information) and attending to the heterogeneity of agents (e.g., different preferences for risk-taking or natural amenities). Nevertheless, the ultimate and common research priority is

[2] Institutional economic geography (IEG) approaches analyze markets as 'instituted' or resulting from social processes. There is overlap between this tradition and institutional analysis, but IEG is not to be confused with natural resource governance narrowly.

[3] Of the four authors of this manuscript, two of us contribute centrally to LCS research. We wish to provide a sympathetic critique from within the community.