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Impact of justice and solidarity variables on the acceptability of managed realignment

BÉNÉDICTE RULLEAU[1,2]*, HÉLÈNE REY-VALETTE[3], VALÉRIE CLÉMENT[4]

[1] Université de Versailles-Saint Quentin en Yvelines, CEARC, OVSQ, 11 Boulevard d'Alembert, Guyancourt, 78280 France
[2] Irstea, UR ETBX, 50 avenue de Verdun, Cestas Cedex 33612, France
[3] Université Montpellier 1, LAMETA, Avenue Raymond Dugrand, CS79606, 34960 Montpellier Cedex 2, France
[4] Université Montpellier 1, LAMETA, Avenue Raymond Dugrand, CS79606, 34960 Montpellier Cedex 2, France

Sea-level rise due to climate change will have significant effects on coastal areas and populations. Adaptation policies recommend the managed realignment of the most vulnerable assets and activities. Despite their medium- and long-term benefits, these policies face significant friction due to social acceptability in the communities where they are implemented.

This article investigates the hypothesis that respecting principles of justice in the implementation of managed realignment should increase its acceptability. We compare preferences of those people who are exposed to the risk of climate-change-induced flooding and those who are not, as regards funding managed retreat policies and defining compensation criteria for assets at risk. The main theories of social justice provide the four principles included in the analysis: efficiency, need, responsibility and priority assigned to property rights.

A choice experiment survey was conducted with 258 residents of coastal and hinterland communities in the south of France. Four attributes were selected to define the managed realignment policy: the dialogue arrangements, the implementation period, the policy implementation schedule and the cost. The results show support for a relatively fast launch of these policies (within 15 years) but in stages and through a process of dialogue with the population. People's perceptions of the funding criteria reveal a preference for national solidarity. Finally, national funding of managed retreat policies and compensation criteria based on market prices have a significant positive influence on the acceptability of managed realignment policies, whereas introducing responsibility-based compensation criteria tends to favour the *status quo* over the adaptation policy.

Policy relevance

Prioritization of the funding criteria reveals the preference for national solidarity. Preferences for the justice criteria underpinning compensation reveal a great diversity of values. Besides implantation modalities, preferences for managed realignment policies depend on which level they are implemented at, on the expropriation criteria (the emphasis given to property rights, i.e. market price), on the attachment (people perceived as worst off, i.e. the property is their main residence rather than a second home or they have lower levels of income) and on the degree of responsibility (related to the date of purchase, i.e. on the information given at the time on the risk).

■ *Corresponding author. E-mail*: benedicte.rulleau@irstea.fr

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1. Introduction

The issue of climate change adaptation is particularly relevant where the vulnerability of coastal areas is concerned. Sea-level rise will result in the permanent inundation of some areas and increased storm damage due to the higher water levels. In the case of Languedoc-Roussillon (France), this rise has been estimated to be 40 cm by 2060 based on an adaptation of the Intergovernmental Panel on Climate Change (IPCC) hypotheses (Magnier, 2013). At that date, water levels currently reached during 100-year events may have a decennial return period. Faced with this outlook, shoreline management policies require adaptation. It is recommended that vulnerability is reduced by relocating shoreline assets and activities to retreat areas further inland (MEDDE, 2012). Such policies are of interest not only because of the future savings in damage costs but also because they protect dune biodiversity whilst maintaining the recreational services offered by beaches (Cooper & Lemckert, 2012).

However, the social acceptability and the economic feasibility of these managed realignment policies, even when restricted to a few neighbourhoods, are not straightforward. Besides the uncertainty, and even the scepticism, towards the evolution of these long-term risks that characterize any climate change adaptation policy, managed realignment is hindered by residents' attachment to their assets and the amenities provided by the proximity to the sea. An extensive literature focuses on the dimensions and predictors of the social acceptability of adaptation policies and on the notion of 'social acceptance' in relation, for instance, to 'social support' (Batel, Devine-Wright, & Tangeland, 2013). Wüstenhagen, Wolsink, and Bürer (2007) identify three types of acceptability that are often interactive, depending on the scale: (1) socio-political acceptability where stakeholders are concerned, (2) community acceptability where residents are concerned, and (3) market acceptability where consumers and investors are concerned. As regards acceptability factors, previous work has shown that day-trippers and tourists are significantly more in favour of managed realignment policies than local residents (Rey-Valette et al., 2012; Rulleau & Rey-Valette, 2013), particularly second-home owners who are often older and more attached to their assets (Rey-Valette, Rulleau, Hellequin, Meur-Ferec, & Flanquart, 2015). Opposition is all the stronger in that, depending on the area's configuration, retreat areas may be a significant distance away, even in other towns or villages.

Such relocations require coherent territorial planning at a large scale (Hurlimann et al., 2014) and the mobilization of solidarity between communities. In an institutional approach, solidarity can be defined using social capital parameters that play a decisive role in acceptability. As Jones and Clark (2014) show, the level of social trust within the coastal communities has a significant impact on residents' perceptions of the costs and benefits of adaptation policies. In this article, solidarity and justice principles are defined on the basis of the main theories of social justice. The hypothesis under investigation is that respecting these principles in the implementation of managed realignment increases its acceptability. In funding managed retreat policies, solidarity mostly concerns those people who are exposed to the risk of climate-change-induced flooding and those who are not. In addressing damage compensation mechanisms, four justice principles were selected for our analysis: efficiency, need, responsibility and priority assigned to property rights.

More specifically, the objective was to examine whether people's perceptions of solidarity and justice in realignment policies affect individual preferences for the managed realignment policy compared with the laissez-faire alternative. To this end, a choice experiment (CE) was used to elicit individual preferences regarding the characteristics of managed realignment policies. This economic valuation

method is grounded in Lancaster's characteristics theory (1966), which hypothesises that the satisfaction obtained by consumers from particular goods comes in fact from the consumption of the different characteristics that these goods embody. It is used specifically to study consumers' trade-offs between the different components of a particular good (Bennett & Blamey, 2001). We use it to estimate the value that people place on the attributes of a managed realignment policy, focusing on the hypothetical trade-offs that they make between attributes and the methods used to implement the policy. Thus, our study should provide more information than contingent valuation to the managers and decision-makers involved in the design of acceptable adaptation policies (Hoyos, 2010).

CE is applied in many areas (Hanley & Barbier, 2009). In the case of climate change, most studies focus on individuals' preferences for adaptation and/or mitigation policies (Akter, Bennett, & Ward, 2012; Carson, Louviere, & Wei, 2010; Rajmis, Barkmann, & Marggraf, 2009), or ecosystem protection (Koundouri et al., 2012; Riera, Peñuelas, Farreras, & Estiarte, 2007; Shoyama, Managi, & Yamagata, 2013), on individuals' adaptive capacity (Alberini, Chiabai, & Muehlenbachs, 2006; Brouwer & Schaafsma, 2013) or on climate change impacts on insurance (Brouwer & Akter, 2010; Wouter Botzen & Van Den Bergh, 2012). There are few studies applied, like ours, to the case of coastal zones. Remoundou, Diaz-Simal, Koundouri, and Rulleau (2015) carried out a CE in Spain where the attributes used related to the loss of beach size and associated recreational aspects, the change in biodiversity and the health risks due to the presence of jellyfish. More in keeping with our issue, Luisetti et al. (2011) examined managed realignment in England. But they focused on the site's recreational services whereas we studied the precise methods to implement the managed realignment policy. Zander, Petheram, and Garnett (2013) also addressed relocation but their study focused on Australian aborigines. The article contributes to this limited literature using the example of the French coastal zone.

In section 2, the acceptability constraints of the managed realignment policies are analysed. Section 3 sets out the methodology and the characteristics of the survey protocol. The main results are then presented in Section 4 and discussed in the Section 5 part. Section 6 provides concluding comments.

2. The acceptability of managed realignment policies

Numerous factors hinder the acceptability of managed realignment policies. First, the fact that the shoreline moves naturally must be accepted. Climate change adaptation requires the recognition of the natural resilience limits of non-urbanized beaches. The issue is to reduce coastal area vulnerability by relocating the assets that are most at risk (Clark, 1998; Kelly & Adger, 2000; Titus, 1998) rather than trying systematically to build sea defences, which are now known to worsen erosion (Pilkey, 1990). This kind of profound change in representation implies a learning process and specific communication methods, especially as the progressive nature of the risks related to climate change and the numerous associated uncertainties strengthen optimism and *status quo* biases (Lammel, Dugas, & Guillen Gutierrez, 2012; Lammel, 2013). Spontaneous behaviour tends towards a 'wait-and-see' attitude (Dutt & Gonzales, 2012) and depends heavily on perceptions. These, in turn, depend on socio-demographic characteristics such as the age, education and status of main residents or second-home owners (Hellequin, Flanquart, Meur-Férec, & Rulleau, 2014; Rey-Valette et al., 2012, 2015).

In addition to this change in reference framework, other factors complicate the implementation of managed realignment policies. Several studies have shown the importance of dialogue and of the

legitimacy of the institution in charge of implementation (Cooper & Pile, 2014; Kelly & Adger, 2000; King et al., 2014; Ledoux, Cornell, O'Riordan, Harvey, & Banyard, 2005; Myatt, Scrimshaw, & Lester, 2003; Roca & Villares, 2012). Acceptability must be considered with respect to elected representatives and the local population. Elected representatives and managers are concerned about the scope of territorial reorganization and the financial requirements for compensation (French, 2006; King et al., 2014; Ledoux et al., 2005), and first and foremost by possible opposition from the population. Yet, residents hold contrasting viewpoints depending on their demographic and geographical situation, which evolve when climatic events occur. Several surveys in Australia have shown that the desire to move increases (from 30% to 36%) following a severe storm and, on the other hand, that opposition increases in case of a significant drop in the housing market, especially with indebted homeowners (King et al., 2014).

More generally, whilst hinterland residents tend to favour managed realignment policies as they wish to maintain the beaches' recreational amenities, residents who are directly concerned are usually opposed to these policies as they are attached to their assets and the amenities provided by their proximity to the sea. However, compensation levels together with expropriation and buy-back procedures and conditions are key elements for acceptability (French, 2006; Glenk & Fisher, 2010). These studies have all shown the need to propose a coherent buy-back policy and the importance of governance conditions and dialogue (Milligan, O'Riordan, Nicholson, & Watkinson, 2009; Penning-Rowsell et al., 2014), which promote trust in institutions (Gibbs, Thebaud, & Lorezn, 2013; Graham et al., 2013; Midgley & McGlashan, 2004; Storbjork & Hedren, 2011).

Such social resistance leads many researchers to stress the need to address better the social determinants and impacts (Adger et al., 2009; Graham et al., 2013; Wise et al., 2014). Several authors suggest that the analysis of justice and equity principles, insufficiently developed at this level[1] (Cooper & McKenna, 2008) would promote managed realignment acceptability (Cooper & Lemckert, 2012; Duxbury & Dickinson, 2007; Glenk & Fisher, 2010; Milligan et al., 2009). Indeed, according to Field et al. (2012), fairer policies are better accepted and are therefore more efficient. Glenk and Fisher (2010) showed the importance and the pluralism of the values mobilized (sustainability, efficiency, solidarity). Likewise, Abel et al. (2011) advocate greater transparency in public or private cost and benefit distribution as well as taking responsibility into account. For example, one issue is to avoid tax payers funding the well-being of the wealthiest, as decried by Pilkey (1990) and Platt, Salvesen, and Baldwin (2002), and another is to review the concept of land property, as recommended by Buhot et al. (2012). These authors, for example, recall the intense controversy over private property that opposed the 'libertarian' and 'liberal–egalitarian' currents, the former initiated by Nozick (1974) and the latter associated with Rawls (1971).

In line with this debate, we investigated the justice principles that might underpin the methods to implement managed realignment policies and hence promote their acceptability. To that effect, we used a CE with attributes corresponding to the implementation procedure and then studied the significance of the justice and solidarity variables for relocation policy preferences.

3. The survey protocol

3.1. Description of the study zone

The survey zone was the SCoT[2] territory around Béziers, in Languedoc-Roussillon (southeastern France), where the coastal towns are among the most vulnerable in the area to marine erosion and inundation

(MIAL-LR, 2003). We focused on two coastal towns (Valras-Plage and Vendres) and three towns at an increasing distance from the coast: Béziers, the economic capital situated 15 km from the sea, Murviel-lès-Béziers and Saint Chinian, two agricultural hinterland towns 29 and 40 km from the sea, respectively. These towns and villages were selected due to their potential economic and institutional solidarity with their coastal counterparts. They all belong to the same territorial planning institutional system (the Territorial Coherence Scheme, SCoT), which establishes institutional solidarity. Our hypothesis was that solidarity decreases as one moves from the coast towards the hinterland. Solidarity depends on beach uses, on perceptions and on people's attachment to the coast as well as on economic, institutional and ecological interactions between coastal and non-coastal towns and villages (see supplementary data, Figure S1).

3.2. Questionnaire, completion method and sample

The questionnaire comprised six parts.[3] The first three parts focused on housing, attachment to the coast, beach usage, coastal knowledge and inundation risk perception. The fourth part comprised the choice sets of the CE and follow-up questions. It was introduced by a presentation of the reference situation and the attributes. The next part related to solidarity and justice issues, whilst the final one focused on the socio-demographic characteristics. Two different versions of the first three parts were designed depending on whether the respondent lived on the coast or in the hinterland. The last three were the same for all respondents. This questionnaire was tested with 30 people in April 2013.

Given our hypotheses, a stratified sampling design was adopted. Level 1 consisted of towns and villages that were selected to cover the diversity of the situations (see supplementary data, Table S1). On the coast, Vendres depends both on tourism and wine production whereas Valras-Plage is the archetype coastal resort with a very large number of second homes. In the hinterland, Béziers is the largest town in the area. Further inland, Murviel les Béziers is a typical suburban wine-producing town whilst Saint Chinian is a typical wine-producing village with rural tourism appeal. In level 2, the survey population consisted of residents who had their main home in the selected towns and villages. Participants were contacted by telephone; they were selected randomly, balancing the numbers from the different towns and villages. The telephone call referred only to coastal planning to avoid introducing bias. The questionnaire was completed in rooms provided by the town councils during May and June 2013. It was self-administered in the presence of 7 researchers available to answer any queries. In total, 13 sessions took place involving, on average, 20 people per session. Sessions alternated between week-days and Saturdays to accommodate working people. The survey took roughly an hour.

In all, 258 people were interviewed: 122 from the coast and 136 from the hinterland. Almost half (48%) of the respondents were native to the territorial 'department' and 54% were women. Just over a third of them (38%) were single and households had an average size (2.4 people) equal to the average in the department. The average age was quite high (53 years), which is common in coastal and rural towns and villages. However, educational and income levels were higher than the departmental average. Almost half of the respondents (46%) had higher-education degrees against 27% for the departmental average (data from the French National Institute for Statistics and Economic Studies for 2012), whilst 22% had an average monthly income lower than the average wage and 27% had an average monthly income of at least EU€3,000. These characteristics may be explained by the fact that a high proportion of property owners was deliberately selected in the sample (73% against 55% on average in the department).

The data were processed using Sphinx to test correlations (chi-square tests) and a mixed logit model was then developed using Nlogit to examine the choices formulated in the CE.

3.3. Proposed scenarios of the CE

The attributes and levels used are presented in Table 1. The reference situation was defined according to the IPCC regional forecast. By 2060, without further public intervention, beaches are expected progressively to lose a minimum 30% of their size with very strong 5- to 6-yearly storms, leading to the introduction of insurance premiums proportional to the risk incurred. Faced with this outlook, asset and activity realignment policies may be implemented according to different modalities that were used as attributes in our CE.

Four attributes were selected based on the results of Gordon, Chapman, and Blamey (2001) and the recommendations of Bateman et al. (2002). They were defined on the basis of expert opinion by researchers and State services in charge of these policies ('Direction des risques de la Direction Régionale de l'Environnement, de l'Aménagement et du Logement': DREAL).

Each attribute was described by three levels that were sufficiently different to reflect all future possible options (Bennett & Blamey, 2001). The levels of the monetary attribute were calculated using the cost of the work (demolition and sand nourishment of the areas) estimated by the risk service of DREAL without taking into account owners' compensation. We assumed that half of the work would be funded

Table 1 Presentation of attributes and their levels

Attribute	Description	Levels
Dialogue	Dialogue arrangements	(1) No dialogue
		(2) Consultation on the zones to be relocated
		(3) Consultation on the compensation criteria
Timing	Implementation period for the managed realignment	(1) 15 years (2015–2030)
		(2) 15 to 30 years (2030–2045)
		(3) 30 to 45 years (2045–2060)
Schedule	Schedule for managed realignment implementation	(1) Single stage
		(2) In successive stages
Cost	Size of the relevant area and additional cost	(1) Coastal infrastructure (roads, walls, promenades, games) for a cost of €10
		(2) Coastal infrastructure and houses or shops on the shoreline for a cost of €100
		(3) Coastal infrastructure and houses or shops on and behind the shoreline for a cost of €200

by subsidies and the remainder shared between fiscal households at the 'intercommunal' level (cooperation between several towns), the relevant scale for this type of operation. An increase in the local council tax was proposed as the means of payment.

We then combined these attributes into alternatives and the alternatives into choice sets. To do this, we used a fractional factorial design and the Ngene software. Based on a method proposed by Zwerina, Huber, and Kuhfeld (2004), this approach ensures that the choice sets best meet the efficiency criteria defined by Huber and Zwerina (1996). The 18 choice sets identified were then divided into three blocks using the method proposed by Louviere (1988) so that each respondent is only presented with six choice sets (Adamowicz, Louviere, & Swait, 1998). The three versions of the questionnaire that correspond to the three blocks of choice sets were allocated randomly and uniformly to the respondents.

Each choice set included the reference situation, which described the current situation with no tax increase (business-as-usual), and two alternatives, corresponding to certain levels of the managed realignment attributes, and for each scenario the financial contribution depending on the size of the area concerned by managed realignment.

3.4. Solidarity and justice questions

Given our hypothesis that the respect of justice criteria in the implementation of managed realignment measures enhances their acceptability, our primary aim was to identify, for some factors, the implementation methods that were considered to be the fairest or the most equitable and which, as such, can be considered to be legitimate. In the survey, respondents were asked to rank the principles that they considered to be the fairest regarding both the funding of the managed retreat policy and the damage compensation mechanism.

An *ex ante* perspective was taken of the financing of retreat policies, highlighting the solidarity between those faced with risk and those not. The funding methods indicate whether the respondents thought that adaptations should benefit from financial solidarity or not, and if so at what level. Solidaristic funding mechanisms proposed in the questionnaire included the choice between a national or a regional tax levy. Respondents could also choose a non-solidaristic funding method such as individual insurance policies, a tourist tax or local taxes in the coastal towns. In the latter case, the town concerned was assumed to be solely responsible for funding the climate risk.

Moreover, managed realignment policies may imply the purchase or expropriation of shoreline assets. The question then arises as to the criteria that should underpin compensation mechanisms for the expropriated assets. It was to address this question that theories of justice were used. The choice of compensation criteria arises in an *ex post* perspective that highlights fairness between individuals affected by retreat policies. Four general fairness principles were considered relating to the main theories of social justice: (i) efficiency in the sense of the utilitarian principle of maximizing the total surplus (Harsanyi, 1955), (ii) need in the sense of priority to the worst-off defined by Rawls (1971), (iii) responsibility following Dworkin's (1981) Luck Egalitarianism, and finally (iv) priority to property rights in line with the libertarian approach of Nozick (1974). Placing these four principles in the context of relocalization polices enabled compensation criteria to be defined that modulate compensation for expropriation (Clément, Rey-Valette, & Rulleau, 2015). Hence, compensation for expropriated assets at their market value represents an approach based on efficiency and respect for property rights; taking into account individuals' income, and prioritizing main residences over

Table 2 Preferences concerning compensation criteria

Compensation criteria	Percentage of respondents (1st and 2nd choices)	Justice Principle
Market value of assets	29	Efficiency and property rights
Date of purchase: in favour of longer-term owners	10	(Harsanyi, 1955; Nozick, 1974)
Type of housing: in favour of main residence	12	Need
Owner's income: in favour of lower incomes	30	(Rawls, 1971)
Date of purchase: at the expense of informed owners	14	Responsibility (Dworkin, 1981)
Other or no answer	5	–
Total	100	–

Source: 2013 Solter survey.

second homes represents an approach based on need; and finally varying compensation according to whether or not individuals were aware of the risk when choosing where to reside integrates the principle of responsibility. We tested these criteria (Table 2) asking respondents what would be the fairest compensation approach if houses and shops near the beaches were to be expropriated.

Finally, the possible involvement of respondents in solidarity mechanisms was identified. Some 55% of the respondents belonged to one or more associations, but only 19% of the associations dealt with the social sector. Finally, 20% of the respondents declared that they had made regular donations towards solidarity operations or actions in the previous 12 months, compared with 45% who had done so occasionally and 35% who never had.

4. Willingness to pay modelling

The determinant variables for the econometric modelling are described in Table 3 and the mixed logit results in Table 4. We found that all levels of the attributes had a statistically significant coefficient. In other words, the characteristics of the policies presented to respondents do affect the probability of choosing an alternative policy to the *status quo*, i.e. a realignment policy, as in our case the *status quo* implies laissez faire, which means not anticipating the effects of sea-level rise. Both the cost of the realignment policy and any delay in its implementation have a negative effect on this probability whilst dialogue and implementation in several stages have a positive impact.

The other variables were exclusively qualitative, relating to the respondents' characteristics or their perceptions. Several variable categories have an impact on preferences, beginning with those concerning locality and socio-demographics. Living on the coast has a positive effect on the choice of an alternative other than the reference situation. With respect to socio-demographic factors, education and income play a part but, paradoxically, with negative coefficients. Other than a correlation with location in favour of coastal towns and villages where average income is higher, this result may be explained by the stronger attachment of middle and lower classes to the recreational services provided

Table 3 Description of the methods and the determinant variables

Name	Description
Scenario attributes	
Dialogue 2	Level 2 of the attribute relating to the dialogue modes
Dialogue 3	Level 3 of the attribute relating to the dialogue modes
Timing 2	Level 2 of the attribute relating to implementation timing
Timing 3	Level 3 of the attribute relating to implementation timing
Schedule 2	Level 2 of the attribute relating to the implementation schedule
Cost	Monetary attribute
Variables relating to location and interest for the coast	
Coast	Resident in a coastal town or village
Proximity	Choice of residence in the town or village related to sea proximity
Socio-demographic variables	
BAC + 5	5 years of higher education after the baccalaureate
Resources	Average monthly household resources per consumption unit
Governance, solidarity and justice variables	
Intercommunality	Favour-managed realignment at intercommunal level
Expropriation criterion	Market price selected as the fairest expropriation criterion
National tax	Specific national tax or income tax selected as the fairest way of funding the protection of assets
Attachment	To be in total disagreement with the statement: "compensation at book value rather than market value is unfair as it places at a disadvantage people who have owned their assets for a long time and are therefore more attached to them".
Responsibility	To be in total disagreement with the statement: "it is unfair to use public funding to compensate residents who have recently settled in the area as these people were duly informed of the risk when they made their decision".

by the coast (Rulleau, 2008). Finally, 'intercommunalité' (a group of and cooperation between neighbouring towns and villages) appears to be the most coherent scale for territorial planning to address climate change adaptation, in keeping with the results of other studies (Abel et al., 2011; Graham et al., 2013; Hurlimann et al., 2014).

The willingness to pay (WTP) of each individual for a level of attribute can be calculated as follows (Hanemann, 1984):

$$\text{WTP} = -\frac{b_c}{b_y}$$

where b_c is the coefficient of one of the attribute levels and b_y is the coefficient of the monetary attribute. Their variance was calculated using the delta method (Hole, 2007). The values obtained (Table 5) are the total WTP by household.

Table 4 Mixed logit results

Variables	Coefficients	
Attributes		
Dialogue 2	0.4849*** (0.0990)	
Dialogue 3	0.3089*** (0.1049)	
Timing 2	− 0.1822* (0.1008)	
Timing 3	− 1.2589*** (0.1298)	
Schedule 2	0.1528** (0.0733)	
Cost	− 0.0027*** (0.0007)	
	Alt. 1 1	Alt. 2 2
ASC	0.9769*** (0.2710)	1.0648*** (0.2871)
Variables relating to location and interest for the coast		
Coast	0.6825*** (0.2504)	0.7744*** (0.2598)
Proximity	0.6776*** (0.2514)	0.7216*** (0.2592)
Socio-demographic variables		
BAC + 5	− 1.4361*** (0.2561)	− 1.3177*** (0.2673)
Resources	− 0.0002*** (0.5444×10^{-4})	− 0.0002*** (0.6150×10^{-4})
Governance, solidarity and justice variables		
Intercommunality	0.8085*** (0.2567)	0.6517*** (0.2576)
Expropriation criterion	0.6010** (0.2319)	0.6316*** (0.2349)
National tax	1.0033*** (0.1775)	0.8177*** (0.1785)
Attachment	− 1.3848*** (0.3667)	− 1.2737*** (0.3680)
Responsibility	− 1.5073*** (0.3601)	− 1.5045*** (0.3798)
NsCost	0.0075*** (0.0026)	
Number of observations	1,413	
Log likelihood	− 1,120.50	
McFadden pseudo R^2	0.27	

***significant at the 1% level.
**significant at the 5% level.
*significant at the 10% level.
Standard-errors are in brackets.
Note: NsCost stands for the derived standard deviation of parameter distribution (normal distribution), the parameter being here the cost.

The WTP are significant for all levels of attributes but indicate a hierarchy in the implementation arrangements. The respondents ranked dialogue very high on their list as regards the choice of the zones to be relocated. These findings are consistent with the literature on the acceptability of managed realignment policies. The respondents were also willing to pay for this managed realignment to be organized in several stages rather than on a one-off basis. But the willingness to pay for this policy to be delayed was negative. In other words, the respondents preferred the policy to be implemented relatively quickly. In short, the respondents' preferred scenario comprised a managed realignment policy implemented in the next 15 years, in successive stages and through dialogue with the population.

Table 5 WTP for levels of attributes (in €)

Attributes	WTP	95% confidence interval
Dialogue 2	181.69***	(63.79–299.58)
Dialogue 3	115.75**	(13.96–217.53)
Timing 2	− 68.26*	(− 148.40–11.88)
Timing 3	− 471.65***	(− 692.98– − 250.33)
Schedule 2	57.26*	(− 5.89–120.41)

***significant at the 1% level.
**significant at the 5% level.
*significant at the 10% level.

Among the individual characteristics affecting WTP, and as observed in other surveys (Glenk & Fisher, 2010; Hellequin et al., 2014; King et al., 2014; Myatt et al., 2003; Rey-Valette et al., 2012; Rulleau & Rey-Valette, 2013), we note the impact of education and income, whilst age has no influence. Yet age may indicate a greater degree of reluctance from older people (Rulleau, Flanquart, Hellequin, Meur-Ferec, & Rey-Valette, 2015). Surveys undertaken in Australia confirm the lower mobility of people with low incomes and who are older. The authors link age both with the feeling of belonging to a community and the fact that older people feel less concerned with long-term risks (King et al., 2014). The fact that age has no significant impact in our case could be explained by the relatively large number of older people in our sample.

Moreover, we observe that those people most likely to be affected by inundation are more favourable to managed realignment that would benefit them directly. It should be noted that only 30% of coastal respondents lived in areas exposed to inundation that might lead to a managed realignment programme. By enabling beaches and the attractiveness of coastal towns and villages to be maintained, in particular for tourists, managed realignment is of obvious interest for residents who will not have to move. Hinterland residents have a similar interest, although to a lesser extent, as most of them use the beaches (80% of them go to the beach over 10 times per annum). It seems logical, therefore, that respondents whose choice of home was influenced by proximity to the coast, whether they live on the coast or in the hinterland, are less likely to oppose managed realignment policies.

5. Discussion

The aim of this article was to investigate whether solidarity and justice variables affected individual preferences concerning managed realignment. Three main results emerge from the analysis.

The first result relates to solidarity: respondents preferred managed realignment policies funded on the basis of national solidarity and this variable significantly and positively affected preferences in favour of a realignment policy (Table 4). In the funding of a strategic retreat, the results showed that 47% of interviewees preferred financial solidarity at the national level and 16% at a regional level whilst 37% were opposed to solidarity between those who were faced with a threat and those who were not. In this latter case, funding would come only from individuals or towns directly concerned

with 18% choosing tourist taxes, 12% private insurance and 7% an increase in local taxes in the towns concerned.

It should be emphasized that the respondents' support for national solidarity in funding realignment policies is fully in line with current French practice, where beaches are perceived as public goods that are mainly the responsibility of the State, the historical manager of the public maritime domain in France. Hence, in France, damages due to natural disasters and shoreline management benefit from national solidarity. Damages are funded by a major natural risk prevention fund, called the 'Barnier fund', financed by a 'super-premium' uniformly applied to all insurance contracts (12% for home insurance and 6% for car insurance) (André, 2013).

The second result concerns compensation criteria in the event of expropriation. 29% of respondents felt that using market price provided the fairest basis for compensation. This criterion incorporates the libertarian principle (Nozick, 1974) of respect for property rights and the Utilitarian approach of maximizing total surplus, regardless of individual situations. Its importance, identified by our model, is in keeping with French practice. Currently in France, compensation payments are made with no consideration of the situation of individuals, whether in terms of prior information on the risk incurred or in terms of income. Although we cannot exclude the possibility that adhesion to national funding and market-price based compensation merely reflects current practice in France, our work brings in a new dimension by adding the responsibility principle to compensation criterion.

Finally, the study investigated the date of purchase of the assets and the number of years spent in the area as factors to be included in compensation criteria (Table 2). For owners who have longest lived in the area, this criterion gives value both to their attachment to their property and to their first-arrival rights, but it may also discriminate against owners who have purchased recently with knowledge of the risks. This solution introduces the responsibility principle. According to luck egalitarianism ideas, solidarity does not apply when inequality arises from factors that were deliberately selected by people who were responsible for their choices (Fleurbaey, 2008; Konow, 2001; Roemer, 1993). It was of particular interest to introduce the responsibility criterion into the proposed compensation mechanisms because since 2007, any risk is notified at the time of purchase in France. Results show that respondents who disagree with the idea that identical compensation for recent owners is unfair as they were informed of the risk incurred, tend to choose the *status quo* over managed realignment (Table 4). Hence, the third result of the study highlights that introducing responsibility into the compensation criteria may significantly increase the probability of respondents choosing managed realignment over the *status quo*. This confirms the tendency observed more generally in climate change where the responsibility principle plays a major part (Cooper & McKenna, 2008; Grasso, 2010; Klinsky & Dowlatabadi, 2009; Miller, 2008; Paavola & Adger, 2006).

6. Conclusion

The study shows that the questions of funding realignment policies and of compensation criteria draw on different distributive judgements on the part of individuals. Whereas a principle of solidarity dominates in the case of funding, the results concerning compensation highlight the importance of two principles: the libertarian respect for property rights and the inclusion of individual responsibility of those who were informed of the risks.

Justice trade-offs usually relate to efficiency and equal opportunity principles according to various criteria. For example, in France and in Europe, generic surveys of these issues reveal in decreasing order the need, merit and equality criteria (Forsé & Parodi, 2006). But they also show that preferences vary according to the issue, depending in particular on whether economic growth or welfare is involved. It is difficult in our case to know the motivations of the respondents, given that managed realignment whilst maintaining beaches (and therefore improving the well-being of beach users) will also maintain the attractiveness of the coast for tourists and hence the local economy of these areas which are heavily dependent on tourism.

Finally, this work, carried out directly with the local population, shows that people's perceptions of justice and solidarity criteria are important to inform decision-making in shoreline management policies, where new reference points must be put into operation. Our research shows that the main two determinants of preferences and WTP relate to efficiency and utilitarianism in the sense that they introduce respectively a notion of solidarity towards those who have longest been owners and are most attached to their property and a notion of responsibility towards those who were informed of the risks. This result makes the study of distribute preferences a key element in enhancing the acceptability of environmental policies (Johansson-Stenman & Konow, 2010; Turner, 2007). In France, an experimental programme has been implemented in five pilot sites by the Ministry for Ecology and Sustainable Development to identify the regulatory and financial constraints to the implementation of these processes (MEDDE, 2012). However, few studies focus on residents' preferences for compensation or funding criteria. Hence, our approach paves the way for further analyses to explore, as Cai, Cameron, and Gerdes (2010), Klinsky, Downlatabadi, and McDaniels (2012) have done, various levels of compensation and responsibility.

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Notes

1. In the context of the international negotiations on climate change, many studies have been undertaken on the issue of cost sharing and compensation distribution according to responsibility in terms of emission and countries' incomes (Cai et al., 2010; Grasso, 2010; Klinsky & Dowlatabadi, 2009; Klinsky et al., 2012; Paavola & Adger, 2006).
2. Territorial Coherence Schemes (SCoT) are a territorial planning tool that enables local authorities to coordinate their choices in urban planning, housing, transport, environment and economic development. The SCoT around Béziers comprises 270,000 inhabitants in 87 cities, towns and villages.
3. Interested readers are invited to contact the authors for a copy of the questionnaire.

Supplemental data

Supplemental data for this article can be accessed 10.1080/14693062.2015.1119097.

References

Abel, N., Gorddard, R., Harman, B., Leitch, A., Langridge, J., Ryan, A., & Heyenga, S. (2011). Sea level rise, coastal development and planned retreat: Analytical framework, governance principles and an Australian case study. *Environmental Science and Policy*, *14*, 279–288.

Adamowicz, V., Louviere, J., & Swait, J. (1998). *Introduction to attribute-based stated choice methods*. Edmonton: Advanis.

Adger, W., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D., … Wreford, A. (2009). Are there social limits to adaptation to climate change?. *Climatic Change*, *93*, 335–354.

Akter, S., Bennett, J., & Ward, M. B. (2012). Climate change scepticism and public support for mitigation: Evidence from an Australian choice experiment. *Global Environmental Change*, *22*, 736–745.

Alberini, A., Chiabai, A., & Muehlenbachs, L. (2006). Using expert judgment to assess adaptive capacity to climate change: Evidence from a conjoint choice survey. *Global Environmental Change*, *16*, 123–144.

André, C. (2013). *Analyse des dommages liés aux submersions marines et évaluation des coûts induits aux habitations à partir de données d'assurance. Perspectives apportées par les tempêtes Johanna (2008) et Xynthia (2010)* (Unpublished doctoral thesis). University of Bretagne Occidentale, Brest.

Batel, S., Devine-Wright, P., & Tangeland, T. (2013). Social acceptance of low carbon energy and associated infrastructures: A critical discussion. *Energy Policy*, *58*, 1–5.

Bateman, I., Carson, R. T., Day, B., Hanemann, M., Hanley, N., Tannis, H., … Swanson, J. (2002). *Economic valuation with stated preference techniques: A manual*. Cheltenham: Edward Elgar.

Bennett, J., & Blamey, R. (2001). *The choice modelling approach to environmental valuation*. Cheltenham: Edward Elgar.

Brouwer, R., & Akter, S. (2010). Informing micro insurance contract design to mitigate climate change catastrophe risks using choice experiments. *Environmental Hazards*, *9*, 74–88.

Brouwer, R., & Schaafsma, M. (2013). Modelling risk adaptation and mitigation behaviour under different climate change scenarios. *Climatic Change*, *117*, 11–29.

Buhot, C., Gérard, Y., Vincent, J., Herrera, C., Duvillard, S., Rousseaux, F., … Tritz, C. (2012). *Propriété, conflits et dynamiques foncières sur le littoral: les grands domaines et le camping caravaning sur parcelles privées*. Report of the Liteau III research program. Conservatoire du littoral and the Association des études foncières (ADEF).

Cai, B., Cameron, T. A., & Gerdes, G. R. (2010). Distributional preferences and the incidence of costs and benefits in climate change policy. *Environmental and Resource Economics*, *46*, 429–458.

Carson, R. T., Louviere, J. J., & Wei, E. (2010). Alternative Australian climate change plans: The public's views. *Energy Policy*, *38*, 902–911.

Clark, M. J. (1998). Flood insurance as a management strategy for UK coastal resilience. *The Geographical Journal*, *164*, 333–343.

Clément, V., Rey-Valette, H., & Rulleau, B. (2015). Perceptions on equity and responsibility in coastal zone policies. *Ecological Economics*, *119*, 284–291.

Cooper, J. A., & McKenna, J. (2008). Social justice in coastal erosion management: The temporal and spatial dimensions. *Geoforum*, *39*, 294–306.

Cooper, J. A. G., & Lemckert, C. (2012). Extreme sea level rise and adaptation option for coastal resort cities: A qualitative assessment from the gold coast Australia. *Ocean and coastal management*, *64*, 1–14.

Cooper, J. A. G., & Pile, J. (2014). The adaptation-resistance spectrum: A classification of contemporary adaptation approaches to climate related coastal change. *Ocean and Coastal Management*, *94*, 90–98.

Dutt, V., & Gonzales, C. (2012). Decisions from experience reduce misconceptions about climate change. *Journal of Environmental Psychology*, *32*, 19–29.

Duxbury, J., & Dickinson, S. (2007). Principles for sustainable governance of the coastal zone: In the context of coastal disasters. *Ecological Economics*, *63*, 319–330.

Dworkin, R. (1981). What is equality? Part 2: Equality of resources. *Philosophy and Public Affairs*, *10*, 283–345.

Field, C. B., Barros, V., Stocker, T. F., Qin, D., Dokken, D. J., Ebi, K. L., Mastrandrea, M. D., Mach, K. J., Plattner, G.-K., Allen, S. K., Tignor, M., & Midgley, P. M. (Eds.). (2012). *Managing the risks of extreme events and disasters to advance climate change adaptation*. (A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change). Cambridge: Cambridge University Press. Retrieved from http://ipcc-wg2.gov/SREX/images/uploads/SREX-All_FINAL.pdf.

Fleurbaey, M. (2008). *Fairness, responsibility, and welfare*. Oxford: Oxford University Press.

Forsé, M., & Parodi, M. (2006). Justice distributive. La hiérarchie des principes selon les Européens. *Revue de l'OFCE*, *98*, 213–244.

French, P. W. (2006). Managed realignment – The developing story of a comparatively new approach to soft engineering. *Estuarine Coastal and Shelf Sciences*, *67*, 409–423.

Gibbs, M. T., Thebaud, O., & Lorezn, D. (2013). A risk model to describe the behaviours of actors in the houses falling into the sea problem. *Ocean and Coastal Management*, *80*, 73–79.

Glenk, K., & Fisher, A. (2010). Insurance, prevention or just wait and see? Public preferences for water management strategies in the context of climate change. *Ecological Economics*, *69*, 2279–2291.

Gordon, J., Chapman, R., & Blamey, R. (2001). Assessing the options for the Canberra water supply: An application of choice modelling. In J. Bennett, R. Blamey (Eds.), *The choice modelling approach to environmental valuation* (pp. 73–92). Cheltenham: Edward Elgar.

Graham, S., Barnett, J., Fincher, R., Hurlimann, A., Mortreux, C., & Waters, E. (2013). The social values at risk from sea-level rise. *Environmental Impact Assessment Review*, *41*, 45–52.

Grasso, M. (2010). An ethical approach to climate adaptation finance. *Global Environmental Change*, *20*, 74–81.

Hanemann, M. (1984). Welfare evaluations in contingent valuation experiments with discrete responses. *American Journal of Agricultural Economics*, *66*, 332–341.

Hanley, N., & Barbier, E. B. (2009). *Pricing nature: Cost-benefit analysis and environmental policy*. Cheltenham: Edward Elgar.

Harsanyi, J. (1955). Cardinal welfare, individualistic ethics and interpersonal comparisons of utility. *Journal of Political Economy*, *63*, 309–321.

Hellequin, A.-P., Flanquart, H., Meur-Férec, C., & Rulleau, B. (2014). Perceptions du risque de submersion marine par la population du littoral languedocien: contribution à l'analyse de la vulnérabilité côtière. *Natures Sciences Sociétés*, *21*(4), 385–399.

Hole, A. R. (2007). A comparison of approaches to estimating confidence intervals for willingness to pay measures. *Health Economics*, *16*, 827–840.

Hoyos, D. (2010). The state of the art of environmental valuation with discrete choice experiments. *Ecological Economics*, *69*, 1595–1603.

Huber, J., & Zwerina, K. (1996). The importance of utility balance in efficient choice designs. *Journal of Marketing Research*, *33*, 307–317.

Hurlimann, A., Barnett, J., Fincher, R., Osbaldiston, N., Mortreux, C., & Graham, S. (2014). Urban planning and sustainable adaptation to sea-level rise. *Landscape and Urban Planning*, *126*, 84–93.

Johansson-Stenman, O., & Konow, J. (2010). Fair air: Distributive justice and environmental economics. *Environmental and Resource Economics*, *46*, 147–166.

Jones, N., & Clark, J. R. A. (2014). Social capital and the public acceptability of climate change adaptation policies: A case in Romney Marsh, UK. *Climatic Change*, *123*, 133–145.

Kelly, P. M., & Adger, W. N. (2000). Theory and practice in assessing vulnerability to climate change and facilitating adaptation. *Climatic Change*, *47*, 325–352.

King, D., Bird, D., Haynes, K., Boon, H., Cottrell, A., Millar, J., . . . Thomas, M. (2014). Voluntary relocation as an adaptation strategy to extreme weather events. *International Journal of Disaster Risk Reduction*, 8, 83–90.

Klinsky, S., & Dowlatabadi, H. (2009). Conceptualizations of justice in climate policy. *Climate policy*, 9, 88–108.

Klinsky, S., Downlatabadi, H., & McDaniels, T. (2012). Comparing public rationales for justice trade-offs in mitigation and adaptation climate policy dilemmas. *Global Environmental Change*, 22, 862–876.

Konow, J. (2001). Fair and square: The four sides of distributive justice. *Journal of Economic Behavior and Organizations*, 46, 137–164.

Koundouri, P., Kougea, E., Stithou, M., Ala-aho, P., Eskelinen, R., Karjalainen, T. P., . . . Rossi, P. M. (2012). The value of scientific information on climate change: A choice experiment on Rokua esker, Finland. *Journal of Environmental Economics and Policy*, 1, 85–102.

Lammel, A. (2013, December). *Perception du risque et représentation du changement climatique*. Paper presented at Journées Scientifiques 'La perception du changement climatique', Météo et Climat, Paris. Retrieved from http://meteoetclimat.fr/journees-scientifiques/

Lammel, A., Dugas, E., & Guillen Gutierrez, E. (2012). L'apport de la psychologie cognitive à l'étude de l'adaptation aux changements climatiques: la notion de vulnérabilité cognitive. *VertigO*, 12. doi:10.4000/vertigo.11915

Lancaster, K. (1966). A new approach to consumer theory. *Journal of Political Economy*, 74, 132–157.

Ledoux, L., Cornell, S., O'Riordan, t., Harvey, R., & Banyard, L. (2005). Towards sustainable flood and coastal management: Identifying drivers of, and obstacles to, managed realignment. *Land Use Policy*, 22, 129–144.

Louviere, J. (1988). *Analyzing individual decision making: Metric conjoint analysis*. Newbury Park: Sage Publications.

Luisetti, T., Turner, R. K., Bateman, I. J., Morse-Jones, S., Adams, C., & Fonseca, L. (2011). Coastal and marine ecosystem services valuation for policy and management: Managed realignment case studies in England. *Ocean and Coastal Management*, 54, 212–224.

Magnier, A. (2013). *Cartographie de l'aléa submersion marine dans le golfe du Lion. Etude de deux sites pilotes dans la dadre du projet SOLTER* (Unpublished master's thesis). University Paul Valéry, Montpelier.

MEDDE. (2012). *Stratégie nationale de gestion intégrée du trait de côte – Vers la relocalisation des activités et des biens*. Paris: Ministère de l'Écologie, du Développement Durable et de l'Énergie.

MIAL-LR. (2003). *Orientations stratégiques pour la gestion de l'érosion en Languedoc-Roussillon*. Montpellier: Mission Interministérielle d'Aménagement de la Région Languedoc-Roussillon.

Midgley, S., & McGlashan, D. J. (2004). Planning and management of a proposed managed realignment project: Bothkennar, Forth Estuary, Scotland. *Marine Policy*, 28, 429–435.

Miller, D. (2008). Global justice and climate change: How should responsibilities be distributed? The Tanner Lectures on Human Values, Beijing.

Milligan, J., O'Riordan, t., Nicholson, S. A., & Watkinson, A. R. (2009). Nature conservation for future sustainable shorelines: Lessons from seeking to involve the public. *Land Use Policy*, 26, 203–213.

Myatt, L. B., Scrimshaw, M. D., & Lester, J. N. (2003). Public perceptions and attitude towards a forthcoming managed realignment scheme: Freiston Shore, Lincolnshire, UK. *Ocean and Coastal Management*, 46, 565–582.

Nozick, R. (1974). *Anarchy, state and Utopia*. Oxford: Blackwell.

Paavola, J., & Adger, W. N. (2006). Fair adaptation to climate change. *Ecological Economics*, 56, 594–609.

Penning-Rowsell, E. C., de Vries, W. S., Parker, D. J., Zanuttigh, B., Simmonds, D., Trifonova, E., . . . Bouma, T. (2014). Innovation in coastal risk management: An exploratory analysis of risk governance issues at eight Theseus study sites. *Coastal Engineering*, 87, 210–217.

Pilkey, O. H. (1990). A time to look back at beach nourishment. *Journal of Coastal Research*, 6, iii–vii.

Platt, R. H., Salvesen, D., & Baldwin, G. H. (2002). Rebuilding the North Carolina coast after Hurricane Fran: Did public regulations matter? *Coastal Management, 30*, 249–269.

Rajmis, S., Barkmann, J., & Marggraf, R. (2009). User community preferences for climate change mitigation and adaptation measures around Hainich National Park, Germany. *Climate Research*, 40, 61–73.

Rawls, J. (1971). *A theory of justice*. Cambridge: Cambridge University Press.

Remoundou, K., Diaz-Simal, P., Koundouri, P., Rulleau, B. (2015). Valuing climate change mitigation: A choice experiment on a coastal and marine ecosystem. *Ecosystem Services*, *11*, 87–94.

Rey-Valette, H., Rulleau, B., Hellequin, A.-P., Meur-Ferec, C., Flanquart, H. (2015). Second-home owners and sea level rise: The case of the Languedoc-Roussillon region (France). *Journal of Policy Research in Tourism, Leisure and Events*, *7*, 32–47.

Rey-Valette, H., Rulleau, B., Meur-Ferec, C., Flanquart, H., Hellequin, A.-P., & Sourisseau, E. (2012). Les plages du littoral languedocien face au risque de submersion: Définir des politiques de gestion tenant compte de la perception des usagers. *Géographie, Economie, Société*, *14*, 379–391.

Riera, P., Peñuelas, J., Farreras, V., & Estiarte, M. (2007). Valuation of climate-change effects on Mediterranean shrublands. *Ecological Applications*, *17*, 91–100.

Roca, E., & Villares, M. (2012). Public perceptions of managed realignment strategies: The case study of the Ebro Delta in the Mediterranean basin. *Ocean and Coastal Management*, *60*, 38–47.

Roemer, J. (1993). A pragmatic theory of responsibility for the egalitarian planner. *Philosophy and Public Affairs*, *22*, 146–166.

Rulleau, B. (2008). *Services récréatifs en milieu naturel littoral et évaluation économique multi-attributs de la demande* (Unpublished doctoral thesis). University Montesquieu-Bordeaux IV, Bordeaux.

Rulleau, B., Flanquart, H., Hellequin, A. P., Meur-Ferec, C., & Rey-Valette, H. (2015). Perception des risques de submersion marine liés au changement climatique sur le littoral Héraultais: "On a eu la guerre, ils auront les inondations !". *VertigO*, Special Issue 21. doi:10.4000/vertigo.15811

Rulleau, B., & Rey-Valette, H. (2013). Evaluating the benefits of beach protection measures in the face of climate change: The case of Languedoc-Roussillon (France). *Journal of Environment Economics and Policy*, *2*, 133–147.

Shoyama, K., Managi, S., & Yamagata, Y. (2013). Public preferences for biodiversity conservation and climate-change mitigation: A choice experiment using ecosystem services indicators. *Land Use Policy*, *34*, 282–293.

Storbjork, S., & Hedren, J. (2011). Institutional capacity building for targeting sea-level rise in the climate adaptation of Swedish coastal zone management. Lesson from Coastby. *Ocean and Coastal Management*, *54*, 265–273.

Titus, J. G. (1998). Rising seas, Coastal erosion, and the takings clause: How to save wetlands and beaches without hurting property owners. *Maryland Law Review*, *57*, 1279–1391.

Turner, K. (2007). Limits to CBA in UK and European environmental policy: Retrospects and future prospects. *Environmental and Resource Economics*, *37*, 253–269.

Wise, R. M., Fazey, I., Stafford-Smith, M., Park, S. E., Eakin, H. C., Archer van Garderen, E. R. M., & Campbell, B. (2014). Reconceptualising adaptation to climate change as part of pathways of change and response. *Global Environmental Change*, *28*, 325–336.

Wouter Botzen, W. J., & Van Den Bergh, J. C. J. M. (2012). Monetary valuation of insurance against flood risk under climate change. *International Economic Review*, *53*, 1005–1026.

Wüstenhagen, R., Wolsink, M., & Bürer, M. J. (2007). Social acceptance of renewable energy innovation: An introduction to the concept. *Energy Policy*, *35*, 2683–2691.

Zander, K., Petheram, L., & Garnett, S. (2013). Stay or leave? Potential climate change adaptation strategies among Aboriginal people in coastal communities in Northern Australia. *Natural Hazards*, *67*, 591–609.

Zwerina, K., Huber, J., & Kuhfeld, W. F. (2004). *A general method for constructing efficient choice designs*. Marlow: SAS Institute Inc.