Can the rebound effect reduce fuel poverty?

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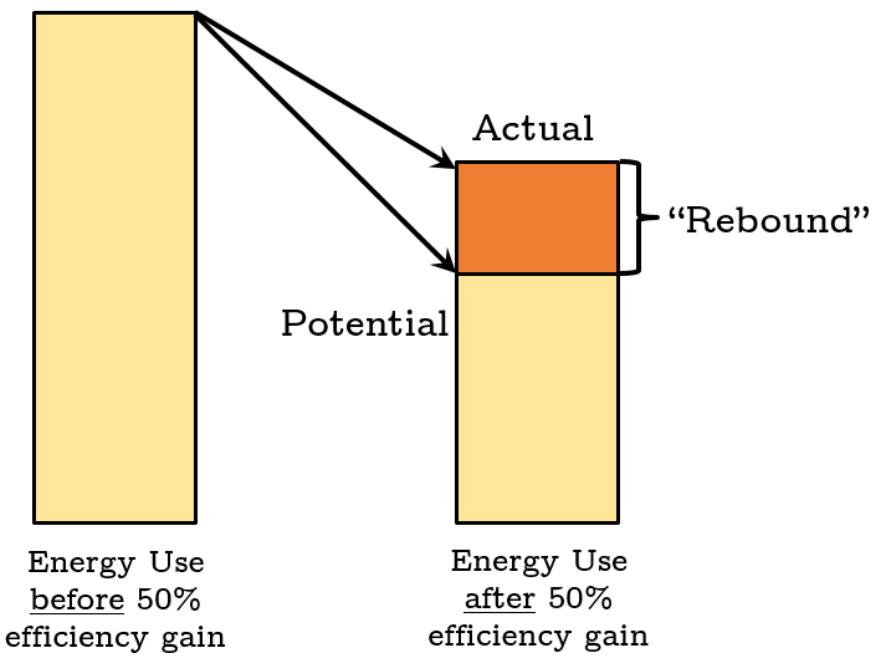
Energy efficiency and rebound effect

Potential energy saving from more efficient energy use can eroded by the behavioural response of economic agents. This is the **rebound effect**.

It can be considered at different levels of energy uses, and types of energy uses, depending of what we include in 'actual energy savings'.



Is rebound necessarily bad?

Macroeconomic Benefits

Studies show that the presence of rebound is associated with a series of macroeconomic benefits. These include stimulus to important components of GDP such as investment, consumption and trade, and to key labour market indicators (unemployment, employment and real wage level).

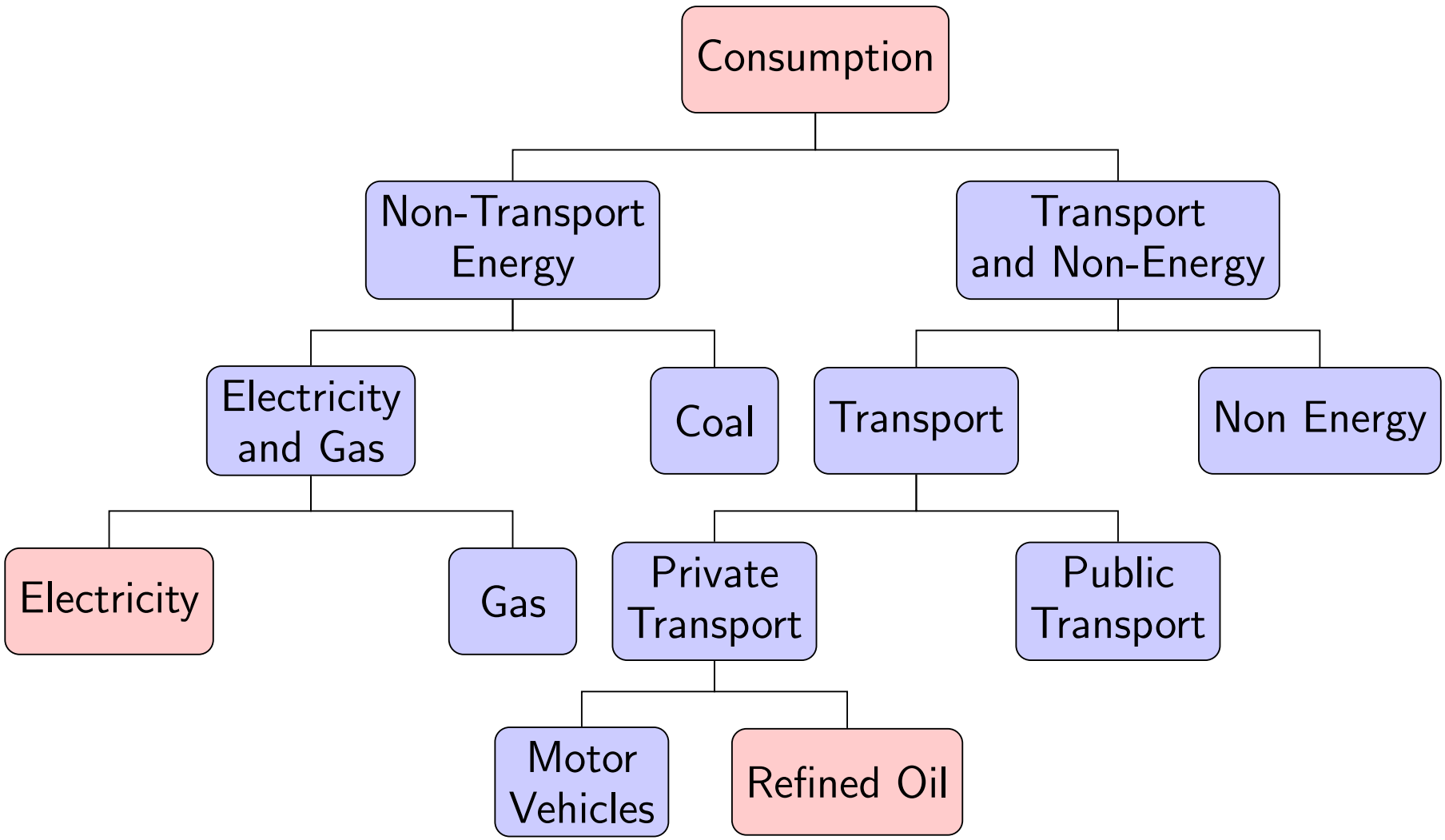
Impact on households

Rebound is associated with changes in patterns in consumption. Households reallocate their spending taking into account for savings from the more cost-effective use of energy, changes in prices of commodities and income variations.

Can we reduce fuel poverty by increasing energy efficiency?

- *"A household is in* **fuel poverty** *if it would be required to spend more than 10% of its income (including Housing Benefit or Income Support for Mortgage Interest) on all modelled household fuel use"* (The Scottish Government 2012).
- In this study we analyse the general equilibrium impacts of introducing an illustrative 10% efficiency improvement household's energy use across five households income bands.
- We focus on two particular energy use by simulating a 10% energy efficiency increase in a) electricity consumption, b) refined oil fuels used in private transport.
- We use a regional dynamic CGE model for Scotland specifically designed to the effect to disturbances in the energy sector.

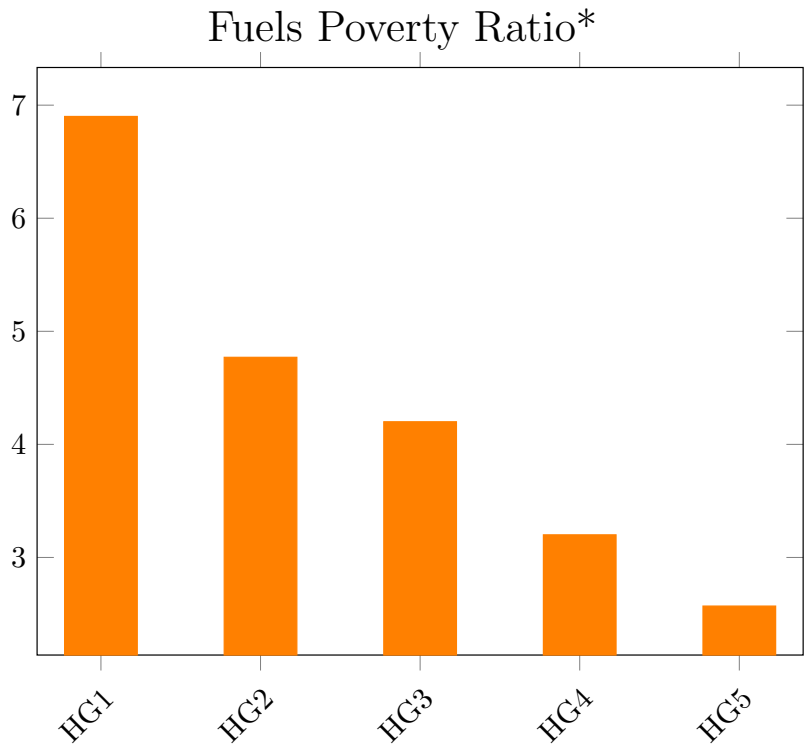
The Structure of Consumption



Disaggregating the household sector in the Scottish SAM

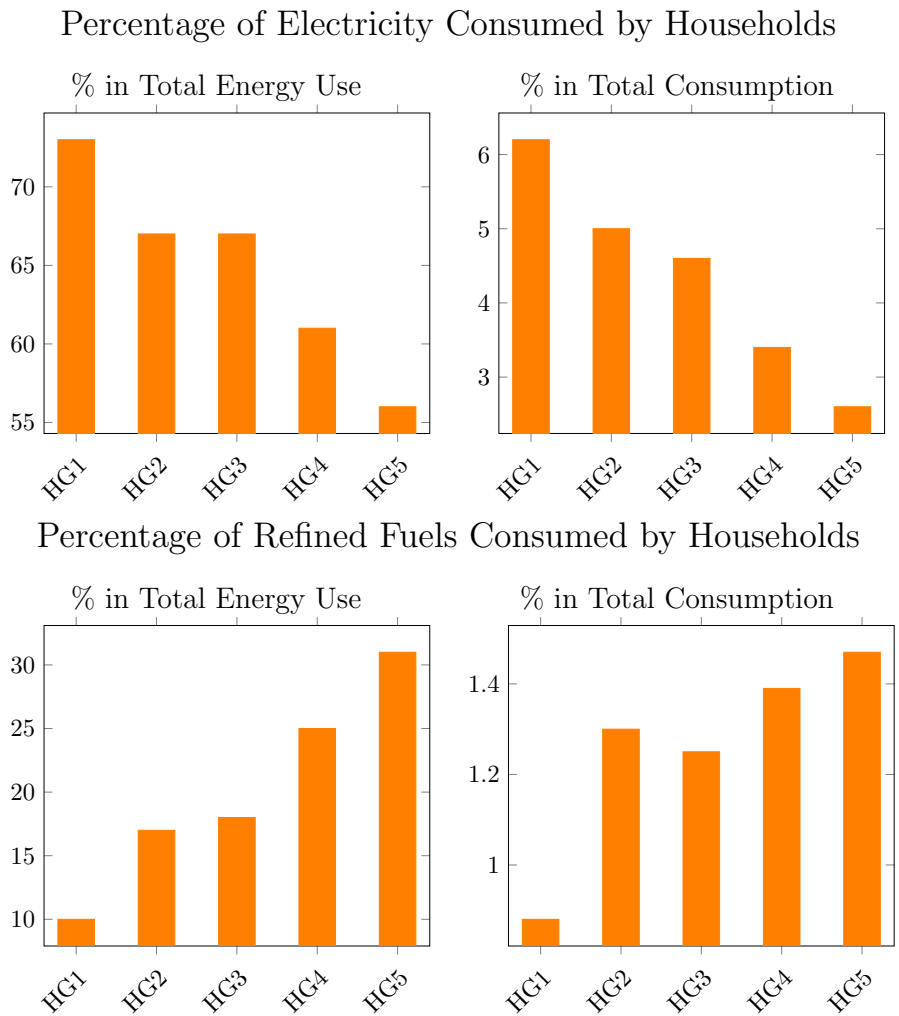
Table 1: Income group disaggregation in the 2010 Scottish SAM

HG1	HG2	HG3	HG4	HG5
up to £32.0K	£32.1K - £41.0K	£41.1K - £52.0K	£52.1K - £69.0K	£69.1K and over



*calculated as total energy consumption/household income

Patterns in energy consumption



Macroeconomic impacts of an illustrative 5% increase in household's energy efficiency

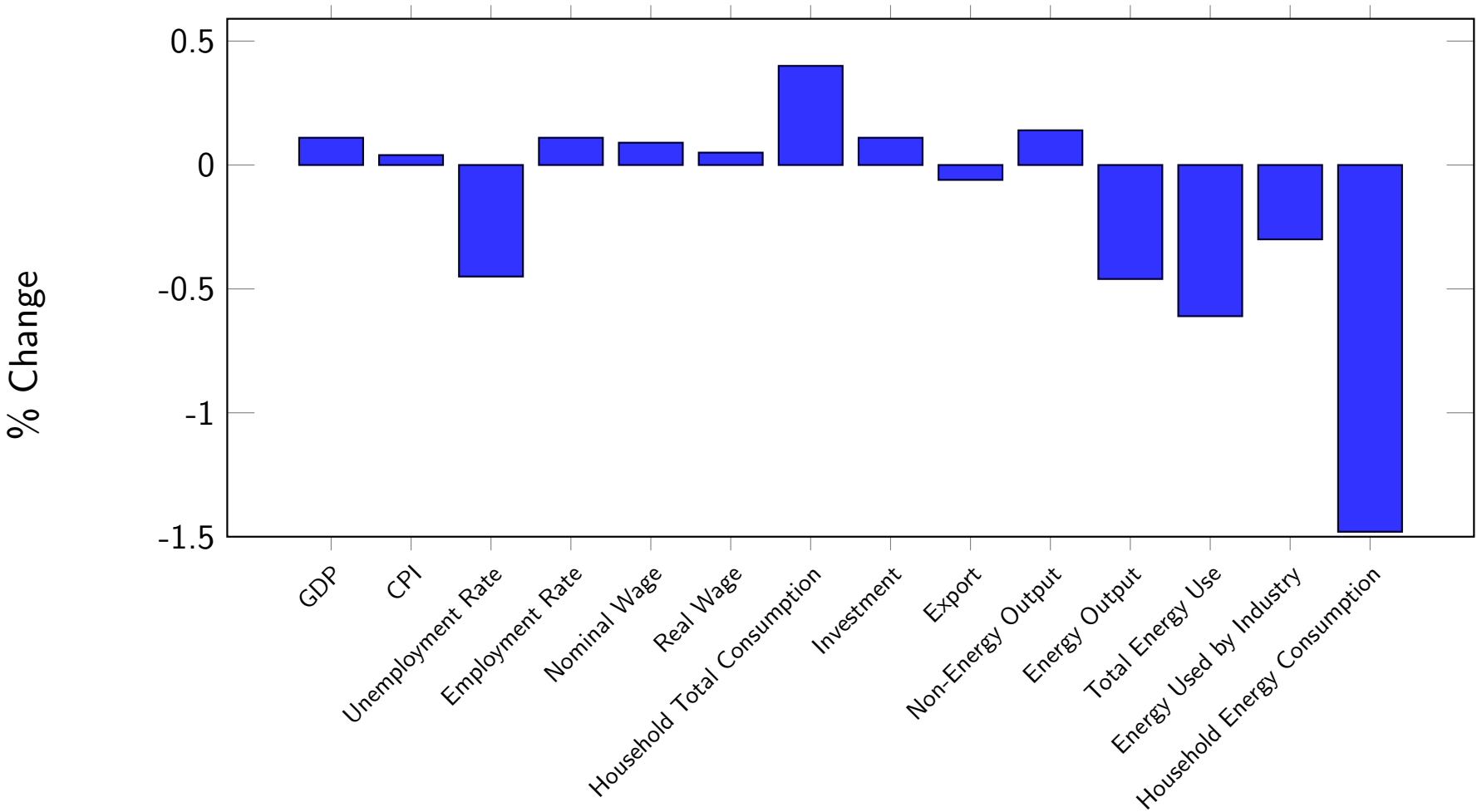
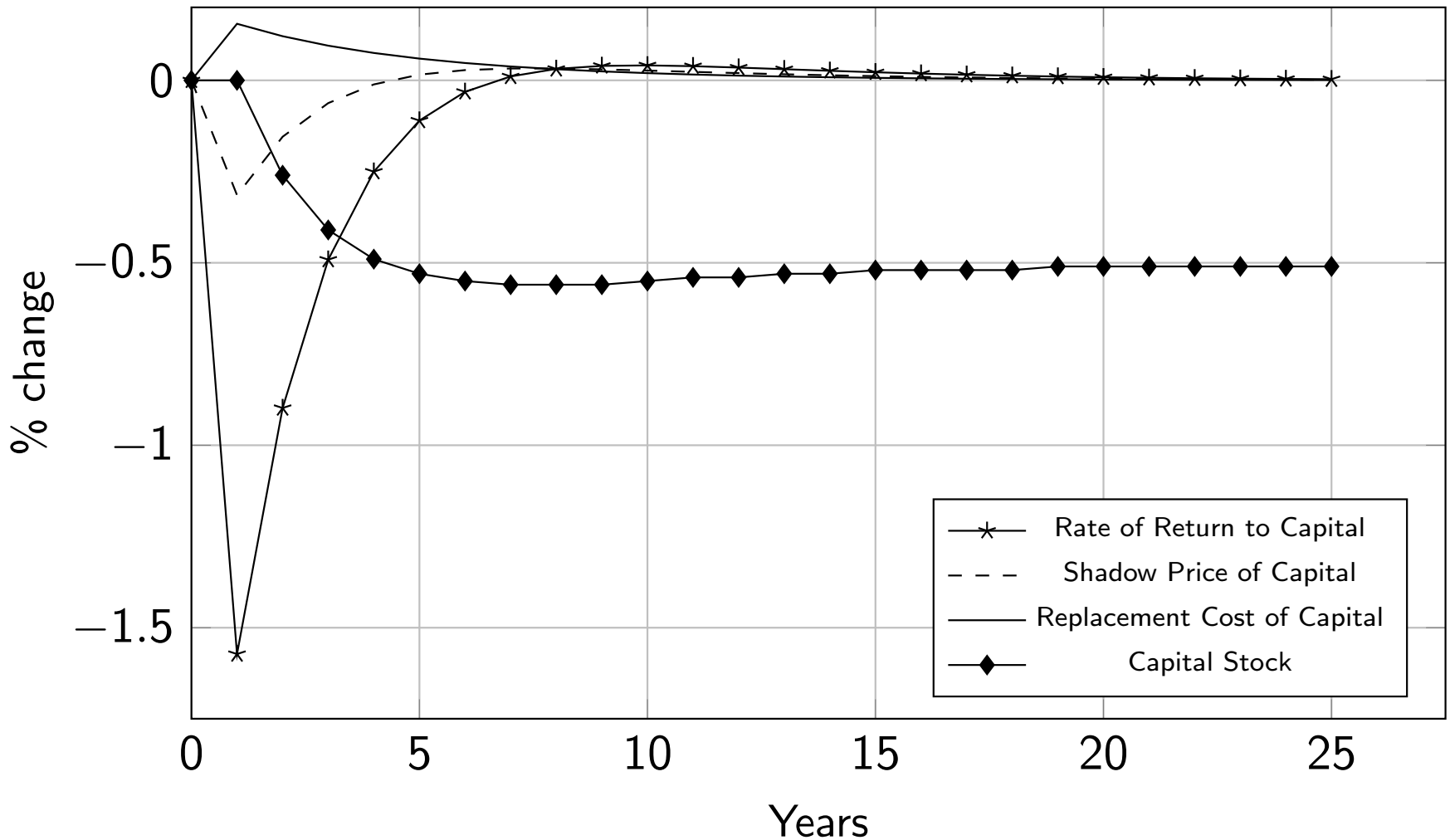
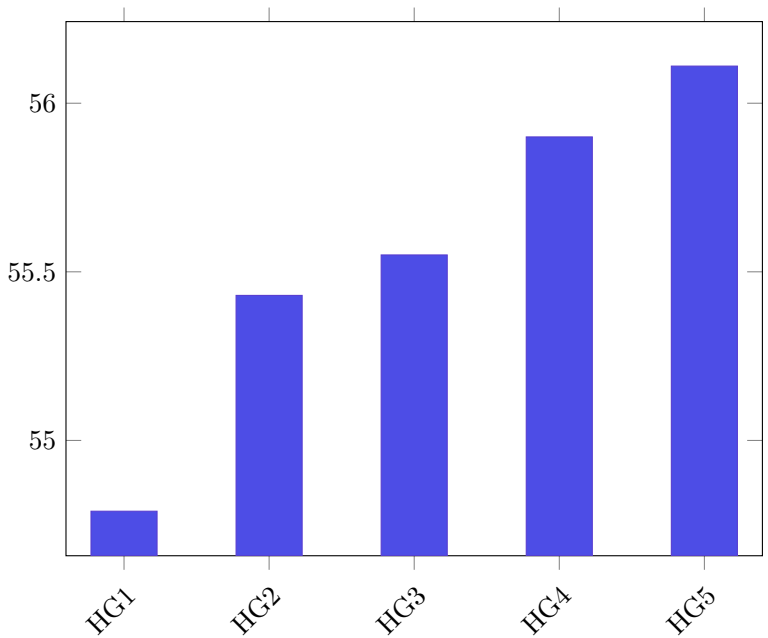


Figure 1: Disinvestment Effect in Energy Sectors

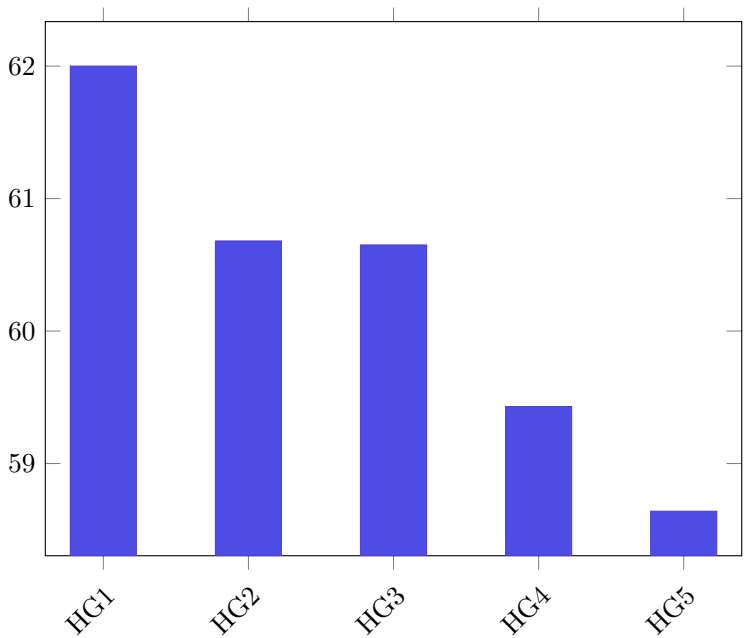


Comparing rebound effects

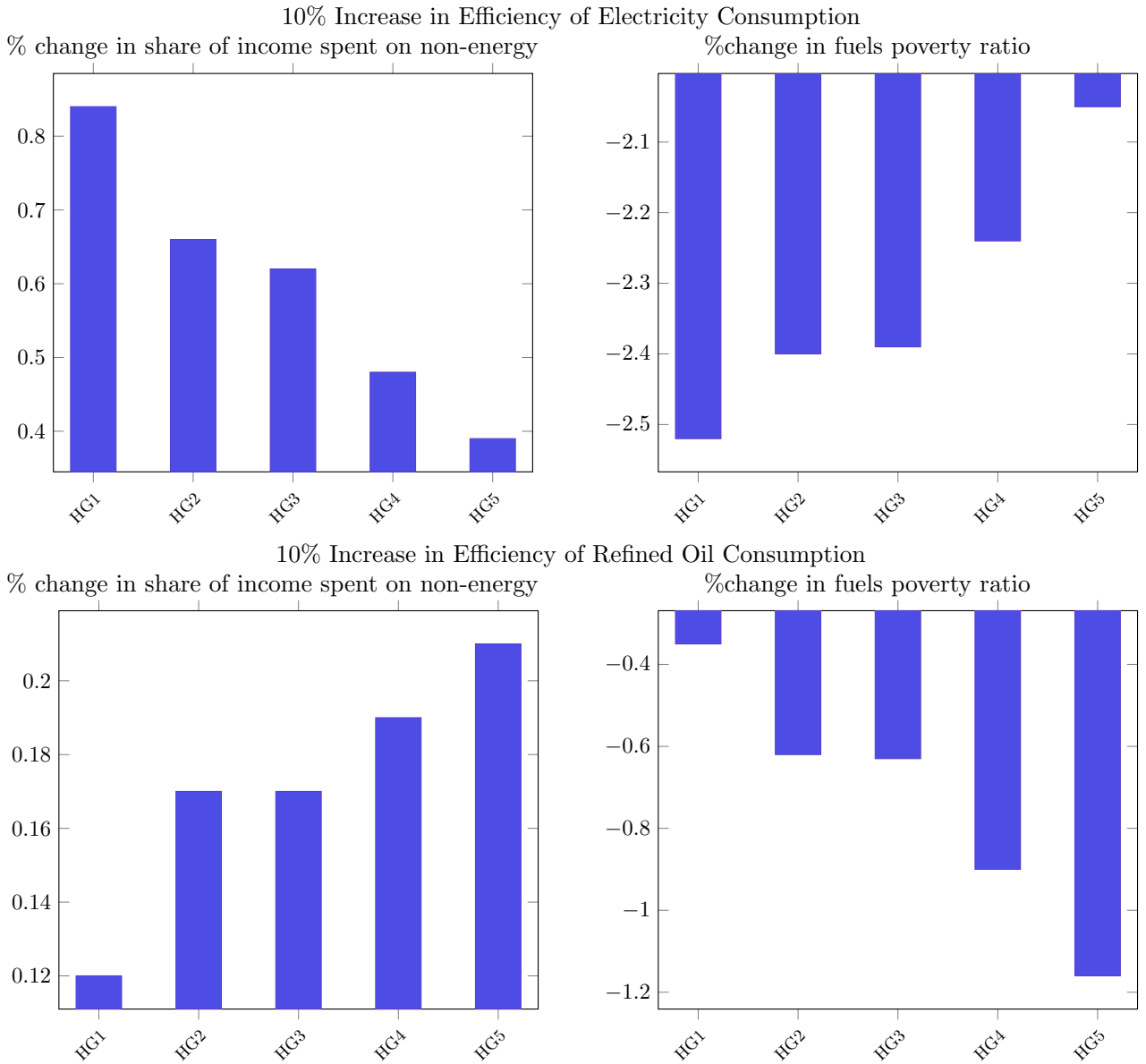
Household Rebound Effect in Refined Oil Use from a 10% Increase in Refined Oil Efficiency



Household Rebound Effect in Electricity Use from a 10% Increase in Electricity Efficiency



Comparing changes in spending composition



Conclusion

- Income groups consuming a certain energy good more intensively tend to rebound more in the use of the same good.
- The disaggregated household rebound effect varies across different income groups depending on which energy use is improved in efficiency.
- Rebound effect can help to reduce fuels poverty.
- Improving efficiency in electricity is more effective in terms of fuels poverty reduction.
- Disinvestment is sensitive to assumptions about capital adjustment.
- Energy system models can help constructing a supply curve for energy sectors.

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Thank You for Your Attention