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CENTRE  
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Chaire Modélisation prospective  
au service du développement durable

# Technical optimism, technical pessimism and the social cost of a carbon tax

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Stockholm, June 23rd

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# Technical uncertainty and the failure of the French carbon tax



- Technical uncertainty shapes the temporal profile of a carbon tax
  - A huge amount of uncertainty around the social costs and benefits of a carbon tax
  - The Quinet report in France
  - A smooth and progressive carbon pricing?
- An apparent political consensus in France
  - Presidential “commitment” during the elections
  - Support from environmental NGOs...
- But a major failure at the end
  - A very conservative reform: Not enough for political acceptability...
  - Arguments: Economic costs (tax base erosion), uncertain environmental impact, households’ vulnerability
  - Technical uncertainty has something to do with this failure

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# The double dividend literature: non technical economics



- Technical and macroeconomic uncertainty
  - A remarkable theoretical consensus about the way of recycling the tax
  - Find the main tax distortion in the economy... Not so easy!
  - A way to answer skepticism about the environmental impact and to manage technical uncertainty?
- A gap between bottom-up (technical studies) and top down studies
  - A gap we are trying to fill in this paper
  - How to deal explicitly with technical uncertainty
  - What is the the link between technical and macroeconomic costs?

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# IMACLIM-S: Key features of a '2nd best world'

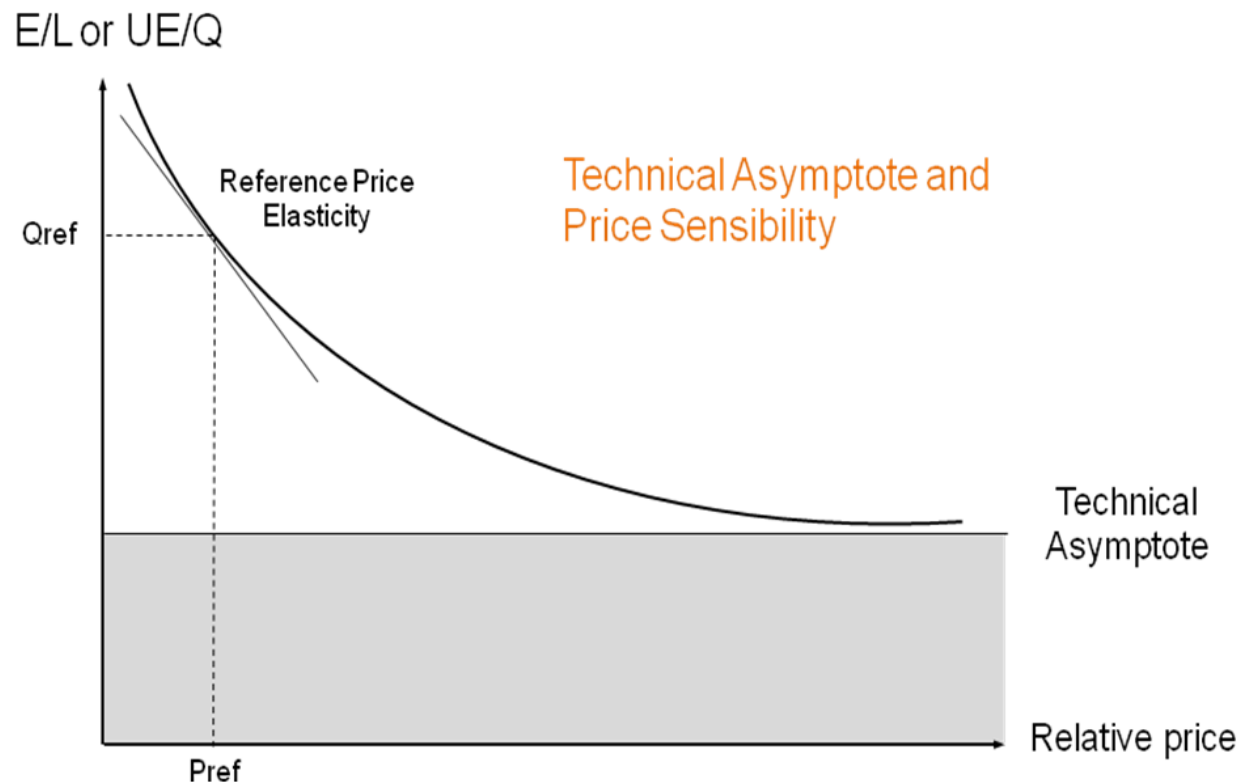


- Calibrated on national accounting data (INSEE “TES” 2004)
- Open economy, 4 categories of agents, 4 goods (3E + 1‘Composite’)
- Simultaneous equilibria in monetary and physical units (MTOE)
- Production: factor substitution, Hicks-neutral induced technical change, static decreasing returns
- Limited adaptation capacity of productive systems and households (technical asymptotes and basic needs)
- Equilibrium unemployment: real wages and unemployment negatively correlated by a wage curve (Blanchflower and Oswald, 2005)
- International trade competitiveness is function of production costs

# IMACLIM-S: How to deal with technical uncertainty



- A reference price elasticity : characterizes the degree of responsiveness of the economic system
- Technical asymptotes calibrated on the POLES model (Criqui and al.)
- Different assumptions are made for these two crucial parameters



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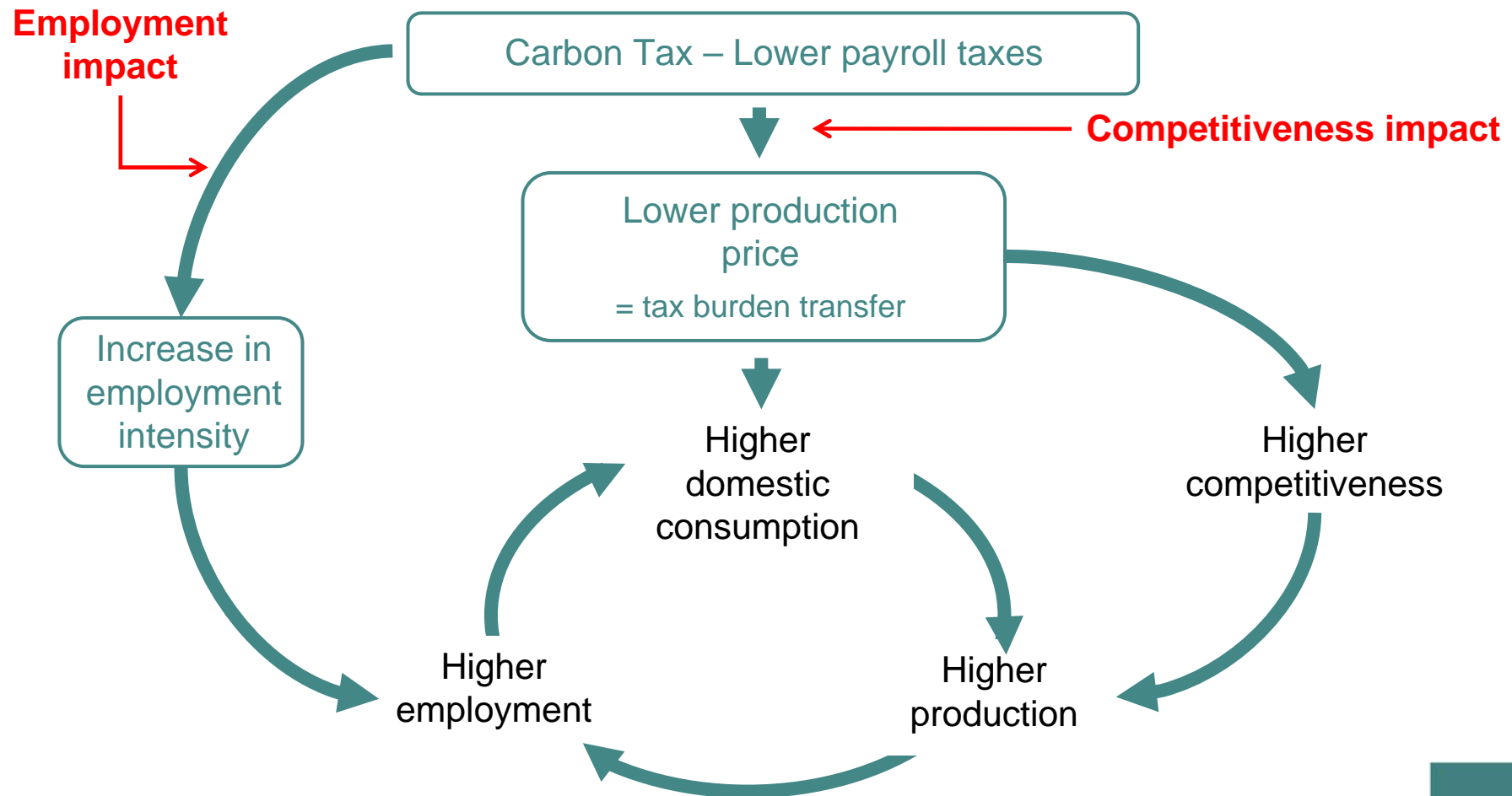
# A sensitivity analysis on decarbonisation potentials



- Evaluation of **long term impacts** (20 years) of a carbon tax recycled which proceeds are recycled into lower payroll taxes
- A study of ‘the worst case’ :
  - Unilateral CT without border adjustment
  - Based only on the carbon content of all consumptions
  - Reaching very high tax rates (from 100€/tCO<sub>2</sub> to 400€/tCO<sub>2</sub>) to analyze a deep transition to a low-carbon economy
- We simulate ‘counterfactual France-2004’ that are **compared to a same reference situation**: actual 2004-France without carbon tax.
- A very simple sensitivity analysis
  - A doubling of the ultimate potential of ‘decarbonisation’
  - Or half potential

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# The sources of a double dividend in IMACLIM-S



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# Sensitivity on the decarbonisation potential of productive systems



Recycling	Lower payroll taxes		
	Half	Central	Doubled
Decarbonisation potential (production)			
CO <sub>2</sub> Emissions	-16,4%	-41,5%	-58,1%
GDP	+2,0%	+2,1%	+2,5%
Employment (FTE)	+3,2%	+4,1%	+5,2%
Composite producer price	-2,8%	-1,2%	+0,8%
Labor content of composite production	+0,1%	+1,6%	+3,0%
Effective cons. of households	+1,0%	+1,8%	+2,9%
Exports (composite good)	+1,6%	+0,7%	-0,4%
Imports share in domestic demand (composite good)	-2,5%	-1,0%	+0,7%

- Macroeconomic performance depends not really on technical constraints
- Importance of the recycling scheme (lower payroll taxes)

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# Explanation of the results

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- Results associated with greater optimism
  - Higher consumption due to employment and labor income gains
  - Higher wages (through the wage curve), hence higher production costs
  - Not sufficient to counterbalance the positive impact on economic activity
  - A slight loss of competitiveness
- Results associated with technical pessimism
  - A much less rapid erosion of the tax base
  - Hence higher cuts in payroll taxes
- Positive results at the aggregate...
  - But sectoral impact need to be examined
  - Adverse « equity » impacts when technical potentials are constraints

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# Sensitivity on the decarbonisation potential of households



Recycling	Lower payroll taxes		
	Half	Central	Doubled
Decarbonisation potential (production)			
CO <sub>2</sub> Emissions	-25,4%	-41,5%	-52,6%
GDP	+3,5%	+2,1%	+1,0%
Employment (FTE)	+5,0%	+4,1%	+3,5%
Composite producer price	-3,1%	-1,2%	+0,4%
Labor content of composite production	+1,8%	+1,6%	+1,4%
Effective cons. of households	+2,6%	+1,8%	+1,0%
Exports (composite good)	+1,7%	+0,7%	-0,2%
Imports share in domestic demand (composite good)	-2,7%	-1,0%	+0,4%

- Increased flexibility preserves the purchasing burden, but limits the revenue recycling effect
- Opposite effects in terms of efficiency and equity

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# Sensitivity on the recycling scheme of the fiscal reform



Recycling	Payroll taxes cut	VAT cut	Green check
CO <sub>2</sub> Emissions	-41,5%	-43%	-44.8%
GDP	+2,1%	-0,2%	-1.0%
Employment (FTE)	+4,1%	0,5%	+0.5%
Composite producer price	-1,2%	+3,1%	+4.3%
Labor content of composite production	+1,6%	+0,5%	+1.1%
Effective cons. of households	+1,8%	+0,4%	+0.7%
Exports (composite good)	+0,7%	-1,6%	-2.5%
Imports share in domestic demand (composite good)	-1,0%	+2,7%	+1.9%

- No factor substitution with VAT cut/green check (lump sum transfers to households)
- No revenue recycling effect: production costs increase
- Higher demand deepens the trade deficit

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# Sensitivity on some macroeconomic “views of the world”



Recycling Wage Curve	Payroll Tax Cut					
	Nominal Wage			Real Wage		
Exposure to international trade	Low	Central	High	Low	Central	High
GDP	+1,6%	+2,1%	+2,3%	+0,2%	-3,1%	-5,1%
Employment (FTE)	+3,6%	+4,1%	+4,3%	+0,8%	-2,5%	-4,6%
Composite producer price	-1,7%	-1,2%	-0,9%	+13,4%	+8,1%	+6,4%
Intensité en travail du bien composite	+1,6%	+1,6%	+1,6%	+0,4%	+0,5%	+0,5%
Labor content of composite production	+1,1%	+1,8%	+2,1%	+3,5%	-1,0%	-3,4%
Effective cons. of households	+1,2%	+1,9%	+2,2%	+4,0%	-0,8%	-3,4%
Exports (composite good)	+0,6%	+0,7%	+0,7%	-4,3%	-4,0%	-4,2%
Imports share in domestic demand (composite good)	-1,0%	-1,0%	-1,0%	+7,7%	+7,1%	+7,6%

Two “views” of the French economy: the 70’s (real wage indexation and limited openness to trade) vs. Today (wage moderation and great openness)

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# Conclusions

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- Impact of technical uncertainty not as clear-cut as one may think
  - Technical costs vs. macroeconomic, social costs
  - Importance of the fiscal design and the use made of tax proceeds
- Intuitively, technical inertia reinforces the vulnerability of a given economy to a carbon tax
- But the most important aspects from an efficiency perspective is the recycling of tax proceeds and the macroeconomic context
- Equity issues is a different story...

**THANK YOU**

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