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CENTRE
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SUR L'ENVIRONNEMENT
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Carbon Tax and Equity

The Importance of Policy Design

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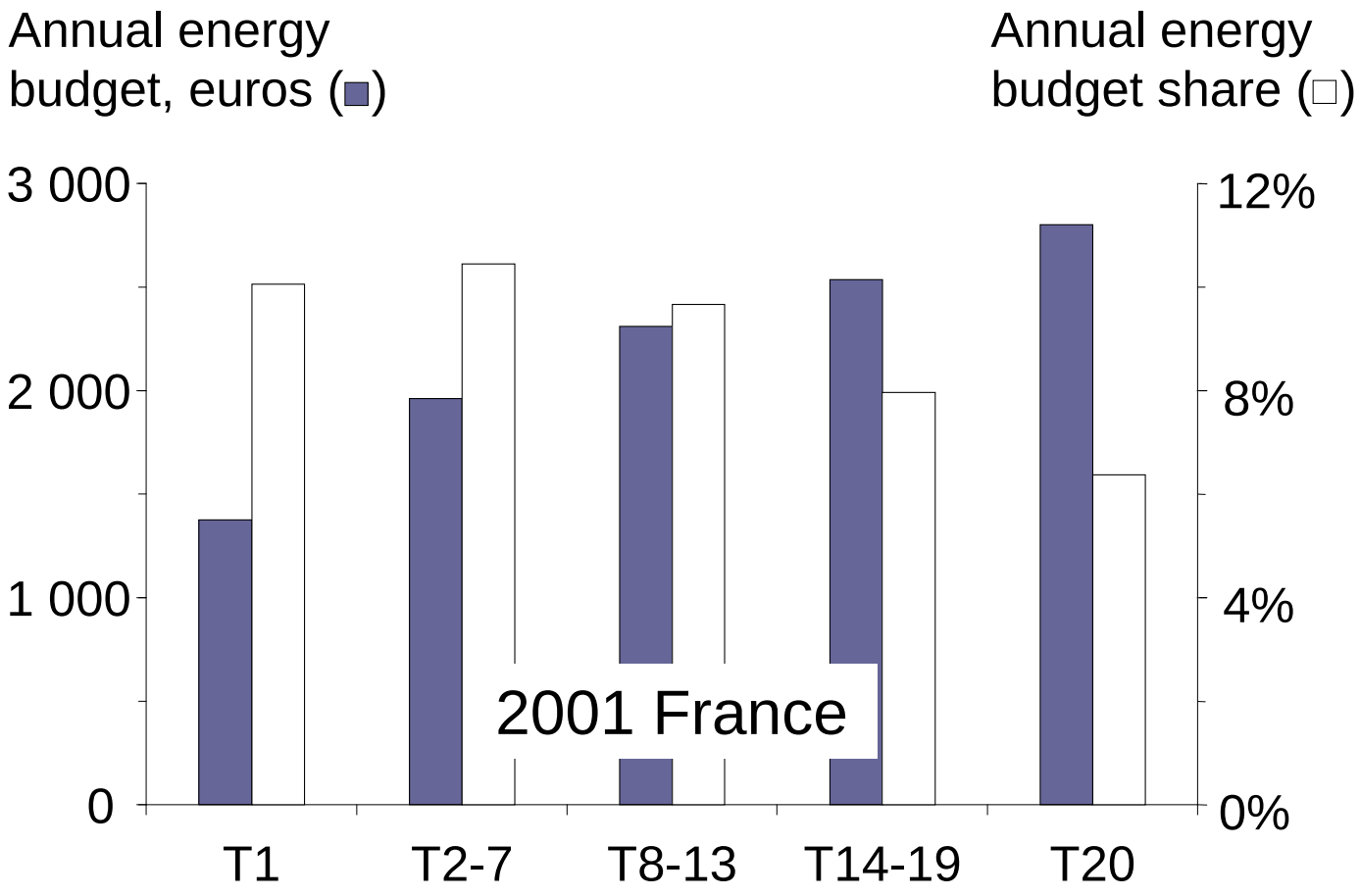
Research rationale

- Carbon tax (auctioned permits) has been advocated for decades by economic science as an efficient policy instrument
- Some successes but also an impressive list of failures inc. the latest French endeavour + pending US legislation
- Beyond specific contexts and circumstances 2 main counterarguments:
  - competitiveness issues: carbon leakage... and job drain !
  - distributional issues: the poor bear the brunt of the policy

The poor more vulnerable to a carbon tax?



INSEE 2001 data, authors' calculation

Static budget shares overlook three sources of discrepancies

- Responses to price signals (the very point of a carbon tax reform): impact unclear?
  - Lower classes more responsive to prices but ‘physical’ constraints
- Propagation of the price signal in the IO matrix and compounding effect: more regressive
- Rebating of the tax proceeds to households or not, following some rule of thumb: potentially mighty lever
  - Political appeal of the green check option, cf. France, Cantwell-Collins US bill

Interactions and feedbacks require a general equilibrium framework: IMACLIM-S modelling

IMACLIM-S: key features

A compact static computable general equilibrium model (CGEM) of climate policy analysis, with key features

- Endogenous technical change: ‘hybrid’ factor substitution together with Hicks-neutral induced technical change; ‘hybrid’ consumption trade-off (4 productions)
- Static decreasing returns: factor consumptions increase with real output
- Equilibrium unemployment: real wages and unemployment correlated by a wage curve
- Extended to secondary distribution of income between households (20 classes), firms, public adm. and the RoW

IMACLIM-S: key parameters & assumptions

- Parameters
  - Behavioural elasticities + asymptotes (prod. and cons.)
  - Elasticity of exports and imports to domestic prices (fixed international prices)
  - Elasticity of wage to unemployment
- Assumptions
  - Wage curve: wage relative to foreign prices (rather than to domestic prices) correlated to unemployment
  - Pre-existing excise taxes and transfers (pensions, unemployment benefits, other) indexed on average wage
  - Public expenditures constant share of GDP
  - Recycling conditional to constant public debt to GDP ratio

Six rebating schemes of same €300/tCO_2 tax

Comparative statics of a €300/tCO_2 tax on 2004 France, considering 6 alternate rebating schemes

- To frame the issue: what if tax proceeds are ‘not rebated’? A *lower public debt* option
- Two contrasted schemes: *lower payroll tax* (academic #1) *vs.* *extended green check* (political #1)
- Three compromise schemes aiming at a balance of the equity and efficiency impacts

Framing the issue:

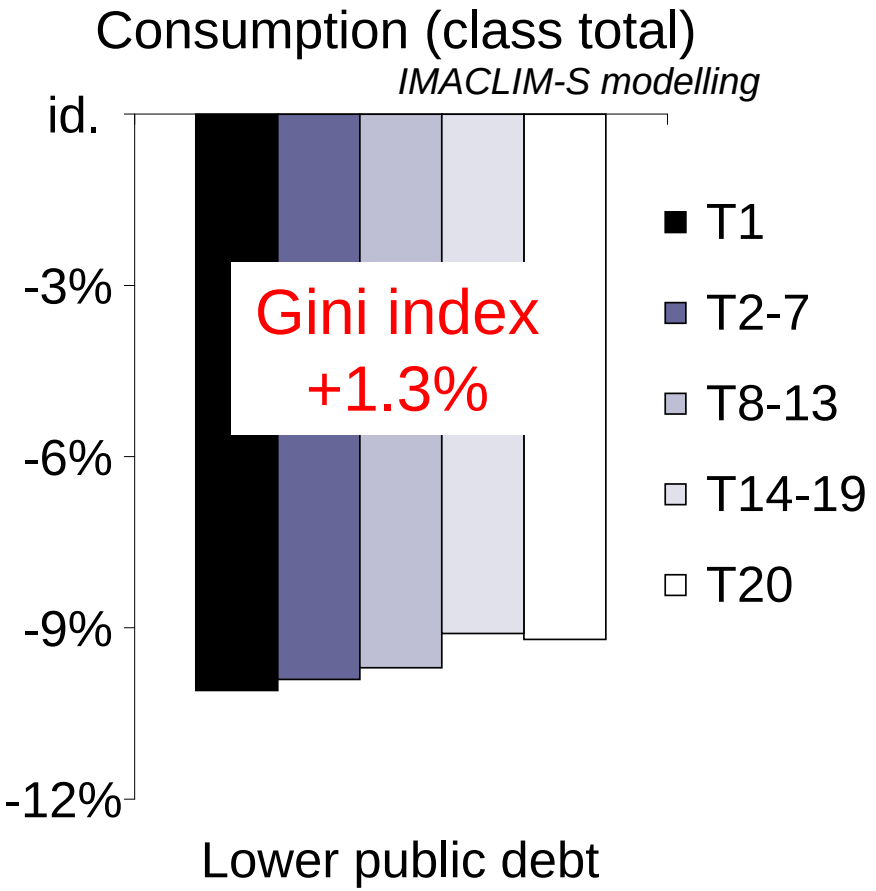
A lower public debt option

(€300/tCO_2)

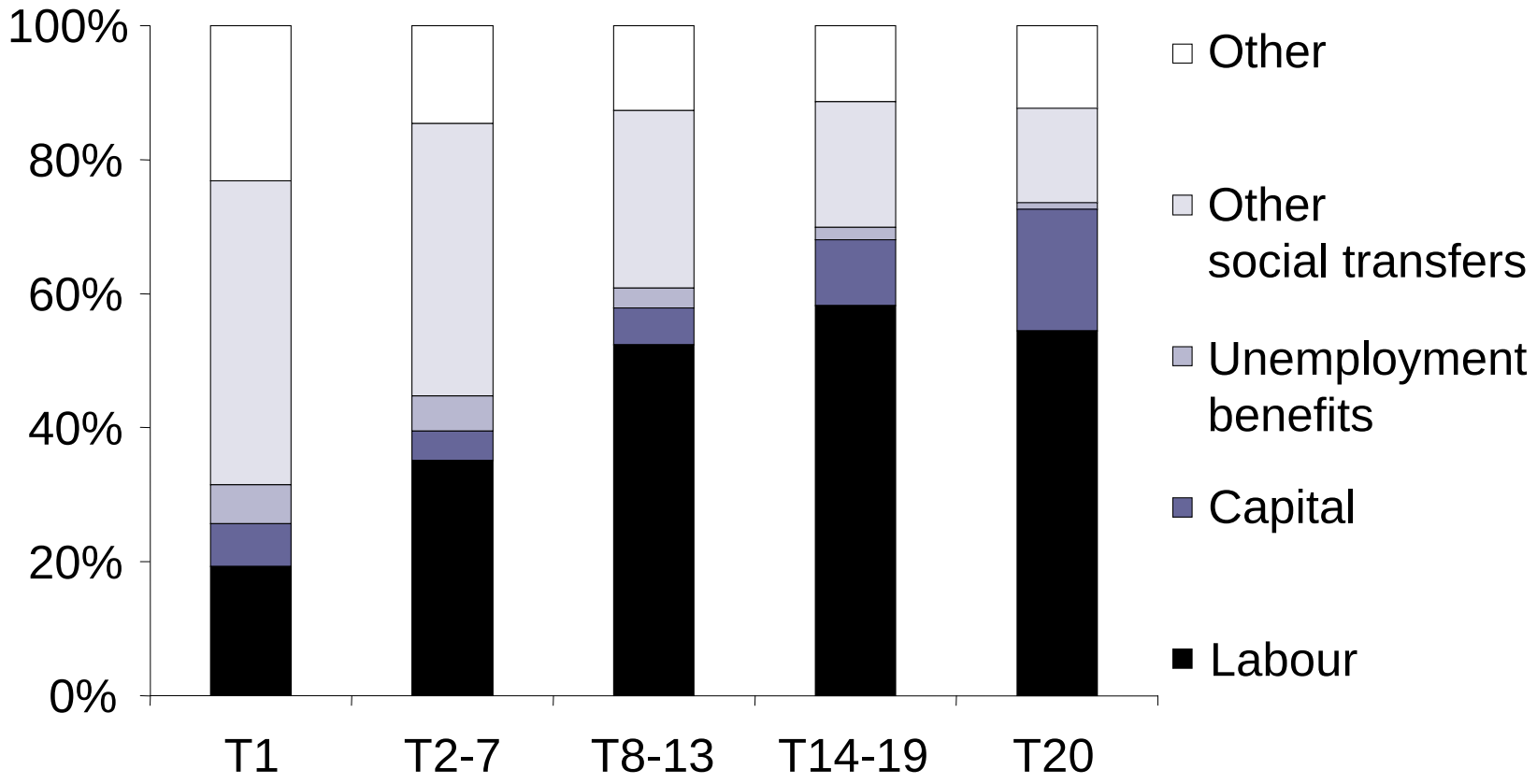
Direct regressivity confirmed...
...but is it really the point?

€300/tCO_2 tax rebated in	Lower public debt
CO_2 emissions	-38.5%
GDP	-6.5%
Consumption	-9.5%
Employment	-5.7%

IMACLIM-S modelling



Income structures channel macro impacts



INSEE 2001 data, authors' calculation

Academics *vs.* politics:

A lower payroll tax
vs.
an extended green check option

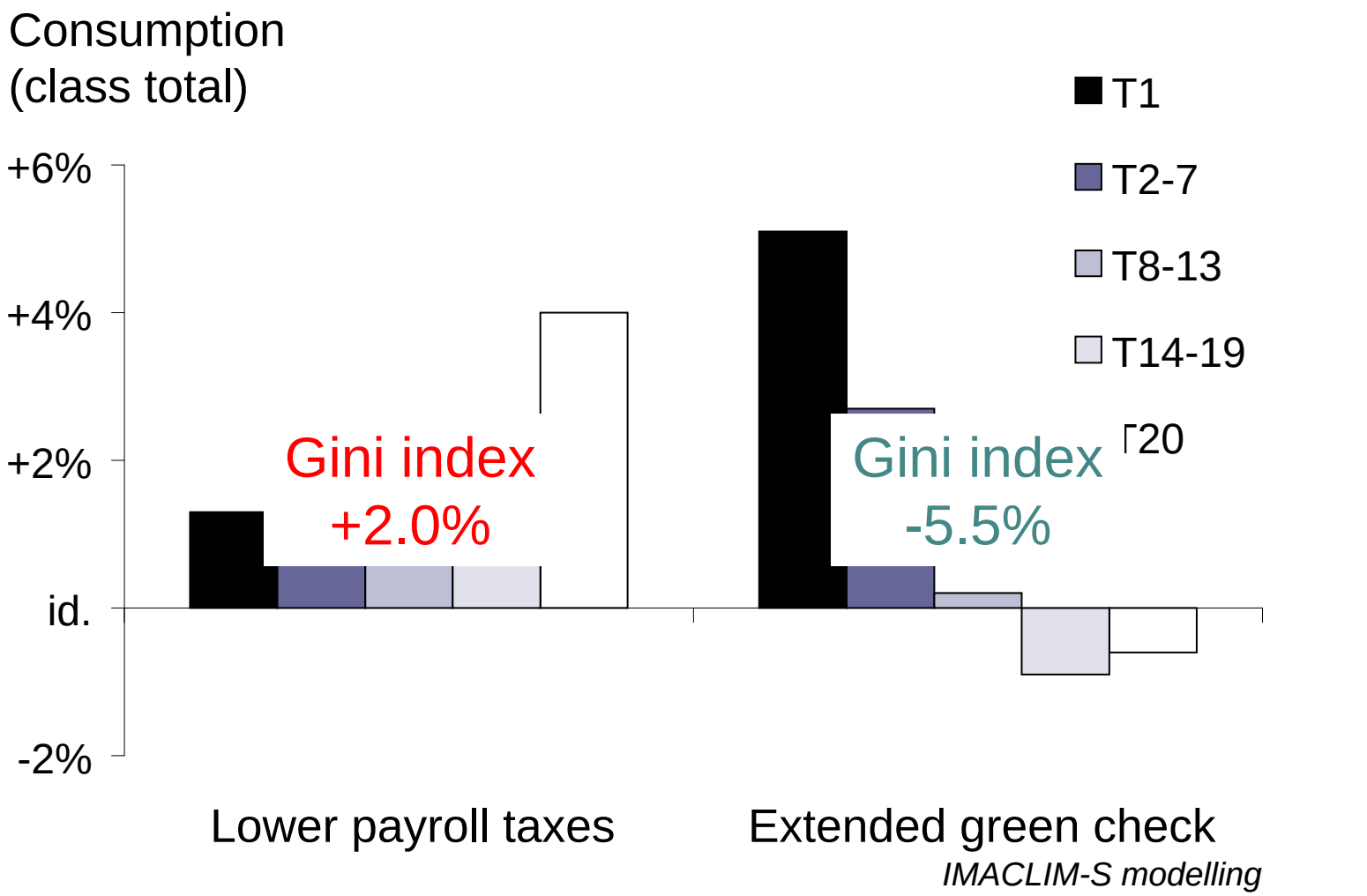
(€300/tCO_2)

Efficiency of lower payroll tax option confirmed

€300/tCO_2 tax rebated in	Lower payroll taxes	Extended green check
CO_2 emissions	-34.1%	-34.8%
GDP	+1.9%	-0.7%
Consumption	+1.5%	+0.4%
Employment	+3.5%	+0.3%

IMACLIM-S modelling

But ext. green check induces higher equity



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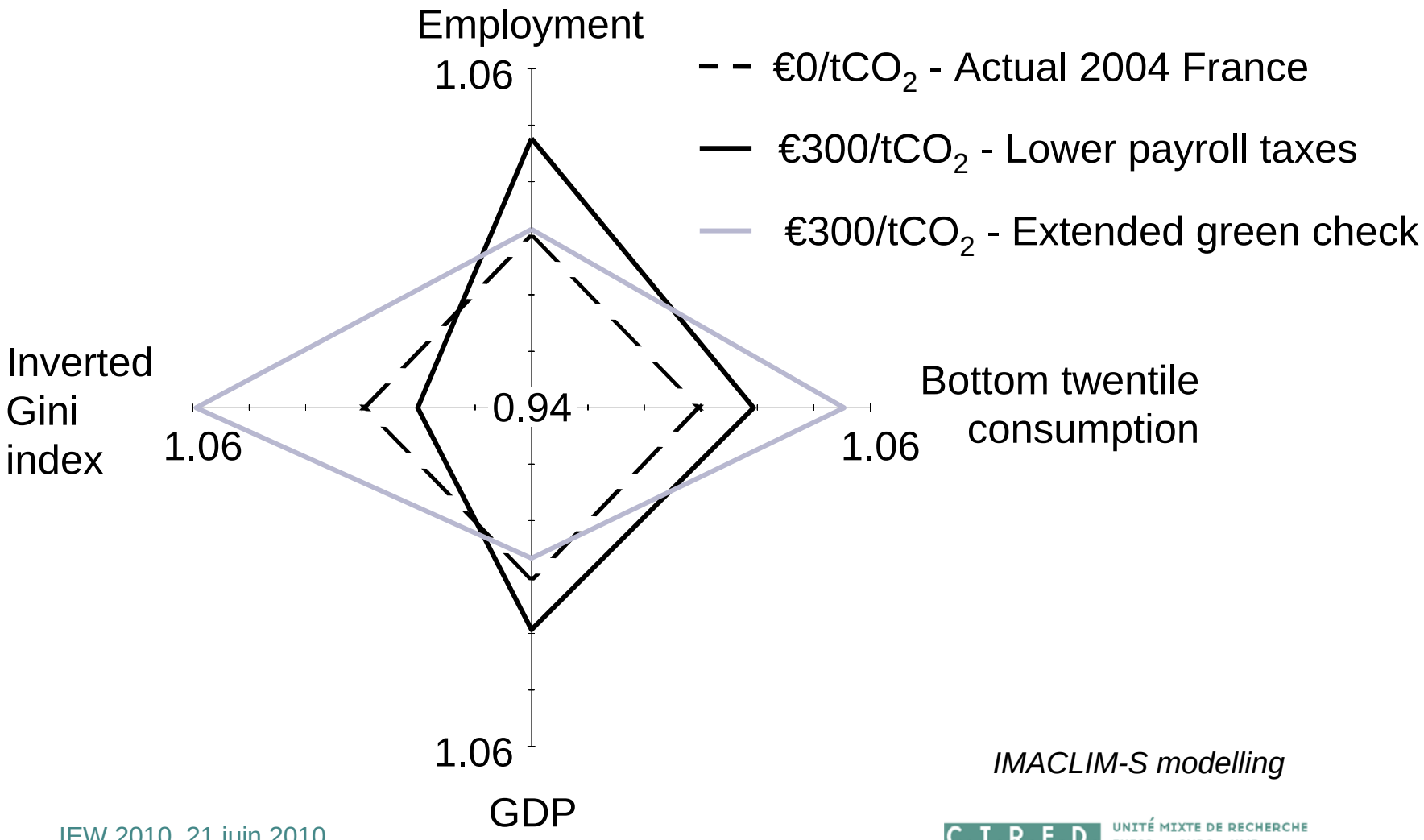
An equity-efficiency trade-off



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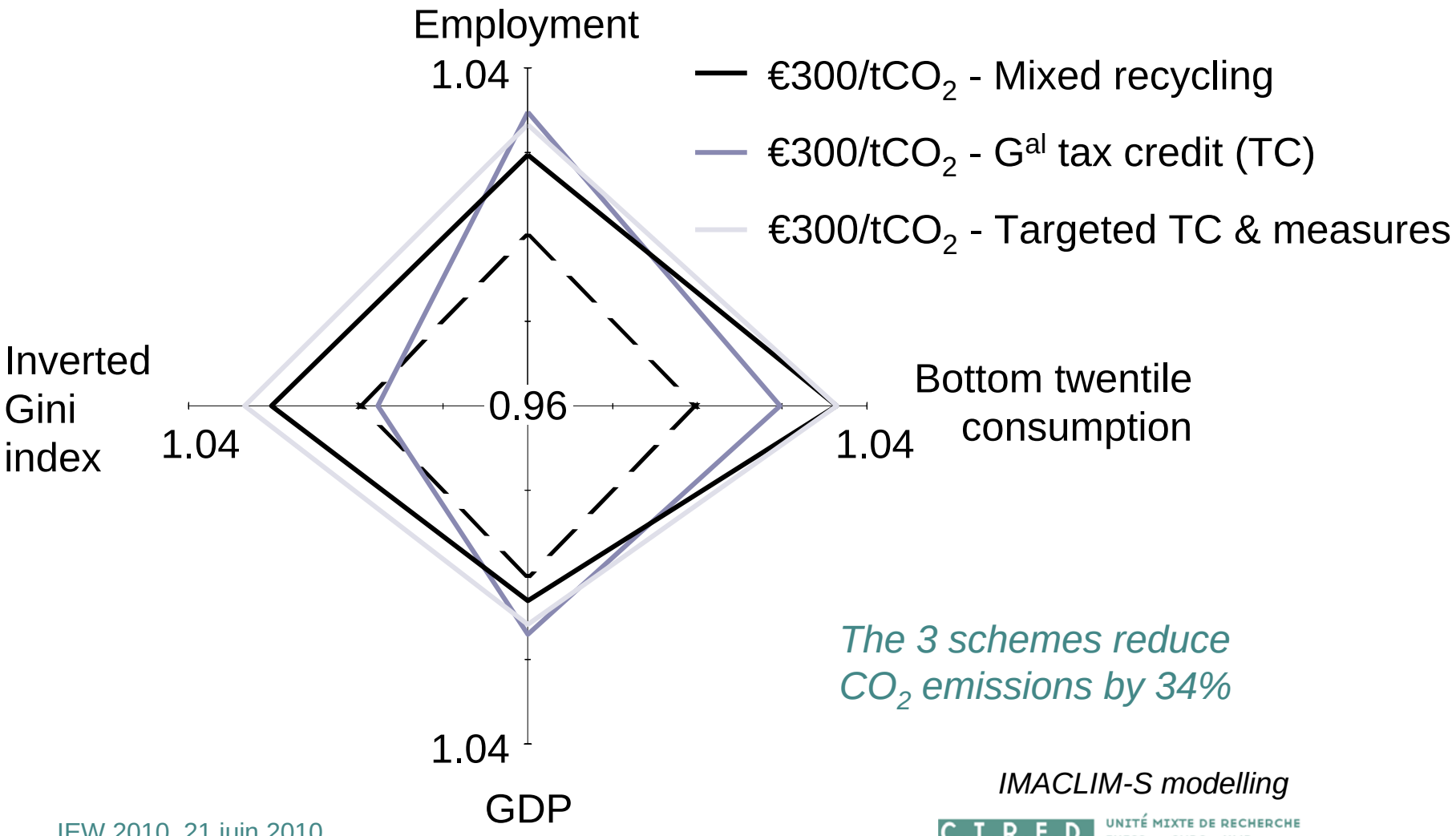
Three compromise schemes

(€300/tCO_2)

Three compromise schemes

- Mixed recycling
  - firms rebated what they paid in lower payroll taxes
  - households rebated what they paid in *per capita* lump-sum
- Generalised tax credit (TC)
  - lump-sum rebate that covers the average car commute + a similar share of residential consumption
- Targeted TC & measures
  - same tax credit limited to T1-16
  - remaining proceeds to payroll tax reduction
  - any budget margin in accompanying measures to T1-T16

Targeted TC & measures seems superior



The 3 schemes reduce CO_2 emissions by 34%

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Crux of the matter: limiting the resources devoted to compensation

€300/tCO_2 tax rebated in	Mixed recycling	G^{al} tax credit	Targeted TC & measures
Share of proceeds to compensation	37.5%	17.8%	26.5%
Domestic *vs.* international price of non-E production	+0.8%	-0.2%	+0.3%

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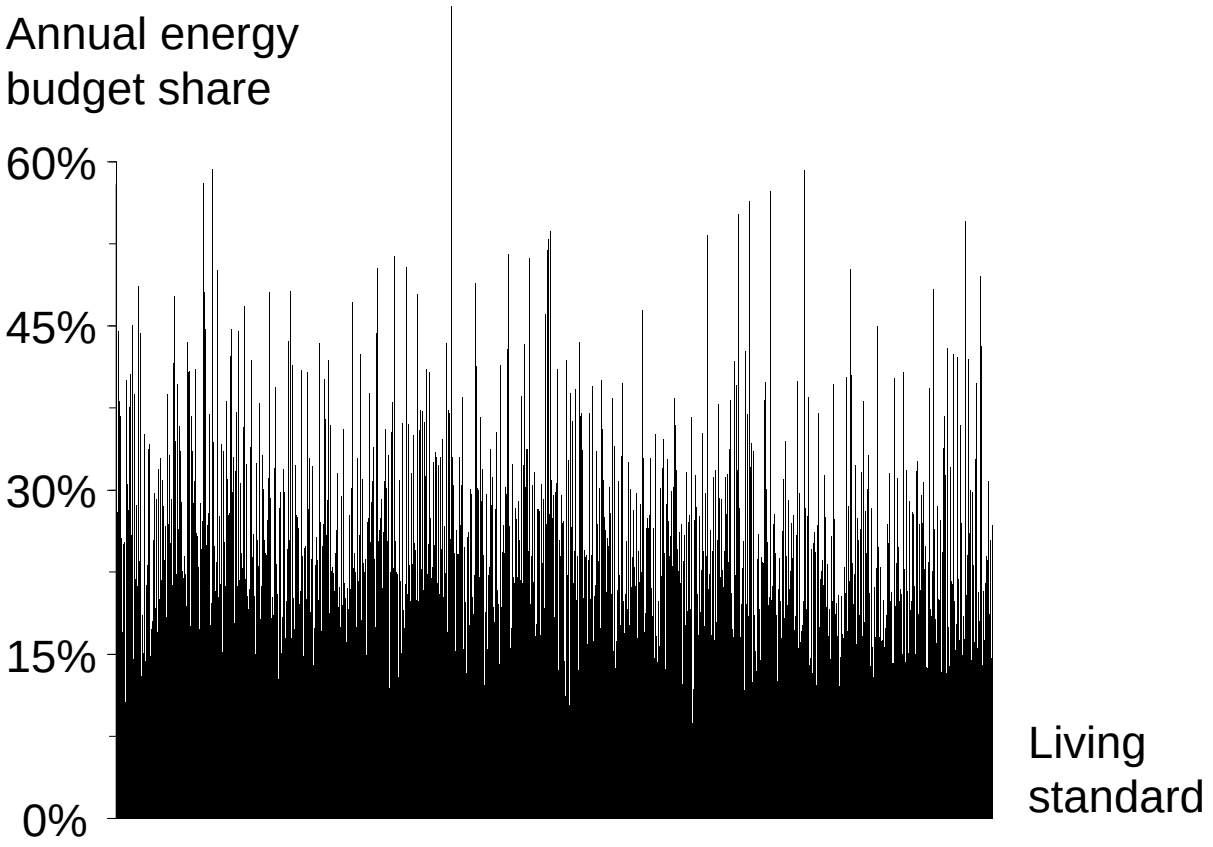
Energy vulnerability ill-explained by income (LS)

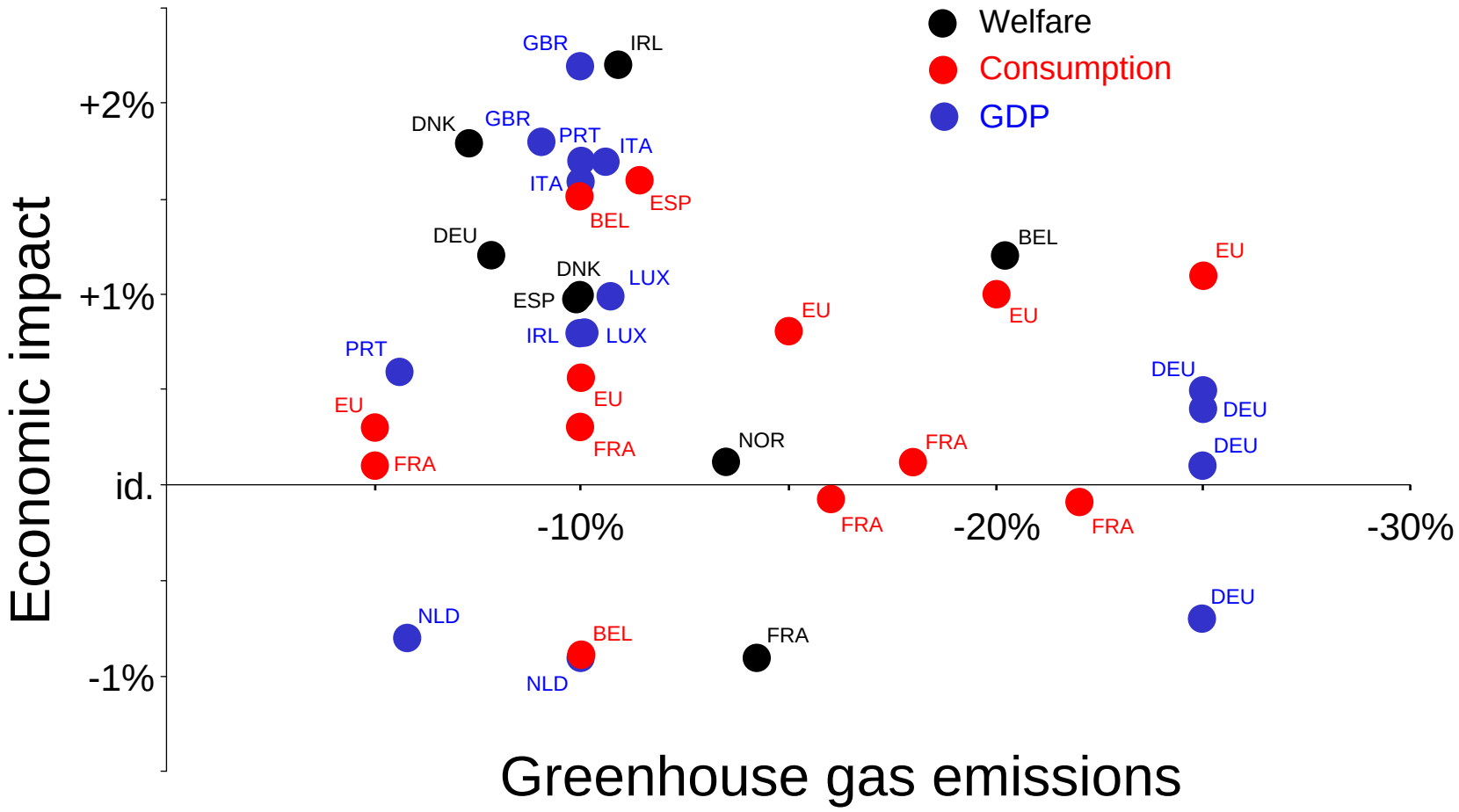


INSEE 2001 data, authors' calculation

Conclusion

- Direct impact of a carbon tax (slightly) regressive
- Politically appealing rebate to consumer comes at the cost of efficiency as maintained purchasing power turns to foreign goods
- Targeting efficiency offers room for manoeuvre to tackle equity—for most European economies this implies considering at least a partial recycling in lower payroll taxes
- Potential for win-win reforms

IPCC SAR: efficiency of payroll tax recycling...



... *vs.* other 'nicer' options