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Tax incidence from environmental taxation

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Presentation outline



- Designing tax policies for emission abatement considering also tax incidence
- International evidence of tax incidence
- Danish empirical evidence of effect from different environmental taxes already implemented
- Marginal Gini coefficients indicate both regressive and progressive tax effects – comparison with other taxes
- Suggestions for future work on modelling incidence of tax policies/tax shifts with technology constraints

Designing policies for emission abatement considering also tax incidence



- Why consider tax incidence?
- Equity concerns matters a lot for acceptance of policies including both taxes and support schemes
- Environmental taxes can be designed in ways that has less problematic distributional effects than other tax policies
- For a choice of tax composition to achieve emission abatement choose a one that does not impact poor households very much
- Tax recycling should be designed to compensate also poor households for additional taxes not only to compensate industry

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Which elements of distributional impacts to consider?



- Direct impact on tax payments by households
- Indirect tax payments through consumption of (domestically=taxed) produced goods and services
- Employment effects
- Tax structure interaction - reduced income taxation financed by higher environmental taxes
- Efficiency - equity trade-offs
- a less uniform tax leads to in-optimal solutions (marginal abatement costs differs)
- Distribution of benefits from mitigating pollution

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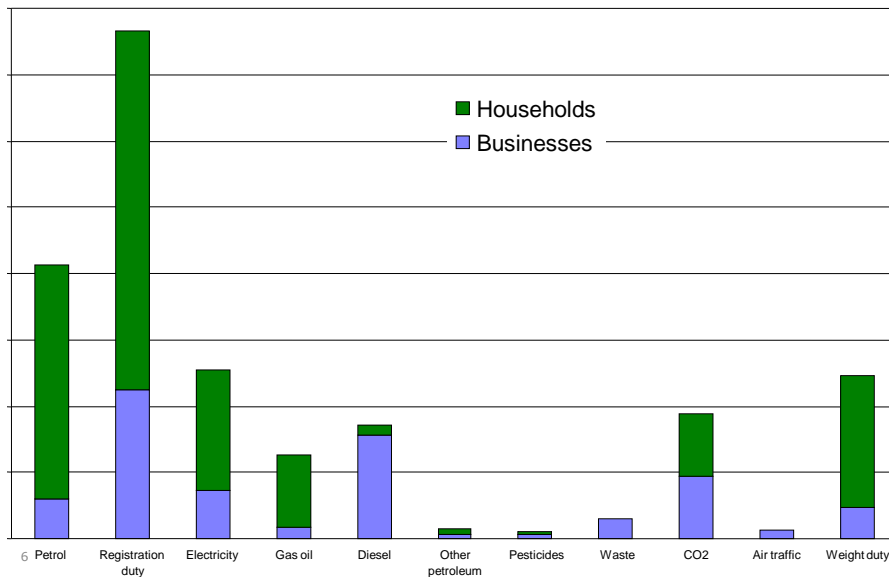
International experiences for taxes levied on household consumption



- Environmental taxes (broadly defined) are much higher for households than for producing sectors especially for high-income countries
- Some countries have negative taxes – energy subsidies
- The taxes are levied on both basic goods as water and heating and on more luxury goods as expensive cars and air travel
- The distributional effect varies among different countries and for different taxes
- Empirical studies are based on both household expenditure surveys and tax-collection databases for income

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Composition of environmental tax revenues DK



Recent studies



- Hassett, Mathur and Metcalf (Energy Journal, 30 (2) 2009) *The incidence of a US carbon tax: A lifetime and regional analyses*
 - Carbon taxes are regressive and the direct part is more regressive than the indirect part
- Labandeira X, Labeaga JM, Rodriguez M, (Energy Policy, 37, 2009) *An integrated economic and distributional analysis of energy policies.* (Spain)
 - microeconomic household demand model + CGE model
 - flat carbon tax is found to be neutral due to transport
- Wier, Jacobsen et. al. (2005) *Ecological Economics: Are CO2 taxes regressive?* (Denmark) and Jacobsen et. al. (Fiscal Studies, 24 (4), p. 477-499) *Distributional Implications of Environmental Taxation in Denmark,*

Combining direct and indirect effects : Input-output

- Yes regressive but the indirect does not add to the regressive effect even though food has high energy (carbon) content

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International studies

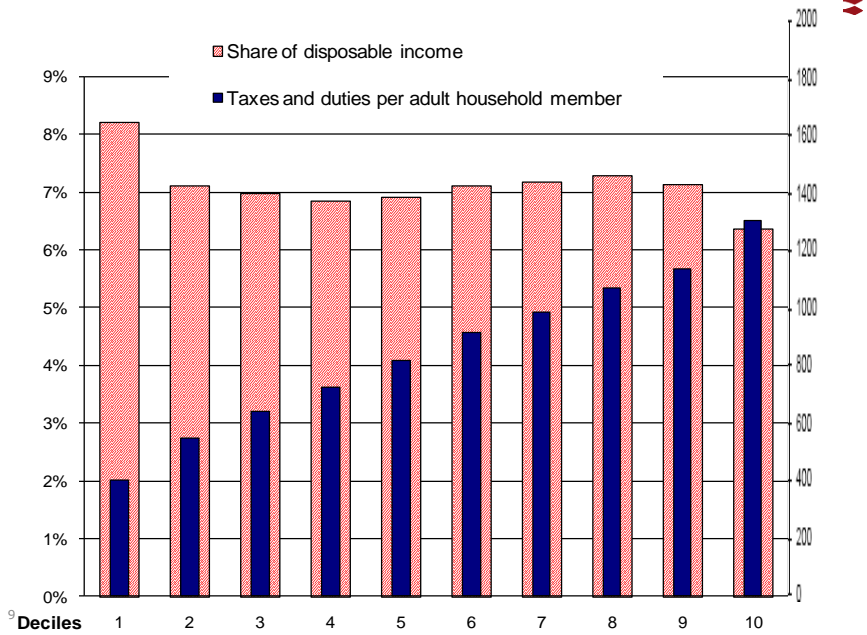


Older studies:

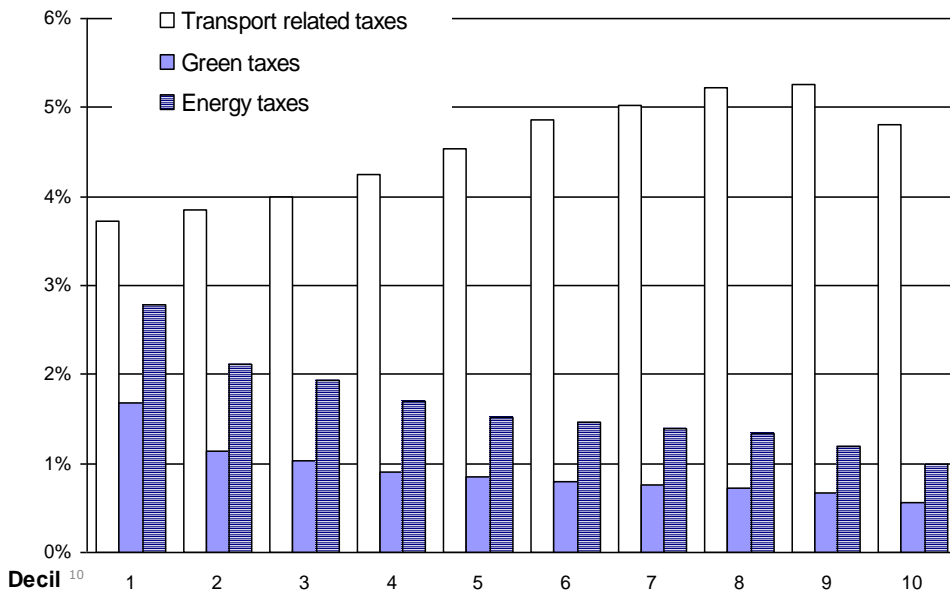
- Symons et. al. (1997) compare distributional impact of energy and carbon taxes in a number of EU countries. They combine direct and indirect consumption effect in a static input-output framework
 - The effect is most regressive in northern Europe (Germany, UK) explanation - transport - heating?
- Cornwell and Creedy (1996, 1998) for Australia also use io-methodology combined with demand response and conclude that CO2 taxes are regressive unless revenue is used for compensating low-income households
- For developing countries some results might be reversed in that these taxes tend to be progressive - Energy and especially gasoline are luxury products (Shah and Larsen 1992, Pakistan)

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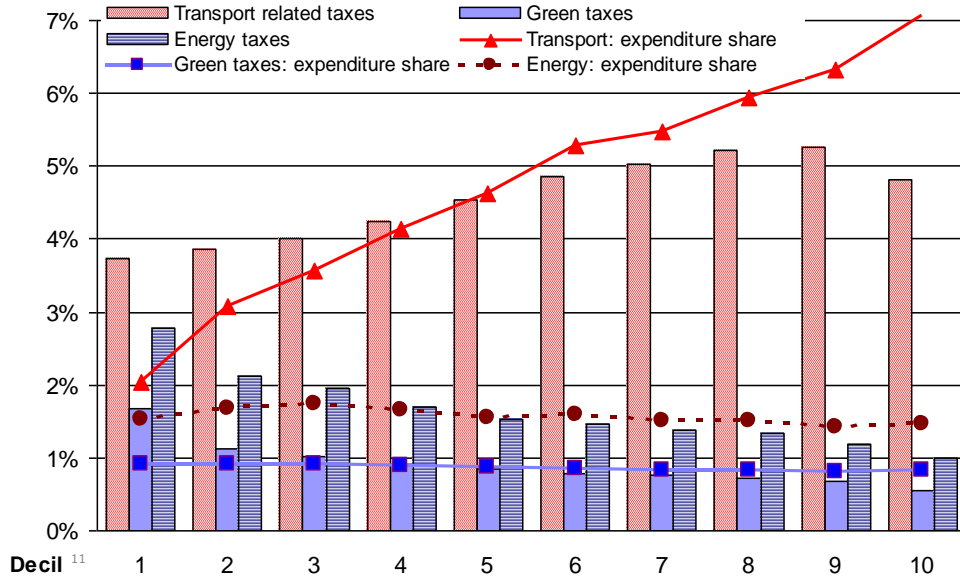
Environmental taxes and disposable income deciles



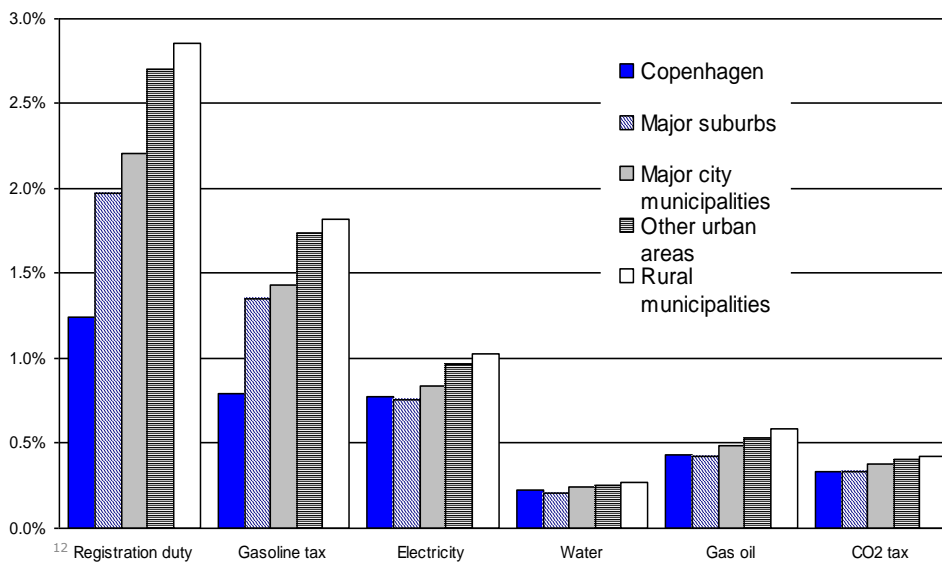
Major categories of environmental taxes (share of disposable income)




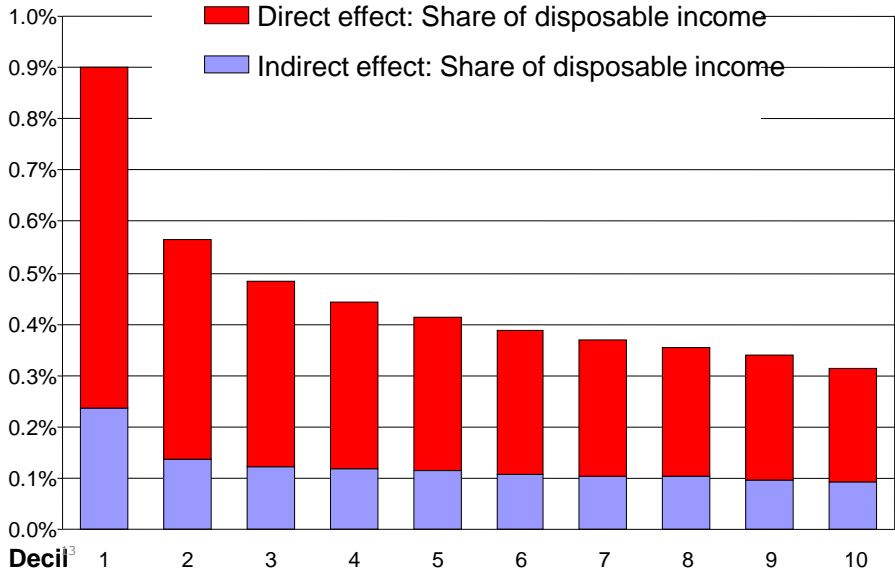
Comparing disposable income and expenditure shares




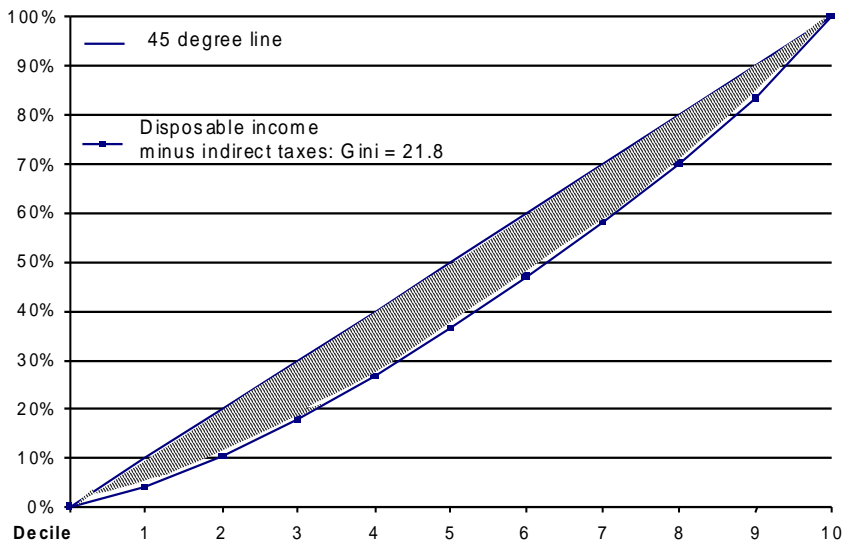
Residential location and selected environmental taxes



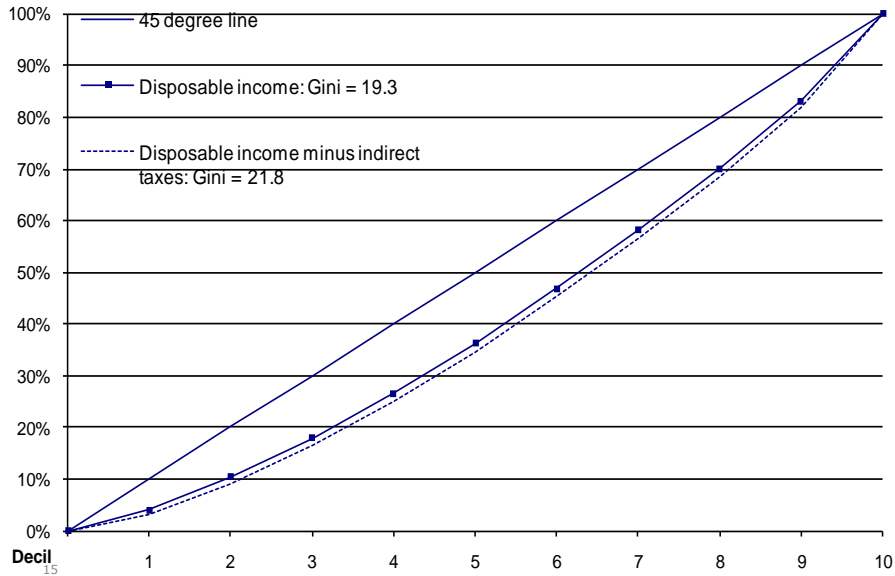
Combining direct and indirect effect of CO2 tax 



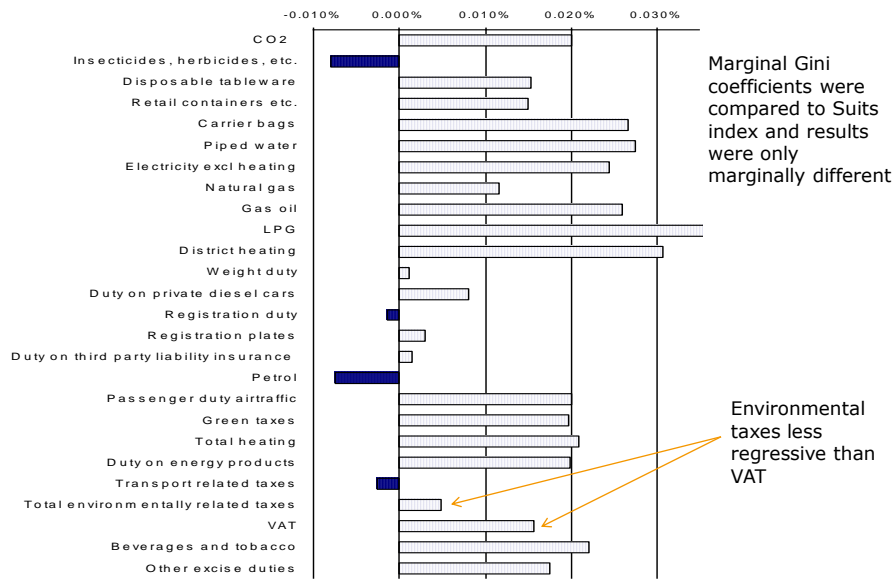
Gini coefficient: One measure of distribution inequality 



Gini coefficient change when indirect taxes are subtracted



Marginal Gini coefficient as measure of regressivity



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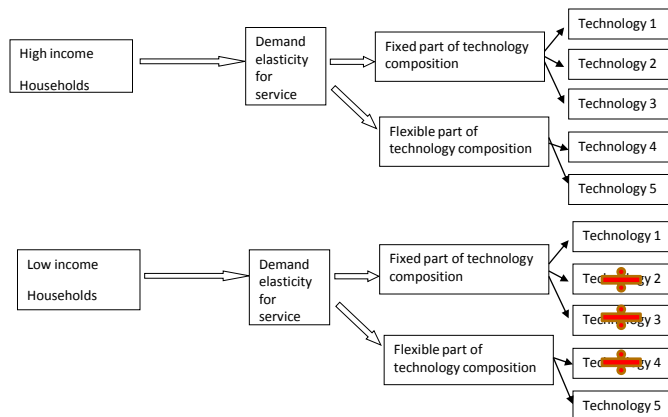
Tentative ideas for modelling tax incidence effects with technology constraints for income groups



- Empirical studies as the one above miss the demand shift that will occur as a consequence of changed prices
 - Policy analyses with models will provide additional insight to how policy instruments as taxes affect different income groups that depend on different energy technologies and to varying degrees are constrained in technology choice
 - Identification of income/population segments where behavioural parameters differ
1. Difference in elasticities: (price and income) ➡ the higher the income (and the consumption) the higher the elasticity for some energy goods (electricity)
 2. Different coverage of technologies for population segments: not all technologies available for all groups: ➡ costs of increased prices higher for income groups restricted in technology choice

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Structural difference of parameters



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Conclusions

- Environmental taxes in Denmark are regressive and probably in most countries – However, they are no worse than VAT
- The distributional impact of different types of environmental taxes varies a great deal
- Electricity and water taxes are among the most regressive taxes
- Registration duties and taxes on petrol are progressive
- Environmental taxes on average are less regressive than VAT and energy and green taxes are only slightly more regressive
- Modelling effects of mitigation policies could address also distributional concerns based on different consumption and technology options for income groups including technology constraints

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Thank you

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