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# Environmental taxes: economic principles and the UK experience

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# Outline

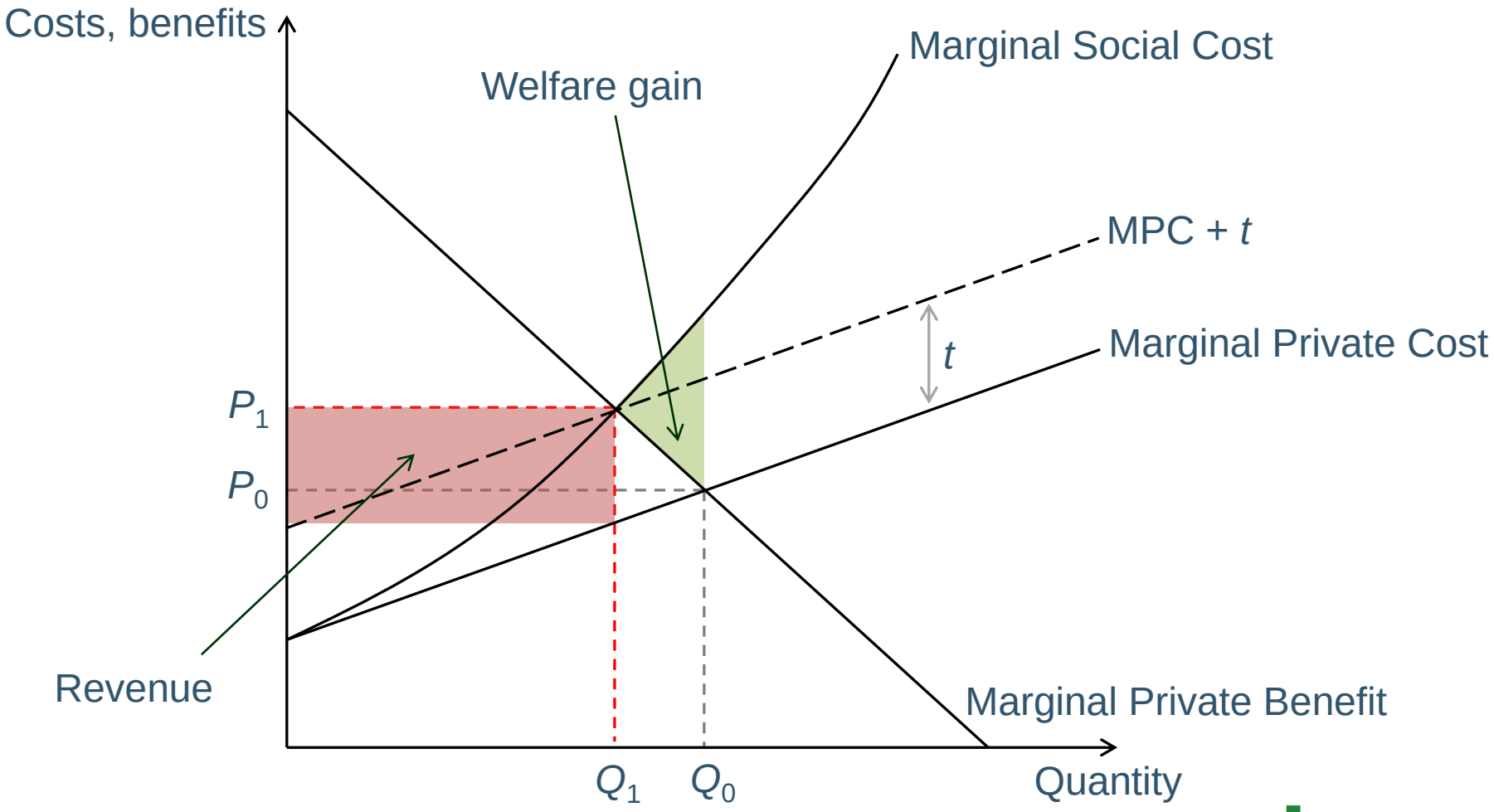
- Economics of environmental taxes
  - rationale for green taxes in environmental policy: externalities
  - pros and cons of green taxes
  - using green tax revenues
- Outline of the current UK green tax system
  - transport-, energy- and resource-based taxes
  - significance of green taxes in total 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



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# Economics of environmental taxes
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- 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 |
|---|---|---|---|
| *Fuel duty* | •Equal for petrol and diesel since 1994<br>•71% real rise 1993–1999 ('escalator')<br>•17% real fall since 1999<br>•No current reduction for biofuels | 57.95p/ litre | £26.9 billion |
| *Vehicle excise duty* | •Annual vehicle ownership tax<br>•Varies with fuel efficiency (13 bands)<br>•Different first-year rates for new cars | £0–£475 (£1,030 in year 1) | £5.8 billion |
| *Air passenger duty* | •Departing passenger tax<br>•Varies by destination (4 distance bands)<br>•Varies by class of flight (2 bands) | £13–£184 | £2.7 billion |
| *Company car & fuel taxes* | •Value benefit in kind income tax purposes<br>•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 |
|---|---|---|---|
| *Climate change levy* | •Tax on commercial energy use<br>•Varies by energy type<br>•65% reduction for carbon-intensive sector | 0.509p/ kWh (elec)<br>0.177p/ kWh (gas) | £0.7 billion |
| *Renewables obligation* | •Requires energy companies to supply proportion of energy from renewables<br>•Can 'buy out' unmet obligation | £40.71/ MWh buyout | £0.4 billion (recycled) |
| *EU ETS auctioning* | •UK to auction 7%+ of Phase II permits<br>•First auction in 2008 | Last cleared at €8.11/$tCO_2$ | £0.7 billion |
| *Carbon reduction commitment* | •Tax on carbon content of fuels used by mid-sized firms and organisations<br>•League table of participants | £12/$tCO_2$ | £0.7 billion |

Revenues for 2011/12 unless otherwise stated

# Current UK environmental taxes

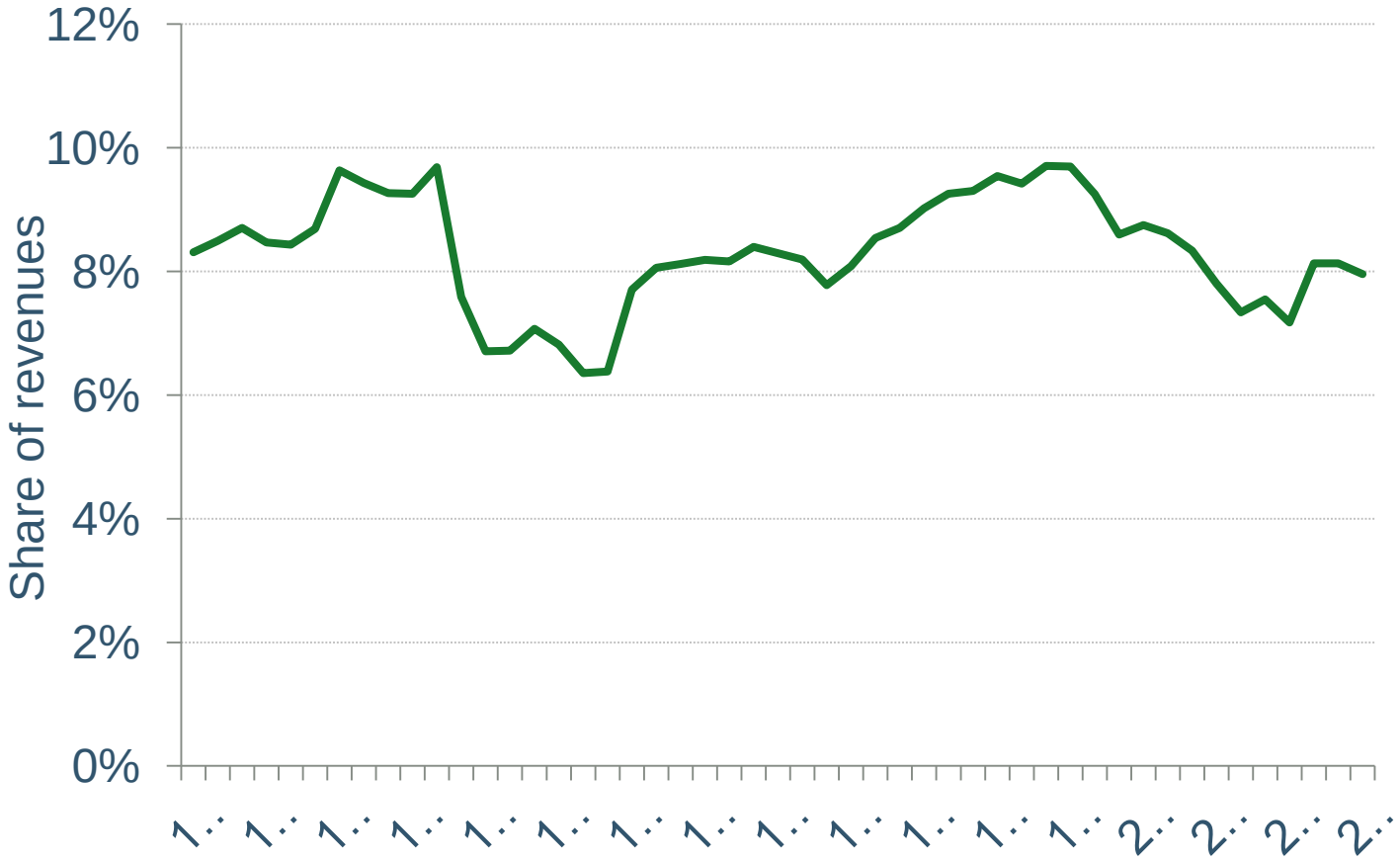
## Natural resource and waste taxes

| Tax | Key points | Rate(s) | Revenue |
|---|---|---|---|
| *Landfill tax* | •Tax on waste sent to landfill<br>•Lower rate for inert waste<br>•Annual escalator in place since 1999 | £64/t<br>£2.50/t (inert) | £1.2 billion |
| *Aggregates levy* | •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



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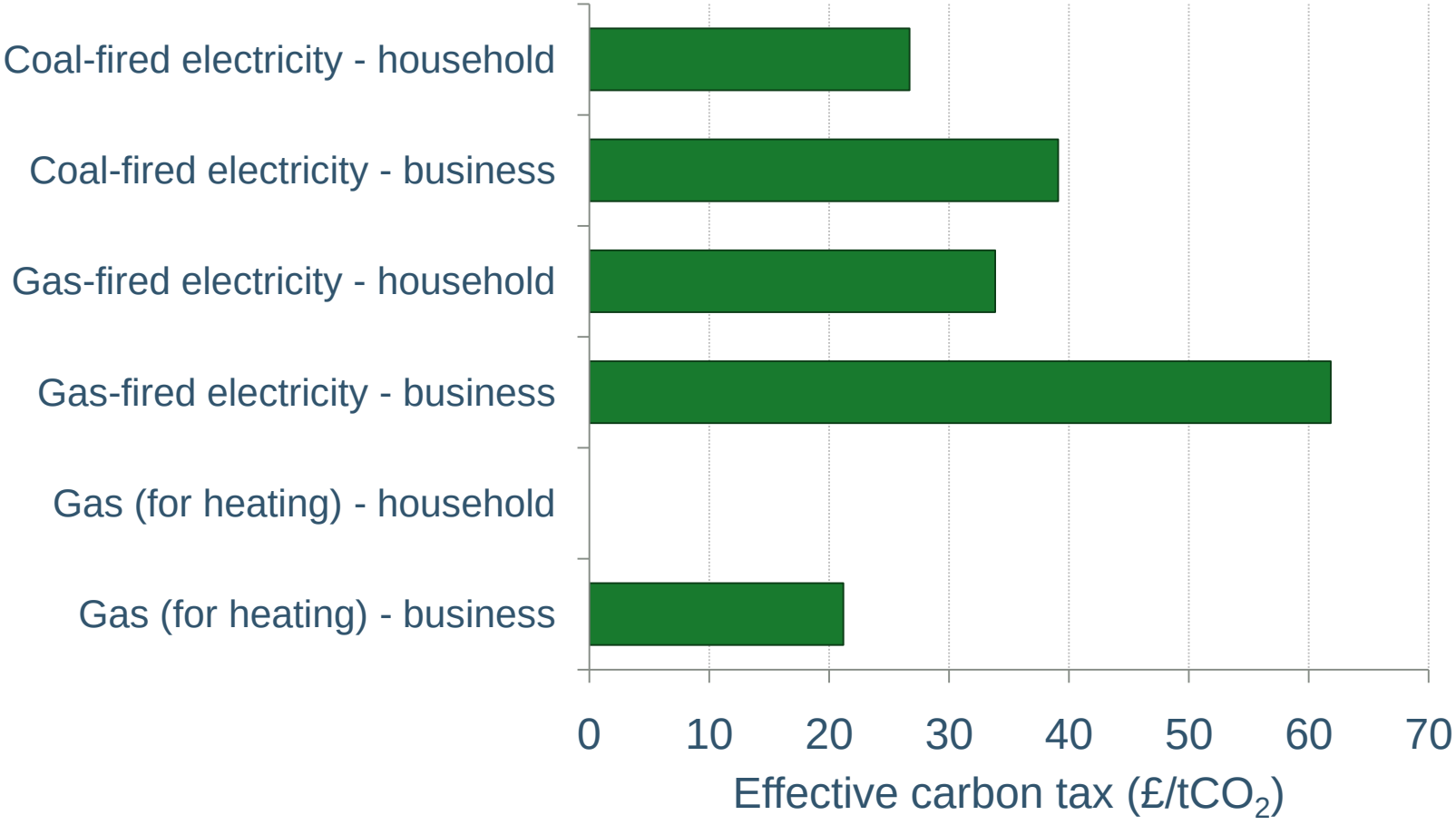
# The inconsistency of prices on carbon

- 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.



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# The inconsistency of prices on carbon

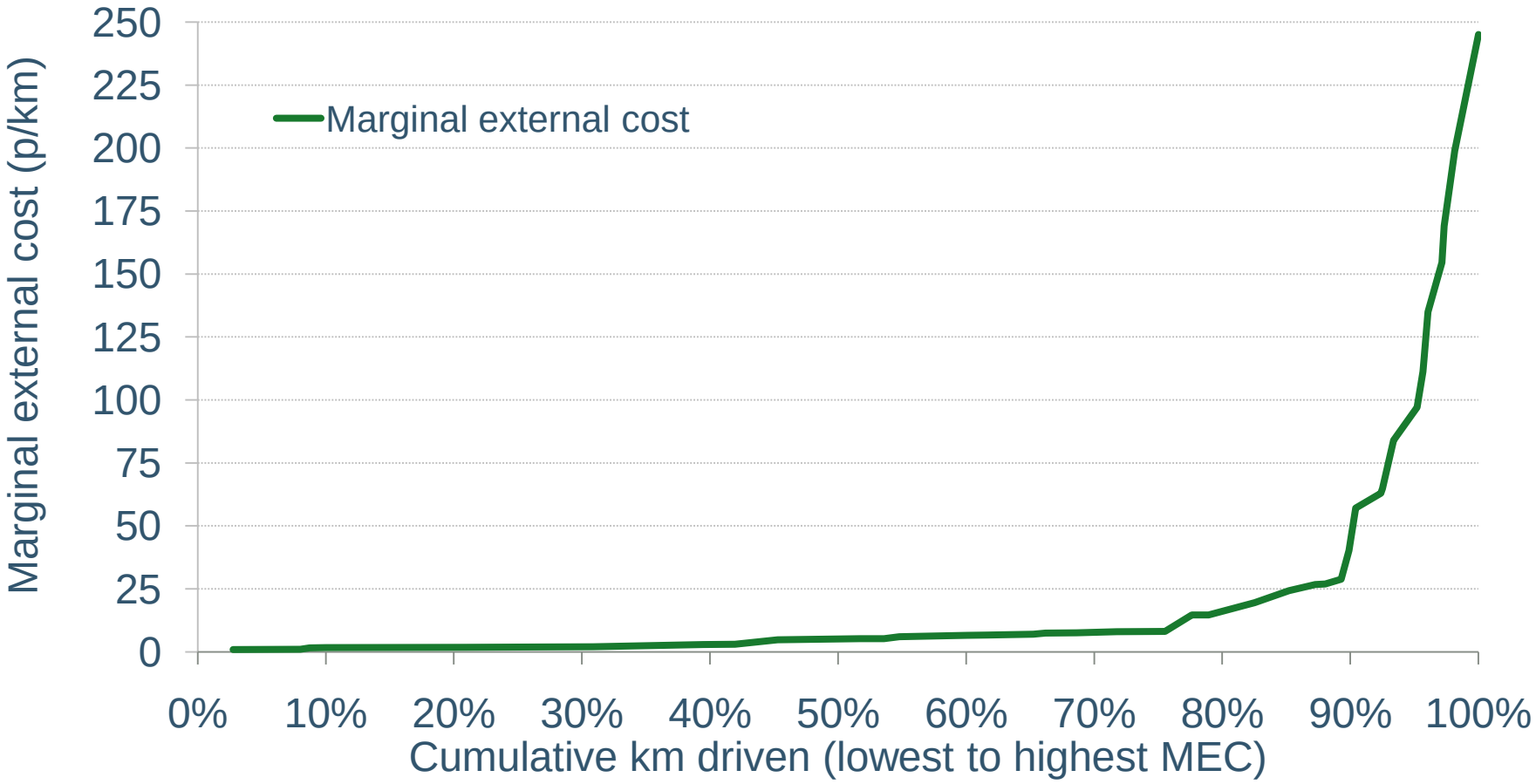
- Putting the ‘right price’ on carbon emissions is hard
- But efficiency requires carbon price to be consistent
  - otherwise raises cost of reducing emissions
- Evidence of a wide range of effective carbon prices in the UK
  - firms vs. households (no carbon taxes on domestic gas)
  - firms of different 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).



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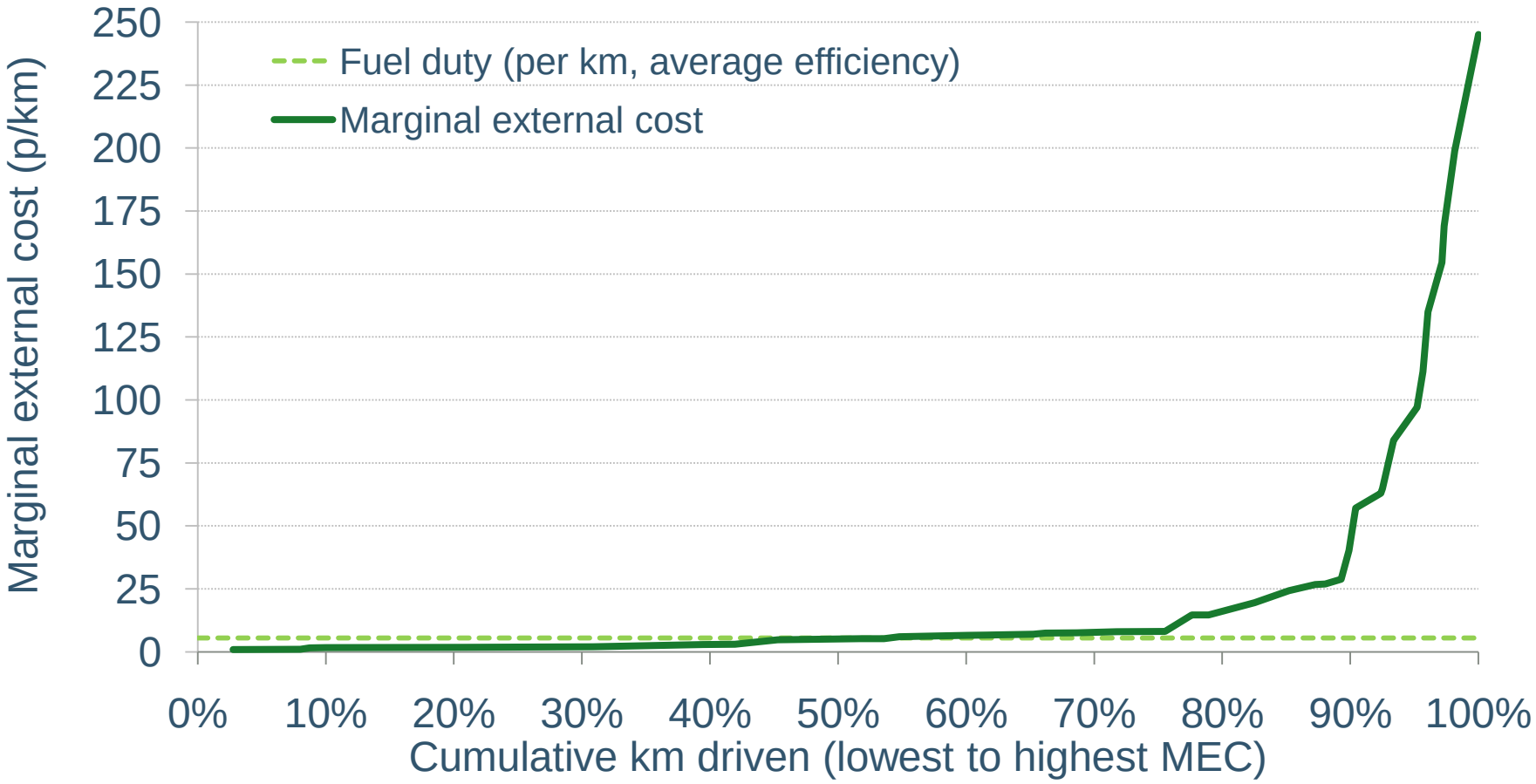


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# Conclusions

- 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