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Managing the risks of ecosystem services markets

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ABSTRACT

Environmental governance is undergoing innovation in the use of market instruments, including payments for environmental services. As it is in nature, in society change (such as commercial or policy innovation) brings the risk of failure or of unanticipated consequences. Good governance requires intelligent precautions against what can go wrong. In investment markets governance safeguards such as competition and market regulation manage the risk that private gains accrue to the ruthless at the cost of the innocent, or that inexperience or incompetence lead to high public and private costs. For environmental markets risk safeguards are under developed. This paper explores the risk dimension of payments for environmental services, and suggests that systematic risk governance could make it more likely that these innovations will serve the public interest.

1. Introduction

Innovativeness is celebrated with tales of the pioneers who create technologies and businesses that provide benefits to society. What is less often highlighted is that a high percentage of innovations – and their entrepreneurs – fail. Success requires the ability to identify and manage the potential undesirable contingencies that reduces value. For this reason engineering analyses failure potentials and corporate governance focuses on risk management. In this paper I explore adverse contingencies that may reduce the value from payments for environmental services.

Modern environmental governance uses market instruments to value the environment, to reduce over-consumption and under-protection of resources (Jordan et al., 2003). One approach is instruments that require payments for environmental services valued by man such as clean water, aesthetic values, or biodiversity ("P.E.S.") (Alston et al., 2013; Herbert, 2010; Wunder, 2015). Many examples can be found in the literature (Swanson et al., 2004; Coggan et al., 2009; Brsuer et al., 2006; European Environment Agency, 2006; Ecosystem Marketplace; OECD, 2007). It is common for payments to be made for carrying out of (or restraint from) activities expected to lead to environmental benefits but the link between the payment and the service is hypothesised. The payment is for the expectation, with a risk that the instrument will not deliver the expected value. This is one illustration of the many risk dimensions within the P.E.S. concept.

One version is payments for watershed services ("P.W.S.") (Stanton et al., 2010; Brauman et al., 2007; Webb and Martin, 2013). P.W.S. approaches have been applied to ensure water quality for drinking water catchments, fish stocks, flood mitigation and a variety of landscape values. In the USA in 2008, P.W.S. transactions involved 16.4 million hectares of land with payments in excess of $1.3 billion. (Stanton et al., 2010, p10) Typically these schemes involve State controls over access to watersheds or potentially polluting activities, as well as the operation of the market. Other versions include P.E.S. for carbon sequestration and for biodiversity (Ecosystem Marketplace), and internationally the REDD+ scheme is a high profile example (Gupta, 2012; Costenbader, 2009; Corbera, 2012). P.E.S. schemes are typically examples of hybrid rather than purely private governance, and depend on complex institutional structures (Martin and Noble, 2015; Khanna, 2012; Holley and Gunningham, 2010; Hutter, 2006).

While P.E.S. is characterised a private market-based approach, the state often has a central role. A carbon credit or bio-banking system is likely to depend on the state to designate and securitise units or to create an obligation to purchase, to establish the contract structures including rights, and to prohibit activities that could undermine market value. Government agencies are often central to P.E.S. markets as customer, supplier and operator and regulator.

Arguments that public policies have not achieved their purposes, that they are inefficient, or have caused undesirable impacts are the "meat and drink" of politics. The history of innovative private market instruments such as securitised domestic loans demonstrates that apparent successes should not blind policy makers or investors to the reality that with market or policy initiatives comes risk (Conyon et al., 2011; Goldin and Vogel, 2010; and in relation to P.E.S., Lotay, 2014). Failures of markets or by firms within markets are well known, and adverse spillovers from capitalism and from firms are canvassed in scholarly and popular literature. The performance and outcomes of environmental market instruments are contingent on many market and

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public policy variables that create a risk of failure or perverse outcomes. (Stavins, 2001; Gómez-Baggethun and Muradian, 2015a, b; Neuteleers and Engelen, 2015) Despite evidence that public policies often also fail (in terms of effectiveness, acceptability, efficiency and un-intended impacts), there is little explicit risk management for these risks, even if commentators point out many risks (for example Freestone et al., 1999; Stavins (2001); Freeman and Kolstad (2006); Hepburn (2010); Okamoto et al. (2012)).

There is no established 'best practice' for risk management, though a wealth of material that could contribute (for example Elmore (1979), Bovens and 't Hart (1996), IRGC (2009), ISO 3100 (2009), Allan et al. (2013)). The paper draws on a framework for policy risks intended to contribute to filling this gap (Martin and Williams, 2010) . A taxonomy of risks for policy instruments was developed based on investigation of implementation of the Australian National Water Initiative policy. The Australian National Water Initiative relies on markets to achieve policy outcomes (Council of Australian Governments, 2004; Moran et al., 2014; Gray and Lee, 2016). Three main categories of risk to implementation of this market-instrument approach were isolated: political risks, failures due to instrument and implementation strategy design, and the risk of undesirable spillovers.

The political risk of market instruments is that a policy can fail for reasons such as not achieving adoption, or opposition that prevents implementation (Stavins, 2004; Howes, 2005; Le Gal, 2012; Wimmer et al, 2003; Torenvlied and Thomson, 2003; Michaelowa, 1998).

The second risk category concerns inadequate conceptualisation, design, or implementation arrangements. A body of literature, which is not, synthesised into a body of theory or best practices points to the significance of this risk. (Walsh, 2006; Martin and Shortle, 2010; Gunningham and Sinclair, 2004; Parker, 2000; Freeman and Kolstad, 2006; Martin et al., 2016; Sabatier and Mazmanian, 1980). The literature concerned with policy and strategy implementation offers insights that could form the basis for more effective design and implementation risk management (Pustkowski et al., 2014; Parker, 2000; Bammer, 2005; Martin et al., 2016; Michie et al., 2011).

The third risk category is that an instrument causes unintended harms, termed negative 'spillovers'. Spillovers include unintended or excessive costs to the disadvantaged, economic distortion or undermining of other policies and institutions. A body of un-synthesised literature points to the reality of this risk and some of its characteristics, particularly in relation social justice and "marketising" nature (Martin, 2012; Corbera, 2014; Lohmann et al., 2006; Martin 2013; Calvet-Mir et al., 2015; Martin and Kennedy, 2011; O'Neill et al., 2016; Matulis, 2014a, b).

The taxonomy was applied to examine instruments to manage farmland biodiversity and emissions with an in-depth examination of interests created by "conventional" and novel instruments (Martin et al., 2010). Property right complexity emerged as a risk from environmental instruments. This has the potential to create undesirable effects on land titling and to create transaction costs in land management (Martin et al., 2013). The taxonomy has been used to explore other policy settings (Martin and LeGal, 2016; Martin, 2013; Martin and Shortle, 2010; Martin and Kennedy, 2011; Martin and Williams, 2014; Martin, 2012; Martin et al., 2007). This paper distils lessons about risk from these diverse examples.

2. Managing the elephants in the room

A typical environmental market instrument requires: estimation of the limits to resource use; legally specified rights to fractions of the environment; market or market-like mechanisms to allocate interests; and economic and biophysical methods to evaluate the strategies. These elements take different forms. All instruments, both traditional regulation and market-oriented instruments, can fail wholly or to some degree (see for example Stavins (2001), Crowley and Walker (2012), Hepburn (2010), Walsh (2006), Martin and Shortle (2010), Jaffe et al. (2005), Parker (2000), Pahl-Wostl (2009), Freeman and Kolstad (2006), Gómez-Baggethun and Muradian (2015a, b), Faure (2012), Scott (1998), Mickwitz (2003), Williams et al. (2008), Hill and Hupe (2002), Phromlah (2013)). The evidence suggests variability in the outcomes from P.E.S., market and other instruments. Despite widespread expectations that market instruments will be more reliable than traditional methods these may suffer similar problems to other forms of regulation, though the dynamics will be different due to different mechanisms.

Generally, the more novel an innovation the higher is the potential for it to fail. The shift from an attractive concept, through prototypes and testing, to adopted innovation is littered with disappointment. Failure should generally be considered likely (see for example Teece (1986), Rothwell et al. (1974)). Experience reduces mistakes, improving efficiency due to accumulated learning or from observation and analysis ("the learning curve"), and scale and sophistication in equipment and skills ("economies of scale"). In the early stages the challenge is to make the innovation work, often with many concepts being proposed or tried but few proving feasible. Some versions emerge as the dominant paradigm. (Abernathy and Utterback, 1978) The concept is refined and becomes more efficient in practice. In the mature stage the paradigm becomes well known and reliable, becoming conventional.

Diverse models of markets for ecosystem services are being tried. What is likely is that there will be failures and there is evidence that these are happening. What is lacking is systematic learning from these natural experiments.

3. Intrinsic risks with monetisation

The creation of an environmental service market involves activities where things can go wrong: specifying the components of the environment as the basis of the instrument; defining these in measurable ways to be securitised; creating a legal interest; identifying buyers and sellers and creating an incentive to trade; creating institutional and administrative mechanisms; and governing the market. Many concerns have been raised about the concept or practice of PES that might be considered not as arguments against the approach *per se*, but as risks should be managed (summarised in Jenkins (2008)). Some of these risks, discussed immediately below, are intrinsic and thus difficult to manage.

The pricing of some attributes of environmental systems risks overemphasis on the (priced) aspects, triggering undesirable social or environmental outcomes. The experience of payments for carbon sequestration (Bofin et al., 2011; Corbera, 2014; Martin, 2013) or biofuels (Dillon et al., 2008; Bringezu et al., 2009; Pimentel, 2009; Bailis and Baka, 2011; Ernsting, 2008; De La Torre et al., 2006), which have sometimes triggered adverse spillovers demonstrate that this is a real contingency. These examples illustrate that private entrepreneurship pursuing sustainability interests of wealthy countries can overwhelm governance in less wealthy communities, exacerbating inequities. Unfortunately PES schemes continue without explicit risk management (Martin, 2013).

A second embedded risk is the effect of mis-pricing components of the environment. For example Costanza et al.'s work on economic values of ecosystem services (and of others) involves intrinsic subjectivity and context dependence (Costanza et al., 1997; Costanza et al., 2014; Ecosystem Marketplace). The estimates are useful in policy discourse, but depend on the artifice of pricing nature. How much is a megalitre of water worth? A price determined under one set of circumstances may be unreliable under other conditions. In a time of flood, water volume has negative value (though quality water may be scarce and highly valuable). During a drought, water has high value. To a person dying of thirst water has enormous value. "Valuation" reflects values that are applied, and embeds decisions about the relative worth, and the basis of worth, of interests. This nature of value creates a risk of