

Economics-led approach to residential relocation based on inhabitants' preferences – risk and amenity tradeoffs, and territorial reconfiguration in coastal zones

Context and key issues

Coastal areas are affected by a range of natural phenomena which, combined with global warming, can pose a real danger to local residents. Despite these risks, they continue to attract large numbers of new residents. France's *Observatoire du Littoral* refers to these locations as "both threatened and sought after". According to the French office for statistics, the size of seaside communities is likely to balloon over the next few decades, with a total population of 9 million people predicted by 2040. Coastal development, or "coastalisation" is one of the main causes of the vulnerability of coastal areas (DEBOUDT, 2013). Coastalisation serves to exacerbate failings in urban planning.

Faced with growing coastal risks of flooding and/or erosion, decision makers are now having to look at ways of managing residential development in areas at risk from rising sea levels. One potential solution is managed retreat, or the movement of people and property inland. From a bio-physical and ecological perspective, allowing some coastal zones to return to their natural state could potentially protect people and property while at the same time making inland areas more attractive (ABEL, *et al.*, 2011). However, initiatives such as managed retreat will inevitably inflame existing conflicts, notably issues relating to public and/or private ownership of coastal areas, as well as disputes about how much financial compensation is to be paid (RYAN, *et al.*, 2011). By planning relocations in advance, and staggering such action over time (NIVEN, BARDSLEY, 2013), it ought to be possible to find solutions which minimise disruption to the people involved, while at the same time reducing the cost borne by local authorities. Financial costs are also an issue for local authorities, who may find themselves restricted by the costs involved in carrying out building work and compensating residents for the loss of their property (ANDRÉ, *et al.*, 2015).

France's national coastline management strategy defines relocation of people and property as "a coastal management method whereby people and property are moved sufficiently far inland so as to protect them from the risk of rising sea levels in the short and/or long term" (MEDDE (MINISTÈRE DE L'ÉCOLOGIE DU DÉVELOPPEMENT DURABLE ET DE L'ÉNERGIE), 2012). However, actual cases where relocation has taken place are relatively few and far between, despite there being a body of research covering such possibilities (EID, 2010).

Research looking at risk analysis and perception has generally been a starting point when trying to anticipate the choices made by users and residents in vulnerable areas (i.e. either building new properties or adapting to nature as it takes its course. (REY-VALETTE, *et al.*, 2012) (HELLEQUIN, *et al.*, 2013). However, one issue remains largely ignored in the literature: how residents' preferences relating to relocation are linked with individual and/or collective risk awareness. Studying these could prove useful in modelling adaptation scenarios for specific zones.

While recent studies looking at the property market have focused specifically on variable such as quality of live and amenities as deciding factors in people's decision to move to a coastal area (DACHARY-BERNARD, *et al.*, 2011), the issue of residential relocation to escape from risk is intrinsically linked to residents' preferences in terms of amenities, particularly when the advantages of living in a particular area blind residents to the risks involved (MICHEL-GUILLOU, *et al.*, 2015). Any strategy aimed at planning changes in land use that are likely to affect the level of risk posed to people, property, or the natural environment needs to take into account the way residents perceive risk, so as to predict their likely behaviour. Both possible reactions to coastal risk (staying and adapting / relocating) involve costs for the residents involved. The way in which the make-up of a given zone would change should a real program of relocation be introduced is difficult to predict.

The topic of this thesis is **the study of residential preferences of inhabitants in vulnerable areas, in order to help coastal local authorities to develop effective climate change adaptation strategies.**

State of the art

Spatial and urban economics provides a useful analytical framework by which to study the choices people make to live in a certain area, mobility, and the effects of those choices on the spatial balance of a given area. The seminal model developed by (ALONSO, 1964) and (MUTH, 1969) assumes that the choice to live in a certain area will be governed by access to work, ease of access to local amenities, and the general urban backdrop. More recently, modelling of residential choices has expanded to include residents' preferences in terms of environmental amenities. Taking these into account has become necessary in order to explain new spatial configurations born out of peri-urbanisation (among other phenomena) (CAVAILHES, *et al.*, 2003).

Natural or recreational amenities tend to attract people to properties in a certain location (IRWIN, BOCKSTAEL, 2004), while the presence of disamenities is likely to have a negative effect on people's choice of residence. This could be, for example, exposure to pollution or a certain level of risk (TRAVERS, *et al.*, 2009). There are numerous factors which can explain why people change or wish to change their place of residence (DETANG-DESSENDRE, JAYET, 2000). It can be as a result of amenities present in a certain area following a change in personal preference (GRAVES, 1983), but may also be for reasons of climate (GROUT, *et al.*, 2016) or the cost of accommodation (PLANTINGA, *et al.*, 2013). When people start to move around, it can upset the spatial equilibrium in a given area, leading to territorial restructuring.

In contrast to theory, exposure to flood and other coastal risks would appear to have little or no influence on residential choices (BIN, *et al.*, 2008). Such choices seem to be made more on the basis of the availability of amenities. Clearly, relocation is incompatible with this. On this basis, we believe that it would be useful to integrate the priority given to perceived risk by residents into the concept of residential preference, as addressed in the urban economics literature. By doing so, it ought to be possible to better understand the spatial characteristics of residential land use (BRUECKNER, *et al.*, 1999) (BAUMONT, LE GALLO, 2000) in the case of relocation, as well as generating relevant urban planning and long-term land use strategies (KING, *et al.*, 2014).

The concept of "perceived" risk is based on the case of a lay person rather than an expert. This perception¹ is influenced by a number of factors, such as emotions generated by events (LOEWENSTEIN *et al.*, 2001) or familiarity with those events (WEINSTEIN *et al.*, 2000).

Putting this theory into practice will involve quantitative analysis of individuals' opinions of risk based on their characteristics. This type of psychometric paradigm (SLOVIC, 1987) is based on the supposition that most psychological, institutional, social and cultural factors affecting perception of risk can be quantified, and their relationships modelled (SLOVIC, 2000).

The key concept addressed in this thesis is the link between residents' perception of risk and their willingness to relocate. There will be three key tasks: (i) identifying the factors that structure perception of erosion risks by those living nearby, and the effects of that perception on their willingness to take part in protection initiatives, (ii) analysing residents' preferences in terms of relocation scenarios, making use of areas of concern relating to risk and protection, and (iii) studying the impact of a relocation strategy on possible forms of territorial restructuring based on residents' amenity preferences. This thesis will make use of the choice experiment method (BENNETT, BLAMEY,

¹ "Risk perception" refers to risk as it is assessed by lay people, measured using a psychometric paradigm (SLOVIC, 1987).

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2001) to identify residential preferences. Micro-simulations of possible territorial restructuring scenarios will also be carried out (WU, PLANTINGA, 2003) (FILATOVA, BIN, 2014).

Practical information

The project will take place at the Iristea research center in Cestas, near Bordeaux, France. It will be registered with the Economics department of Bordeaux University (École doctorale Entreprise, Économie, Société – ED42). The PhD student will be supervised by **Tina Rambonilaza**, Director of Research in Environmental Economics, and co-supervised by **Jeanne Dachary-Bernard** lead researcher in spatial economics.

Requirements for the post

Candidates should possess a French “Master 2” in Economics (or equivalent), with extensive experience in the use of quantitative analytical tools. Students applying for this post should also have a keen interest in environmental issues, an excellent command of scientific English, and be enthusiastic about field studies.

Contracts will run from November/December 2018. The successful candidate will be employed on a fixed three-year contract with a net monthly salary of approximately 1500 euros.

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