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Market-based instruments for the governance of coastal and marine ecosystem services: An analysis based on the Chinese case

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ABSTRACT

Scholars and policy makers have increasingly emphasized the role of market-based instruments (MBIs) for the governance of ecosystem services (ESs). Limited focus however exists on a systematic understanding of how coastal and marine governance facilitates MBIs to sustain ESs. This paper develops a framework for analyzing the governance of MBIs on the basis of four distinctive aspects, including price, regulatory support, coordination, and spatial consideration. This framework can be used to analyze how MBIs are reflected in the governance of coastal and marine ESs and to understand to what extent a market environment is created for ESs. This study focuses on one in-depth case, namely Chinese national coastal and marine governance. The case suggests that existing MBIs are based on ES valuation and impacts and serve for understanding transactions. Moreover, the MBIs tend to show a clear focus on improving policy coordination. Finally, a further understanding of MBIs for coastal and marine governance is needed to also explore the role of voluntary choice.

1. Introduction

Increasingly, both market-based instruments (MBIs) and the concept of ecosystem services (ESs) have gained favor in the environmental policy, planning and ecological conservation world (Pirard and Lapeyre, 2014). ESs are the benefits people obtain from ecosystems, such as water purification and the provision of seafood; this concept frames the relationship between humans and the rest of nature (Costanza et al., 2014; MA, 2005). The close linkages between human well-being and natural resource management has required better policies and instruments to enable sustainable governance outcomes. Accordingly, MBIs – a generic term referring to a range of approaches (e.g., cap and trade schemes, payment schemes, and levies) to address environmental policy issues in an economically efficient way – have attracted much attention (Muradian et al., 2013; Pirard and Lapeyre, 2014). These instruments attempt to build supply-demand connections and create incentives to affect actors' behavior (Boisvert et al., 2013). MBIs mainly support market mechanisms, such as voluntary transactions between actors, competition for services, and price signals (the EC Green Paper, European Commission, 2007; Lockie, 2013). Specifically, MBIs internalize the external costs of an action through taxes, or they create a market for ESs and individual property rights that favors competition (Dargusch and Griffiths, 2008). By doing so, MBIs seek to solve negative environmental externalities or even benefit positive externalities, such as inshore overfishing, sewage discharge into the sea, and utilization of environmentally-friendly tourism products (Engel et al., 2008; Greiner et al., 2000; Muradian et al., 2010). The main motive underlying MBIs is that they constitute more flexible responses and cost-effective options, which are superior to traditional regulation for ES conservation (Bräuer et al., 2006; Davis and Gartside, 2001; Hahn and Stavins, 1992).

MBIs have been gradually adopted to serve the governance of coastal and marine ESs. There are wetland mitigation banks, tradable development rights of flooding zones, eco-labels of fish products, and payment for ecosystem services (Binet et al., 2013; Filatova, 2014; Froger et al., 2014; Ressurreição et al., 2012). Coastal and marine ESs play a critical role in sustaining socio-economic development in coastal regions. However, there is a challenge for coastal and marine governance worldwide: managing ES complexity in relation to, for instance, ecological uncertainty, bio-physical dynamics between land and sea, and stakeholders' interests across geographical and institutional scales (Koch et al., 2009). MBIs have been advocated as being desirable to address this challenge (Davis and Gartside, 2001). Nowadays, they are considered to be the preferred tools for improving coastal and marine governance in both developed (e.g., the U.S., and Australia) and developing countries (e.g., Latin American countries and China;

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Douvere, 2008; Greiner, 2014; Womble and Doyle, 2012; Zhao et al., 2015).

Previous studies concerning MBIs have mainly emphasized initiative development in forest reservation, watershed protection, agriculture, biodiversity, and carbon sequestration (Chobotová, 2013; Hejnowicz et al., 2014; Schomers and Matzdorf, 2013). A strong focus has also been on the performance evaluation of MBIs by measuring and modeling their benefits and the cost-effectiveness of investment (Connor et al., 2008; Crossman et al., 2011; Bryan et al., 2016). Next to these empirical experiences, theoretical studies have presented conceptualizations, classifications, and potential governance modes that may strengthen the application of MBIs (Muradian et al., 2010; Pirard and Lapeyre, 2014). The governance of MBIs for ESs needs to facilitate economic incentives to influence actors' behavior and allocate natural resources. This should be in combination with regulations to draw on different motivations to sustain ESs cost-effectively (Matzdorf et al., 2013). In other words, the use of MBIs for ESs has required hybrid governance that combines both market and regulatory elements (Muradian and Gómez-Baggethun, 2013). However, to date, MBIs for ESs in the coastal and marine field have received limited attention. In particular, an empirical understanding of the required governance has been lacking. To improve the implementation of MBIs for ESs, it is critical to gain insights into how existing coastal and marine governance facilitates MBIs in practice.

The objective of this paper is to gain theoretical and empirical insights into the utilization of MBIs for governing coastal and marine ESs. For this purpose, this paper develops an analytical framework to investigate the governance of MBIs from four distinctive aspects; namely price, regulatory support, coordination, and spatial consideration (e.g., Boisvert et al., 2013; Muradian and Rival, 2012). The empirical focus is on experience from China. China has experienced a fast-paced economic development in the past thirty years. Its complex environmental issues and huge pressures on ecosystems (e.g., air pollution, biodiversity losses, and depleted fisheries) are among the most severe of any major country (Liu and Diamond, 2005). China's traditional command-and-control arrangements have gradually facilitated the evolution of MBIs for ESs to tackle these issues in a more flexible and effective way. This development is visible in China's national coastal and marine governance. Many national policies have tended to integrate economic incentives, ES valuation, impact assessment, and spatial allocation. This makes China an interesting case when discussing how MBIs are implemented in national policies that focus on coastal and marine ESs, and understanding to what extent a market environment can be created for ESs.

The structure of this paper is as follows. Section 2 explains the theoretical relevance of understanding MBIs for ESs. It also presents an analytical framework formulated around four distinctive governance aspects of MBIs to guide further empirical investigation. Section 3 introduces the case of China. The research strategy is explained in Section 4. Results on the governance of the selected MBIs are shown in Section 5. Subsequently, merits and shortcomings of Chinese coastal and marine governance are reflected on regarding their relevant to MBIs. Efforts to improve MBIs' utilization in general are emphasized. The final section presents the main conclusions.

2. MBIs for ES governance

2.1. Theoretical relevance of understanding MBIs for ESs

The use of MBIs for ES governance has emerged in recent international discussions and sparked a broad theoretical debate (Muradian and Gómez-Baggethun, 2013; Tacconi, 2012). Within this debate, it has been argued that MBIs need to emphasize a typical market feature; namely, the voluntary nature of the choice for related actors (Engel et al., 2008). MBIs should facilitate freedom of choice for interactions among related stakeholders (Jack et al., 2008; Tacconi, 2012; Wunder, 2015). This implies that coastal and marine governance should, for instance, establish negotiation platforms and stimulate bargaining processes to achieve voluntary agreements on effective allocation of ESs (Filatova, 2014; Liu and Guo, 2015; Tennent and Lockie, 2013). Reinforcing coordination has also been emphasized in terms of the transaction costs for MBIs. Transaction costs refer generally to costs of information, bargaining, and enforcement, including contracting (Williamson, 1998). Markets for ESs normally involve considerable transaction costs when aligning interrelated actions, such as price setting and performance monitoring (Jack et al., 2008; Muradian and Rival, 2012). The governance of MBIs seeks to reduce transaction costs by building up necessary trust, using regulatory power, providing cost assessment, and stimulating competition (Stavins, 2003; Vatn, 2010). For MBIs to be worthwhile, coastal and marine governance should keep transaction costs sufficiently low.

Moreover, ES valuation has been perceived as an important basis for MBIs. Commoditizing ES-related proxies has been promoted and rationalized as a way to integrate ES values into MBIs (Nelson et al., 2009). Observable and measurable ecosystem properties and regulatory factors have gained favor in valuation to inform costs and benefits in ES transactions (Jack et al., 2008; Tacconi, 2012). This theoretical discussion implies more instrumental innovations with respect to coastal spatial allocation through land/sea uses and economic incentives. Last, but not least, MBIs are envisioned to incorporate the idea of dealing with complex causalities of ES issues (e.g., spill-over influence, trade-offs and synergies among ESs). MBIs are supposed to reveal cost-effectively causal information, internalize multiple costs, and allocate benefits that diverge according to spatial range (Corbera et al., 2009; Lockie, 2013; Muradian et al., 2010; Pirard, 2012). MBIs may offer the possibility to clarify affected actors, handle impacts that cross land-sea borders, increase co-benefits from different ESs, and prescribe offsite measures for compensation.

In summary, there is a need to gain a better understanding about market features and ES governance complexity. This should be based on empirical studies about MBIs and related governance. Next, an analytical framework will be presented to guide further empirical understanding.

2.2. An analytical framework

Against the backdrop of the aforementioned theoretical context, this paper presents an analytical framework. This draws on existing qualitative studies about MBIs for ESs which use three perspectives: governance, institutions, and ecological economics (e.g., Boisvert et al., 2013; Chang, 2008; Muradian and Rival, 2012; Schomers and Matzdorf, 2013). These schools of thoughts have suggested four distinctive governance aspects of MBIs in relation to coastal and marine ESs. This framework enables a structured method to gain insights into the utilization of MBIs. Table 1 presents the four distinctive aspects.

2.2.1. Price

Generally, MBIs either rely on ESs directly, or on ES-proxies, partially, in regulatory terms, to realize commodification. A price could be attached "to different degrees and in different ways…whether for market exchange or for direct deals between a limited number of stakeholders, or whatever other purpose" (Pirard, 2012). Social and economic values of services have been incorporated into MBIs, such as direct fishery losses. Previous studies (e.g. Bräuer et al., 2006; Grafton, 1996; Greiner et al., 2000) have provided a considerable evaluation of ES-related proxies for hard-to-commodify ESs, including artificial prices for externalities (e.g., upstream pollution), and measurable regulatory elements (e.g., land use/cover, fishing quotas, and carbon credits). In this context, land/sea uses have played a critical role, as these are assumed to generate desirable ESs, connect ecological functions, ES provision, and coastal and marine spatial allocation