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The effect of area based urban regeneration policies on fuel poverty: Evidence from a natural experiment in Northern Ireland

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ABSTRACT

This paper studies the effect of the most extensive area based regeneration policy in Northern Ireland – Neighbourhood Renewal (NR) – on fuel poverty using a natural experiment approach. NR was launched in 2003 in Northern Ireland as a holistic area-based regeneration policy to improve the lives, prospects and environments of residents living in thirty-six of the nation's most deprived areas over a seven- to ten-year roll-out. Using data from the Northern Ireland Household Panel Survey and from the Understanding Society survey, the effect on fuel poverty during a twelve year period is investigated. Difference-in-difference regression modelling of the impact of NR on fuel poverty provides evidence of a 3.0% reduction in fuel poverty comparing respondents in NR areas with the rest of Northern Ireland and a 4.7% decline relative to a similarly deprived control group. When the effect on heterogeneous characteristics of the sample is explored, the analysis reveals that NR has been particularly effective in relieving fuel poverty among groups with lower qualifications, the retired and those receiving benefits, and has therefore contributed to a reduction in inequalities within the most deprived areas in Northern Ireland.

1. Introduction

An occupant is considered to be living in a fuel poor household if the household is unable to maintain sufficient home warmth and domestic energy services at a reasonable cost. The UK government introduced a Fuel Poverty Strategy in 2001 as a commitment to ensure that no vulnerable households would be fuel poor by 2010 (Department of the Environment, Transport and the Regions and Department of Trade and Industry, 2001). Northern Ireland has the highest prevalence of fuel poverty in the UK (Northern Ireland Housing Executive, 2013), attributable to a combination of a cooler climate, lower incomes and higher dependence on more expensive forms of heat such as oil, solid fuel and electricity. The prevailing definition of a fuel poor household in Northern Ireland is one which must spend in excess of ten-percent of household income to service fuel requirements (Department for Social Development, 2011a, 2004). In developed countries characterised by a temperate climate, fuel poverty is regarded as a form of social inequality and injustice (Braubach and Ferrand, 2013; Marmot, 2011; Roberts, 2008; Walker and Day, 2012; Wilkinson et al., 2007). Fuel poverty is a political and health priority because of its increasingly evidenced adverse impacts on physical and mental health, the role it plays in excess winter deaths as well as its social implications (Balfour and Allen, 2014; Liddell and Morris, 2010; Marmot, 2011). The prevalence of fuel poverty may be more acute in disadvantaged neighbourhoods marked by socio-economic and physical deprivation due to lower household incomes and poorer housing stock (Curl and Kearns, 2016; Walker et al., 2013; Webber et al., 2015).

A major urban regeneration programme, Neighbourhood Renewal (NR) in Northern Ireland began in 2003 to improve the environmental conditions, prospects and quality of life for residents of thirty-six urban neighbourhoods throughout the nation characterised by the highest levels of deprivation (Department for Social Development, 2003).

Abbreviations: NR, Neighbourhood Renewal; NRA, Neighbourhood Renewal Area; NIHPS, Northern Ireland Household Panel Survey; CI, Confidence Interval; SAP, Standard Assessment Procedure

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Fifteen NR areas (NRAs) were established in Belfast, six in the North West including four in the city of Derry/Londonderry and fifteen in smaller cities and towns across Northern Ireland. These NRAs accounted for one in six of the Northern Ireland population, 278,000 persons according to the 2001 census. The policy was designed to be long term, operating over a seven to ten year horizon, acting as a catalyst for sustained coordinated investment across four interlinking objective areas – community, economic, social and physical renewal.

The NR programme was based on the premise that transforming neighbourhoods hinges on community empowerment in cooperation with statutory bodies and delivery agencies (Atkinson, 1999; Foley and Martin, 2000; Meegan and Mitchell, 2001; Social Exclusion Unit, 2001). Accordingly, NR Partnerships, consisting of voluntary, community, statutory, political and private sector stakeholders, were established in each NRA. These acted as a vehicle to identify the most pressing issues in the locality and directed the response to local problems in planning and implementation. Each partnership produced a long term vision statement outlining challenges, priorities and aspirations for the roll out of the Strategy as well as three-year action plans detailing local schemes designed to achieve NR objectives in the area. The action plans and annual reports from NR partnerships specify that addressing fuel poverty was an important objective (Downpatrick Neighbourhood Renewal Partnership, 2010; Greater Falls Neighbourhood Renewal Partnership, 2013; Strabane Neighbourhood Renewal Partnership, 2012; Triax Neighbourhood Renewal Partnership Board, 2011).

The operation of the £194 million community-led, state-sponsored, NR urban regeneration policy is hypothesized to ease fuel poverty in policy-on areas over a decade of implementation. The statutory government evaluations of the NR policy did not consider the impact of NR on fuel poverty (Department for Social Development, 2011b; RSM McClurre Waters, 2014), and thus this study adds to the assessment of the effect of the policy on an unexplored measure. Using data from the Northern Ireland Household Panel Survey and the Understanding Society survey, difference-in-difference regression modelling in a natural experiment setting is applied to investigate how fuel poverty has been affected by the introduction of the NR policy. To the authors' knowledge, this paper presents novel research in the energy literature as the first assessment of the impact of a national, holistic area-based regeneration policy on fuel poverty.

The remainder of this paper is structured as follows. Section 2 provides an overview of fuel poverty in Northern Ireland and cites the relevant policies designed to address fuel poverty. The literature evaluating fuel poverty policies is explored in Section 3. The methods used to assess the impact of the NR strategy on fuel poverty in Northern Ireland are outlined in Section 4 and the modelling results are documented in Section 5. Section 6 concludes with a synopsis of the strengths and limitations of the study, the findings of the investigation and implications for research and policy.

2. Addressing fuel poverty in Northern Ireland

The latest official figures on fuel poverty in Northern Ireland estimate that about 294,000 households, or about 42% of the total, were fuel poor in 2011 (Northern Ireland Housing Executive, 2013). Whilst in 2001, the introduction of the Warm Homes Scheme (Department for Social Development, 2004; National Audit Office, 2008) contributed to reducing fuel poverty in Northern Ireland between 2001 and 2004 (from 27% to 23%), by 2006 the rate of fuel poverty had increased to 34% and then to 44% in 2009 mainly due to increases in the price of fuel and continued dependence on oil, electricity and solid fuel for heating in Northern Ireland (Northern Ireland Housing Executive, 2013). The 2011 House Condition Survey shows some progress in reducing the proportion in fuel poverty despite rising fuel prices largely as a result of significant investment in new energy efficiency measures such as heating conversions, insulation and double glazing by the Housing Executive in its own stock and also by the Warm Homes Scheme in private homes.

The 2001 *UK Fuel Poverty Strategy* (Department of the Environment, Transport and the Regions and Department of Trade and Industry, 2001), the 2004 *Ending Fuel Poverty: A Strategy for Northern Ireland* (Department for Social Development, 2004), and the 2011 *Warmer Healthier Homes: A new Fuel Poverty Strategy for Northern Ireland* (Department for Social Development, 2011a) are the main policy documents drafted to address fuel poverty in Northern Ireland. In particular, the 2004 Strategy aimed at eliminating fuel poverty in vulnerable households by 2010, and in non-vulnerable households by 2016. It also indicated that no household in the social rented sector should suffer from fuel poverty by 2016. The policy recognised that the best way to tackle fuel poverty was through a partnership approach, which entails working with organisations that have an influence on income, fuel costs, energy provision and efficiency, and with organisations from the voluntary and community sector. The 2011 *Warmer Healthier Homes* strategy recognised that the 2001 strategy goal of eradicating fuel poverty by 2010 was set at a time of relatively low fuel prices and indicated that the new strategy needed to: remove energy inefficiency, achieve affordable energy for households, and build strong partnerships working across organisational and professional boundaries.

The central scheme for implementation of the fuel poverty strategy in Northern Ireland was the Warm Homes Scheme (Department for Social Development, 2004; National Audit Office, 2008), which was launched in 2001. Under this initiative, eligible households anywhere in the country could apply for a range of measures to upgrade the energy efficiency of their homes at a discounted or no cost. Walker et al. (2013) evaluated the success of Warm Homes using Geographic Information Systems mapping to compare targeting of the scheme at the small geographic area level with household need, assessed using a multi-dimensional fuel poverty risk index. The evaluators concluded that the policy may have had some impact on fuel poverty, but determined that targeting of the scheme was poor and the majority of retrofits were small-scale and unlikely to reduce fuel poverty. As a result, Walker et al. (2013) suggested that fuel poverty policies could be better implemented using pre-emptive, area-based approaches.

3. Evaluating fuel poverty policies

To date, the evaluations of policies on fuel poverty typically do not assess their performance according to 'official' definitions of fuel poverty such as the ten-percent definition – which states that households are fuel poor if they spend more than 10% of their income in fuel (Boardman, 1991) – or the Low Income High Cost measure, which states that a household is considered to be fuel poor if they must meet fuel costs that are above average (the national median level) and, were they to spend that amount, they would be left with a residual income below the official poverty line (Department of Energy and Climate Change, 2015). Instead, the fuel poverty literature has mostly examined impacts of policies on a range of alternate gauges such as subjective measures of ability to pay fuel bills, objective measures of indoor temperatures or energy consumption, and is dominated by a concern for health impacts (Critchley et al., 2007; Fowlie et al., 2015; Green and Gilbertson, 2008; Hong et al., 2009; Howden-Chapman et al., 2012, 2007; Liddell and Morris, 2010; C.R. Lloyd et al., 2008).

A review of the health effects of housing improvements (Fenwick et al., 2013) found six studies where energy efficiency improvements reduced fuel expenditures (Ambrose, 2000; Caldwell et al., 2001; Green and Gilbertson, 2008; Heyman et al., 2011; E.L. Lloyd et al., 2008; Shortt and Rugkåsa, 2007). However, in some cases, occupants also experienced rent increases after the improvements. Therefore, the net effect on household budgets and on fuel poverty was unknown.

An uncontrolled before and after evaluation of the Warm Front scheme in England (Green and Gilbertson, 2008) found that, after receiving assistance, fewer recipients reported difficulties in paying fuel