This is a postprint version of this paper.

[Jeffers, J.M., 2013]. The definitive, peer-reviewed and edited version of this article is published in *Environment and Planning A,* 45, 1436-1454, 2013. [doi:10.1068/a45386]

http://www.envplan.com/abstract.cgi?id=/a45386

Double Exposures and Decision-Making: Adaptation policy and planning in Ireland's coastal cities during a boom-bust cycle

Acknowledgements: This paper is part of a larger project completed for my doctoral dissertation at Rutgers, the State University of New Jersey. I would like to thank James. K. Mitchell, Robin Leichenko, Trevor Birkenholtz and John Sweeney for their comments on the dissertation, and Robin Leichenko, James K. Mitchell and three anonymous reviewers for comments on earlier drafts of this paper. I would also like to thank Mary Jeffers, Philomena Jeffers and Christy Jeffers for assistance with proofreading earlier drafts. Funding for this research was provided by a PERISHIP Fellowship and a Social Science Research Council, Dissertation Proposal Development Fellowship.

Double Exposures and Decision-Making: Adaptation policy and planning in Ireland's coastal cities during a boom-bust cycle

The importance of the interactions between global environmental and socio-economic changes in shaping vulnerability and exposure to hazards is now increasingly recognised. However relatively little attention has been focused on the ways in which these interactions help to shape planning and policy in response to both processes. This paper examines how the intersections between the twin crises of economic recession and climate change are influencing hazards mitigation policy and climate change adaptation planning in three of Ireland's coastal cities. The cities of Dublin, Cork and Galway are important case studies for this analysis due to the magnitude of socio-economic and environmental changes they have witnessed in recent years. The paper begins by using the double-exposure framework to analyse how the interactions between global environmental and socio-economic change have produced the contextual environment within which decision-making and policy formation take place. This is followed by the presentation and analysis of the results of semi-structured interviews with local decision-makers and stakeholders. These illustrate that the interactions between environmental change and economic crisis have created the material and ideological conditions in which a neoliberal growth centred discourse of economic development dominates all areas of decision-making and policy. This has important implications for environmental policy and planning in cities, promoting a vision of a modern competitive city in which technological solutions are the preferred means of addressing flood risks. These decisions in turn reshape the exposures and vulnerabilities of local communities.

Keywords: adaptation, vulnerability, hazards, floods, climate change, double-exposure, economic crisis, financial crisis, globalisation, neoliberalism, Celtic Tiger, Ireland.

Introduction

In the eyes of many observers we live in a time of unusual crisis as the impacts of economic recessions continue to be felt around the world. At the same time global environmental change has been framed as an unprecedented challenge that we must take immediate steps to address. While researchers have increasingly recognised how the interactions between socio-economic and environmental change shape patterns of exposure and vulnerability to a variety

of shocks and stressors (Leichenko et al, 2010; Leichenko and O'Brien, 2008; O'Brien et al, 2004*;* Silva et al, 2010) scant attention has been focused on the ways in which these interactions shape decision-making, policy and planning in response to both processes.

The exposure of cities to hazards and the vulnerabilities of their populations to disaster has been the subject of a growing body of literature focused on both developing and developed world contexts (Chatterjee, 2010; Mitchell, 1999; Pelling and Wisner, 2009). Urban adaptation to climate change has also been an important research focus (Carter, 2011; Fünfgeld, 2010; Hanson et al, 2011; Leichenko, 2011; Rosenzweig et al, 2011). Other researchers have examined the factors that influence and shape the vulnerability and resilience of individuals, households and communities to environmental hazards in both urban and rural contexts (Adger, 2000; Cutter and Finch, 2008; Eakin et al, 2010; Kleinosky et al, 2006; Wolf et al, 2010). A largely separate body of literature has focused on globalisation and its consequences (Brenner et al, 2010; England and Ward, 2007; Harvey, 2005; Held et al, 1999; Stiglitz 2002) while the factors that influence the impacts of globalisation at national, regional and local scales, and the uneven nature of its outcomes have also been highlighted (Held and Kay, 2007; Leichenko and Silva, 2004; Silva, 2007). Most recently attention has also focused on the causes and consequences of the current global economic and financial crisis (Harvey, 2010; Wojick, 2011).

The double exposure framework (Leichenko and O'Brien, 2008) has enabled some integration of these often disparate literatures and illustrates how the interactions between global environmental change and globalisation produce winners and losers, benefiting some while enhancing the vulnerabilities of others. However studies of double exposure have focused almost exclusively on the outcomes of both processes, giving relatively little consideration to decision-making responses to those outcomes and the ways in which those decisions influence

who becomes a winner or loser. This paper focuses on the complex and often bidirectional relationships between the outcomes of double exposure and decision-making responses to them. It goes beyond examining how double exposures produce winners and losers to demonstrate how discourses and framings of economic development and environmental change influence the ways in which local actors respond to the shocks and stressors produced by both processes. Their responses have profound implications for the vulnerabilities and exposures of local populations while they also help to reproduce the discourses and framings of change within which they occur (See Fig. 1).

Contemporary hazards mitigation policy and climate change adaptation planning in the cities of Dublin, Cork and Galway are examined in the context of the dramatic socio-economic shifts experienced by Irish society within the past two decades. The current economic and financial crisis has been acutely felt in Europe and the magnitude of the socio-economic transformations witnessed in Ireland make it an important case for analysis. At the same time climate change adaptation and hazards mitigation remain understudied in Ireland. The results presented in this paper suggest that a 'growth mentality' that became embedded in public policy during years of economic success, combined with the current economic crisis have created the material and ideological conditions in which a particular economic discourse dominates all areas of decision-making. While an economic perspective has always been influential in environmental decision-making and policy, in the contemporary crisis it has become a hegemonic narrative that stakeholders are unwilling or unable to escape. Empirical data illustrates that local decision-makers envision their city primarily as an economic entity that is situated in a global competition for capital. This vision has profound implications for disaster risk reduction and climate change adaptation as it leads to an emphasis on some policies (technological fixes) and excludes others (those that emphasise socio-economic drivers of vulnerability). This narrative also shapes the decision-making process, emphasising

a cost-benefit model that may direct resources away from vulnerable communities. More effective climate adaptation planning may require a reimagining of the city in ways that recognise the complex linkages between economic and environmental challenges, and that promote resilience to a variety of shocks and stressors (Pelling, 2010). In order to more fully understand local vulnerabilities to global changes, studies of double exposure must consider not only the outcomes of both processes and their interactions but also evaluate how a range of actors respond to those outcomes to further transform exposure and vulnerability.

The research on which this paper is based was part of a larger study of urban vulnerability and adaptation in Ireland that examined how available scientific knowledge is used by local decision-makers, how hazards are framed and conceptualised by those decision-makers, and whether current institutional structures and policies are sufficient to meet the challenges of adaptation to future climatic change. Thirty-five semi-structured interviews with executive officials in local government (planners and engineers), elected decision-makers (city councillors) and other stakeholders (representatives of local business organisations, environmental groups and residents) were completed in Dublin, Cork and Galway during July and August 2009. The executive officials were chosen based on their senior positions in the administration of local government and their responsibilities for areas such as planning, economic development, infrastructure and the environment while city councillors were sampled to provide a range of perspectives from across the political spectrum as well as a mix of newly elected and more experienced representatives. The inclusion of stakeholders from local business organisations, environmental NGOs and local residents associations aimed to provide perspectives from outside the administration of local government. Interviews were transcribed and coded using the NVivo qualitative software analysis package. This data was supplemented with an analysis of the records of over three hundred and fifty City Council meetings across the three cities. These provided a record of at least four years of decision-

making in each city covering the period January 2006 to January 2010 for all three cities but stretching back to January 2005 for Galway and January 2001 for Cork. While the minutes provide a limited summary of the meetings they nevertheless indicate the types of policies formulated and illuminate some of the motivations behind particular decisions.

Double Exposures in Ireland

The double exposure framework (Leichenko and O'Brien, 2008; O'Brien and Leichenko, 2000) provides a means of examining the ways in which global change processes interact across space and time (Leichenko et al, 2010). The framework focuses on three closely related and often interlinked pathways through which double exposures can produce winners or losers in a particular place or population. Outcome double exposure focuses on the direct results of exposure to processes of global change and their interactions (Leichenko et al, 2010). Context double exposure describes how the processes of global environmental and socio-economic change can individually or collectively act to modify the contextual environment of a particular place, while feedback double exposure highlights the ways in which outcomes and actions taken in response to them can further reinforce the drivers of change or create further changes in the contextual environment (Leichenko et al, 2010). Figure 1 provides a simple illustration of the key components of the double exposure framework, modified to emphasise the relationships between outcomes of double exposure, decision-making responses and discourses of change.

Fig 1. To go here: The Double Exposure Framework (adapted from Leichenko et al, 2010)

In this portion of the paper the double exposure framework is applied to the cities of Dublin, Cork and Galway. This illustrates how the processes of climate change and socio-economic change and the interactions between them have created negative outcomes for the populations of each city, have transformed the biophysical, socio-economic and institutional contexts within which decision-making takes place, and created feedbacks which enhance the drivers

of change and continue to reshape the contextual environment. This discussion provides the context for the remainder of the paper which presents and analyses empirical research on decision-making responses to the outcomes of double exposure. This analysis also illustrates how these responses are shaped by (but also help to reproduce) particular discourses and framings of change. The importance of discourses in shaping how processes of global change are understood and responded to has been highlighted by Leichenko and O'Brien (2008) while other geographers have employed discursive approaches in a variety of contexts (Adger et al, 2001; Gabriel, 2011; Peet and Watts, 1996).

The biophysical context

The biophysical context for exposure to hazards in the cities of Dublin, Cork and Galway is a product of the climate, topography and hydrology of each city. Dublin is situated on a low lying coastal plain at the confluence of several rivers. Each of these rivers has been the subject of human modification ranging from the straightening of channels to the construction of dams. While the hydroelectric dams on the Liffey have successfully regulated peak flows to prevent major flooding (Fitzpatrick and Bree, 2001), the flooding of Cork in November 2009 suggests that the presence of dams does not guarantee that flood waters can or will be managed successfully (Jeffers, 2011). The large number of 'underground' rivers in Dublin has also become an increasing source of concern in recent years with flooding emerging from rivers that had historically been culverted. As floods experienced in 2002 illustrate, Dublin also faces significant exposure to coastal floods. Cork's city centre is located on an island between two channels of the River Lee. These are the visible remains of an extensive system of channels that have been filled in or culverted over as the city developed (Hickey, 2005). Much of the city centre island lies at elevations of less than five metres and is exposed to both river and coastal floods (Tyrrell and Hickey, 1991). In addition to filling in and culverting of river channels in the city centre, much of what is now the city's South Docklands, an area primed for extensive redevelopment, was reclaimed from the estuary of the River Lee

(Coughlan, 2009). Galway is built on the banks of the Corrib, a short river which runs from Lough Corrib, just a few kilometres north of the city to Galway Bay. The city has not experienced significant river flooding in its recent history but concerns over the potential for river flooding have led to difficulties for some businesses in obtaining insurance. The city is exposed to coastal flooding due to its low elevation and its location on Ireland's west coast which experiences frequent Atlantic storms.

Climate change is likely to influence the exposure of each of these cities to flooding. Projections for Ireland's future climate include increased sea levels, modified patterns of storms and changes in rainfall and stream-flow patterns (Charlton et al, 2006; Lozano et al, 2004; McGrath et al, 2005; McGrath and Lynch, 2008; Semmler et al, 2007; Steele-Dunne et al, 2008). Sea level rise is predicted along most of the coastline with projected sea level rises of almost half a metre on the east coast within the next century (Olbert, et al, 2012). The event frequency for storm surges typically associated with coastal flooding in Ireland (50 – 100 cm) is also expected to increase by up to 30% in some locations by the period 2031 – 2060 (Wang et al, 2008).

Hazard events experienced across Ireland in recent years have illustrated the extent to which environmental hazards and climate change are creating pressing decision-making and policy challenges. Extensive coastal flooding in February 2002 was most severe in Dublin where hundreds of homes and businesses were flooded. Flooding from the River Tolka also impacted parts of Dublin in November of the same year. Severe river floods struck many parts of Ireland including Cork City in November 2009 damaging homes, businesses and critical infrastructure. Flash floods caused by extreme rainfall have occurred in Dublin in 2004, 2008 and 2009, Cork in 2002 and Galway in 2003 and 2008. Most recently severe floods resulting from heavy rainfall again struck Dublin and other eastern parts of Ireland in October 2011

leading to several fatalities, while flash floods in Cork and other parts of the country caused widespread property damage in June 2012.

Fluctuating socio-economic conditions

The last two decades have been a time of dramatic economic and social transformations in Ireland. While a full discussion of the causes and consequences of these events is beyond the scope of this paper, a brief account is necessary to contextualise the discussion that follows and to consider the extent to which the transformations that have occurred can be attributed to globalisation and neoliberalisation.

For much of time since the acquisition of independence in the early 1920s the prospects for economic growth in the Irish state had been poor. Despite modest development in the late 1960s and the early 1970s, by the late 1980s the economy was stagnant (O'Hearn, 2001) and unemployment peaked at over 17% in 1985 (Kirby, 2010). However in the early 1990s the Irish economy began a period of unprecedented economic growth that became known as the Celtic Tiger. GDP grew at rates in excess of 7% per annum between 1993 and 2000 while unemployment fell to 3.8% by 2001 (Kirby, 2010). From 1993 to 2002 foreign direct investment fuelled export led growth while a second stage of growth from 2002 to 2008 was based on financial services and a construction boom (Allen, 2009; Kitchin et al, 2012). While growth slowed somewhat after 2000, GDP remained high reaching 6% in 2007 (Kirby, 2010). However the construction boom had now become a property bubble and when this burst it combined with the impacts of the global financial crisis to reduce GPD to -3% in 2008 (Kirby, 2010). Unemployment grew to over 14% by 2011 (Central Statistics Office, 2012). The collapse of the property bubble revealed the extent to which Irish banks were over exposed to toxic property loans (Kitchin et al, 2012). The State borrowed heavily to fund a bank bailout and public expenditure, ultimately leading to an €85 billion IMF-EU bailout of Ireland in November 2010.

The drivers of Ireland's economic success and the causes of its collapse have been the subject of extensive commentary (see: Kirby, 2002; 2010). Among proponents of neoclassical economics Ireland had been cited as an example of the profits to be made by embracing globalisation and neoliberalisation (see: Powell, 2008). The Irish model based on deregulation, free-market principles and the aggressive pursuit of foreign direct investment (FDI) was celebrated as an example for others to follow (Kitchin et al, 2012). The Industrial Development Authority (IDA), the state agency charged with responsibility for attracting FDI became so successful that it began offering consultancy services to similar agencies in other countries (Phelps, et al 2007). The combination of the IDA's success and several other factors including low corporate tax rates and infrastructure development funded through EU structural funds helped to create the conditions for extraordinary economic growth (Kirby, 2010). However this left the economy vulnerable when restructuring led to job losses (Collins and Grimes 2011).

While Ireland was frequently cited as an example of successful adaptation to globalisation, doubts about the true extent of Ireland's global integration and the sustainability of its economic model began to emerge (see: Kirby 2002). While the attraction of FDI was essential in delivering growth, it was heavily dependent on a relatively small number of US multinationals, leaving Ireland particularly vulnerable to any change in the fortunes of the US economy (Kirby, 2002; 2010; O'Hearn, 2003). Throughout the years of successful FDI supported growth little was done to prepare for the inevitable decline once investment moved elsewhere. If fuelled solely by FDI it is likely that Ireland's economic growth would have declined significantly from 2002. However this was prevented by the construction boom which was itself a product of lax regulation in the banking sector and a planning system that was compromised by corruption (Kitchin et al, 2012). A strong case can be made that

Ireland's recent economic fortunes are a product of the Irish state's move towards neoliberalism which operated at two scales: "the international level whereby the state attempted to create a vibrant and open economy that would attract FDI due to the ease of conducting business and generating profit, and the national/local level whereby the state pandered to their political allies by cultivating the conditions for a property boom" (Kitchin et al, 2012, in press).

The boom-bust cycle of the last two decades has had important implications for the exposure and vulnerability of local populations. During the boom large scale emigration was suddenly replaced with immigration and Ireland's largely homogenous population was transformed into a more ethnically and culturally diverse blend. The collapse has reversed these trends bringing a return to emigration. Evidence from the 2002 coastal floods in Dublin suggest that elderly and retired residents may have been among the most vulnerable to floods, but also that they were able to rely on some support networks among their local communities. However these supports may be diminishing over time, a trend that has been observed in other countries, as younger families increasingly live at significant distance from elderly relatives (Leichenko and O'Brien, 2008). The growth of suburban development and large commuter belts during the boom, and current youth emigration may exacerbate these trends in Irish cities. It is also unclear how effectively immigrant communities have integrated into Irish society and the implications this may have on their vulnerabilities.

While economic growth may have decreased vulnerability for some, increased wealth may actually have enhanced the potential for economic losses for others. In Dublin in particular, some of the most expensive property in the city is located along the coastline of the city's south side, an area increasingly exposed to coastal flooding. The new affluence may also have increased polarisation between rich and poor in Ireland (Keohane and Kuhling, 2004). By

some measures poverty increased significantly during the boom while income inequality also increased (Kirby, 2002; 2010; Nolan and Smeeding, 2004). While the relationship between vulnerability and poverty is often complex (Pelling, 2003), these factors are likely to have increased the vulnerability to environmental and economic shocks by limiting the ability of individuals and families living in poverty to respond to them. The lack of regulation during the construction boom allowed property prices to escalate to such an extent that following its collapse many home owners are now repaying mortgages that are significantly higher than the current value of their homes. The challenges of unemployment, reduced incomes and increased taxation have left many unable to meet mortgage repayments with over 10% of mortgages now over 90 days in arrears (Central Bank of Ireland, 2012). These challenges may also make it difficult for some homeowners to afford insurance. At the same time increasing premiums or declined coverage has become an issue in areas perceived to be at risk of flooding.

Some development practices have also created feedbacks that enhance exposure to environmental hazards. Several Irish cities have pursued urban redevelopment policies in their docklands, similar to those implemented in numerous other coastal cities. While these redevelopment strategies have often been controversial due to their reproduction of urban space (O'Callaghan, 2007), their impacts on urban politics and governance (Bartley and Treadwell Shine, 2003; Oakley, 2007; Swyngedouw et al, 2002) and their impacts on local communities and cultures (Wonneberger, 2008), their implications for exposure to hazards has rarely been considered. In Dublin substantial redevelopment of the docklands has already taken place while plans have been made for similar redevelopments in Cork and Galway. These waterfront developments frequently involve large financial investments, land use changes and population growth in low elevation districts in close proximity to the coast. For example, as Dublin's Docklands were redeveloped its population increased by 26.8% (Dublin

Docklands Development Authority, 2008). While the plans for the redevelopment of Cork's Dockland's include flood mitigation measures such as raised ground floors (Coughlan, 2009), the financial investment involved seems likely to fuel demands for more expensive engineering defences. It seems almost inevitable that the costs of such measures will fall on the state and it is difficult to foresee how such projects will be funded without cuts in other areas of spending. Poor planning regulation during the boom also enhanced river and pluvial flooding through increased urban and suburban development, including development on floodplains. While stricter planning regulations are now in place, the construction that has already taken place has increased runoff while simultaneously placing more property and people in flood prone locations.

Changing institutional contexts

Significant changes in governance have also occurred in Ireland since the late 1980s. Mirroring the move from government arrangements to governance practices witnessed elsewhere, social partnership agreements between the national government, trade unions and other stakeholders have become an increasingly important aspect of national economic and social policy, while a results-oriented institutional restructuring has created numerous single purpose or single remit agencies known as QUANGOS[1] (Larragy and Bartley, 2007). As the regulatory and decision-making functions of the government have been outsourced to these bodies (Clancy and Murphy, 2006, Hughes et al, 2007), establishing responsibility for a particular issue can become difficult, particularly in the context of managing environmental hazards (Jeffers, 2011). The ongoing expansion and integration of the EU has also been influential, particularly as the Union has acquired increased competences. The enactment of the EU *Floods Directive* is reshaping flood risk management policies at local and national levels in Ireland although it remains to be seen how effective an instrument designed in the

[1] Quasi-autonomous non-government organisations.

context of widespread transnational floods in continental river basins will be when applied in different geographical and institutional contexts (Jeffers, 2011).

While it has not been as overtly ideologically driven or as characterised by the destruction of pre-existing institutional structures as in other contexts, Ireland's embrace of neoliberalism has nonetheless reshaped national and local government (Kitchin et al, 2012). A range of services have been privatised (Barrett, 2004; Kitchin et al, 2012). Public private partnerships have become a key component of infrastructure development including in the dockland's redevelopment projects (Bartley, 2007; O'Callaghan, 2007). The planning system has become characterised by an entrepreneurial approach to urban development, often manifested in the creation of single purpose renewal agencies that marginalised the planning functions of local government (Bartley 2007; McGuirk and MacLaran, 2001). New Public Management approaches that emphasise competitive practices, efficiency and reducing costs have reshaped local and national government (Bartley, 2007). A business model now permeates local government with city councils viewed as businesses providing services to customers rather than as governments serving citizens, a vision articulated in the corporate plans now required of all local authorities. While the impacts of these transformations are difficult to quantify, similar changes in city government have been implicated in a number of urban disasters including the Paris heat wave of 2003, the Chicago heat wave of 1995 and Hurricane Katrina in 2005 (Klinenberg, 2002; Leichenko and O'Brien, 2008). A business model where services are received only when asked for limits the ability of local government to respond effectively to disasters as those most in need are unlikely to seek these services (Klinenberg, 2002).

It is also worth noting that in comparison to other countries local government in Ireland is relatively weak. Irish local authorities have responsibility for significantly fewer policy areas than their counterparts in other European countries (Tierney, 2003) and since the abolition of

domestic rates in 1978 Irish local authorities have had a limited ability to raise funds locally. Almost 50% of their funding comes directly from central government with the remainder split between commercial rates[2] and other sources such as service charges (Dollard, 2003). This leaves local government particularly dependent on local businesses as commercial rates are the chief source of locally generated revenue.

Decision-Making Priorities

The above biophysical, socioeconomic and institutional contexts illustrate how environmental and economic change shape patterns of exposure, vulnerability and resilience in Ireland's cities. This provides the backdrop for contemporary decision-making and the remainder of this paper is devoted to the presentation and analysis of empirical research on that issue. For most interviewees the current economic recession was their biggest concern. This view was particularly strong among elected decision-makers, with several describing their experiences of hearing the views of their constituents during their campaign for the local government elections that had occurred just weeks before the interviews (see Table 1). One Cork City Councillor commented

> "The older people are worried about the younger generation and jobs. You meet the parents who are worried about their children. The parents are out looking for opportunities for their children for the future. That's probably not new but jobs, jobs, jobs is the major thing now".

Unsurprisingly, similar views were evident among executive officials and businesses representatives (See Tables 2 and 3). "Everybody is making the economy a priority. It is all about job creation, it is all about where your next phase of economic development is coming from" commented a planner in Dublin.

[2] Property based taxes levied on commercial and industrial properties.

Views on climate change varied from those who saw it as one important issue among many to those who did not view it as a pressing issue. For business representatives climate change was not a priority. One business representative in Cork suggested that if a list of challenges facing business interests in the city were compiled, climate change would currently be found at the bottom of the list. Similarly a business representative in Galway commented that the "biggest issue is economic down turn by a long shot, things are immediate, people are losing their jobs because businesses are not selling as much as they have". Respondents frequently described the economic crisis as an event that is experienced every day through reduced income levels or unemployment. This was contrasted with climate change and environmental hazards which were seen as distant and less relevant to everyday life, despite their visible manifestations in the form of flooding.

Among executive officials, climate change and hazards were viewed as important but economic recovery was considered to be a more pertinent concern. Unlike many of the elected representatives these officials generally viewed the two issues as interlinked suggesting that responding appropriately to climate impacts was an important element in ensuring economic recovery. They viewed their cities as being in direct competition with others to attract financial investment and interruptions to the life of the city such as those caused by floods were seen as likely to have a negative impact on efforts to attract such investment. A planner in Dublin suggested that infrastructural solutions to flooding were required to ensure that the city remained economically competitive

> "one of the key things in terms of our global competitiveness and economy is the type of city that you have. You have to have good infrastructure whether it is drainage, water, or transport. If you have a risk of flooding or if you don't have access to a port or proper infrastructure as a result of flooding, then you are not at the races".

An engineer in Dublin made similar comments

"if you allow things to drag on in your capital city it gives an indication to foreign investment that you don't care and you don't know what is going on and you are not being proactive in managing the situation."

Some interviewees pointed to direct links between the impacts of hazards on businesses and the decision-making of local government. One Galway City Councillor emphasised how much of the funding for local government is derived from commercial rates paid by businesses. He suggested that businesses that experienced flood losses would experience difficulties in paying, commenting

"a lot of these businesses here are rate payers and that is what finances the operation of the city and I know that at certain times of the year when this area outside is flooded it has an impact on the rate payers. They are slow to pay, and they have difficulties with the council".

Some distinctions can be drawn between the responses given by elected politicians and those of executive officials. In general, elected decision-makers focused more on the current economic crisis, illustrating a shorter term focus. They prioritised a quick recovery from the current crisis. Climate change and environmental hazards were labelled as a luxury issue, something that could be addressed in better times. As one City Councillor in Galway commented

"That [climate change] is the future, or people see it as the future. Even though we are in the middle of it at the moment people are trying to get there houses in order, people are interested about getting their jobs, about survival today".

Another observed

"Three or four years ago environmental issues were more important as we had the green wave here in this country where it was nice to talk about climate change whereas now

because of the economic downtown the focus has changed to just putting the bread and butter on the table".

While the economic crash trumps climate change as a decision-making priority for elected politicians, for executive officials it appears to reinforce the significance of the linkages between economic and environmental issues. Executive officials saw the elimination of flooding as an essential aspect of their efforts to develop their cities. This suggests that all decision-makers are operating within a discourse that places economic development at the core of their policy priorities but for elected representatives this is more of a short term response to the current crisis while for executive officials it is part of a longer term strategy.

While this emphasis on economic development is undoubtedly a function of having to prioritise some issues over others it also indicates the dominance of a narrative of economic development that shapes all areas of policy and decision-making. Interview responses indicate not just the understandable desire to promote job creation during a time of economic difficulty but rather the promotion of a particular vision of economic development, one that is founded on the pursuit of continuous growth fuelled by external investment. Within this vision, cities are viewed first and foremost as economic entities situated within a competitive battle to attract geographically mobile capital (Harvey, 2005; Phelps et al, 2007). This vision of economic development was shared by executive officials, business interests and the majority of elected representatives with only a small number of councillors from the political left and representatives of environmental NGOs articulating an alternative vision for a more environmentally and socially sustainable model of development (See Table 3).

This dominant reading of development was visible not only in the ways in which interviewees viewed climate change and hazards but also in the ways in which they described their city, Ireland as a whole and their role as local decision-makers. A number of interviewees made

this perspective quite explicit by describing their city or the country as a whole in primarily economic terms. For one planner in Dublin, the future needs of the city and the country had to be viewed through this lens. Emphasising that the national government must make Dublin City its priority, he commented

> "If we can't sustain growth in what the OECD and the National Competitive Council have agreed is the only place where you are going to have this global city, the growth of Dublin as a global city, whether it is in relation to climate change, or whether it is in relation to drainage or water they have to be dealt with".

The importance of Ireland being an island was something that was also frequently alluded to by officials, elected decision-makers and businesses representatives. For some this was undoubtedly a negative, seeing Ireland as isolated and potentially exposed to more severe challenges than other places. For others the experience of living and doing business on an island was a positive, allowing Irish people to bring their pre-existing experience to the new challenges presented by climatic change. Identifying the potential for both positive and negative outcomes, a business representative in Cork observed

> "we are an island economy as well, so maybe we're more prepared to deal with the environment that's around us. The other end of that then of course is that because we are an island economy if you are dealing with areas like sea level rises we have an awful lot more of our country which potentially is impacted by it".

Table 1. A selection of elected representatives' views on the importance of the current economic crisis and climate change.

I think the economic situation is the big one at the moment and after that reliable health facilities and then social housing. I genuinely don't get a sense that people are talking about climate change or the effects of climate change but we do get reports from the City Council. They are aware of it, they have certain things in place around it. Even like the height of the quay walls here for example. No money has gone into the protection of quay walls. So the priority that's given to the protection of the city is low. (City Councillor – Cork)

Unfortunately it [climate change] is not top of the list whereas a number of years ago it would have been higher up. People are concerned, in Galway here obviously the economy is a big thing. Galway is regarded as a tourist city, numbers are down , the big focus is that we are in a difficult recession at the moment, but we will come out of it no doubt, and at that stage you will see that climate change will emerge again as a high priority but at the moment people are concerned about living expenses, will they have their jobs, can they pay their mortgages. (City Councillor – Galway)

I would probably rank it [climate change] second. The first major issue for the city is to generate the economy again in this city, but I think the two of them are interlinked. (City Councillor – Dublin)

Well in my own personal estimation obviously the change in fortunes of the economy, employment and the maintenance of employment are the two highest levels of priority that I think should be afforded at this present time, that is not in any way saying that this whole issue [climate change] is not as important. They are all very important but in the short term I would feel that the whole issue about employment retention and employment generating potential are the two key issue. (City Councillor – Dublin)

Table 2. A selection of executive official's views on the importance of the current economic crisis and climate change.

Obviously we are in a recession at the moment but in terms of planning we take a longer term view. We don't just look at the recession we're in now. We have to position the city for the upturn whenever it comes. It has to be an attractive place for investment and job creation. (Engineer – Cork)

Everybody is making the economy a priority. It is all about job creation. It is all about where your next phase of economic development is coming from. Bearing that in mind one of the key things in terms of our global competitiveness and economy is the type of city that you have. You have to have good infrastructure whether it is drainage, water, or transport. If you have a risk of flooding, if you don't have access to a port or proper infrastructure as a result of flooding, then you are not at the races. (Planner – Dublin)

The issues that we are facing as a community would be first of all economic, the issues of job creation, the economy sits up at the very top. I would put the second at managing our energy infrastructure in terms of our vulnerability and exposure the lack of head room that we have and our vulnerability because we haven't invested significantly in renewable energy. I think energy would come second and it would put the climate change impacts as third because they are changing the way we view our city and they are changing the way we are going to have to adapt our city, as we speak now it is raining outside there it is the middle of the summer that is not what people expect.(Engineer – Dublin)

We have a few major industries medical, technology and research that are major employers and it is just to retain those and maintain the competitiveness of the city. We are designated as a gateway under the spatial strategy so we would expect that investment would be targeted here to maintain the critical mass. (City Council Official – Galway)

For a city to survive you need water, you need people and you need commerce, and climate change is right there with that, because in order for people to live here it has to be attractive to them. The economics of it is one of the things that will help people to stay but also the capability to travel any place you want now around the world and live there, and if we want people to live in Dublin we have to have an attractive environment and that means your public spaces and what you do with your own time and just the quality of life issues. Climate change is a major part of that. (Engineer – Dublin)

Table 3. A selection of other interviewee's views on the importance of the current economic crisis and climate change.

If you were to put the general business environment, access to finance, generating new business, and a whole range of others and include climate change on that I've no doubt that climate change would be at the bottom of that list. (Business Representative – Cork)

More and more people are very worried. Lots of people have lost their jobs so the reality is where are you going to get the next few Euro to survive, and the next bill coming through the door, climate change doesn't enter into it. (Business Representative – Galway)

You can't separate them, and I don't think you should separate them [economic and environmental change]. I think you have to weave them in. Just because we have gone through a Celtic Tiger and we have had so much money generated in terms of jobs, and there has been lots of jobs there, if we had done things slightly differently there could still be jobs, but we might have ended up with a better environment and a better transport system. (NGO Representative – Galway)

We're in the process of developing a new development plan for Dublin which will be published next year, or towards the end of this year for consultation. It's essential that, that has some aspect of sustainability within it. Obviously we're pushing for the strongest measures. It was traditionally seen that this was economic development. The Special Policy Committee that looks at planning as a city is also called the Economic Development Committee. I would see that as being the wrong focus. Yes economic development is important but the point surely is sustainable development. Without that essence of sustainability within the development plan ultimately you end up where are we at the minute, sixteen thousand unsold apartments in Dublin as a consequence of the planning decisions that were taken. Things ran wild and we're now bearing the economic consequences of that. (NGO Representative – Dublin)

Environmental Hazards in the Competitive City

The results presented above offer important insights for geographies of double exposure as they emphasise the key role that the bidirectional relationships between outcomes of double exposure and decision-making responses to them play in shaping vulnerability and resilience, while providing further insights into the ways in which environmental change, globalisation, and neoliberalism are experienced in diverse ways in local places. This data also indicates that rather than prompting alternative strategies, the negative outcomes experienced during economic or environmental shocks often reinforce pre-existing policies due to the influence of the discourses within which decision-making and policy operate. These discourses shape both the processes and the outcomes of decision-making. As the earlier discussion of socio-economic and institutional contexts demonstrates, Ireland's economic model was one that could function only in a state of continuous growth. "This need for perpetual growth was

ingrained both structurally in the state's taxation system, and discursively in the Celtic Tiger myth itself" (Kitchin et al, 2012, in press). The structural and discursive aspects of this perpetual need for growth have both influenced responses to double exposure as they shape the decision-making process and the decisions that it produces.

The structural aspects were present in the financing of local and national government. At the national level the taxation system had become heavily dependent on the construction industry through stamp duty, capital gains tax and VAT while at the local level development levies became a lucrative but unsustainable source of local revenue (Kitchin et al, 2012). As mentioned in the earlier contextual discussion and in the empirical data presented above, local authorities were also heavily dependent on commercial rates as the only other major generator of local revenue, a factor which encouraged local decision-makers to see the interests of local businesses as aligned with their own and those of the city as a whole. This resulted in the interests of local businesses playing a major role in the types of strategies employed to address environmental hazards.

The extent to which the need for growth had become ingrained discursively is indicated throughout the interview data presented above. This growth narrative has resulted in the promotion of a vision of the competitive modern city which must stand out from others in order to attract the capital necessary to sustain ongoing economic growth. This vision has become entrenched to such an extent that it has become the only model to which most local decision-makers subscribe. As Kitchin et al (2012) note, neoliberalism in Ireland acquired a 'commonsense' status. Respondents saw themselves not as promoting a particular ideologically driven vision for their cities, but as advancing the only vision there could be. These findings support the conclusions that neoliberalism is not always characterised by the destruction of pre-existing structures and the retreat of the state but in different contexts can

find a more welcoming environment (Kitchin et al, 2012). The competitive city sits within what Kirby (2002; 2010) describes as the competition state, where rather than retreating the face of neoliberalism, the state has been reformed to play a central role in creating conditions conducive to inward investment.

The vision of the competitive city places a strong emphasis on the ways in which the city is perceived by potential external investors. This reinforces particular policies as floods are seen as damaging to the image of the city and its ability to compete for capital. Therefore strategies that control or eliminate the physical drives of hazard are preferred over those that might reduce the vulnerability of the population and enhance resilience. The flooding event itself becomes viewed as the problem to be dealt with rather than the losses which it might cause. The promotion of large scale engineering solutions as the optimal solution to flood hazards is of course not new in Ireland or in most other contexts. What is new in this context is the justifications that serve as the driving force behind this approach. Flooding must now be prevented not just because of the problems that it causes directly (although these are viewed as important) but because of the ways in which flooding could be perceived by outside observers. Failure to control the natural environment through the elimination of floods would be a sign that the city is not sufficiently modern and therefore not a desirable location in which to invest. This finding raises important questions for research on climate change adaptation as it demonstrates the extent to which factors that have little to do with the direct impacts of hazards, and more to do with the fears of local officials regarding the ways in which those impacts might be perceived by others, can be an important influence on decision-making.

The influence of this conception of the modern city also helps to explain the continuing dominance of the technological fix despite an official shift in national policy, well established

critiques of engineering based flood risk management strategies, and funding difficulties associated with engineering schemes. Technological fixes have been extensively critiqued by hazards researchers, focusing in particular on the potential for engineering failures and for a false sense of security to create larger disasters (Jeffers, 2011; López-Marrero and Yarnal, 2010; Platt, 1982; Penning-Rowsell et al, 1998; Wisner et al, 2004; White, 1945). Engineering schemes are also challenged by the large financial costs typically associated with such projects, raising questions regarding how such projects should be funded and when their costs can be justified. The conception of the competitive city as being flood free ensures that engineering solutions remain the preferred option despite these drawbacks.

While the vision of the modern competitive city plays a key role in promoting the technological fix, it also acts to exclude alternative strategies from consideration. Little attention is focused on the identification of vulnerable populations or on steps that could be taken to enhance their resilience. This is due in part at least to the lack of critical reflection on the goals of economic development itself. Within the discourse of perpetual growth the implicit assumption appears to be that economic growth is beneficial for all members of society. However as the earlier discussion of socio-economic contexts clearly illustrated, the rising tide of growth did not raise all boats equally while the recession has also produced unequal outcomes. Within this context flood risk management policies do not acknowledge that some sections of society are more susceptible to loss. Within the dominant discourse there is also no space for reflection on the ways in which the economy is shaped by society (rather than the reverse) and could be directed to achieve particular social goals such as greater equality or sustainability. This again raises important questions for research on climate change adaptation. Proponents of adaptation might hope that economic and social transformations would result from efforts to achieve a more sustainable future but to date environmental and social goals have been subservient to development objectives.

The influence of a dominant growth model on vulnerability and exposure to environmental hazards has been highlighted in literature on disasters and development. Attempts to exploit natural resources to the fullest extent possible in order to promote export led growth in so called developing countries often results in land use changes that have profound implications for vulnerability (Wisner et al, 2004). The results of this research demonstrate that the linkages between economic development and vulnerabilities to hazards are also important in the global north and have been understudied in these contexts. They also illustrate that the ways in which environmental issues are integrated into dominant narratives of development have important implications for the policies enacted to address environmental concerns. The Irish case highlights the need for further research on the complex relationships between development and adaptation in a range of contexts.

The growth narrative also plays an important role in shaping the ways in which decisions are made with almost all decisions made on the basis of cost-benefit analyses. This decision-making tool limits the types of policy responses that are considered as it emphasises projects that deliver a clear return on investment in terms of their benefits for the economy of the city. The economic value of hazards mitigation policies that focus on steps to reduce social vulnerability or other non structural responses may be less immediate and less likely to successfully pass a cost benefit analysis. The focus on cost-benefit also presents the decision-making process as neutral and quantifiable, obscuring subjective assessments of the economic values attached to particular types of hazard loss. This raises important environmental justice concerns regarding where investments in flood relief measures are targeted. The comments of some respondents implied that environmental issues including climate change might be considered somewhat of a discretionary expense, to be afforded funding during times of plenty but not when finances are more constrained. This view of climate change adaptation as

an expense that cannot currently be justified is further evidence of the implications of the growth model of development for climate change adaptation. The growth narrative reinforces a pre-existing division of decision-making which keeps economic, environmental and social concerns in distinct policy arenas with the later two subservient to the former.

Conclusions

The intersecting crises of economic recession and climatic change and the interactions between these processes are altering patterns of vulnerability and resilience. Ireland's embrace of neoliberal globalisation supported an economic boom that produced some winners, particularly in the construction and financial services sectors. However it also sowed the seeds of the current crisis which is enhancing the vulnerabilities of several sectors of society including the poor, the unemployed and the elderly. Feedbacks between economic and environmental change are further increasing vulnerability as rising losses from hazard events lead insurance companies to increase premium costs or to withdraw coverage altogether in high risk locations, further escalating the challenges for those who are already most vulnerable.

The interactions and feedbacks between global environmental and economic change, simultaneously operate at scales from global to local and provide the context for contemporary decision-making and policy. This context is producing the material and ideological conditions in which a growth centred discourse of economic development continues to dominate all areas of public policy. As optimising the position of their cities in the battle for capital has become the primary objective of local officials, hazards events are often viewed primarily as disruptions to that goal. This leads to an emphasis on climate adaptation and hazards mitigation strategies that target the drivers of physical exposure to hazard but do not generally consider the socio-economic aspects of vulnerability. This particular economic framing of hazard also shapes the way in which decisions are made,

emphasising cost-benefit analysis as the optimal tool for decision-making. This further reinforces an emphasis on costly engineering fixes as the utility of alternative strategies for vulnerability reduction is often difficult to quantify. The dominance of this economic development narrative ensures that a technological fix remains the preferred policy for both hazards mitigation and climate adaptation, regardless of well established critiques of this strategy.

Despite the changing conditions Ireland has experienced and the new constraints imposed by the current economic crisis, decision-making criteria that focus on the pursuit of economic growth remain largely unchanged. While there is now a renewed emphasis on fiscal rectitude and regulation in the financial sector, the overall goals of public policy have not been altered. Rather than instigating policy change the current crisis appears to have reinforced and entrenched the prevailing discourse. The conception of Ireland and its cities as competitors in the race to attract capital fully permeated local decision-making during the Celtic Tiger era and remains the dominant consideration today.

The double exposure framework has proven to be a useful analytical tool for examining how interactions between global environmental and economic change reshape exposure and vulnerability to both processes. However insufficient attention has been devoted to the production of discourses of environmental or economic change in local places, the implications of these discourses for decision-making and policy responses to both processes, and the role of those local responses in shaping vulnerability and resilience. Environmental and economic changes remain ongoing, constantly reshaping the circumstances within which local actors respond to both processes and their interactions. The empirical research presented in this paper demonstrates how discourses of economic development and environmental change operate within these shifting contexts to shape the outcomes of local decision-making,

how they remain entrenched despite shifting socio-economic and environmental contexts, and how they are often reinforced by economic or environmental shocks. These discourses and their influence on decision-making and policy outcomes have implications for local vulnerabilities and exposures that are just as profound as the processes of double exposure themselves. Understanding actions taken in response to both processes and their interactions is essential to advancing knowledge on future vulnerabilities to the shocks and stressors produced by both environmental and economic changes.

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