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DISCUSSION PAPER SERIES

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Mayula Chaikumbung
Kasetsart University

Hristos Doucouliagos
Deakin University and IZA

Helen Scarborough
Deakin University

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IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Institutions, Culture, and Wetland Values

Do institutions and culture affect environmental values? In this article we analyze 1,041 environmental valuations of 223 wetlands in 38 developing countries, to examine the effect of institutions and culture on environmental values. We assess three dimensions of institutional quality: economic freedom, democracy, and good governance. We also consider the impact of cultural differences. Possibly surprisingly, wetland values are lower in more market based economies and they are lower in cultures that are more indulgent and authoritarian. In contrast, improved government effectiveness increases wetland valuations. Understanding these important and varying effects of institutions and culture on wetland valuations is important for policy development and environmental preservation.

JEL Classification: Q3, H4, O13, P48

Keywords: institutions, culture, wetlands, valuations, environmental preferences, meta-regression

Corresponding author:
Hristos Doucouliagos
Department of Economics
Deakin Business School
Deakin University
70 Elgar Road
Burwood, Vic 3125
Australia
E-mail: chris.doucouliagos@deakin.edu.au

1. Introduction

Environmental management is becoming more complex due to accelerating pressure from growing resource scarcity, declining environmental health, increasing human consumption of resources, changing public preferences, and climate change, all of which are leading to rapidly growing demand for information on environmental valuations (Richardson et al. 2015). However, despite an expanding literature and evidence base on the value of non-market environmental assets, much more research is needed to further develop our understanding of the links between the institutions and culture prevailing within nations and the estimated environmental valuations.

The links between institutions and preferences are potentially strong. Institutions play an important role as conventions, norms, and legal rules (North 1990) and they shape the relationships between citizens concerning their access to and use of natural resources (Vatn 2005). Governance structures and political regimes also play a pivotal role in economic policy, including environmental policy (Wehkamp et al. 2018; Rausser and Swinnen 2011). Moreover, cultural differences also affect environmental preferences and attitudes (see Kountouris and Remoundou, 2016 and references therein).

In this study we consider three channels through which institutions and culture may impact wetland valuations. First, imperfect information and imperfect awareness of available information can affect estimates of environmental valuations. 'Good' institutions can improve access to and awareness of information and thereby enable more informed valuations. Second, institutions can also affect environmental valuations through their impact on incentives. For example, the willingness to pay for public goods is directly related to good governance (Anderson 2017). Weak institutions reduce trust and the willingness to fund public goods. Protection of property rights also plays an important role in the willingness to fund public goods (Deininger and Minten 2002). A third channel is endogenous preferences, whereby institutions

and culture, shape values, preferences, and behavior (Bowles 1998; Aghion et al. 2010; Alesina and Giuliano 2015). Information awareness and incentives are fundamentally different processes to the endogeneity of preferences. Preference endogeneity paves the way for institutions such as the degree of economic freedom to shape preferences, in contrast to traditional, neoclassical economics, wherein preferences are assumed to be fixed and exogenous.

Within the environmental and natural resource literatures, there has been some work exploring the relationship between institutions and environmental outcomes in terms of environmental management (Loomis and Paterson 2014), and environmental quality (Buitenzorgy and Mol 2010). The purpose of this article is to extend this line of inquiry by empirically investigating the relationship between institutions and culture and environmental *valuations*. Specifically, we explore whether institutions and culture influence cross-national differences in wetland valuations. Our contribution to the literature is to offer the first meta-regression analysis (MRA) that examines the effects of institutions and culture on environmental valuations.[1] Our focus is the influence of political and economic institutions (economic freedom, democracy, and governance) and cultural traits, norms and values (power distance, individualism, masculinity, uncertainty avoidance, long term orientation and indulgence) on wetland values in developing countries, using a recently assembled dataset of 1,041 valuations of 223 wetlands in 38 developing countries (Chaikumbung, Doucouliagos, and Scarborough 2016).[2] MRA is

[1] Some authors (e.g. Roland 2004) categorize culture as an institution, viewing culture as a more persistent and slower changing institution. Alternatively, institutions can be viewed as part of the culture of society. We follow recent work in economics (e.g. Tabellini 2008; Alesina and Giuliano 2015; Besley and Persson 2018), and distinguish between institutions and culture, noting that institutions and culture are interdependent and co-evolve. However, this distinction is not essential for our study; our results and their interpretation do not depend on the differences between institutions and culture. As we show in this article, both culture and institutions affect environmental valuations.

[2] A focus on developing countries provides a less heterogeneous sample, than would be the case if wetlands from developed countries were also considered. As explained in the Data section below, our sample is somewhat smaller than Chaikumbung, Doucouliagos, and Scarborough (2016).

ideally suited in this context, as the wetland valuations come from diverse studies, samples, and research designs.

Economic freedom, democracy and governance quality capture different aspects of institutions: the relative importance of markets, the degree of political contests and civil liberties, and aspects of good governance, respectively. In addition to these aspects of institutional 'quality',[3] we also assess the effect of country differences in culture on environmental valuations. This enables a comparison of the deeper roots of culture that change slowly to economic and political institutions that can change much more rapidly (Roland 2004; Tabellini 2008; Luttmer and Singhal 2011).

Wetland resources are important environmental assets and managing wetland resources has become a major challenge for developing countries. Understanding how institutions affect and potentially shape preferences regarding wetland ecosystem services will extend our understanding of the relationship between institutions in the economy and environmental values and assist with policy and market design for the sustainable management of resources. Developing countries are urged to transform their institutions: to become more democratic, more market based, and adopt good governance initiatives. At the same time, they are also being urged to protect their environmental assets. For example, environmental sustainability is one of the eight Millennium Development Goals. While 'good' institutions benefit the economy and development, little is known about their impact on environmental valuations. Which institutions affect environmental valuations? Are policy initiatives to improve institutions consistent with policies for environmental protection?

[3] The term institutional 'quality' is widely used when referring to features of institutions. The term reflects a degree of normative judgement. Our use of the term follows the literature and reflects a judgement that less corruption, more effective governance, and greater political representation are preferable, for a range of economic and social outcomes.

The study of institutions, culture, and preferences and their interactions is complex. Vatn (2017) provides an overview of the development of institutional economics which addresses some of these interactions. We make no new theoretical contributions. Instead, we empirically investigate whether institutions and culture are correlated with wetland valuations. We show in this article that institutions and culture matter. Specifically, economic freedom, government effectiveness, and cultural traits of power distance and indulgence affect wetland valuations in developing countries. We find that the degree of economic freedom plays a prominent role; countries with more economic freedom place smaller valuations on wetlands, on average, and this offsets the positive impact of government effectiveness on valuations.

In the following section we discuss the links between institutions and environmental valuations. Subsequently, we discuss the dataset and the meta-regression methodology. We then present and discuss our findings with respect to the relationship between economic freedom, democracy, governance, and culture and wetland valuations in developing countries. The final section summarizes the main findings and discusses some of the policy implications.

2. Institutions and environmental valuations

The theory behind the valuation of environmental goods and services sits within welfare economics and evaluates human well-being based on the behavior and utility of individuals, households, and firms (see for example, Pearce 1993; Garrod and Willis 1999; and Haab and McConnell 2002). While challenges have been developed to the standard framework for environmental valuation, as discussed for example in Hanley et al (2007), the neoclassical approach is considered most appropriate for this analysis.

The impact of institutions on environmental valuations is theoretically ambiguous; arguments can be advanced that institutions increase valuations, reduce them, or have no effect at all. Hence, empirical investigations are essential. Nevertheless, empirical studies of the

influence of institutions on the economic value of environmental resources are relatively scarce. In contrast, there are numerous empirical studies that explore the relationship between institutions and environment *quality*, mostly using economic freedom, democracy, and governance as the main institutional variables. These different dimensions of institutions can potentially have a differential impact on environmental outcomes and valuations. [4]

Economic freedom denotes liberalization, or the degree to which agents are free to make decisions and markets function free of government intervention (Wood and Herzog 2014). Economic freedom reflects several aspects: the size of government, the quality of the legal system and strength of property rights, soundness of money, freedom to trade and burden of regulation.[5] Democracy reflects political representation, political competition, and civil liberties (Downs 1957; Bhattarai and Hammig 2001). Good governance is a broad term that relates to the process and capacity of government. In this article we focus on three dimensions of good governance: political stability, government effectiveness, and control of corruption (defined in the Data section below).

Institutions can potentially affect valuations of environmental assets in several ways. Here we discuss three channels through which institutions can affect valuations: (1) information and awareness, (2) incentives, and (3) endogenous preferences. There is a crucial difference between information awareness and incentives on the one hand and changes in preferences on the other. Endogenous preferences are a fundamental departure from the standard neoclassical model of choice. Neoclassical economics treats preferences as fixed and exogenous; consumers are autonomous and preferences are not influenced by social

[4] The literature on the impact of institutions on environment *outcomes* has produced mixed results. See, for example, Deininger and Minten (2002) and Wehkamp et al. (2018) on deforestation.
[5] Nevertheless, economic freedom is consistent with some government involvement, e.g. to protect property rights and to enforce the rule of law.

processes/institutions. This assumption simplifies analysis of rational choice (Ng 2004). Within this framework, institutions can impact on information awareness and incentives but they do not impact preferences. Indeed, the studies included in our meta-analysis report monetary valuations of wetlands using valuation methods that assume a utilitarian framework and that preferences are not influenced by social processes/institutions. In contrast, theories of endogenous preferences acknowledge that institutions can also shape preferences (Vatn 2017).

Institutions, information and awareness

Valuations reflect preferences and information. Willingness to pay reflects the perceived marginal benefits of environmental asset preservation (Fouquet 2012). This will be affected by access to information, and understanding and awareness of environmental costs and benefits. Imperfect information and imperfect awareness of available information are distinct. Dasgupta et al. (2002, p. 157) note that: "Until recently, relatively little was known about the economic damage associated with pollution in developing countries." Moreover, available information may be imperfectly assessed. For example, individuals may be unaware of the opportunity costs associated with non-market wetland services. Better information and growing awareness of environmental issues can change attitudes to environmental assets and their valuations (holding other factors constant). This is supported by a considerable body of research suggesting that the provision of information influences preferences (e.g. Hasselström and Håkansson 2013 on willingness to pay for water quality).[6] This is not to say that greater awareness leads to higher valuations; it could lead to lower valuations. Rather, awareness of

[6] Awareness has been linked to willingness to pay for a range of environmental issues. For example, Jalan et al. (2003) find that awareness influences willingness to pay for water purification in India, while Wang et al (2016) link awareness to willingness to pay for smog pollution abatement in China. See also references in Hasselström and Håkansson (2013).

environmental issues may alter environmental valuations, conditional on all other factors such as individual's attitudes.

Institutions can affect awareness and they can also impact the opportunity cost of wetland services. Some institutions can facilitate the exchange of information on environmental issues, and better enable the communication and expression of community preferences and the conversion of these preferences into environmental policies. Institutions are 'rules of the game' that constrain human interactions and shape incentives (North 1990) and as such affect the costs of market and non-market transactions and the costs of implementing market or non-market based policy responses. 'Good' institutions can facilitate communication of emerging environmental problems and lower the costs of accessing necessary information.

Institutions affect the manner in which public officials and institutions acquire and exercise the authority to form public policy and provide public goods (Hosseini and Kaneko 2013). Institutions influence the formulation and implementation of effective environmental policies, and they shape the ability to manage and respond to environmental issues. For example, environmental policies are partly fashioned by community preferences for environmental quality, especially in democracies (Roca 2003; Farzin and Bond 2006). Economic valuation reflects people's perceptions of the impact natural resources have on their wellbeing (Lambert 2003).

Institutions and incentives

Institutions can affect valuations through incentives to protect environmental assets. For example, there is now a relatively large literature on the effects of democracy on environmental policy (e.g., Li and Reuveny 2006; Bernauer and Koubi 2009; Hosseini and Kaneko 2013). When citizens in a democracy can influence policy, they have greater incentives to inform themselves

about environmental issues. This investment may translate into higher wetland valuations as communities become better informed about environmental problems and have greater opportunities to express their preferences for improved environmental outcomes (Payne 1995), and democratic leaders may be more likely to adopt positive environmental policies favorable to their re-election (Congleton 1992). In contrast, autocratic leaders may personally benefit from the encroachment of natural resources (Arvin and Lew 2011). Moreover, by their very nature, autocracies are less likely to provide public goods such as environmental quality (Olson 1993). Hence, democratic institutions may result in higher valuations for environmental assets, such as wetlands. Nevertheless, more generally, political engagement can either increase or decrease support for wetland conservation.

The willingness to contribute to public goods is also influenced by factors such as fairness, equity, reciprocity, and the behaviors of others (Ostrom 2000; Liebe, Preisendörfer, and Meyerhoff 2011). These factors are influenced by institutions and indeed become part of the institutional fabric of societies. Where institutions encourage and foster cooperation and reciprocity, then citizens are willing to pay or contribute more for public goods (Ostrom 2000; Liebe, Preisendörfer, and Meyerhoff 2011).[7] Trust in political processes and institutions is also important for willingness to pay (Uslaner 2002; Harring and Jagers 2013; Anderson 2017). Hence, we expect that in democracies and societies that encourage cooperation, citizens may assign higher values to, and be more willing to protect, environmental assets. Conversely, countries that are plagued by corruption may find that people are less willing to pay for public goods, as they have little confidence in public officials and organizations to deliver public goods. Several studies have examined the effect of corruption on environmental quality (e.g.,

[7] This is supported by research that has estimated the willingness to contribute to public goods, using non-monetary payment vehicles such as labour contributions. See for example, Gibson (2017) and Rai and Scarborough (2014).

Damania et al. 2003; Fredriksson et al. 2004; Cole, Elliott and Fredriksson 2006). The main finding to emerge from this literature is that corruption hastens environmental degradation. Hosseini and Kaneko (2013) argue that corruption weakens the stringency of environmental policies. Corruption can also reduce public expenditure on environmental public goods and thereby affect valuations. In contrast, willingness to pay is likely to be higher where there is a higher level of trust in non-corrupt institutions (Yogo 2015).

'Good' governance enables nations to enforce environmental regulations and may enable them to achieve the sustainable use of natural resources. In contrast, states where governance is weak can deplete their natural resources and diminish environmental quality (Wingqvist et al. 2012). Politically stable countries are more likely to establish and enforce policies that protect the environment that continue across successive administrations (Deacon 1994; Fredriksson and Svensson 2003; Galinato and Galinato 2012). Political stability creates policy certainty which leads to increased resource conservation in developed countries. Nevertheless, it is possible that the same certainty may increase consumption and lead to resource exploitation in developing countries.

Conversely, some institutions may reduce willingness to pay. For example, where democracies enable lobbying, rent seeking, and excessive redistribution, policies may become distorted and environmental quality adversely affected (Dryzek 1987). This then may affect willingness to pay. Political stability may also affect willingness to pay for wetland conservation. For example, if political stability reduces policy uncertainty, this increases demand for improved environment quality (Deacon and Mueller 2004).[8] However, greater political stability also provides better foundations for economic growth and a more attractive investment climate. This can either increase or decrease pressures on environmental quality. This dimension is distinct

[8] When institutions provide more information that reduces uncertainty over an environmental asset, this may make the environmental asset more appealing to some and less to others. Consequently, the demand curve will rotate (Johnson and Myatt, 2006).

from the effects of democracy. For example, Olson (2000) distinguishes between roving bandits that expect to rule for a short time and stationary bandits that run their country as a business, optimizing profits in the long-run. Roving bandits operate in an environment with political instability; there is little incentive to invest in environmental assets. Stationary bandits may want their subjects to be reasonably content; governance is likely to be better than with roving bandits.

The impact of economic freedom is also uncertain. Economic freedom can increase or decrease willingness to pay depending on its impact on incentives to exploit rather than preserve environmental assets. Economic freedom may lead to lower environmental valuations if it increases the opportunity cost of preserving wetlands. Economic freedom may improve economic efficiency and reduce resource exploitation and environmental degradation (Dinda 2004), competitive markets may satisfy consumer preferences for a cleaner environment (Le, Chang and Park 2016), and security of property rights can improve environmental quality (Culas 2007). Moreover, some regulations can harm the environment (Antweiler, Copeland and Taylor 2001; Wood and Herzog 2014; Mavragani et al. 2016).

Institutions and endogenous preferences

As previously stated, neoclassical economics treats preferences as fixed and exogenous. Nevertheless, it is recognized that an individual's utility is "sharply influenced by his personal history and social environment" (Rayo and Becker 2007, p. 303). Clearly preferences come from somewhere, e.g. family, geography, church, state, and also from innate characteristics. Hence, rather than taking preferences as given, much can be learned from treating preferences as endogenous.

Frey (1999) argues that values can be just as important as incentives in motivating willingness to pay. Values and attitudes may be shaped by institutions and these differences in

attitudes towards environmental assets are then reflected in valuations. There is mounting evidence that preferences (and willingness to pay) may be endogenous to institutions. Bowles (1998) discusses the importance of institutions in shaping individual preferences, norms and behavior, and emphasizes that little is known about the mechanisms that drive these relationships. Gerber and Jackson (1993, p. 639) observe endogenous preferences with respect to political processes, noting that: "Individual preferences may be altered by actions taken during the normal sequence of events associated with institutional processes." Luttmer and Singhal (2011) show that preferences for redistribution are shaped by culture. Kountouris and Remoundou (2016) find that culture determines environmental preferences.

The impact of institutions on preferences is theoretically ambiguous. For example, economic freedom may reduce willingness to pay if it fosters a more self-interested outlook that places lower importance to the environment. Consequently, people in countries with more economic freedom may assign lower valuations to wetland conservation. Wetland conservation is a public good that requires collective action. The more individual the responses to public good problems, the less likely that they will be adequately tackled (Olson 1965), i.e. people will tend to place lower valuations on environmental assets. Conversely, a more self-interested outlook could result in higher valuations for environment assets if self-interested individuals recognise the need for collective action to preserve wetlands.[9]

[9] Relatedly, Berggren and Nilsson (2016), and references therein, argue that voluntary exchange may lead to greater cooperation and pro-social behavior.

Culture

Culture and institutions are difficult to define. Definitions vary. A distinction can be made between institutions and culture. Tabellini (2008) defines culture as "as a set of principles and normative values that motivate individuals" (p. 259). These "values and codes of good conduct are likely to be more persistent and to change slowly from one generation to the next" (p. 260). Culture and institutions co-evolve; values impact institutions and institutions influence values (Tabellini, 2008; Alesina and Giuliano 2015; Besley and Persson, 2018). Hofstede et al. (2010, p.6) define culture as "*the collective programming of the mind that distinguishes the members of one group or category of people from another*." Culture influences preferences through learned and shared values and norms of behavior.

Taking an eclectic approach, we see institutions as both external constraints (e.g. as per North's 'rules of the game') and also as potentially shaping values, preferences and social norms (e.g. as per social constructivism, see Vatn 2017). In social constructivism, preferences are shaped through social interactions and collaboration with other people and institutions. Hence, based on the literature above, we hypothesize that expressing environmental valuations is influenced by institutions and cultural attitudes. Institutions have the potential to influence wetland valuations through their effects on information awareness, incentives, and possibly preferences. Given the different dimensions of institutions and the diverse predictions regarding these individual dimensions, the net effect of institutions is an empirical matter, which motivates our meta-analysis of the extant evidence. We investigate this hypothesis through meta-regression analysis of 1,041 estimates of wetland valuations, from 283 studies, for 223 wetlands in 38 developing countries.

3. Data

Our data extraction, meta-analysis, and reporting of results follows the Meta-Analysis of Economics Research Network (MAER-Net) guidelines for meta-analysis in economics (Stanley et al. 2013). Our principal data are drawn from Chaikumbung, Doucouliagos, and Scarborough (2016). These data cover all published and unpublished studies that report estimates of wetland valuations in developing countries.[10] We supplement these data with information collected from several external sources, as outlined below.

Dependent variable

The dependent variable is measured as the annual value per hectare as the dependent variable. This includes all reported wetland values in developing countries: total value, mean value per acre per annum, mean value per hectare per annum, willingness to pay (WTP) per household per annum, WTP per person per annum, WTP per person per month, and WTP per visit. These varying measures of valuations were converted into the common metric of the logarithm of the wetland value *per hectare per annum*. In the case of estimates of WTP, we considered only studies reporting compensated surplus (mean WTP) from which we then calculated the value per hectare per annum. From the 379 studies of the Chaikumbung, Doucouliagos, and Scarborough (2016) dataset, 283 studies provide sufficient information for our meta-analysis.[11] Thus, our dataset contains 283 studies with 1,041 observations from 38 developing

[10] Sample selection bias may affect this data if the choice of wetlands surveyed is not random, e.g. if researchers evaluated those wetlands that are easier to survey.

[11] 70 studies drop out because of insufficient information on sample size. Sample size is necessary to construct a proxy for standard error of the estimated wetland valuations which is then used in weighted least squares meta-regression. The economic freedom, governance, and culture data are not available for all developing countries and time periods. Consequently, we lose a further 26 studies for which data on the quality of institutions could not be matched to the country and time period used in primary studies.

countries, published from 1995 to 2015; data on governance commence in 1995 and this defines the starting year.[12]

To ensure comparability, we converted all wetland values in different years and expressed in different currencies into US$ per hectare per year and adjusted to 2002 prices using purchasing power parity exchange rates. The average wetland value is 1,998 US$ (2002 prices) per hectare per annum and the median value is 1,177 US$ (2002 prices) per hectare per annum. The distribution of wetland values is skewed with a long tail of high valuations. Hence, we transformed valuations into logarithms.

External information

In order to investigate the effects of institutions and culture on wetland valuations, it was necessary to collect data from sources external to the empirical studies. We carefully matched data on institutions for the same period as the primary study. Note that none of the 283 studies actually explored the impact of institutions on wetland valuations; instead, they provide estimates of the value of different wetlands. However, by pooling these studies together, we can take advantage of spatial and time variation in institutions, at the time the primary valuation studies were conducted, to formally test whether these contextual differences affected the reported wetland valuations.

The degree of economic freedom was quantified by the index reported by the Economic Freedom of the World (EFW); see Gwartney, Lawson, and Hall (2016).[13] This index is measured on a scale between 0 and 10, where 10 is the highest degree of economic freedom. In our data, the index ranges from 3.52 to 7.57, respectively. For democracy, we use the Polity

[12] The largest number of studies is for India (35 studies), followed by China (27 studies), and Thailand (25 studies).
[13] We use the aggregate index of all five constituent components: size of government, legal system and property rights, sound money, freedom to trade internationally, and regulation.

II data from The Polity Project.[14] The polity measure ranges from −10 (autocratic) to +10 (democratic) with a higher level for a stronger democracy. The average democracy level in our sample is 2.39.

Governance was quantified using three series–government effectiveness, control of corruption, and political stability–from the Worldwide Governance Indicators.[15,16] Each governance index takes a range -2.5 to 2.5 with a higher score for a better governance. The average score of government effectiveness, political stability, and corruption control in our sample are -0.004, -0.327, and -0.328 respectively.[17] Government effectiveness reflects "the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies" (Kaufman, Kraay and Mastruzzi 2011, p. 223). Political stability is defined as the likelihood that a government will not be "destabilized or overthrown by unconstitutional or violent means" (Kaufman, Kraay and Mastruzzi 2011, p. 223). Corruption refers to the use of public funds for private gain.

The World Development Indicators were used to source data on GDP per capita and the Gini index. Finally, data on estimates of cultural differences was collected from Geert Hofstede.[18] We investigate all six dimensions of culture: individualism, power distance,

[14] http://www.systemicpeace.org/polityproject.html. Accessed December 23rd, 2017. The Polity democracy index is an aggregation of several components: competitiveness of executive recruitment, openness of executive recruitment, constraints on Chief executive, regulation of participation, and competitiveness of participation.
[15] These indices are based on experts' perceptions of the quality of governance. https://data.worldbank.org/data-catalog/world-development-indicators. Accessed January 27th, 2018.
[16] The World Bank provides six indicators of governance: ccorruption control, political stability, government effectiveness, voice and accountability, rule of law, and regulation accountability. We focus on the three main series used in the environmental quality literature. Moreover, voice and accountability is captured by our democracy indicator and rule of law is captured by our economic freedom indicator.
[17] In some applications, the average of the various components is used. However, the individual components can be associated with varying effects on valuations. Hence, it is preferable in our case to use the individual components.
[18] http://geerthofstede.com/research-and-vsm/dimension-data-matrix/. Accessed December 23rd, 2017.

masculinity, uncertainty avoidance, long-term orientation, and indulgence; see Table 1 for definitions of the key variables (see appendix for description of all variables).

The data is not a panel. We have an unbalanced panel in the sense of more observations for some countries than other. However, the wetlands that have been valued over time are not the same, in most instances. For 13 countries, we have only a cross-section, i.e. estimates for wetlands at a single point in time. For others, we have several estimates, for different wetlands at different points in time. Moreover, the data on culture are time invariant. These features of the data restrict the use of panel fixed effects in the meta-regressions.

Figures 1 and 2 illustrate two individual country examples of co-patterns between measures of institutions and wetland valuations (logarithm of annual wetland value per hectare): figure 1 traces the co-patterns with corruption in Malaysia (1997-2012);[19] and figure 2 traces the co-patterns with government effectiveness in China (1996-2013). Measures of institutions and wetland valuations vary within and between countries over time. These dimensions of institutions are time varying and hence it might be possible to identify whether they influence wetland valuations. At the same time, wetland valuations are likely to differ for a range of reasons that are unrelated to institutions and these other factors need to be controlled for. Hence, in addition to the institutional and cultural characteristics variables, we also control for a range of socio-economic characteristic variables (e.g., GDP per capita and income inequality),[20] regional dummies, and wetland characteristics (e.g., wetland size, wetland types, wetland ecosystem services, and valuation methods). The names, definitions and descriptive statistics of the variables included in the meta-data set are presented in table 1. Table A1 in the

[19] Figure 1 suggests a positive correlation between control for corruption and wetland valuations. Below we show that controlling for other factors, control for corruption is *inversely* related to wetland valuations, on average.
[20] Inequality is included as it influences the willingness to pay taxes and the willingness to fund public goods. Income is included as it has been shown to affect willingness to pay (Chaikumbung, Doucouliagos, and Scarborough 2016) and also because institutions can affect income and hence it is important to isolate the impact of income from institutions.

appendix presents country specific wetland valuations and data on the median value of the institutional variables. Table A3 presents a correlation matrix.

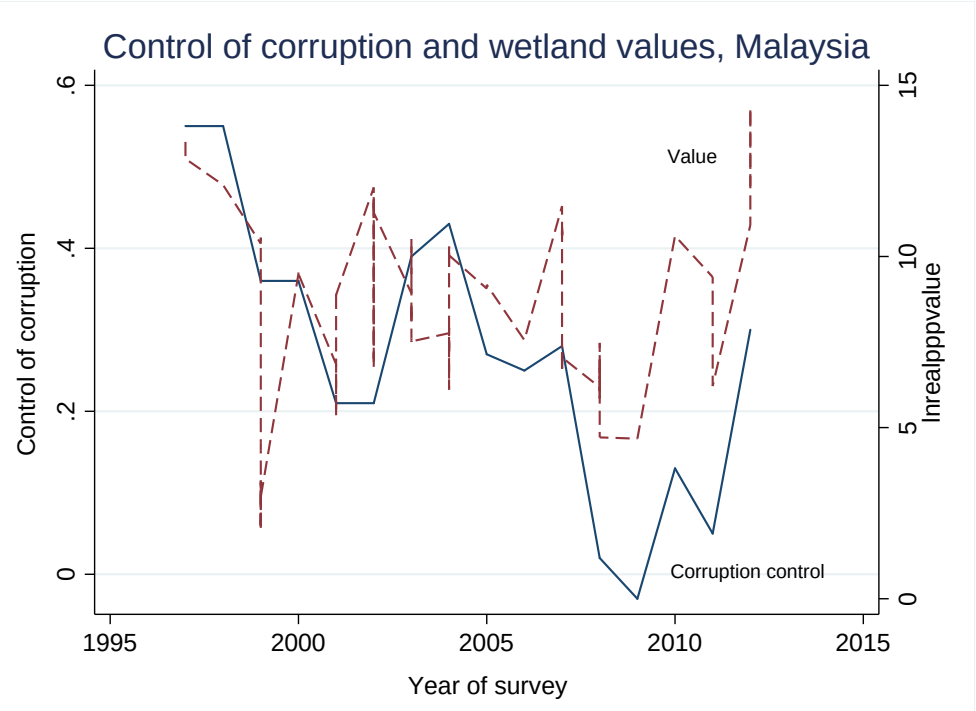

Figure 1. Co-patterns in control of corruption and wetland values, Malaysia, 1997-2012

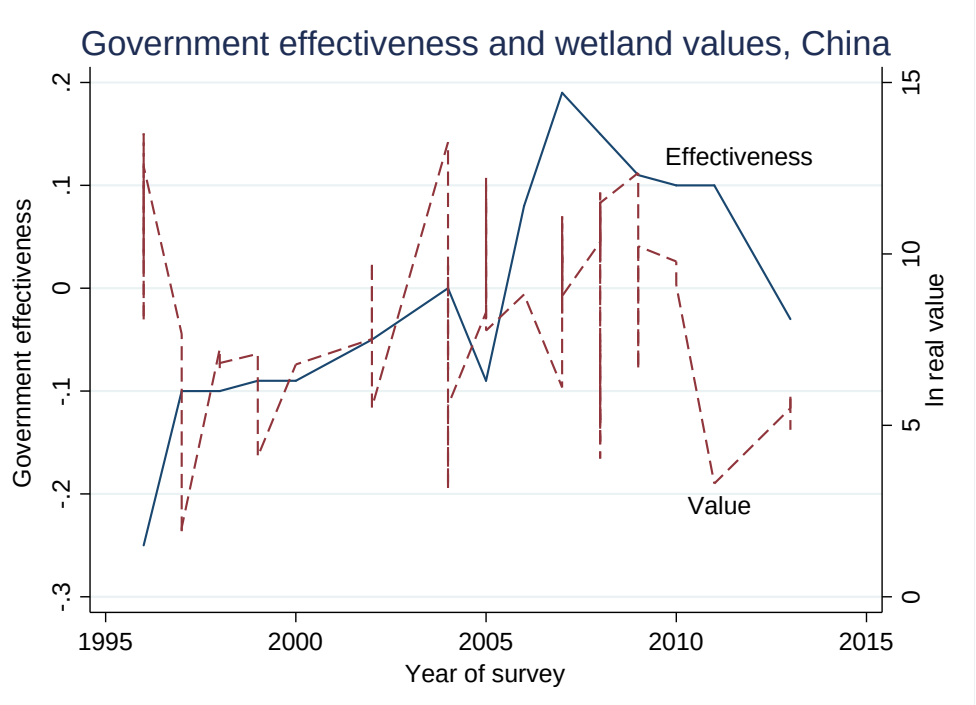

Figure 2. Co-patterns in government effectiveness and wetland values, China, 1996-2013

Table 1. Variable Definitions and Descriptive Statistics of Institutional and Culture Variables

Variable names	Variable Description	Mean	S.D.	Min	Max	Source
Dependent variables						
Annual value (y)	Annual value per hectare in 2002 US$ in logarithmic form	7.60	2.82	0.19	16.68	Chaikumbung
Independent variables						
Institutional variables (X_I)						
Economic freedom	Index of degree of personal choice, voluntary exchange, freedom to compete, and protection of person and property.	6.41	0.62	3.81	0.65	EFW Data
Democracy	The degree of the effective existence of institutional rules framing of the power and the presence of institutions enabling citizens to express their expectations and choose political elites.	2.88	5.79	-7	10	The Polity Project
Political stability	Perceptions of the likelihood of political instability and politically-motivated violence, including violence and terrorism.	-0.50	0.69	-2.63	1.08	WDI (World Bank)
Government effectiveness	The quality of public services, the quality of the civil service and the degree of its independence from political pressures and the quality of policy formulation and implementation.	0.07	0.61	-0.98	1.25	WDI (World Bank)
Control of corruption	The extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	-0.31	0.44	-1.42	1.25	WDI (World Bank)
Culture						
Power distance	The degree to which the less powerful members of organizations and institutions accept and expect that power is distributed unequally.	77.50	15.40	35	100	Hofstede
Individualism	The extent people in a society are integrated into groups.	28.16	9.75	12	65	Hofstede
Masculinity	The degree to which people prefer achievement, heroism, assertiveness and material rewards for success.	50.46	9.81	21	73	Hofstede
Uncertainty avoidance	A society's tolerance for uncertainty and ambiguity.	47.42	16.42	13	90	Hofstede
Long term orientation	The connection of the past with the current and future actions/challenge.	41.10	19.58	7	87	Hofstede
Indulgence	The degree to which a society allows relatively free gratification of basic and natural human desires related to enjoying life and having fun.	43.79	18.02	0	100	Hofstede

Note: Chaikumbung denotes Chaikumbung, Doucouliagos, and Scarborough (2016). See Table A2 of the appendix for descriptions and summary statistics for all variables.

4. Meta-regression methodology

Meta-regression involves the application of regression analysis to the pool of comparable empirical estimates. We regress wetland values on a vector of covariates relating to institutions, culture, policy site characteristics, and authors' research design choices:[21]

$$(1) \qquad lnV_{ij} = \beta_0 + \beta_I \boldsymbol{I}_{ij} + \beta_C \boldsymbol{X}_c + u_{ij}$$

[21] We follow the prior literature and estimate a trans-logarithmic form (Johnston et al. 2005).

where lnV_{ij} is the annual wetland value per hectare in 2002 US$ (in logarithmic form), $\boldsymbol{I}$ is a vector of variables that reflect institutions and culture, $\boldsymbol{X}$ is a vector of control variables, β_0 is the constant term, β_I and β_c contain the estimated coefficients on the measures of institutions and other moderator groups of explanatory variables, respectively, and u is the error term.

Ideally, Eqn (1) is estimated using unrestricted weighted least squares, using inverse variance weights (Stanley and Doucouliagos 2015, 2017). By assigning greater weight to the more precise estimates, these weights can be shown to be optimal (Hedges and Olkin 1985). However, wetland valuations are rarely reported with associated standard errors. Hence, we follow Stanley and Rosenberger (2009) and Chaikumbung, Doucouliagos, and Scarborough (2016) and use the inverse of the square root of sample size as a proxy for the standard error. A second issue is that we use several estimates per study. These estimates may not be strictly independent of each other. Hence, we adjust the standard errors for clustering of estimates within studies **(**Oczkowski and Doucouliagos 2015).

Our principal aim is to investigate the impact of institutions on wetland valuations. It is very unlikely that wetland valuations shape institutions. Nevertheless, it cannot be entirely ruled out that institutions are endogenous and shaped by preferences in general, and that wetland valuations may be correlated with more general preferences for particular types of institutions. For example, a preference to live in a democracy might manifest in both higher wetland values and more democracy in a nation. Hence, the possibility of reverse causation needs to be addressed. Unfortunately, our model includes several dimensions of institutions and finding suitable instruments for even one of these dimensions (e.g., democracy) is no easy task. Instead, we use three-year lags in the institution variables to mitigate the risk of reverse causality. For robustness, we also use longer, ten-year lags in institutions. The intuition behind this approach is that the three- and ten-year lagged value of institutions is less likely to be shaped by current wetland valuations. Nevertheless, if wetland valuations and institutions

change slowly, then the use of lags may not be sufficient to alleviate reverse causality. Consequently, our results are then best interpreted as correlational rather than causal.

Moreover, it is also possible that there is no association between institutions and preferences and instead other factors shape both political and economic institutions and preferences. One such factor may be underlying cultural differences between countries. If not controlled for in the MRA, this would be an omitted variable.

5. Results

The meta-regression results are presented in table 2, where for the sake of brevity, only the main variables of interest are presented; the full results are available in the appendix, table A4. Columns (1) and (2) present the baseline results where only institutional variables are considered. The contemporaneous values of the institutional variables are used in column (1) and three-year lags in institutions are introduced in column (2). A large range of wetland characteristics and research design control variables are added in columns (3) and (4). The six variables that reflect cultural differences are added in column (5). Multicollinearity can be a problem in MRA models. Hence, Stanley and Doucouliagos (2012) strongly recommend the application of a general-to-specific modelling strategy to gain greater clarity in results. These results are presented in column (6), where institutional variables are lagged three years. Finally, in column (7) we use longer, ten-year, lags in institutional variables; these results are even less likely to be afflicted with reverse causality.

Table 2. MRA of Economic Valuations of Wetlands, Developing Countries (Dependent variable is ln value per ha per year)

Variable	Current institutions (1)	Institutions lagged three years (2)	Current institutions & covariates (3)	Institutions lagged three years & covariates (4)	Institutions lagged three years & covariates & culture (5)	Specific model, three-year lag (6)	Specific model, ten-year lag (7)
Constant	14.442***	14.765***	15.013***	15.488***	19.621***	22.972***	17.982***
	(3.410)	(3.144)	(5.105)	(5.889)	(6.491)	(2.183)	(3.432)
Economic	-1.123*	-1.310***	-1.158***	-0.848**	-1.109**	-1.313***	-1.101**
Freedom	(0.679)	(0.496)	(0.350)	(0.391)	(0.456)	(0.246)	(0.431)
Democracy	0.015	0.064	0.025	0.001	-0.007		
	(0.054)	(0.053)	(0.043)	(0.040)	(0.043)		
Political	-0.075	0.399	0.096	0.369	0.177		
Stability	(0.381)	(0.478)	(0.305)	(0.311)	(0.444)		
Government	1.486*	3.767***	-0.486	3.049***	3.231***	2.223***	2.278***
Effectiveness	(0.813)	(0.870)	(0.954)	(0.739)	(0.915)	(0.332)	(0.578)
Control of	0.088	-2.834**	0.728	-2.527***	-1.553*		
corruption	(1.039)	(1.152)	(0.874)	(0.942)	(0.881)		
Size (lnArea)			-0.355***	-0.262***	-0.288***	-0.339***	-0.197**
			(0.084)	(0.081)	(0.089)	(0.065)	(0.089)
Power					-0.035*	-0.041***	-0.015
distance					(0.020)	(0.01)	(0.013)
Indulgence					-0.025	-0.020**	-0.018*
					(0.016)	(0.009)	(0.009)
Masculinity					0.012		
					(0.042)		
Uncertainty					0.015		
avoidance					(0.024)		
Long term					-0.005		
Orientation					(0.015)		
Individualism					0.010		
					(0.028)		
Other Controls	NO	NO	YES	YES	YES	YES	YES
No. of observations	1,041	1,000	1,041	1,000	941	941	529
No. of studies	283	270	283	270	252	252	159
Adjusted R^2	0. 097	0.181	0.599	0.606	0.646	0.625	0.546

Note: Estimation using unrestricted weighted least squares, using sample size weights. Only the main variables of interest are presented; the full results are available in the appendix, table A4. Columns (1) and (2) include only the institutional variables. Covariates added to Columns (3) to (5): GDP per capita, year of survey, Gini index, regional dummies, latitude, population density, wetland characteristics, wetland ecosystem services, wetland types, valuation methods, and publication characteristics. Institutional variables lagged three years in columns (2), (4), (5), and (6), and ten years in column (7). Some studies drop out due to insufficient data on some of the explanatory variables. Figures in brackets are standard errors, adjusted for clustering of wetland valuations within studies.

*, **, ***, denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Institutions matter

Our results confirm that institutions influence valuations. Economic freedom has a negative and statistically significant coefficient. This result is robust to inclusion of various controls, including cultural differences between countries. This finding suggests that the more market-based a nation,

the less people value wetlands. One explanation for this is that citizens in market-based societies are more individualistic and more driven by the pursuit of maximizing short-run economic returns than protecting wetland resources over the long-run. Consequently, people in countries with more economic freedom assign lower values to wetland conservation. Wetland conservation is a public good that requires collective action. The more individual the responses to public good problems, the less likely that they will be adequately tackled (Olson 1965). A further explanation is that it is possible that the more market-based a country, the higher the opportunity cost of favoring environmental values over direct use market values. The higher opportunity cost of environmental outcomes may explain why the impact of economic freedom on wetlands is economically significant and negative.

In contrast, government effectiveness has a positive coefficient suggesting that this measure of good governance is correlated with larger wetland valuations. One explanation for this is that greater government effectiveness means greater ability to implement policies favorable to the environment and policies that reflect community preferences. Evidently, this increases wetland valuations.

Control of corruption has a negative coefficient and is statistically significant in some models. This suggests that people in more (less) corrupt countries value wetlands more (less) highly. At first blush this result is somewhat counter-intuitive, as we expect corruption to reduce incentives to contribute to public goods (Beekman, Bulte and Nillesen 2014). However, the effects of corruption could theoretically go either way. Corruption can lead to overexploitation of natural resources. Nevertheless, it is also possible that corruption may encourage respondents to express preferences for environmental non-market values as they see the proceeds of development and market direct use values going to a few via corruption rather than to society more generally. Another explanation is that corruption may also offer a way to preserve environmental assets from inefficient bureaucrats. Bribes and corruption may be a way of

getting things done. So, with more corruption, citizens are willing to pay more to protect wetlands. This is the idea that corruption helps to grease the wheels of an inefficient bureaucracy. For example, Beck and Maher (1986) argue that corruption can replace competitive markets. Competition results in greater efficiency. Nevertheless, the inefficiency of bureaucrats may be offset by bribes. Government officials may not have sufficient information or competency (Méon and Sekkat 2005). Corruption offers a way to resolve these problems. In such settings, people may be more willing to pay to protect wetlands, as they know that things can get done through corruption. However, if corruption declines while other distortions remain (like incompetent and inefficient bureaucracies), then citizens may be less able to get things done and wetlands less likely to be protected. In this case, people may be less willing to pay to protect environmental assets. It should be recalled that the MRA controls for factors such as income, inequality, and population density. Thus, the MRA is indicating that controlling for these factors and also controlling for institutions, corruption may be 'greasing the wheels'.

The MRA suggests that democracy and political stability are not significant factors in wetland valuations.[22]

Two of the six culture variables appear to influence valuations. Both power distance and indulgence are negatively associated with wetland valuations. Power distance reflects the degree to which the less powerful members of organizations and institutions accept and expect that power is distributed unequally. High power distance means that people do not expect to be actively consulted and they do not expect to participate in decisions that impact their lives. In high power distance cultures people do not question authority and they comply with decisions

[22] The MRA also confirms that socio-economic and wetland characteristics influence wetland valuations. Wetland size is inversely related to wetland valuations. Urban wetlands have a higher valuations than those in rural settings. Wetlands that provide for biodiversity and marine wetlands are also more highly valued, while palustrine wetlands are less valued, relative to estuarine (the base).

made on their behalf. High power distance cultures are less democratic. Indulgence refers to doing what "your impulses want you to do" (Hofstede 2010). The MRA results suggest that societies with greater the power distance and the more indulgent societies place lower values on wetlands. Hofstede (2010) draws a similar conclusion between power distance and environment. Arguably, the indulgence results reinforces the findings for economic freedom.

The MRA results suggest that both slow moving cultural attributes (such as the power distance and the degree of indulgence) and faster moving institutions (such as economic freedom and government effectiveness) impact on wetland valuations. The calculated elasticities at sample means are as follows: economic freedom -6.91; government effectiveness 0.11; control of corruption 0.46; power distance -2.71; and indulgence -1.09.[23] Thus, the responses appear to be larger for economic freedom and culture, then they are for governance. These elasticities suggest that wetland values in developing countries are relatively more sensitive to the degree of economic freedom. Market liberalization policies are likely to have a larger response and improvements in government effectiveness a smaller response.

Robustness

We explored the robustness of the results in several ways. These results are presented in table A5 in the appendix. First, in order to test the sensitivity of the results, we remove all the institution and culture variables, except for lagged economic freedom; this confirms that economic freedom exerts a strong effect on wetland values. Second, we considered whether ethnic fractionalization plays a role.[24] Specifically, we allow ethnic fractionalization to influence wetlands directly and also through its interaction with institutions. Ethnic

[23] These elasticities are calculated using the sample means and the coefficients from the general model, column (5) of table 2. If the specific version of the meta-regression model is used, the associated elasticities are: economic freedom -8.18; government effectiveness 0.08; corruption 0; power distance -3.18; and indulgence -0.88.

[24] Ethnic fractionalization can cause divisions within nations which may then impact on policy and willingness to fund public goods. Data on ethnic fractionalization from Alesina et al. (2003).

fractionalization has a negative coefficient but is not statistically significant and neither are any of the interactions. However, economic freedom, government effectiveness, and control of corruption retain their signs and statistical significance. Next we considered the possibility of non-linearity in the effects of institutions on valuations; non-linearity is not detected.

As previously noted, the data are not a panel. For example, we have 1,041 observations from 283 studies, i.e. less than four observations per study, on average. Moreover, of the 223 wetlands, we have time series observations for only 42 wetlands (usually two and in some cases three years of data). Moreover, data on culture are time invariant. Hence, for these reasons we cannot explore within wetland associations and the analysis revolves around between wetland differences. As part of robustness, we re-estimated the meta-regressions using year of survey fixed effects. These results are reported in table A4 and confirm the results of table 2; the findings are not driven by unobservable time variation.

Next, we consider whether the results are sensitive to the valuation method. Our approach has been to follow the prior literature (e.g., Chaikumbung, Doucouliagos, and Scarborough 2016) and pool the estimates from the various valuation methods. We tested the sensitivity of the results to removing groups of studies associated with specific valuation methods. These results are reported in the appendix, table A6, where it is shown that the results for the institutional and cultural variables are robust to the valuation method (the one exception is indulgence in two cases).

6. Discussion and implications

This article contributes to understanding of the relationship between institutions and culture and environmental preferences through a comprehensive meta-regression analysis of the evidence base of 283 valuation studies covering 223 wetland sites in 38 developing countries. We focus on the effects of economic freedom, democracy, and three measures of 'good'

governance (corruption, political stability, and government effectiveness) on wetland values in developing countries. We also investigate the effects of long-lived cultural differences (power distance, individualism, masculinity, uncertainty avoidance, long term orientation, and indulgence) on environmental preferences.

Institutions shape the values citizens place on wetlands in developing countries. Our central finding is that citizens assign lower values to wetlands in countries with greater economic freedom. Greater economic freedom means greater reliance on markets to allocate scarce resources. While economic freedom is, on average, welfare enhancing and growth promoting, it also comes at a price of citizens' assigning lower value on environmental quality and environmental assets; at least for wetlands in developing countries. It is possible that this reflects higher opportunity costs of environmental protection in economies with well-developed markets for direct use values. This finding may reflect less awareness of environmental problems or possibly that citizens in more market-based economies are more individualistic and less willing to contribute to public goods.

We also find that cultures that are more indulgent and more authoritarian assign lower values on environmental assets. In contrast, government effectiveness results in higher valuations. This, however, only partly offsets the effects of economic freedom and culture. Consequently, in net terms, 'good' institutions *reduce* wetland values. For example, the estimated elasticities from the MRA can be used to estimate the change in wetland values as a result of changes in institutions over time. In the case of China, we predict that wetland valuations fell by 13%, on average, between 1996 and 2013. In the case of India, wetland valuations fell by 4%, on average between 1999 and 2012. These cases illustrate that moves to reform institutions in developing nations may have an unintended consequence of lowing valuations of wetlands, thereby adding pressure to these scarce environmental assets.

Reducing economic freedom is not a policy that we advocate. Improvements in institutions through greater government effectiveness and enhanced security of property rights[25] rather than limiting economic freedom may ultimately reduce pressure on wetland resources and lead to better environmental health.

Our results show that across space and time institutions are correlated with wetland valuations. This correlation might, of course, be spurious and driven by unobserved factors that influence both institutions and wetland valuations. The association might, however, be causal. Causality might reflect endogenous preferences arising from changes in political and economic institutions and differences in culture. Causality might also reflect the impact of changes in institutions on constraints, incentives, and opportunity costs. While the findings confirm the endogeneity of preferences with respect to some cultural traits (power distance and indulgence), our data and methodology do not enable us to disentangle these various observationally equivalent factors to identify the underlying channels. Do the links between wetland values and economic freedom stem from endogenous preferences? Are the primary drivers from the effects of institutions on the incentives to fund public goods or the opportunity costs of environmental management decisions? Nevertheless, our results suggest that institutions appear to be important and that further research is warranted to confirm this finding and importantly to uncover the underlying channels. Disentangling these effects is an important area for future research. The possibility that preferences are endogenous to economic and political institutions is particularly important as it suggests that the effectiveness of policies to protect wetlands is influenced by institutions and culture. Indeed policy itself might affect preferences and hence effectiveness (Bar-Gill and Fershtman 2005). Hence, preference development cannot be ignored in the protection of wetlands.

[25] Strong property rights are important to environment protection. Hardin (1968) suggests that economic freedom accelerates overexploitation of natural resources whenever property rights are not well defined.

Our findings also have implications for meta-analyses and benefit transfer, in particular. Thus, the finding that institutions matter suggests that failing to control for institutions can lead to omitted variable bias in meta-regression and benefit transfer. For example, in their benefit transfer of wetlands, Chaikumbung, Doucouliagos, and Scarborough (2016) did not consider institutional variables.

The results highlight the dilemma of the trade off between development and preservation. Changes in some institutions, particularly greater economic freedom, will put greater pressure on environmental assets. This is an important finding that both national governments and international bodies such as the World Bank need to consider. The results presented here suggest that some of the stated policy objectives clash.

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Table A1: Wetland Valuations and Institutions by Country

Country	Number of wetlands	Number of studies	Number of observations	Median value of wetland (US$/yy/ha)	Median degree of economic freedom	Median degree of democracy	Median degree of political stability	Median degree of government effectiveness	Median degree of corruption control
India	25	35	78	682	6.37	9	-1.15	-0.05	-0.41
China	23	27	84	9,181	6.06	-7	-0.46	-0.04	-0.54
Thailand	21	25	85	9,213	6.72	9	-0.15	0.25	-0.21
Malaysia	17	24	202	1,247	6.99	3	0.17	1.17	0.28
Philippines	16	18	71	785	6.97	8	-1.32	-0.09	-0.45
Indonesia	12	12	22	646	6.48	8	-1.48	-0.38	-0.86
Tanzania	8	11	23	743	6.38	-1	-0.35	-0.40	-0.63
Pakistan	8	7	25	6,761	5.71	-5	-1.70	-0.46	-0.74
Uganda	8	8	18	4,588	7.20	-1	-1.16	-0.48	-0.87
South Africa	7	6	9	1,693	6.70	9	0.04	0.52	0.16
Sri Lanka	7	12	27	4,810	6.37	5	-1.19	-0.29	-0.26
Vietnam	6	10	49	523	6.32	-7	0.37	-0.20	-0.74
Kenya	6	8	12	239	7.01	8	-1.27	-0.54	-0.94
Brazil	6	6	66	26,273	5.29	8	-0.37	-0.11	0.00
Ethiopia	5	7	18	88	5.60	-3	-1.71	-0.57	-0.64
Jamaica	4	10	36	16,151	7.15	9	0.01	0.18	-0.17
Bangladesh	4	5	24	1,326	5.91	6	-1.08	-0.70	-1.18
Nigeria	4	9	16	1,096	5.67	4	-1.69	-0.97	-0.97
Iran	3	8	10	646	6.24	0	-1.48	-0.49	-0.86
Nepal	3	3	7	709	5.15	5	-0.15	-0.41	-0.01
Turkey	3	3	19	138,848	6.33	7	-0.84	0.04	-0.17
Zambia	3	2	15	296	6.90	1	-0.05	-0.86	-0.85
Cameroon	3	3	23	196	5.97	-4	-0.66	-0.88	-1.08
Madagascar	3	3	5	148	6.41	7	-0.29	-0.58	0.06
Mexico	2	2	5	138,068	6.46	4	-0.97	0.07	-0.45
Egypt	2	3	15	19,392	6.10	-6	-0.46	-0.40	-0.29
Fiji	2	2	24	4,715	7.23	-3	-0.01	-0.13	-0.27
Morocco	2	2	5	5,515	6.11	-6	0.21	-0.03	0.41
Tunisia	1	1	3	34	6.96	-4	0.19	0.47	-0.11
Armenia	1	1	12	8	7.30	5	-0.80	-0.57	-0.61
Botswana	1	3	5	353	7.02	8	1.08	0.73	1.25
Costa Rica	1	1	2	2,971	7.20	-5	0.69	0.27	0.57
Ecuador	1	1	3	129,969	5.82	9	-0.24	-0.80	-1.01
Malawi	1	1	1	777	4.95	6	-0.47	-0.38	-0.21
Mozambique	1	1	1	126	5.97	5	-0.15	-0.43	-0.40
Senegal	1	1	16	26	5.79	8	-0.29	-0.26	-0.14
Ukraine	1	1	3	3,990	7.10	-1	-1.16	-0.48	-0.91
Venezuela	1	1	2	247,577	4.35	8	-0.62	-0.72	-0.91
All (median)	**223**	**283**	**1,041**	**1,171**	**6.37**	**5**	**-0.46**	**-0.38**	**-0.43**

Table A2. Variable Definitions and Descriptive Statistics

Variable names	Variable Description	Mean	S.D.	Min	Max	Source
Dependent variables						
Annual value (y)	Annual value per hectare in 2002 US$ in logarithmic form	7.60	2.82	0.19	16.68	Chaikumbung
Independent variables						
Institutional variables (X_I)						
Economic freedom	Index of degree of personal choice, voluntary exchange, freedom to compete, and protection of person and property.	6.41	0.62	3.81	0.65	EFW Data
Democracy	The degree of the effective existence of institutional rules framing of the power and the presence of institutions enabling citizens to express their expectations and choose political elites.	2.88	5.79	-7	10	The Polity Project
Political stability	Perceptions of the likelihood of political instability and politically-motivated violence, including violence and terrorism.	-0.50	0.69	-2.63	1.08	WDI (World Bank)
Government effectiveness	The quality of public services, the quality of the civil service and the degree of its independence from political pressures and the quality of policy formulation and implementation.	0.07	0.61	-0.98	1.25	WDI (World Bank)
Control of corruption	The extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	-0.31	0.44	-1.42	1.25	WDI (World Bank)
Other moderator groups of explanatory variables (X_C)						
Country-specific characteristics						
Socio-economic characteristics						
GDP per capita	Real GDP per capita (in year of survey) in	8.21	0.83	6.24	9.78	World Bank
GINI Index	The Gini index measures the income distribution of a country's residents.	0.42	0.07	0.29	0.65	World Bank
Population density	Population density in logarithmic form	5.60	1.83	0.09	10.71	World Bank
Locations						
South East Asia	BD =1: wetland located in South East Asia	0.55	0.49	0	1	Chaikumbung
MENA	BD =1: wetland located in the Middle East and	0.05	0.22	0	1	Chaikumbung
South Asia	BD =1: wetland located in South Asia	0.54	0.49	0	1	Chaikumbung
Africa	BD =1: wetland located in Africa, except MENA	0.17	0.38	0	1	Chaikumbung
Latin America	BD =1: wetland located in Latin America	0.10	0.30	0	1	Chaikumbung
wetland characteristics						Chaikumbung
Wetland size	Area of wetland site in logarithmic form	9.17	2.86	0.69	19.72	Chaikumbung
Wetland ecosystem services				0	1	Chaikumbung
Recreation	Providing opportunities for recreational activities (e.g., tourism, sport fishing and other outdoor recreation activities). Baseline category.	0.48	0.49	0	1	Chaikumbung
Disturbance regulation	Storm or flood protection. BD =1: Study of disturbance regulation	0.15	0.36	0	1	Chaikumbung
Water regulation	Irrigation, hydroelectric power, water transportation. BD =1: Study of water regulation	0.08	0.26	0	1	Chaikumbung
Water supply	Consumptive water for household, industrial activities. BD =1: Study of water supply	0.12	0.32	0	1	Chaikumbung
Nutrient cycling	Nitrogen fixation, phosphorus, potassium, and other elemental cycling. BD =1: Study of nutrient cycling	0.01	0.09	0	1	Chaikumbung
Erosion control	Prevention of soil loss by wind, runoff process, storage of silt in the lake and wetland. BD =1: Study of erosion control	0.08	0.27	0	1	Chaikumbung
Gas regulation	Carbon sequestration. BD =1: Study of carbon sequestration	0.09	0.29	0	1	Chaikumbung
Water treatment	Pollution control/detoxification, filtering of dust particles. BD =1: Study of water treatment	0.21	0.40	0	1	Chaikumbung
Biodiversity-Habitat	Nurseries, habitat for migratory species, regional habitat and degree of life form BD =1: Study of habitat -biodiversity	0.29	0.45	0	1	Chaikumbung
Food production	Gross primary production extractable as food BD =1: Study of food production	0.41	0.49	0	1	Chaikumbung
Raw materials	Gross primary production extractable as raw materials BD =1: Study of raw materials	0.25	0.43	0	1	Chaikumbung
Culture	Providing opportunities for non-commercial uses BD =1: Study of culture	0.04	0.20	0	1	Chaikumbung
Wetland types						Chaikumbung

Estuarine wetland	Rivers meet the sea or tidal partly enclosed by land, including tidal marshes, seagrass and mangrove, lagoon. Baseline category	0.41	0.49	0	1	Chaikumbung
Riverine wetland	Wetlands along river or streams. BD =1: Study is riverine wetlands	0.12	0.32	0	1	Chaikumbung
Marine wetland	Coastal wetlands, including rocky shore and coral reefs. BD =1: Study is marine wetlands	0.19	0.39	0	1	Chaikumbung
Constructed wetland	An artificial wetlands or dam, marsh, pond. BD =1: Study is constructed wetlands	0.03	0.16	0	1	Chaikumbung
Lacustrine wetland	Wetlands associated with lakes. BD =1: Study is lacustrine wetlands	0.13	0.33	0	1	Chaikumbung
Palustrine wetland	Wetlands associated with marshes, swamps and bogs. BD =1: Study is palustrine wetlands	0.09	0.27	0	1	Chaikumbung
Other wetlands	Combined wetlands, watershed, catchment area BD =1: Study is other wetlands	0.03	0.17	0	1	Chaikumbung
Protected area	Wetlands provide any other legal protection by government (e.g., non-hunting area, national park, nature reserve) BD = 1: Study site is protected area	0.24	0.42	0	1	Chaikumbung
Ramsar site	Ramsar sites are wetlands of international importance, designated under the Ramsar Convention BD =1: Study site designated as RAMSAR	0.16	0.37	0	1	Chaikumbung
Urban wetlands	Wetlands located in urban areas BD =1: Study site is urban wetland	0.07	0.25	0	1	Chaikumbung
Latitude	Latitude in absolute value	14.99	10.77	0	48	Google map
Valuation methods						
Market price method (Mkt)	Assigns the value of goods and services traded in the market. Baseline category	0.44	0.49	0	1	
Replacement cost (RC)	Cost of providing substitutes for ecosystem services BD =1: Study applies RC	0.17	0.37	0	1	
Contingent Value (CVM)	Hypothetical question to obtain WTP BD=1: Study applies CVM*	0.42	0.49	0	1	Chaikumbung
Choice Experiment (CE)	Estimate WTP based on eliciting individual preferences through survey BD =1: Study applies CE	0.07	0.26	0	1	Chaikumbung
Travel Cost method (TCM)	Estimate WTP via amount of money and time individuals expend for the visiting recreation site BD =1: Study applies TCM	0.15	0.35	0	1	Chaikumbung
Net factor income and Production function (NFIPf)	Estimate effect of ecosystem services loss or gain in earning or productivity BD =1: Study applies NFIPf	0.05	0.20	0	1	Chaikumbung
Opportunity Cost (OC)	Value of next best alternative use of resources BD =1: Study applies OC	0.05	0.21	0	1	Chaikumbung
Hedonic Pricing (HP)	Estimate WTP uses the price difference in property of related products BD =1: Study applies HP	0	0	0	0	Chaikumbung
Avoided damage cost (DC)	Estimate the expenditure to repair the damage incurred with the loss of the wetland area BD =1: Study applies DC	0.15	0.35	0	1	Chaikumbung
Publication status						Chaikumbung
Published paper	Study of wetland valuation is published in a journal BD =1: study is a journal article	0.46	0.49	0	1	Chaikumbung
Impact factor	5-year impact factor of each journal	0.86	1.37	0.96	8.04	Chaikumbung
Thesis	BD =1: study is thesis /Dissertation	0.07	0.26	0	1	Chaikumbung
Year of survey	The year of the survey (normalized to the year 2000)	2.44	5.64	-7	13	Chaikumbung
Culture						
Power distance	The degree to which the less powerful members of organizations and institutions accept and expect that power is distributed unequally.	77.50	15.40	35	100	Hofstede
Individualism	The extent people in a society are integrated into groups.	28.16	9.75	12	65	Hofstede
Masculinity	The degree to which people prefer achievement, heroism, assertiveness and material rewards for success.	50.46	9.81	21	73	Hofstede
Uncertainty avoidance	A society's tolerance for uncertainty and ambiguity.	47.42	16.42	13	90	Hofstede
Long term orientation	The connection of the past with the current and future actions/challenge.	41.10	19.58	7	87	Hofstede
Indulgence	The degree to which a society allows relatively free gratification of basic and natural human desires related to enjoying life and having fun.	43.79	18.02	0	100	Hofstede

Note: * CVM is baseline category when annual WTP per household is the dependent variable. Chaikumbung denotes Chaikumbung, Doucouliagos, and Scarborough (2016).

Table A3: Correlation Matrix, Institutional and Cultural Variables

	ecofre~m	Democr~y	PolSta~y	Corrup~n	GovtEf~t	powerd~e	Indivi~m	Mascul~y	Uncert~y	Longterm	Indulg~e
ecofreedom	1.0000										
Democracy	0.2547	1.0000									
PolStability	0.1884	-0.0593	1.0000								
Corruption	0.3925	0.2521	0.6940	1.0000							
GovtEffect	0.5116	0.2365	0.6081	0.8744	1.0000						
powerdista~e	0.3001	-0.0101	0.2861	0.5231	0.6061	1.0000					
Individual~m	0.0638	0.4533	-0.1829	0.1542	0.0444	-0.1125	1.0000				
Masculinity	0.0391	-0.0327	-0.1344	0.0451	0.0559	0.2558	0.3255	1.0000			
Uncertainty	-0.3355	0.2374	-0.2630	-0.2588	-0.3304	-0.3522	0.0161	-0.5093	1.0000		
Longterm	-0.3164	-0.3799	0.0208	-0.0682	0.0159	0.1674	-0.1424	0.3399	-0.2194	1.0000	
Indulgence	0.0888	0.2461	0.2566	0.3533	0.3093	0.2462	0.0388	-0.1933	0.0197	-0.4775	1.0000

Note: All institutional variables lagged three years.

Table A4: MRA of Economic Valuations of Wetlands, Developing Countries, Full Results
(Dependent variable is ln value per ha per year)

Variable	Current institutions (1)	Institutions lagged three years (2)	Current institutions & covariates (3)	Institutions lagged three years & covariates (4)	Institutions lagged three years & covariates & culture (5)	Specific model, three-year lag (6)	Specific model, ten-year lag (7)
Constant	14.442***	14.765***	15.013***	15.488***	19.621***	22.972***	17.982***
	(3.410)	(3.144)	(5.105)	(5.889)	(6.491)	(2.183)	(3.432)
Economic Freedom	-1.123*	-1.310***	-1.158***	-0.848**	-1.109**	-1.313***	-1.101**
	(0.679)	(0.496)	(0.350)	(0.391)	(0.456)	(0.246)	(0.431)
Democracy	0.015	0.064	0.025	0.001	-0.007		
	(0.054)	(0.053)	(0.043)	(0.040)	(0.043)		
Political Stability	-0.075	0.399	0.096	0.369	0.177		
	(0.381)	(0.478)	(0.305)	(0.311)	(0.444)		
Government Effectiveness	1.486*	3.767***	-0.486	3.049***	3.231***	2.223***	2.278***
	(0.813)	(0.870)	(0.954)	(0.739)	(0.915)	(0.332)	(0.578)
Control of corruption	0.088	-2.834**	0.728	-2.527***	-1.553*		
	(1.039)	(1.152)	(0.874)	(0.942)	(0.881)		
GDP per capita			0.726	-0.175	-0.042		
			(0.469)	(0.575)	(0.595)		
GINI Index			-0.064	-0.022	-0.012		
			(0.039)	(0.045)	(0.054)		
MENA			0.295	0.816	0.340	1.282**	
			(0.832)	(0.961)	(1.209)	(0.544)	
South Asia			-1.077	-0.057	-0.106		
			(0.780)	(0. 691)	(1.094)		
Africa			-0.021	-0.056	-0.197		
			(0.832)	(0.774)	(0.932)		
Latin America			1.142*	1.696**	0.375		
			(0.595)	(0.681)	(0.833)		
Eastern Europe			0.184	1.033	0.301		
			(1.439)	(1.368)	(2.079)		
Latitude			0.037*	0.021	0.006		0.091***
			(0.019)	(0.018)	(0.033)		(0.018)
Population density			-0.031	-0.155	-0.003		
			(0.142)	(0.120)	(0.136)		
Size (lnArea)			-0.355***	-0.262***	-0.288***	-0.339***	-0.197**
			(0.084)	(0.081)	(0.089)	(0.065)	(0.089)
Protected area			1.099*	0.532	0.204		
			(0.657)	(0.552)	(0.463)		
Ramsar site			-1.198**	-0.529	-0.507	-1.035**	
			(0.459)	(0.491)	(0.520)	(0.408)	
Urban wetlands			1.703**	2.014***	1.860**	1.901***	1.794***
			(0.662)	(0.699)	(0.753)	(0.434)	(0. .601)
Disturbance regulation			-0.095	0.573	-0.716		
			(0.487)	(0.540)	(0.548)		1.762***
Water regulation			1.597**	1.789**	1.339*		(0.648)
			(0.659)	(0.709)	(0.712)		
Water Supply			-0.884**	1.196**	-0.805**	-0.694**	-1.257***
			(0.439)	(0.467)	(0.459)	(0.344)	(0.294)
Nutrient cycling			0.589	-0.348	-0.351		
			(1.309)	(1.091)	(1.112)		
Erosion control			0.224	0.438	0.917		
			(0.687)	(0.548)	(0.666)		
Carbon sequestration			-1.315*	-0.680	-0.812		
			(0.794)	(0.618)	(0.718)		
Water treatment			0.640	1.219**	1.014*		
			(0.551)	(0.540)	(0.562)		
Biodiversity-Habitat			1.631***	1.517***	1.432***	1.740***	1.393***
			(0.424)	(0.455)	(0.464)	(0.376)	(0.435)
Food production			-0.660	-0.360	0.001		
			(0.442)	(0.398)	(0.429)		
Raw materials			1.291**	0.572	0.318		
			(0.532)	(0.523)	(0.572)		
Culture			-0.040	0.399	-0.146		
			(0.713	(0.727)	(0.697)		

Table A4: MRA of Economic Valuations of Wetlands, Developing Countries, Full Results, Continued (Dependent variable is ln value per ha per year)

Variable	Current institutions (1)	Institutions lagged three years (2)	Current institutions & covariates (3)	Institutions lagged three years & covariates (4)	Institutions lagged three years & covariates & culture (5)	Specific model, three-year lag (6)	Specific model, ten-year lag (7)
Riverine wetland			0.181	-0.318	-0.408		
			(0.6100)	(0.609)	(0.718)		
Marine wetland			1.310**	1.033*	1.065**	1.131***	2.379***
			(0.536)	(0.543)	(0.447)	(0.408)	(0.482)
Constructed wetland			-0.394	-0.683	-1.002		
			(0.791)	(0.978)	(1.148)		
Lacustrine wetland			-0.442	-0.165	-0.322		
			(0.682)	(0.646)	(0.629)		
Palustrine wetland			--0.907*	-1.597**	-1.073	-1.272***	
			(0.816)	(0.719)	(0.807)	(0.465)	
Other wetlands			0.132	-0.105	-0.060		
			(0.721)	(0.646)	(0.679)		
RC			1.028*	0.938*	0.864	1.215***	1.419***
			(0.576)	(0.504)	(0.550)	(0.444)	(0.420)
CVM			-1.846***	-1.443***	-0.869**	-1.183***	-1.388***
			(0.442)	(0.402)	(0.412)	(0.331)	(0.339)
CE			-1.999***	-1.582***	-1.332**	-1.707***	-1.674***
			(0.615)	(0.536)	(0.537)	(0.478)	(0.574)
TCM			0.012	0.947	1.133*		1.052**
			(0.720)	(0.731)	(0.614)		(0.445)
NFIPF			1.133*	1.101*	0.811		
			(0.649)	(0.656)	(0.708)		
OC			-2.330	-1.012	0.403		
			(0.680)	(0.810)	(1.022)		
DC			0.611	-0.166	-0.034		
			(0.505)	(0.475)	(0.473)		
Impact factor			-0.293**	-0.168	-0.078		
			(0.148)	(0.149)	(0.146)		
Published			-0.381	-0.538	-0.607	-0.835***	
			(0.409)	(0.413)	(0.411)	(0.264)	
Thesis			-0.765	-0.733	-0.327		
			(0.625)	(0.611)	(0.545)		
Year of survey			-0.020	-0.013	-0.009		
			(0.053)	(0.060)	(0.066)		
Power distance					-0.035*	-0.041***	-0.015
					(0.020)	(0.010)	
Indulgence					-0.025	-0.020**	-0.018*
					(0.016)	(0.009)	(0.009)
Masculinity					0.012		
					(0.042)		
Uncertainty avoidance					0.015		
					(0.024)		
Long term Orientation					-0.005		
					(0.015)		
Individualism					0.010		
					(0.028)		
Other Controls	NO	NO	YES	YES	YES	YES	YES
No. of observations	1,041	1,000	1,041	1,000	941	941	529
No. of studies	283	270	283	270	252	252	159
Adjusted R^2	0. 097	0.181	0.599	0.606	0.646	0.625	0.546

Notes: Estimation uses unrestricted weighted least squares, using sample size weights. Institutional variables lagged three years in Columns (2), (4), (5), (6), and (7). Some studies drop out due to insufficient data on some of the explanatory variables. Figures in brackets are standard errors, adjusted for clustering of wetland valuations within studies.*,**, ***, denote statistical significance at the 10%, 5%, and 1% levels, respectively

Table A5: Robustness Checks, Interactions, Non-linearity and General-to-Specific Models
(Dependent variable is ln value per ha per year)

Variable	Economic freedom only	With lagged institution & culture and ethnic interactions	With non-linearity	General model, year of survey fixed effects	Specific model, year of survey fixed effects
	(1)	(2)	(3)	(4)	(5)
Constant	8.708**	20.021***	28.058**	18.984***	22.973***
	(4.244)	(7.188)	(12.469)	(6.904)	(2.183)
Economic freedom	-0.611**	-1.587**	-4.484	-0.788*	-1.312***
	(0.292)	(0.731)	(3.229)	(0.462)	(0.246)
Democracy		0.042	-0.052	-0.018	
		(0.139)	(0.054)	(0.042)	
Political Stability		1.710	0.787	0.624	
		(1.854)	(0.669)	(0.435)	
Government effectiveness		5.658***	3.591***	2.647**	2.223***
		(2.134)	(0.940)	(0.924)	(0.334)
Control of corruption		-4.291*	-1.407		
		(2.584)	(1.079)		
GDP per capita	0.760*	0.462	0.068	-0.163	
	(0.445)	(0.671)	(0.632)	(0.667)	
GINI Index	-0.025	-0.068	-0.058	-0.007	
	(0.040)	(0.055)	(0.054)	(0.056)	
MENA	-0.079	-0.596	0.577	-0.288	1.282**
	(0.143)	(1.376)	(1.193)	(1.230)	(0.544)
South Asia	-.0496	-1.184	-0.907	-0.906	
	(0.569)	(1.522)	(1.067)	(0.933)	
Africa	-0.014	0.581	0.408	-0.427	
	(0.843)	(1.195)	(1.201)	(0.984)	
Latin America	1.080*	0.264	0.774	0.976	
	(0.603)	(0.902)	(0.910)	(0. 896)	
Eastern Europe	0.408	-1.336	-0.621	-2.477	
	(1.220)	(3.332)	(2.138)	(2.255)	
Latitude	0.027	0.004	0.0001	0.016	
	(0.017)	(0.042)	(0.033)	(0.033)	
Population density	-0.079	-0.092	0.054	-0.017	
	(0.142)	(0.142)	(0.138)	(0.131)	
Size (lnArea)	-0.281***	-0.283**	-0.280***	-0.294****	-0.339***
	(0.043)	(0.091)	(0.089)	(0.084)	(0.065)
Protected area	0.902	0.469	0.340	-0.387	
	(0.609)	(0.436)	(0.494)	(0.423)	
Ramsar site	-0.561	-0.737	-0.769	0.207	-1.035**
	(0.436)	(0.549)	(0.543)	(0.510)	(0.407)
Urban wetlands	2.131***	1.953**	1.746**	1.658**	1.901****
	(0.704)	(0.769)	(0.749)	(0.702)	(0.434)
Disturbance regulation	0.402	0.537	0.692	0.871	
	(0.502)	(0.562)	(0.527)	(0.522)	
Water regulation	1.841**	1.009	1.687**	1.839**	
	(0.711)	(0.681)	(0.748)	(0.726)	
Water Supply	-0.953**	-1.005**	-1.321***	-1.156	-0.694***
	(0.460)	(0.476)	(0.471)	(0.496)	(0.344)
Nutrient cycling	0.273	-0.409	-0.157	0.1790	
	(1.242)	(1.080)	(1.057)	(1.075)	
Erosion control	0.531	0.797	0.789	0.913	
	(0.614)	(0.591)	(0.634)	(0.669)	
Carbon sequestration	-0.814	-0.684	-0.756	-1.483	
	(0.712)	(0.688)	(0.686)	(0.780)	
Water treatment	0.648	0.989*	0.731	0.649	
	(0.569)	(0.566)	(0.565)	(0.573)	
Biodiversity-Habitat	1.425***	1.396***	1.506**	1.321***	1.740***
	(0.734)	(0.485)	(0.452)	(0.424)	(0.375)
Food production	-0.763	-0.040	0.035	0.027	
	(0.742)	(0.456)	(0.420)	(0.368)	
Raw materials	0.578	0.506	0. 675	0.606	
	(0.546)	(0.581)	(0.613)	(0.582)	
Culture	0.232	-0.153	-0.091	0.230	
	(0.706)	(0.680)	(0.697)	(0.703)	
Riverine wetland	0.131	-0.206	-0.246	-0.414	
	(0.645)	(0.723)	(0.708)	(0.720)	
Marine wetland	1.317***	1.178***	1.192***	1.594***	1.131***
	(0.582)	(0.590)	(0.856)	(0.511)	(0.408)
Constructed wetland	-0.467	-0.829	-0.856	-0.579	
	(0.926)	(1.164)	(1.165)	1.151	
Lacustrine wetland	0.076	-0.378	-0.181	-0.831	
	(0.655)	(0.623)	(0.623)	(0.572)	
Palustrine wetland	-1.408*	-0.378	-0.935*	-0.786	-1.272***
	(0.826)	(0.805)	(0.738)	(0.734)	(0.465)
Other wetlands	0.270	-0.134	0. 115	-0.211	
	(0.609)	(0.845)	(0.734)	(0.860)	

Variable	Economic freedom only	With lagged institution & culture and ethnic interactions	With non-linearity	General model, year fixed effects	Specific model, year fixed effects
	(1)	(2)	(3)	(4)	(5)
RC	1.243	0.813	0.823	0.705	1.214***
	(0.536)	(0.527)	(0.521)	(0.519)	(0.444)
CVM	-1.649***	-0.878**	-0.955**	-0.955***	-1.183***
	(0.504)	(0.445)	(0.521)	(0.356)	(0.332)
CE	-1.967***	-1.211**	-1.401**	-1.468***	-1.707***
	(0.647)	(0.572)	(0.543)	(0.552)	(0.478)
TCM	0.783	0.886	0.792	1.256**	
	(0.800)	(0.612)	(0.580)	(0.607)	
NFIPF	1.429*	0.727	0.436	0.3845	
	(0.674)	(0.737)	(0.701)	(0.742)	
OC	-0.892	0.622	0.430	0.538	
	(0.846)	(0.738)	(1.017)	(0.980)	
DC	0.206	-0.088	-0.109	0.262	
	(0.457)	(0.481)	(0.481)	(0.541)	
Impact factor	-0.154	-0.139	-0.050	0.011	
	(0.141)	(0.147)	(0.146)	(0.141)	
Published	-0.551	-0.551	-0.660	-0.840*	-0.835***
	(0.398)	(0.411)	(0.405)	(0.442)	(0.264)
Thesis	-0.716	0.383	-0.123	-0.196	
	(0.647)	(0.531)	(0.569)	(0.598)	
Year of survey	-0.005	-0.059	-0.013	0.120	
	(0.058)	(0.068)	(0.060)	(0.079)	
Power distance		-0.027	-0.018	0.007	-0.041***
		(0.032)	(0.021)	(0.019)	(0.010)
Individualism		0.034	0.022	.0276	
		(0.034)	(0.025)	(0.028)	
Masculinity		0.006	0.012	-0.021	
		(0.034)	(0.037)	(0.039)	
Uncertainty avoidance		0.039	0.023	0.017	
		(0.031)	(0.024)	(0.023)	
Long term orientation		-0.005	-0.005	-0.0008	
		(0.021)	(0.016)	(0.018)	
Indulgence		-0.016	-0.018	-0.023	-0.020**
		(0.024)	(0.020)	(0.015)	(0.009)
Ethnic		-9.889			
		(7.802)			
Ethnic*Economic freedom		1.242			
		(1.173)			
Ethnic*Democracy 3y lags		0.042			
		(0.138)			
Ethnic*Political stability 3y		-2.817			
		(2.305)			
Ethnic*Government		-4.663			
		(3.531)			
Ethnic*Corruption control 3y		4.747			
		(3.811)			
Economic freedom^2			0.267		
			(0.260)		
Democracy^2			0.010		
			(0.014)		
Political stability^2			0.314		
			(0.430)		
Government effectiveness^2			-0.831		
			(0.960)		
Corruption control^2			0.681		
			(1.103)		
No. of observations	1003	941	941	941	941
No. of studies	271	252	252	252	252
Adjusted R^2	0.577	0.652	0.651	0.687	0.625

Notes: Estimation uses unrestricted weighted least squares, using sample size weights. Institutional variables lagged three years in all cases. Some studies drop out due to insufficient data on some of the explanatory variables. Figures in brackets are standard errors, adjusted for clustering of wetland valuations within studies.*,**, ***, denote statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE A6: Sensitivity to Valuation Method (Ln value per ha per year)

Variable	Without RC (1)	Without CVM (2)	Without CE (3)	Without TCM (4)	Without NFIPF (5)	Without OC (6)	Without DC (8)
Economic Freedom	-1.433 ***	-1.235***	-1.285***	-1.049***	-1.327***	-1.313***	-1.395***
	(0.261)	(0.417)	(0.254)	(0.242)	(0.259)	(0.247)	(0.445)
Government	2.458***	1.818***	2.070***	2.080***	2.253***	2.229***	2.229****
Effectiveness	(0.350)	(0.632)	(0.399)	(0.337)	(0.337)	(0.331)	(0.331)
MENA	1.180**	2.808***	0.756	1.009	1.308**	1.289**	1.371***
	(0.585)	(0.760)	(0.548)	(0.668)	(0.560)	(0.543)	(0.497)
Size (lnArea)	-0.375***	-0.279***	0.345***	-0.313***	-0.327***	-0.339***	-0.375***
	(0.071)	(0.092)	(0.070)	(0.069)	(0.067)	(0.006)	(0.067)
Ramsar site	-0.937**	-0.773	-0.601	-1.117***	-1.007**	-1.030**	-0.837**
	(0.407)	(0.504)	(0.479)	(0.401)	(0.427)	(0.032)	(0.398)
Urban wetlands	1.955***	1.655***	2.046***	2.189***	1.941***	1.902***	1.874***
	(0.499)	(0.870)	(0.454)	(0.457)	(0.434)	(0.435)	(0.532)
Water Supply	0.179	0.488	-0.909**	-0.596*	-0.717**	-0.710**	0.764*
	(0.417)	(0.322)	(0.422)	(0.341)	(0.359)	(0.350)	(0.419)
Biodiversity-Habitat	2.016***	1.671***	1.643***	1.722***	1.757****	1.744***	1.907***
	(0.418)	(0.554)	(0.409)	(0.395)	(0.382)	(0.376)	(0.494)
Marine wetland	1.061**	1.847**	1.058**	0.932**	1.083**	1.129***	1.165**
	(0.439)	(0.780)	(0.429)	(0.402)	(0.420)	(0.409)	(0.490)
Palustrine wetland	-1.124**	-1.547**	-1.479***	-1.255***	-1.260***	-1.266***	-1.136**
	(0.485)	(0.594)	(0.416)	(0.472)	(0.457)	(0.465)	(0.453)
RC		0.047*	1.200***	1.114***	1.281***	1.222***	1.323***
		(0.581)	(0.455)	(0.421)	(0.444)	(0.447)	(0.480)
CVM	-1.429***		-1.101***	-1.357***	-1.131***	-1.179***	-1.385***
	(0.378)		(0.339)	(0.319)	(0.346)	(0.332)	(0.381)
CE	-2.1046***	-1.724***		-1.691***	-1.641***	-1.705	-2.039***
	(0.513)	(0.466)		(0.477)	(0.508)	(0.479)	(0.519)
Published	-0.831***	-1.082***	-0.687**	-1.691***	-0.848***	-0.837***	-0.849***
	(0.295)	(0.399)	(0.294)	(0.262)	(0.274)	(0.246)	(0.299)
Power distance	-0.043***	-0.038*	-0.041***	-0.035***	-0.038***	-0.041***	-0.040***
	(0.011)	(0.019)	(0.011)	(0.010)	(0.010)	(0.010)	(0.011)
Indulgence	-0.021**	-0.020	-0.022**	0.013	-0.028*	-0.020**	-0.023**
	(0.009)	(0.013)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)
Other Controls	YES	YES	YES	YES	YES	YES	YES
No. of observations	820	433	841	797	896	933	854
No. of studies	212	133	230	230	240	248	222
Adjusted R^2	0.670	0. 552	0.639	0.642	0.622	0.625	0.640

Notes: Figures in brackets are standard errors. *,**, ***, denote statistical significance at the 10%, 5%, and 1% levels, respectively.