



Institute for
Fiscal Studies

Environmental taxes: economic principles and the UK experience

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Outline

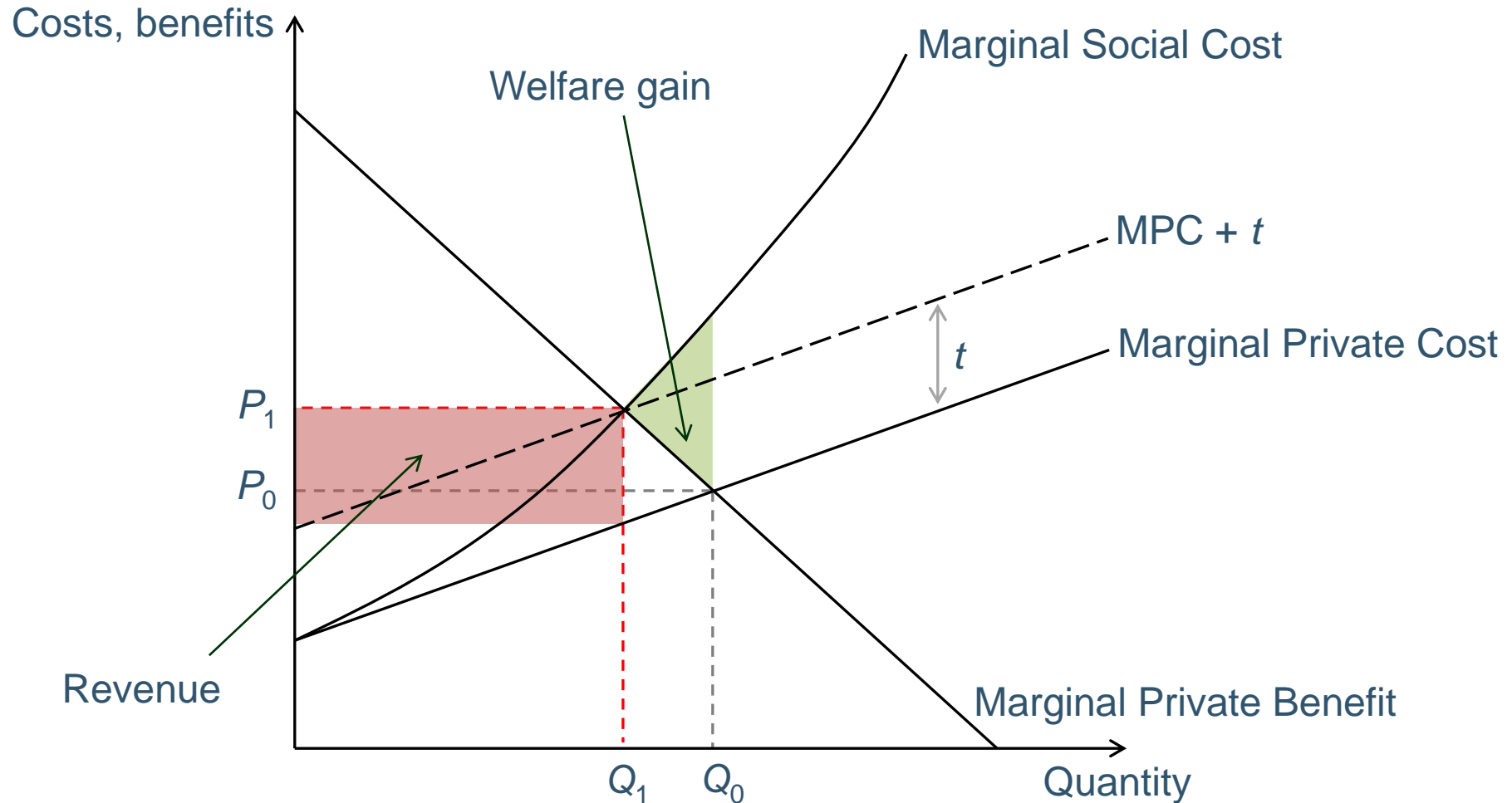
- Economics of environmental taxes
 - rationale for green taxes in environmental policy: externalities
 - pros and cons of green taxes
 - using green tax revenues
- Outline of the current UK green tax system
 - transport-, energy- and resource-based taxes
 - significance of green taxes in total receipts
- Failures of the UK system against good economics
 - inconsistent carbon taxes
 - motoring taxes not targeting the external costs

Economics of environmental taxes

The externality principle

- Costs of environmental damage not borne by polluters
 - pollution is a ‘negative externality’
- Private decisions lead to socially excessive pollution levels
- Tax can help polluter recognise full social costs
 - ‘internalise’ the externality
 - generate socially optimal outcomes and improve economic welfare

Externality-correcting green taxes



Economics of environmental taxes

The externality principle

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- Tax can help polluter recognise full social costs
 - ‘internalise’ the externality
 - generate socially optimal outcomes and improve economic welfare
- Some key insights for ‘Pigouvian’ green taxes:
 - set according to marginal external cost at socially optimal outcome
 - target the tax as closely as possible to the externality
- Taxes or regulatory ‘command-and-control’ approach?

Advantages of environmental taxation

- Static efficiency
 - with many polluters, likely to be different costs of abatement
 - regulation may fail to account for this
 - taxes incentivise efficient abatement patterns (low cost do more)
- Dynamic efficiency
 - ongoing incentives to reduce emissions
- Reduce need for individual negotiation
 - minimise risk of ‘regulatory capture’
- Revenue raising
 - UK green taxes generated about £43 billion in 2011 (8% of revenue)

Disadvantages of environmental taxation

- A uniform tax rate may not be efficient
 - variation in external cost by across emissions, location
 - can be hard to differentiate taxes appropriately
- Unintended behavioural responses
 - environmental consequences could be more damaging
 - may add to costs of tax collection and compliance
- Not always compatible with firm decision-making
 - small taxes may be ignored?

What about the distributional effects?

- Concern that green taxes are regressive
- Shouldn't assume this to be true – UK evidence is mixed
 - energy taxes regressive
 - vehicle fuel taxes appear not to be (low car ownership among poor)
 - taxes on aviation progressive
- Green taxes about sending efficient price signals
 - wider tax and benefit system can compensate (at least on average)
- Other environmental policy has distributional effects
 - much less transparent and harder to compensate

How should the revenue be spent?

- Should green tax revenues be hypothecated?
 - no compelling economic rationale
 - efficient pattern of taxes and spending not necessarily linked
 - political value – but policy makers should make clear economic case
- Is there a double dividend?
 - use revenues to reduce distortionary taxes (e.g. on labour)
 - environmental benefit and improved labour supply incentives
 - but higher green taxes increase prices
 - reduces real wages and labour supply incentives
 - overall effect could go either way

Current UK environmental taxes

Transport-related taxes

Tax	Key points	Rate(s)	Revenue
<i>Fuel duty</i>	<ul style="list-style-type: none"> •Equal for petrol and diesel since 1994 •71% real rise 1993–1999 ('escalator') •17% real fall since 1999 •No current reduction for biofuels 	57.95p/litre	£26.9 billion
<i>Vehicle excise duty</i>	<ul style="list-style-type: none"> •Annual vehicle ownership tax •Varies with fuel efficiency (13 bands) •Different first-year rates for new cars 	£0–£475 (£1,030 in year 1)	£5.8 billion
<i>Air passenger duty</i>	<ul style="list-style-type: none"> •Departing passenger tax •Varies by destination (4 distance bands) •Varies by class of flight (2 bands) 	£13–£184	£2.7 billion
<i>Company car & fuel taxes</i>	<ul style="list-style-type: none"> •Value benefit in kind income tax purposes •Rates depend on efficiency and fuel type 	0–35% of list price	£2.1 billion (2009/10)

Revenues for 2011/12 unless otherwise stated

Current UK environmental taxes

Energy-related taxes

Tax	Key points	Rate(s)	Revenue
<i>Climate change levy</i>	<ul style="list-style-type: none"> •Tax on commercial energy use •Varies by energy type •65% reduction for carbon-intensive sector 	0.509p/ kWh (elec) 0.177p/ kWh (gas)	£0.7 billion
<i>Renewables obligation</i>	<ul style="list-style-type: none"> •Requires energy companies to supply proportion of energy from renewables •Can 'buy out' unmet obligation 	£40.71/ MWh buyout	£0.4 billion (recycled)
<i>EU ETS auctioning</i>	<ul style="list-style-type: none"> •UK to auction 7%+ of Phase II permits •First auction in 2008 	Last cleared at €8.11/tCO ₂	£0.7 billion
<i>Carbon reduction commitment</i>	<ul style="list-style-type: none"> •Tax on carbon content of fuels used by mid-sized firms and organisations •League table of participants 	£12/tCO ₂	£0.7 billion

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Current UK environmental taxes

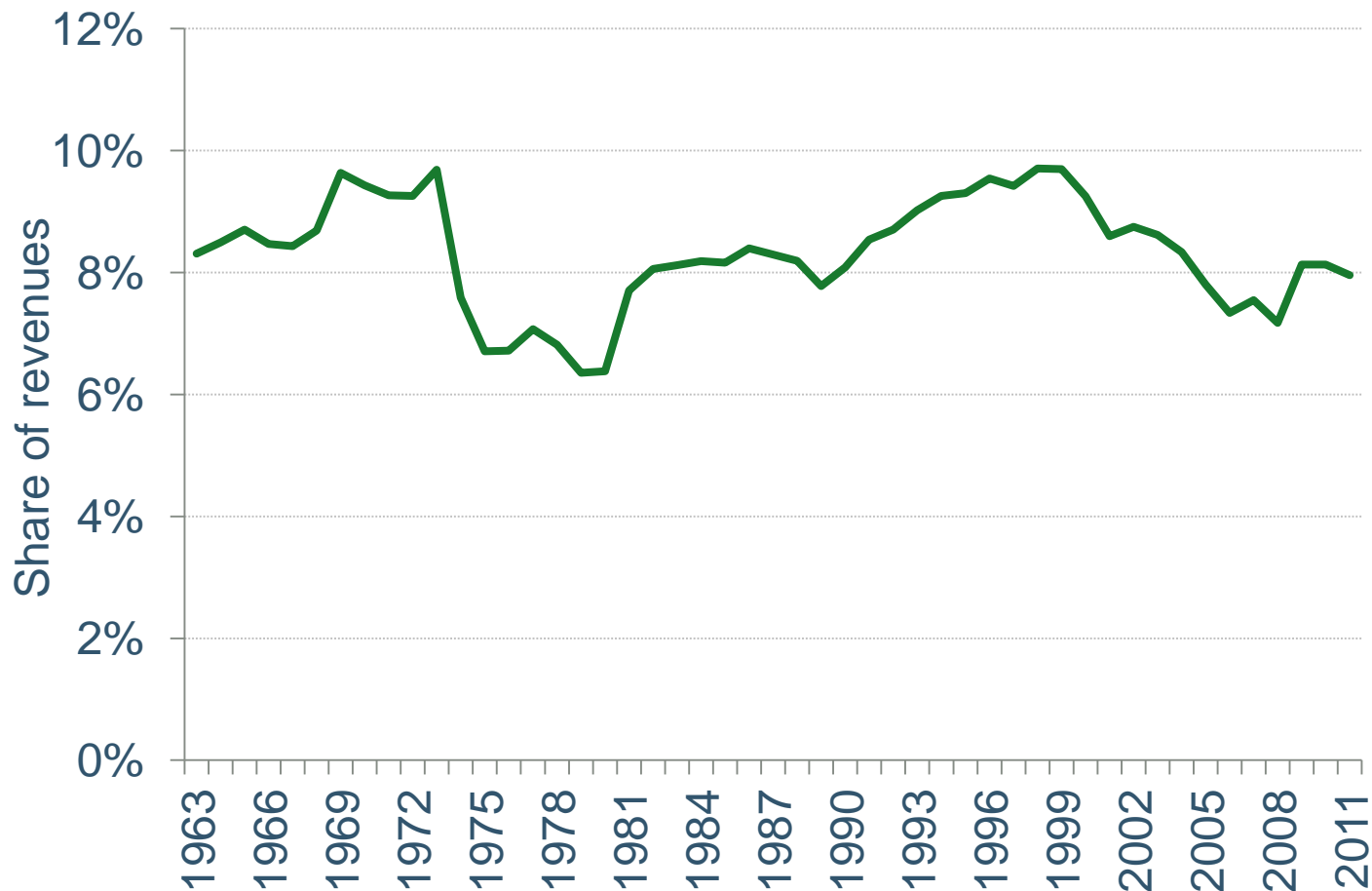
Natural resource and waste taxes

Tax	Key points	Rate(s)	Revenue
<i>Landfill tax</i>	<ul style="list-style-type: none">•Tax on waste sent to landfill•Lower rate for inert waste•Annual escalator in place since 1999	£64/t £2.50/t (inert)	£1.2 billion
<i>Aggregates levy</i>	<ul style="list-style-type: none">•Tax on commercial exploitation of sand, gravel and rock	£2/t	£0.3 billion

Revenues for 2011/12 unless otherwise stated

Green taxes less important in recent revenues

Real revenues (2011 prices) and as a share of total receipts, 1963–2011



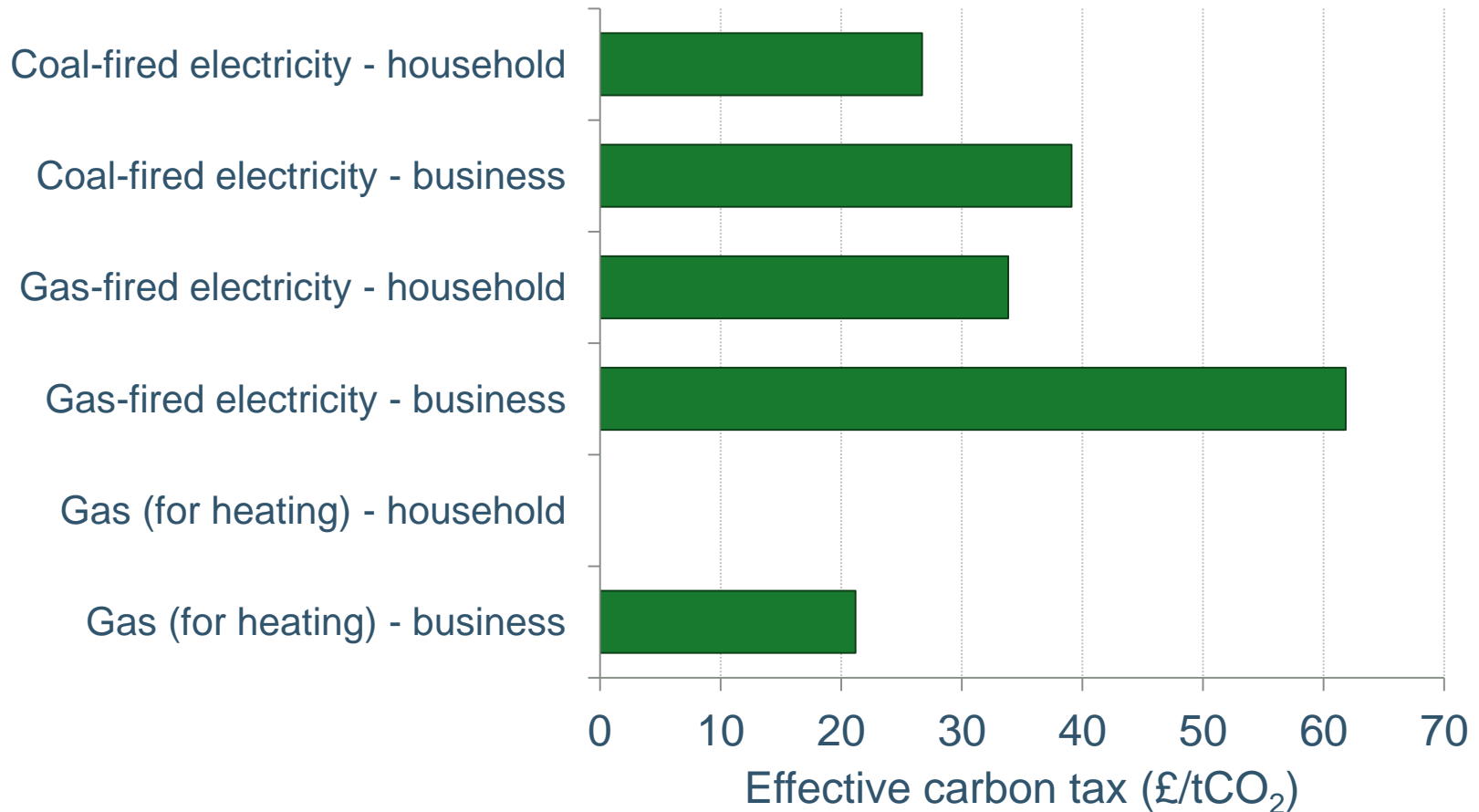
Source: author's estimates, calculated from ONS data

The inconsistency of prices on carbon

- Efficiency requires carbon price to be consistent
 - marginal external cost of tonne of carbon the same everywhere
 - inconsistent prices raises costs of carbon abatement
- Multiple policies in UK set implicit and explicit carbon prices
- Generates wide range of effective prices
 - firms vs. households (no carbon taxes on domestic gas)
 - firms of different sizes , carbon intensiveness
 - different types of fuel (some taxes do not vary by carbon content)

The inconsistency of prices on carbon

Effective carbon prices from UK energy policies, by fuel & user (2013/14)



Source: Advani et al. (2011). Note: Business rates assume CRC participation.

The inconsistency of prices on carbon

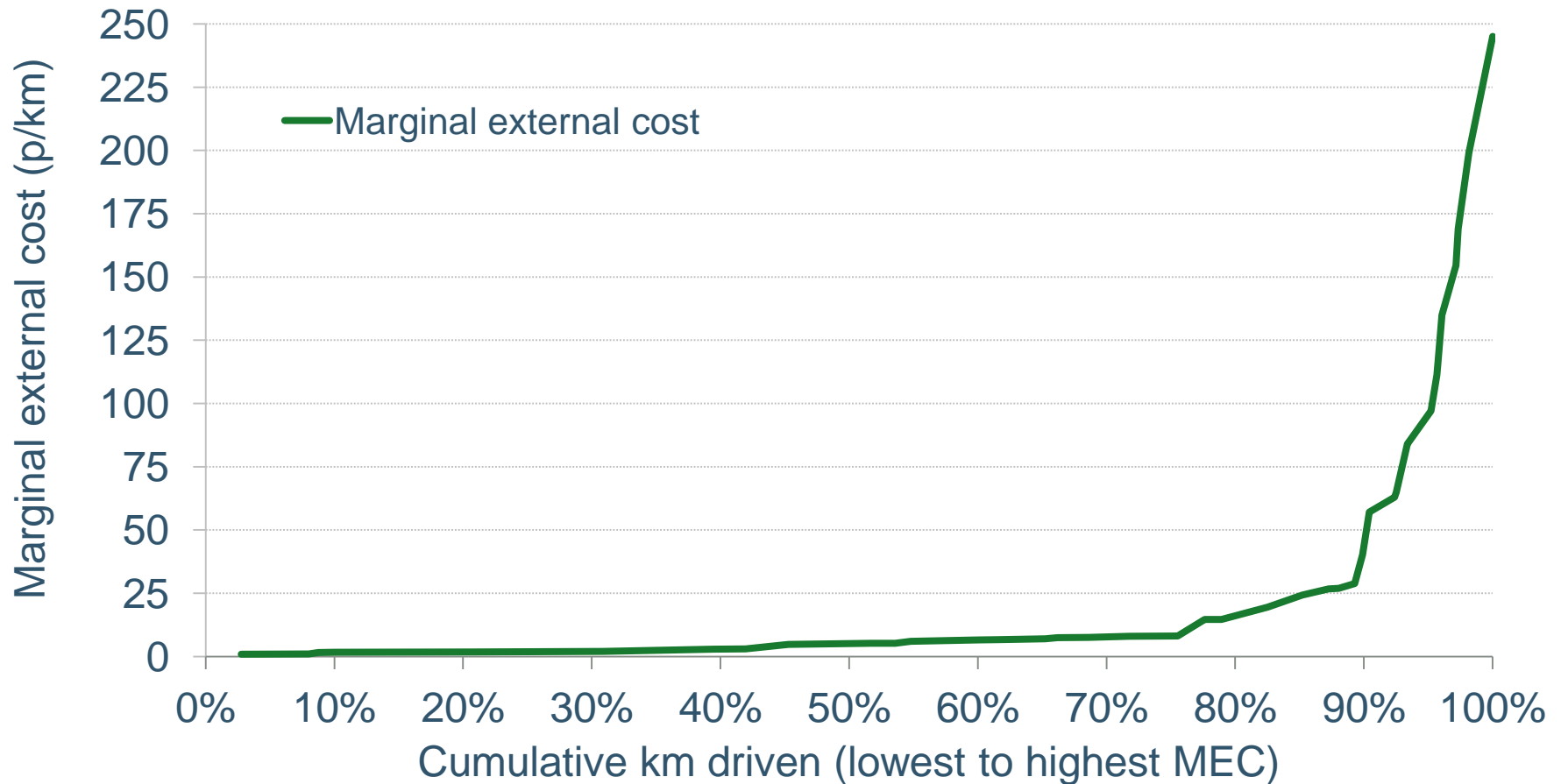
- Putting the 'right price' on carbon emissions is hard
- But efficiency requires carbon price to be consistent
 - otherwise raises cost of reducing emissions
- Evidence of a wide range of effective carbon prices in the UK
 - firms vs. households (no carbon taxes on domestic gas)
 - firms of different sizes, carbon intensiveness
 - different types of fuel (some taxes do not vary by carbon content)
- **In fact, household energy use subsidised by reduced VAT**
 - average subsidy £178, cost £5.5 billion
 - nine times larger than bill impact of climate change policies

Targeting taxes to the externality: road transport

- Road transport associated with several externalities
 - climate change
 - noise and other local pollution
 - congestion (much the biggest externality)
- Climate change externality depends largely on fuel use
 - around 14p per litre for petrol at current UK carbon values
- Current tax on fuel around 58p per litre
- Hard to know whether other externalities rationalise this level
 - fuel a very poor proxy for other externalities
 - depend on where and when someone drives

Marginal external costs of motoring vary widely

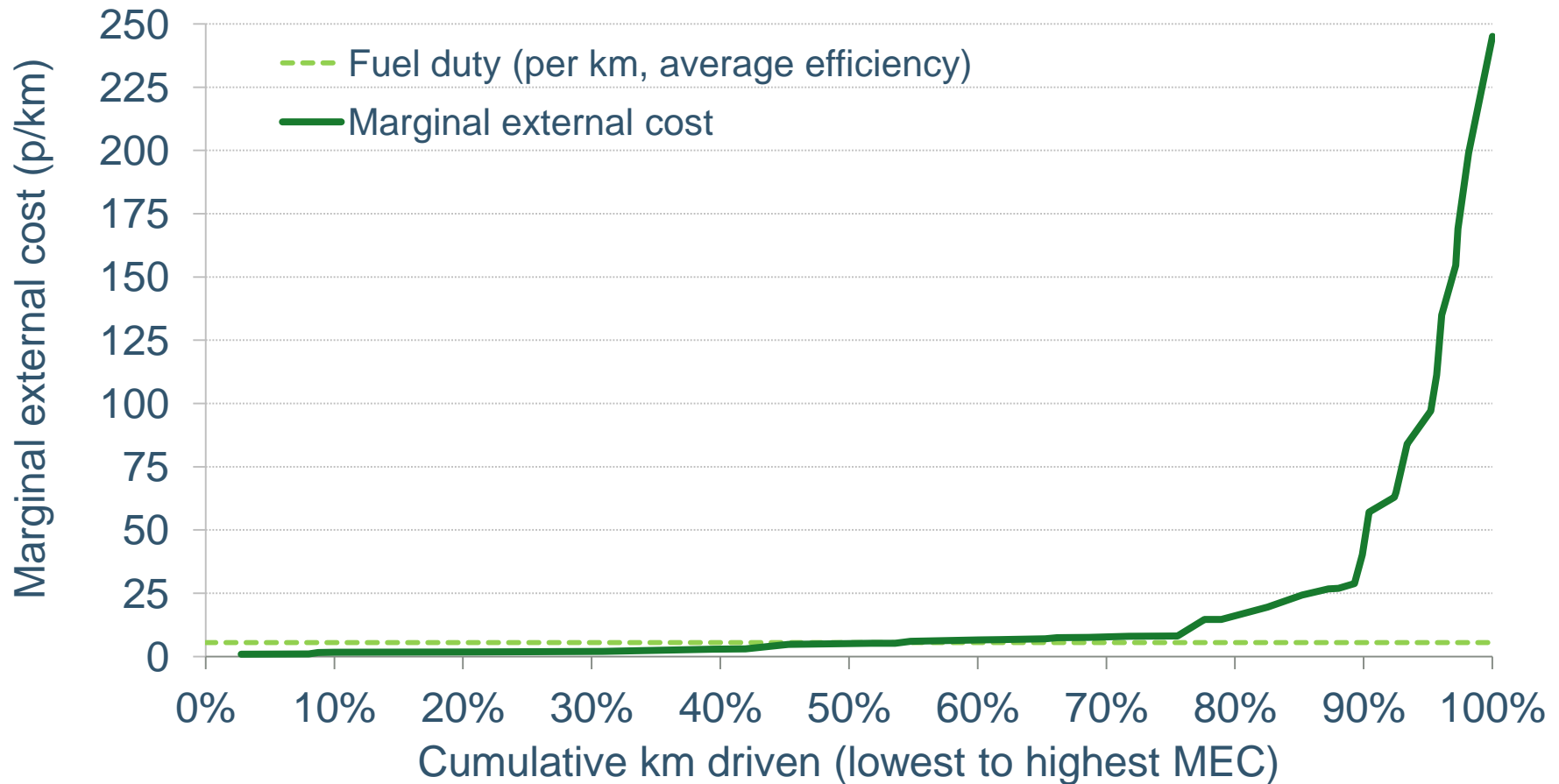
Distribution of marginal external cost in the UK, 2010 estimates



Source: Johnson et al. (2012).

Marginal external costs of motoring vary widely

Distribution of marginal external cost in the UK, 2010 estimates



Source: Johnson et al. (2012).

Conclusions

- Clear economic rationale for environmental taxes
 - should be set based on evidence of environmental costs
 - need to be well-targeted
- Have advantages over other instruments
 - not always the best policy: environmental outcomes uncertain
 - continued role for regulation
- Taxes should be justified by environmental impact
 - hypothecation, double dividend not good rationales
- Several examples where UK reforms could yield big benefits
 - consistency of carbon pricing
 - better targeted transport taxes