

## Appendix 1

### Methodological Appendix

The chapters in this report are based on a series of (single discipline) research projects within the UKERC project 'Equity and Justice in Energy Markets'. Each project has generated at least one research paper which provides the underlying evidence. Here we summarise the methodologies used in the academic papers.

**Deller, D. and C. Waddams Price, 2018a. Energy Affordability in the UK: Corrected Energy Expenditure Shares 1992-2014, Centre for Competition Policy, University of East Anglia, CCP Working Paper 18-8**

This paper uses data from the Living Costs and Food Survey and its precursors, from 1992 to 2014, with additional observations in 1977, 1982 and 1987. The data cover the UK and involve a sample of 4,900-7,500 households per annum. A significant missing data issue is identified for households using pre-payment meters (PPM) from the early-1990s to 2012. This issue is addressed by: (i) running ordinary least square (OLS) regressions with electricity(gas) expenditure as the dependent variable on PPM households with non-missing data, and (ii) using the resulting models to estimate electricity(gas) expenditure for PPM households with missing data. Separate regressions are run for each fuel in each year. Additionally, energy expenditures (ENEX) for all payment methods are de-seasonalised with the seasonality factors produced by log-linear OLS regressions, where ENEX is the dependent variable and there is a wide range of explanatory variables including interview month. Separate de-seasonalisation regressions are run for each payment method and fuel in each year.

ENEX are defined as all expenditure by a household on fuel, light and power within the home; expenditures on transport fuels are excluded. Annual ENEX are converted to 2014 prices using the Retail Price Index (RPI). Energy expenditure shares are defined as ENEX divided by total household expenditure after housing costs are deducted, and total expenditure is equivalised for the number of household members using the modified OECD scale. The results are weighted to address potential sampling issues. Prior to 2001-02 when official weights are first provided, weights are calculated using census data identifying a household's region/devolved administration together with a household head's age and gender.

**Deller, D. and C. Waddams Price, 2018b. Comparing English Fuel Poverty Rates: Reported vs Modelled Expenditure, Centre for Competition Policy, University of East Anglia, CCP Working Paper 18-11**

This paper compares the official fuel poverty (FP) rates from the Department for Business, Energy and Industrial Strategy (BEIS), based on 'required' ENEX, with FP rates based on reported ENEX from the dataset in Deller and Waddams Price (2018a). The official FP rates are based on ENEX modelled using data from the English Housing Survey which includes a physical survey of dwellings. Both the 10% and Low Income-High Cost (LIHC) FP metrics are compared. The official statistics cover 10% FP from 2003-04 to 2011 and LIHC FP from 2003-04 to 2014. The headline rates of 10% and LIHC FP based on reported ENEX are calculated from 1995-96 to 2014, while reported ENEX FP rates disaggregated by household type are calculated for 2003-04 to 2014. Both the required ENEX and reported ENEX FP rates cover England only. When calculating reported ENEX FP rates, care is taken to follow the official

definitions<sup>1</sup> of 10% and LIHC FP as closely as possible. When calculating reported ENEX LIHC FP, median income and median housing costs are calculated separately for each year.

**Deller, D., G. Turner and C. Waddams Price, 2018. A Postcode Lottery: Regional Electricity Price Variations for Inactive Consumers, Centre for Competition Policy, University of East Anglia, CCP Working Paper 18-10**

This paper is based on two datasets. The main focus is a time series of the electricity bill charged by the incumbent supplier for 3,300 kWh of electricity per annum in each electricity supply region in Great Britain between 1970 and 2016.<sup>2</sup> The electricity bills are for the Standard Credit payment method (i.e. the default payment method), inclusive of VAT and are converted to 2016 prices using the Retail Price Index (RPI). The time series is formed from analysis undertaken in previous projects at the University of Warwick, from pricing sheets produced by Which?, energywatch and Consumer Focus and from data provided by Cornwall Energy.

After identifying the electricity bills of consumers who have stayed with the incumbent, data from a 2011 CCP survey are used to identify characteristics associated with this type of inactive consumer via a logit model. Full details of the survey are provided in Flores and Waddams Price (2018). An unrepresentative subsample of the data is analysed because it was not possible to identify households' electricity supply region for some respondents. The data provide two potential ways to identify whether a household had remained with the incumbent electricity supplier since market opening: (i) a question asking whether a household had ever switched supplier, and (ii) comparing a household's current supplier against the identity of the relevant region's incumbent supplier. The two approaches often give 'inconsistent' results regarding whether a household remains with the incumbent.

**Deller, D. and A. Fletcher, 2018. Micro and Small Businesses' Satisfaction with the Energy Market: Policy Implications, Centre for Competition Policy, University of East Anglia, CCP Working Paper 18-9**

This paper uses data from Ofgem's Micro and Small Business (MSB) market engagement surveys in 2014 and 2015.<sup>3</sup> The analysis focused on the 2014 data, using the 2015 survey as a robustness check. The surveys cover businesses in Great Britain with 49 or fewer employees who are directly responsible for their energy purchases and purchase energy using a non-domestic contract. The survey intentionally oversampled firms with 5 or more employees. Ordered logit models are used to identify MSB characteristics associated with a higher level of satisfaction with respect to: (i) an MSB's current supplier, (ii) energy brokers, and (iii) the ease of comparing prices in the market. Each dependent variable consists of a five-point likert scale. Explanatory variables are split into two groups: (a) firm demographics e.g. number of employees, turnover and electricity expenditure, and (b) engagement, e.g. whether the MSB has switched in the last 5 years and whether they have read their energy contract. The analysis is restricted to MSBs providing responses relating to their electricity supplier, yielding a sample of just over 1,000 MSBs in 2014.

1 See BEIS/BRE (2018)

2 Data for 2014 was not found.

3 The researchers were not granted access to a variable identifying an MSB's energy supplier(s).

**Deller, D., G. Turner and C. Waddams Price, 2019. Discrepancies between Perception- and Expenditure-based Fuel Poverty Indicators over Time, Centre for Competition Policy, University of East Anglia, CCP Working Paper 19-1**

This paper uses the British Household Panel Survey (BHPS) between 2001-02 and 2008-09 to form an unbalanced panel involving almost 56,000 observations from 10,500 households. These years are analysed because they include specific survey questions required for our research and to harness booster samples in the devolved administrations. The data cover the UK as a whole, but the booster samples result in over-sampling of the devolved administrations. All monetary amounts are converted to 2008 prices using the Consumer Price Index (CPI). Two FP indicators based on reported ENEX are considered: (i) the 10% metric and (ii) the LIHC metric; and three perception-based indicators are considered: (iii) an inability to maintain adequate warmth in the home, (iv) an inability to afford adequate warmth in the home, and (v) living in a dwelling lacking adequate heating facilities. For LIHC FP the thresholds of median housing costs and median income are re-calculated in each year, applying weights so that the thresholds are representative of the UK as a whole. With the exception of using reported rather than required ENEX, our 10% and LIHC FP indicators are designed to follow the government's official FP definitions as closely as possible. Extensive descriptive statistics are produced looking at the (lack) of overlap between the different FP indicators. Additional descriptive statistics (exit probabilities) provide an initial assessment of the persistence of each FP indicator through time, with the persistence of income poverty<sup>4</sup> used as a benchmark. Last, logit regressions including a wide range of explanatory variables identify the characteristics of households associated with each FP indicator. The regression analysis focuses on indicators (i), (ii) and (v).

**Hargreaves, T. and N. Longhurst, 2018. The lived experience of energy vulnerability among social housing tenants: emotional and subjective engagements, 3S (Science, Society and Sustainability)/Centre for Competition Policy, University of East Anglia, 3S Working Paper 18-32/CCP Working Paper 18-7**

This paper explores the lived experience of social housing tenants at risk of FP. The research began with five telephone interviews with expert stakeholders (both academics and practitioners) working on FP to identify key issues and frame the research. This was followed by fifteen in-depth semi-structured interviews with tenants of Broadland Housing Association (BHA) in Norfolk between January and June 2017. These tenants were identified by BHA staff as likely to be at risk of FP, and were then selected to provide diversity regarding housing type, family structure and type of energy issues faced etc. Interview questions explored their everyday energy use, their properties' energy efficiency, how they manage their energy bills, and their reflections on BHA interventions. The interviews were recorded and transcribed verbatim before being coded thematically using NVivo software.

**Harker, M. and D. Reader, 2018a. W(h)ither independent regulation: the 'repoliticisation' of British retail energy markets, Centre for Competition Policy, University of East Anglia (under review)**

This paper uses two principal methodologies. First, a historic analysis of changes in the regulation of residential energy pricing between 2008 and 2014. The changes to policy are contextualised by investigating contemporary political debate and media coverage. Key institutional developments are charted to analyse whether key reforms had a discernible effect on regulatory independence. Second, semi-structured elite interviews were performed with current and former senior members of the regulatory and policy community (thirteen in total), with each interviewee assigned a descriptive indicator to

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<sup>4</sup> Defined as a household with an income below 60% of the estimated UK median.

contextualise their responses. The interviews enable a more detailed exploration of if, and how, regulatory independence has evolved; the institutional factors which may have contributed to any changes; and how to appropriately manage the relationship between regulators and government.

**Harker, M. and D. Reader, 2018b. How do market regulators interpret statutory duties? The case of energy regulation in the UK, Centre for Competition Policy, University of East Anglia (mimeo)**

This paper explores the evolution of the energy regulator's general statutory duties since privatisation. Here, documentary analysis and legal archival methods are employed to: (i) observe how the list of duties has changed over time through amending legislation, and (ii) identify the likely motivations behind these amendments. This analysis includes using QDA software to examine historic Hansard debates, Parliamentary reports and data from our elite interviews.

**Errington, E., 2019. Just Regulation? Access to policy formulation for affordable energy in GB, Centre for Competition Policy, University of East Anglia, CCP Working Paper 19-2**

To analyse the procedural and recognition justice implications of FP policy formulation, five case studies of documents were constructed. One case involved the House of Commons impacting policy for the UK as a whole and one case was selected for each of England, Scotland, Wales and Northern Ireland. Each of the country case studies included a consultation at national government level and stakeholder responses; a committee investigation or inquiry; and national government strategy documents. This documentary corpus generated an initial set of interviewees for semi-structured elite interviews with practitioners involved with FP policy formulation in the UK. The documents and interview transcripts were coded and analysed thematically using NVivo software. Coding and analysis were conducted in parallel with interviewing so that feedback could support the inclusion of further documents and interviewees. Coding included using a framing around distributive, procedural and recognition justice and emerging themes from the documents and interviews. In total thirty-four individuals from twenty-five organisations were interviewed.

## References

- Department for Business, Energy and Industrial Strategy (BEIS)/BRE, 2018. Fuel Poverty – Methodology Handbook, June 2018, London, available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/719133/Fuel\\_Poverty\\_Methodology\\_Handbook\\_2018.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/719133/Fuel_Poverty_Methodology_Handbook_2018.pdf)
- Flores, M. and C. Waddams Price, 2018, The Role of Attitudes and Marketing in Consumer Behaviours in the British Retail Electricity Market, *The Energy Journal*, 39(4), pp. 153-179

## Appendix 2

### List of Abbreviations

<b>AHC</b>	After Housing Costs
<b>BEIS</b>	Department for Business, Energy and Industrial Strategy
<b>BHA</b>	Broadland Housing Association
<b>BHPS</b>	British Household Panel Survey
<b>CCP</b>	Centre for Competition Policy
<b>CERT</b>	Carbon Emissions Reduction Target
<b>CMA</b>	Competition and Markets Authority
<b>CPI</b>	Consumer Price Index
<b>DCLG</b>	Department for Communities and Local Government
<b>DECC</b>	Department for Energy and Climate Change
<b>ECO</b>	Energy Company Obligation
<b>ENEX</b>	Energy Expenditure
<b>ENEXShr</b>	Energy Expenditure Share
<b>ESRC</b>	Economic and Social Research Council
<b>FP</b>	Fuel Poverty or Fuel Poor
<b>FPS</b>	Fuel Poverty Strategy
<b>kWh</b>	Kilowatt-hour
<b>LCF</b>	Living Costs and Food Survey
<b>LIHC</b>	Low Income – High Cost
<b>MSB</b>	Micro and Small Business
<b>NDC</b>	Non-Discrimination Claus
<b>OECD</b>	Organisation for Economic Co-operation and Development

<b>OFT</b>	Office of Fair Trading
<b>OLS</b>	Ordinary Least Square
<b>PPM</b>	Pre-Payment Meter
<b>RPI</b>	Retail Price Index
<b>SAP</b>	Standard Assessment Procedure (energy efficiency ratings)
<b>SEG</b>	Social and Environmental Guidance
<b>SPS</b>	Strategy and Policy Statement
<b>UEA</b>	University of East Anglia
<b>UKERC</b>	UK Energy Research Centre
<b>UKRI</b>	UK Research and Innovation
<b>WFP</b>	Winter Fuel Payment
<b>WHD</b>	Warm Homes Discount