Exploring housing patterns and dynamics in low demand neighbourhoods using Geographically Weighted Regression

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This paper will examine the geographical variation in house price determinants in areas where housing is in such low demand that there has been a total collapse in the local housing market. This will be explored through the use of a case study in the city of Manchester in the UK. Areas with concentrated housing market collapse have been referred to as low demand neighbourhoods where housing in an area is difficult or impossible to let or sell (Bramley and Pawson, 2000). In analysing housing market collapse it is important to explore patterns and dynamics within and between neighbourhoods in order to assess neighbourhood vulnerability within the wider context of urban industrial restructuring. The case of Manchester will draw on the data and variables used by MCC (Manchester City Council) within its spatial decision support system for neighbourhoods known as TNC (Tracking Neighbourhood Change). The TNC system attempts to locate, monitor and review change by integrating and mapping data from local agencies in addition to the local authority such as the Local Education Authorities, The Land Registry and Local Police Force. It has been highlighted (CLG, 2007) that the roles of such systems are important at the beginning (strategy development) and end (performance monitoring) of the design and delivery process when considering neighbourhood intervention. Similar Local Information Systems are emerging and are in use by other local authorities and agencies in many countries throughout the world. For instance, applications of information systems for many cities in the United States are available and use indicator based visual analysis that focus on neighbourhood change. Many examples of these systems have been centralised in the United States as part of a networked resource known as the National Neighbourhood Indicators Partnership (NNIP, 2007).

Despite the widespread use of local information systems, they may be limited as the systems are usually standard GIS based systems containing data sets that visually represent static unrelated layered choropleth maps. Most of these systems are not very analytical and do not explore spatial relationships. This provides some indication, as explored in this paper, that developing knowledge of the often complex, interlocking and multi-faceted aspects of neighbourhood decline and recovery may be enhanced by analysing neighbourhood indicators using GWR (Geographically Weighted Regression). GWR is a method that considers localised elements in geographical phenomena and should provide a more robust statistical approach as it acknowledges the nonstationarity and locality of relationships within space (Brunsdon, Fotheringham and Charlton, 1998). In recognising the nonstationarity of relationships of neighbourhood indicators in space, GWR may provide a more

accurate statistical understanding as to what is happening in different neighbourhoods within cities and districts. The application of GWR to the Manchester housing market will put an emphasis on the local over the global and could provide improved insight as to the influence of local dynamics and patterns on neighbourhood decline and/or recovery. Using GWR in such a situation may provide policy makers with a better understanding of local neighbourhood effects within housing markets rather than having to rely upon global, district wide models of housing dynamics as is the case with the current TNC system.

Variables and indicators within local information systems that impact on neighbourhood dynamics and spatial patterns are often contained in key domains such as housing, income, employment, geographical access to services, transport, health, education and crime. The key indicators used to analyse low demand neighbourhoods in the TNC system with reference to residential properties are those such as house price by type (e.g. terraced, detached, semi-detached, flat or new build), tenure status (e.g. private, council or RSL owned), property status (e.g. occupied, void, long-term void), housing turnover rate and housing benefit attached to a property. As well as property related variables other socio-economic considerations are used within the TNC system such as crime (e.g. burglary, vehicle and Anti-Social Behaviour Orders[1]), employment (e.g. Incapacity Benefit, Income Support, Job Seekers Allowance and Worklessness), and education (e.g. Primary and Secondary School pass rates) as detailed in Figure 1. In determining the nonstationarity and stationarity of neighbourhood indicator relationships in space, the use of GWR will set the dependent variable focus on property indicators, with the more socio-economic indicators acting as independent variables. The emphasis on property dependent indicators should therefore aid in understanding changes in low demand neighbourhoods containing relatively low value housing with associated negative socio-economic neighbourhood problems such as anti-social behaviour. A degree of experimentation will take place to establish which of the five property domains will be the most appropriate dependent variable. An area to explore in the paper will be the extent to which the distribution and relationship of ASBOs (Anti-Social Behavioural Orders) with respect to low demand neighbourhoods will be of significance. This will be a novel approach because access to ASBO data has been limited until now and this is an under researched field.

[1] An Anti-Social Behaviour Order (ASBO) is a civil order made against a person who has been shown to have engaged in conduct which caused or was likely to cause alarm, harassment, or distress to one or more persons not of the same household as him or herself and where an ASBO is seen as necessary to protect relevant persons from further anti-social acts by the Defendant.

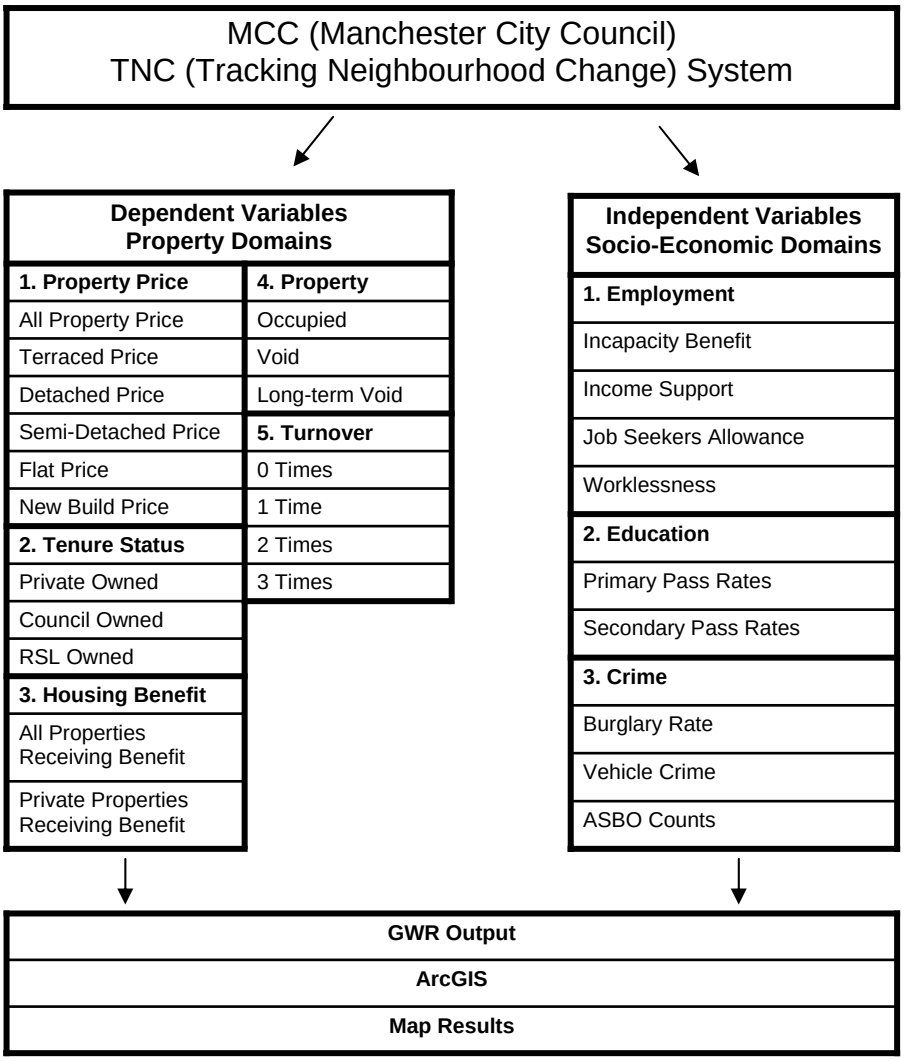

Figure 1. Data Exploration using GWR.

The use and results of GWR neighbourhood analysis could guide policy responses to neighbourhood decline and recovery, for instance it could provide HMR (Housing Market Renewal) pathfinders, in England, with improved foresight when intervening in low demand neighbourhoods characterized by a lack of 'desirability' for households to stay in the area. Recommendations to housing policy with regards to low demand neighbourhoods through the application of GWR in understanding neighbourhood decline and recovery could be extrapolated from the Manchester case. Housing policy in different global contexts could be applied more sophisticatedly using GWR from this example, especially as policy could accurately represent the dynamics and patterns that are particular to the city under analysis. Recommendations to housing policy in the United Kingdom through GWR neighbourhood analysis could similarly be carried out in the US housing policy context. GWR results could aid in recommendations to initiatives that incorporate housing and economic assistance such as the renewal of housing markets and the provision of housing benefits. In the US for example, a more accurate distribution of housing vouchers in the Section 8 housing initiative could be made from the results of GWR neighbourhood analysis, as such analysis will

provide knowledge of which households need assistance. As well as the advantages of applying policy in different global contexts using GWR, analysis in this way can build on more theoretical knowledge of neighbourhood recovery and decline. For example, in understanding patterns and dynamics of neighbourhood change using GWR and its emphasis on the local, it could begin to address questions of social exclusion such as whether people are disadvantaged by where they live. Furthermore, in using GWR analysis to consider local influence, the case of Manchester neighbourhoods could be globally applied to other cities in order to understand how low demand neighbourhoods change within different global contexts.

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