

RESIDENTIAL HEATING EXPENDITURES IN THE UK

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Introduction

Energy consumption in the UK

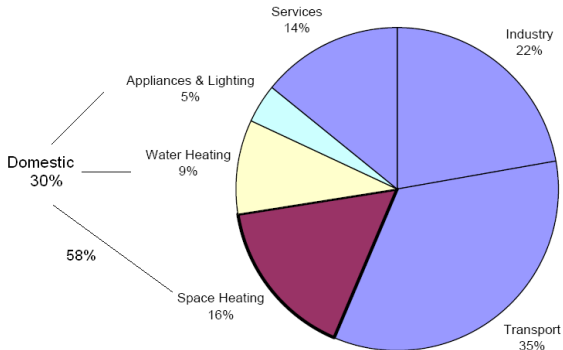


Figure: UK Final energy consumption (DTI, 2001)

- ▶ UK-Domestic sector: 30 % of total energy consumption, 58 % used for space heating

Introduction

Carbon emissions in the UK

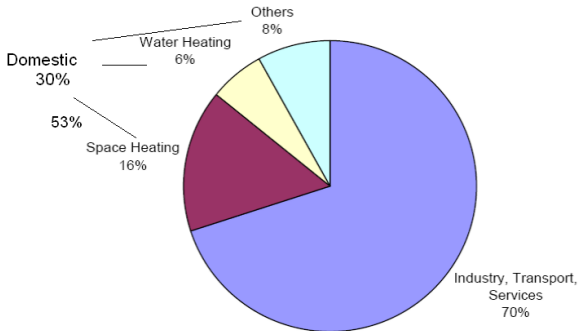


Figure: UK Carbon emissions (DCLG, 2004)

- ▶ Domestic building stock: 30 % of total UK carbon emissions, >50 % caused by residential space heating

Introduction

Complementary policy targets

- ▶ Increasing energy efficiency
- ▶ Reducing carbon emissions

How to achieve targets?

- ▶ In the domestic sector: Improve space heating efficiency and hence decrease heating expenditures
- ▶ Necessary: Understand determinants of space heating expenditures

What we do:

We analyse determinants of residential heating expenditures

Literature

on determinants of residential heating expenditures

Introduction

Literature

Theory

Data

Method

Basic Results

Summary

		Data		Determinants		
		cross section	panel	building	socio- econ.	HDD
long- run	Dubin/McFadden 1984	+		+		
	Nesbakken 2001	+		+	+	+
	Baker/Blundell 1991*	+			+	+
short- run	Leth-P./Togeby 2001		+	+		+
	Rehdanz 2007	+		+	+	
	Baker et al. 1989*	+			+	
	Meier/Rehdanz		+	+	+	+
	* UK-based studies					

Theory

Heating expenditures in the short run

Heating exp. = $px = f$ (fuel type, building & socio-econ. characteristics, location, HDD, year)

- ▶ fuel types: gas, electricity and oil (?)
- ▶ building: detached/semidetached houses (+), end terraced and terraced houses (+), flats (-)
- ▶ socio economic: annual hh-income (+), hh size (+), average hh-age (+), number of retired/unemployed (+), number of children (+)
- ▶ location: 16 regions in England, Scotland and Wales
- ▶ year: 1991 to 2005

(+)/(-) indicate positive/negative influence on heating expenditures.

BHPS

British Household Panel Survey

- ▶ Data at individual and household level, started in 1991
- ▶ Since then, 5,000 households (10,000 individuals) have been reinterviewed annually
- ▶ Today, 15 waves available

BHPS is matched with annual data on

- ▶ yearly UK energy prices for oil, gas and electricity, data from IEA
- ▶ regional heating degree days (HDD), data from UK met office
HDD=summations of negative differences between mean daily temperature and 15.5°C base

Method

Econometric specification

Functional form: log-linear

Dependent variable: log of a households's annual heating expenditures per room

- ▶ econometric specification: random effects model
- ▶ three specifications: all households, owners and renters
- ▶ two time periods: 1991 to 2005 and 1997 to 2005
- ▶ for 1997 to 2005 additional information on building characteristics available (leaky roof, damp walls..)

Basic Results 1991-2005

Dep. variable=log of annual heating expenditures/room			
Variable	all	owners	tenants
electricity	0.36164***	0.36314***	0.35252***
gas	-0.17317***	-0.17219***	-0.16644***
oil	(dropped)	(dropped)	(dropped)
income	0.00728*	0.00333	0.03353***
rooms	-0.71630***	-0.69625***	-0.78081***
hhsz	0.25630***	0.27303***	0.19565***
average age	0.20232***	0.21588***	0.22547***
children no	0.09186***	0.05523***	0.24818***
retired no	-0.06421***	-0.06139***	-0.10661***
unemployed no	0.02484**	0.01797	0.01183
owned	0.02660***		
semi-detached house	-0.09537***	-0.10000***	0.02179
end terraced house	-0.10573***	-0.12566***	0.04171
terraced house	-0.12659***	-0.13446***	0.01387
flat	-0.19955***	-0.19166***	-0.07977**
bungalow	(dropped)	(dropped)	(dropped)
HDD	0.00022***	0.00026***	0.00001
constant	8.82931***	8.72245***	8.92527***
years	yes	yes	yes
regions	yes	yes	yes
Observations	64,155	47,886	16,269
R-sq	0.2712	0.2626	0.2892

*** p<0.01, ** p<0.05, * p<0.1

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Summary and Conclusions

- ▶ Policy measures should target owner households and pensioners
- ▶ Limits of work: Information on age of buildings missing
- ▶ Next step: Analysis of price elasticities for oil and gas
- ▶ Thanks!