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Short Communication

Contrasting approaches to fuel poverty in New Zealand

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HIGHLIGHTS

- Household's spending on fuel is weakly related to self-reported fuel deprivation.
- Many older people spend more than 10% but do not go without.
- Many families who spend less than 10% but do go without fuel

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ABSTRACT

We contrast two measures of fuel poverty in New Zealand. The first is based on estimated expenditure of over 10% of household income on fuel. The second is self-reported deprivation of fuel because of an inability to afford it. Households denoted as fuel poor on the two measures are mostly different and the findings suggest that research is needed to investigate if different households make different trade-offs between expenditure on fuel and other necessities.

1. Introduction and background

Interest in fuel poverty has increased in the recent past with the result that there have been several new enquiries into both the nature of the phenomenon and its measurement (for example Healey and Clinch, 2004; Hills, 2011; Moore, 2012; Liddell et al., 2012; Price et al., 2006; Walker and Day, 2012). It is accepted that fuel poverty is a phenomenon in its own right and not simply a dimension of wider poverty and inequality issues (Hills, 2011) but aspects of the deprivation and the consequences of the insufficiency still seem unclear. For example, most of the work on fuel poverty has been motivated by health issues reflecting concern over conditions ranging from hypothermia in cool climates to respiratory illnesses (for example Shortt and Rugkasa, 2007; Liddell and Morris, 2010). In themselves these might be health manifestations of two very different situations. Hypothermia may be the result of an inability to heat a property adequately over a very short period of time while a respiratory condition might be the consequence of a chronic situation resulting from a small but continuously occurring deficit. However, the consequences of fuel poverty are wider than pure health concerns. Personal communication from executives running the Beacon project in New Zealand[1] explained how retrofitting and warming houses had resulted in increased social activity and connectedness since friends were more willing to visit and spend time with the occupants. A further open question is whether fuel poverty should be widened in definition to include fuels like petrol that support mobility. Inability to access social infrastructure for economic reasons is an accepted indicator of wider assessments of poverty (see for example Citro and Michael, 1995; Rashbrooke et al., 2013 or the United States Census Bureau, 2013). Not being able to take the children to the park, or to afford petrol to shop at the hypermarket instead of the expensive local store are all facets of poverty. It is well understood that there is a serious 'double jeopardy' effect in poverty situations. Not only can the poor afford less but they often pay more for what they do get (e.g. prepay meters for electricity), and they get less benefit for their expenditure (e.g. housing is lower quality and heat losses are greater).

We are curious to understand if the way fuel poverty is measured might influence who is diagnosed as experiencing it and the

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[1] http://www.beaconpathway.co.nz/new-homes.

potential policy responses that might be required. The main approach to defining fuel poverty in the literature is based on the proportion of household income needed to maintain a home at comfortable and healthy living standards (Boardman, 2010; Howden-Chapman et al., 2012). These are usually represented as being temperatures of 21 °C in the living area and 18 °C elsewhere in the home. Having to spend more than 10% of income to maintain these standards is suggested as placing people in fuel poverty. Operationalising this approach in large scale studies can be problematic. The 10% level is subjective and there are many individual factors that may affect whether it is a reasonable diagnostic. Also, the data to make these judgements may be complex to obtain. In New Zealand, where our study took place, there is a huge variation in home construction materials, insulation levels and heating methods, many of which do not provide opportunities to control indoor temperatures very effectively. When this is compounded by personal factors such as health or life stage, the actual required expenditure may be difficult to ascertain. In this study we use the 10% threshold as one of our measures of fuel poverty but use an estimate of actual expenditure as a proportion of before tax household income. We compare the characteristics of households who we estimate are in fuel poverty based upon the 10% threshold and those who inform us that they have gone without power in their home at some point in the previous twelve months because they were unable to afford it. The last approach to diagnosing fuel poverty is one we have not seen previously recorded in the research on the topic and it was particularly framed to try to assess levels of short term fuel poverty. In method it would be closest to some of the subjective measures that have been proposed. A number of these are reviewed by Hills (2011, pp. 128–131). A particular facet we are interested in examining is whether or not we can identify a group in the population who do not appear to spend more than 10% of income on fuel yet are still going without power on occasions. It may be that such a group are restraining expenditure below that threshold but in reality they are still fuel poor.

2. Methods

A commercial market research company was employed who used an online panel and quotas were established to ensure the sample was representative to the national population in terms of age, income and regions. The only noticeable bias in the demographic statistics was an underrepresentation of Pacific Island ethnicities and an overrepresentation of Asian ethnicities. New Zealanders of European descent and Maori were both accurately represented in the number of respondents. Data on fuel expenditure was gathered by asking respondents for their typical monthly summer and winter bills for each of the following fuel types: coal, electricity, gas, petrol/diesel, wood, and other miscellaneous fuels. This was the simplest form of self-report question that we tested that produced reliable responses. We took the typical summer and winter expenditures for each fuel, multiplied each by six and summed the total to estimate total fuel expenditure over a twelve month period. This produced an estimate of a weekly average expenditure of $59.61, excluding petrol and diesel. The closest available data from the New Zealand Household Expenditure Survey gives an average weekly household expenditure of $43.20 for 2010 (Statistics New Zealand, 2010). Fuel prices increased between the Statistics NZ survey in 2010 and ours in 2011 but not by an amount that would explain this difference. The difference arises from higher reported expenditures on both electricity and wood in our survey, with the latter explaining 3/4 of the difference. We believe our estimates are internally consistent with our data, for example 23% of our sample report using wood as their main source of fuel for heating. Such a percentage would not be consistent with the Statistics New Zealand estimate of $1.10 for average weekly expenditure on all solid fuels for all New Zealand households. The sampling and data collection methods for the two surveys are quite different and this may cause some discrepancy but a further complicating issue in the comparison is that our data has a significant positive skew. This seems reasonable but it does imply that the median or possibly mode would be a better statistic than the average for comparison. However, these statistics are not available in the published data.

Initial comparisons between our two indicators of fuel poverty were made using cross-tabulations. Subsequently, four groups were developed in the dataset according to combinations of fuel poverty indicators and these four groups are then compared on other available information using crosstabulations, median and Kruskal–Wallis tests as appropriate, considering measurement levels and distributions. Because of the relative disparity in group sizes we elected to be guided by Monte Carlo, as opposed to asymptotic, p-values when judging whether to report "significant" differences. Also, because we have a sample of over 2000 and are reporting multiple tests, we use the 1% level of significance.

3. Results

Using the estimated expenditure method of determining fuel poverty 17.2% of our sample is classified as in fuel poverty spending more than 10% of household income on home fuel. As an estimate this figure is not inconsistent with extrapolations made by both Howden-Chapman et al. (2012) and Lloyd (2006) even though both used other methodologies and it is also comparable with countries with similar climates within the European Union (BPIE, 2014). As an aside, it is worth noting that this would increase to 19.1% if we included expenditure on petrol in our calculations. We are not aware that the issue of mobility has really been covered as an aspect of fuel poverty but wider literature on poverty does embrace discussion on features like access to employment, shops, schools and services as well as social integration. New Zealand is heavily reliant upon private transport even in our larger cities and we believe that wider considerations of fuel poverty, other than those motivated by biophysical health concerns, need to be debated as an issue when considering fuel poverty.

Our reported measure of going without fuel in the home estimates that 23.9% of sample experience fuel poverty in this way. It is not surprising that as a short term indicator this figure would be higher than our previous estimate and it is also worth noting that Canterbury and Otago figure as regions where people are going without fuel. These are both areas of the cooler South Island where demand for winter heating will be higher than in most of the more populous North Island. A key finding in our data is the lack of overlap between the two measures. The majority of those we estimate have spent more than 10% do not admit to going without power while approximately 1/5 of those who potentially spend less than 10% indicate that they have gone without because they could not afford it. An obvious conclusion is that that people are potentially curtailing expenditure on fuel in order to afford other items. The measure of association between the two variables, although statistically significant ($p < .000$ on the χ^2 test) is low to moderate ($\varphi = .143$). We conclude from this analysis that *different respondents* are classified as being fuel-poor by each measure; i.e. they are not parallel indicators of the same construct.

Reviewing the four different groups arising from the combinations of the two indicators we see that they each have some distinct characteristics. Key variables are summarised in Table 1.