

Impact of EU Biofuel Policies on World Agricultural and Food Markets

EURURALIS, presented by Hans van Meijl

SAG meeting, Schiphol, July2007

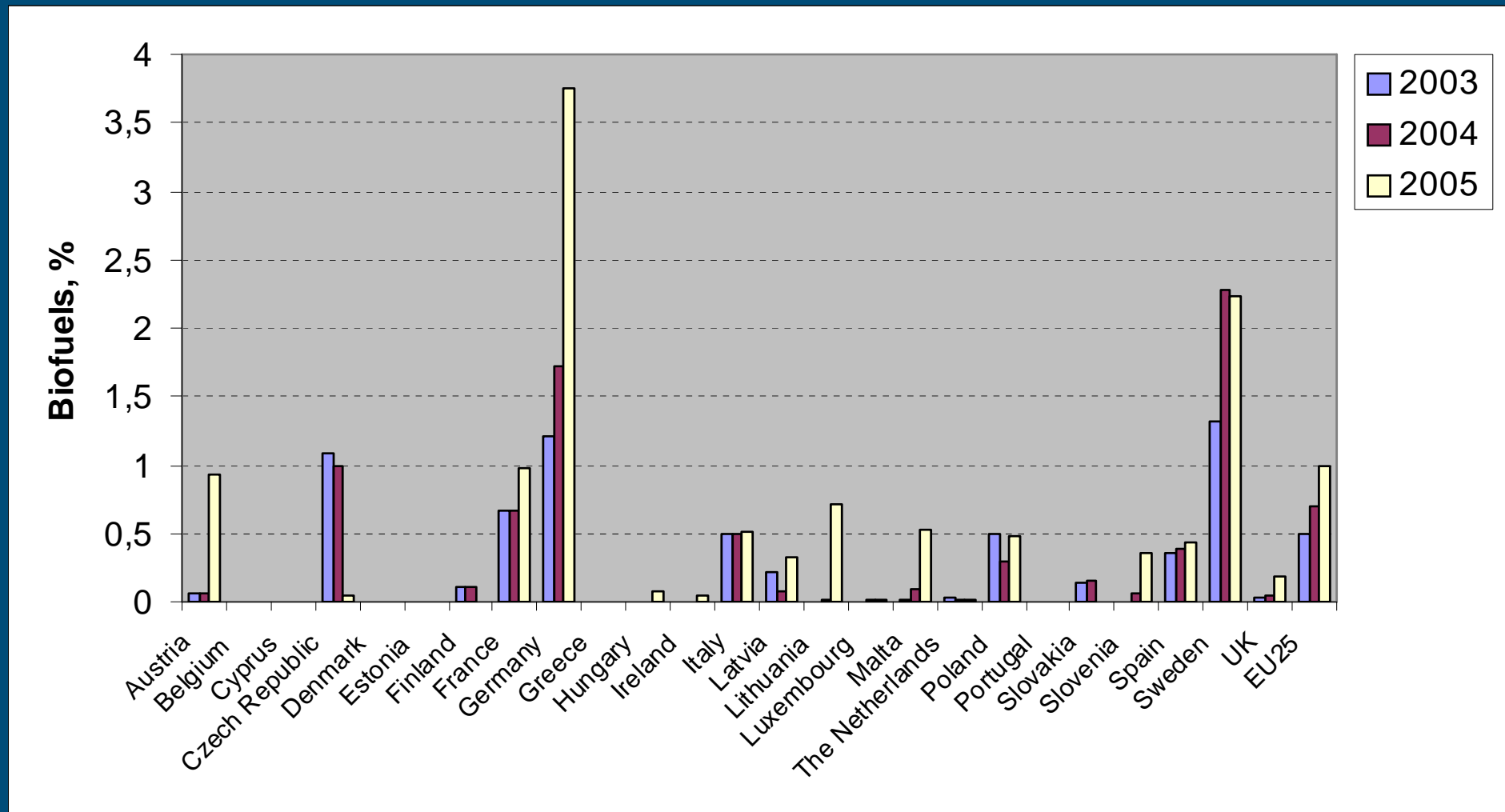


Outline

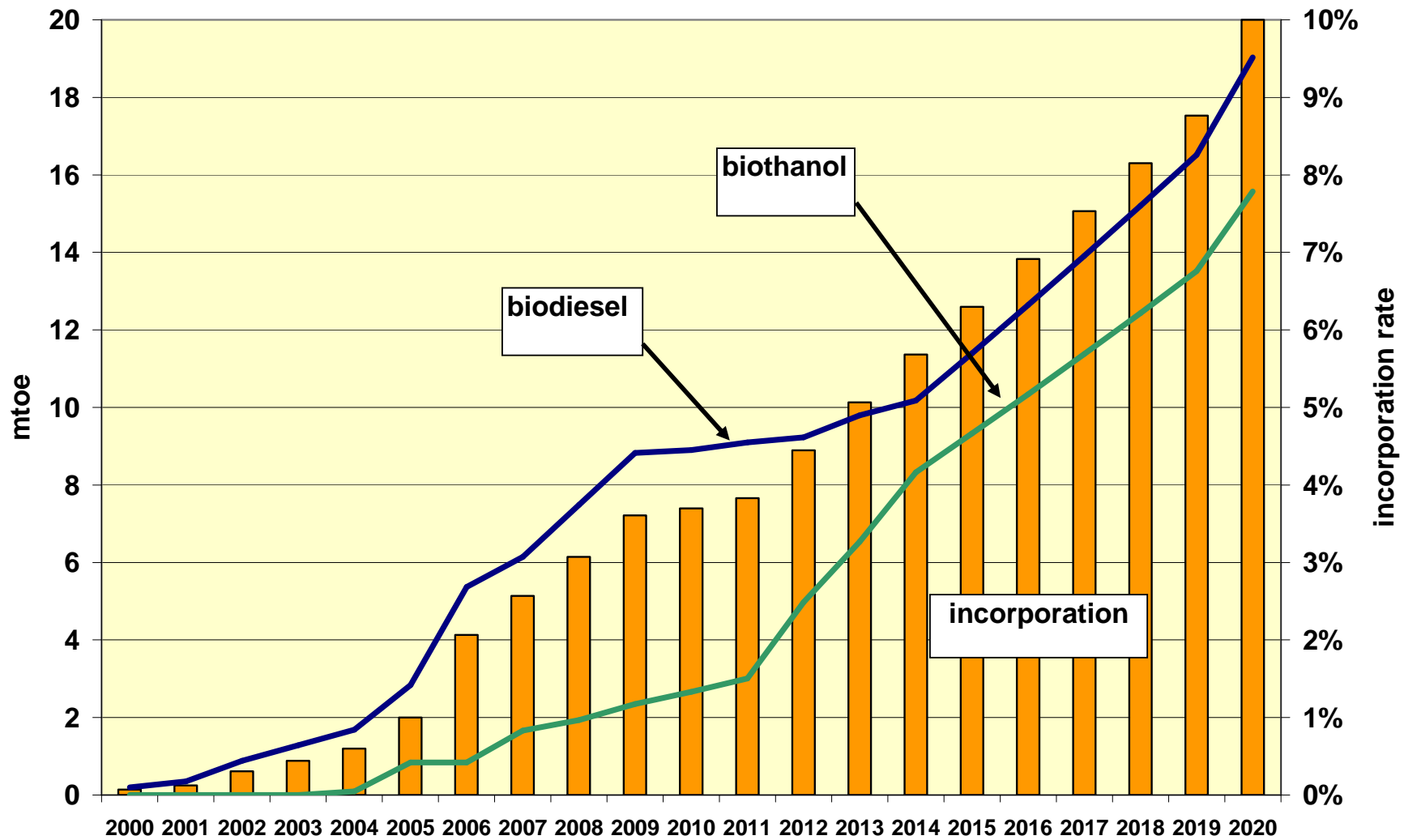
- Recent EU figures
- Implications of EU biofuel directive
 - Methodology
 - Results

Current Situation: Biofuels in EU Member States

% of road transport fuels 2003-2005



Projections by EU-Commission: Development of biodiesel and bioethanol and the incorporation rate until 2020 in the EU-27

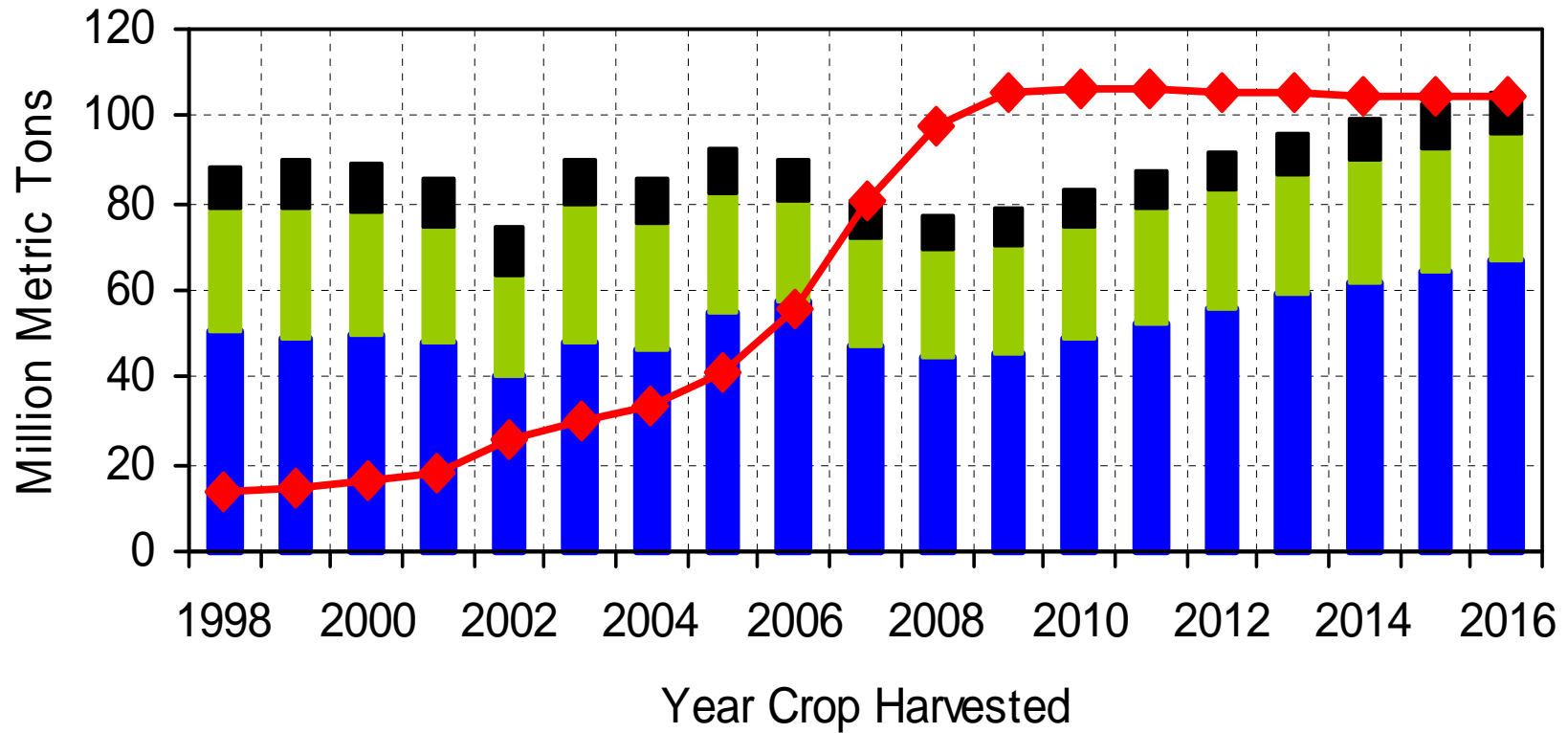


Biofuels-related land use in EU 2006 & 2020

	2006*		2020	
	1.2% share in total area		share in total 10% area	
area bioethanol	1.0	1%	12.9	11%
area biodiesel	2.1	2%	4.6	4%
total area biofuels	3.1	3%	17.5	15%
cereal area	59	52%	62.5	55%
of which				
bioethanol (1st gen.)	0.9	1%	7.1	6%
bioethanol (2nd gen)	n.a.		5.2	5%
oilseed area	8.8	8%	8.5	8%
of which				
biodiesel (1st gen.)	2.1	2%	2.9	3%
BTL	n.a.		1.7	1%
sugar beets	1.9	2%	1.43	1%
of which				
bioethanol	0.1	0%	0.6	1%
idle arable area				
(idle + non used mandatory set aside)	7.2	6%	4.7	4%
other	36.9	32%	36.6	32%
total arable land	113.8	100%	113.8	100%

* including Bulgaria and Romania which joined during the campaign year 2006/07

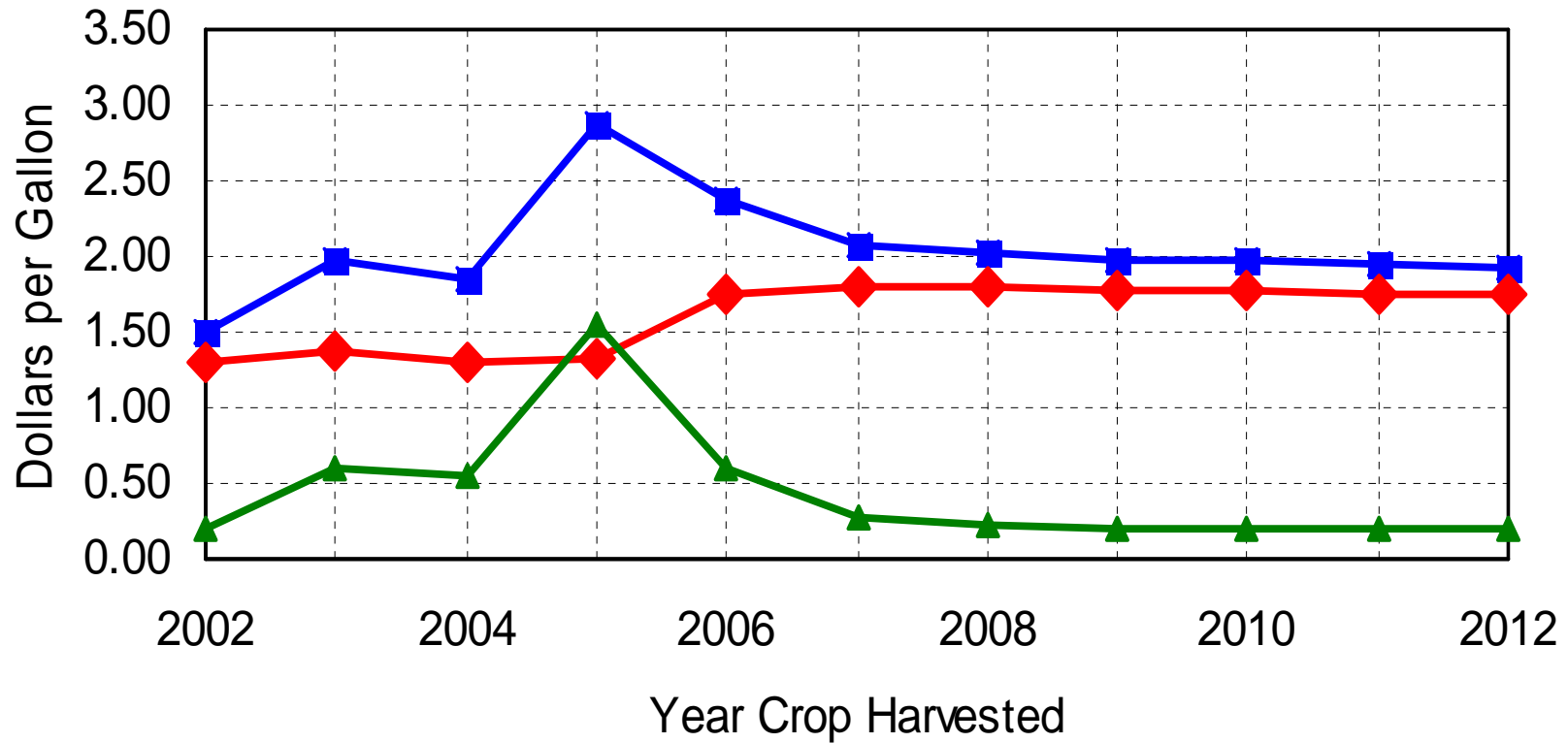
FAPRI: U.S. Grain Exports and Use for Ethanol



■ Corn Exports ■ Wheat Exports
■ Other Grain Exports ◆ Corn for Ethanol

Source: "FAPRI U.S. Baseline Briefing Book," Feb. 2007

FAPRI: Ethanol Dry Mill Costs and Returns



—■— Ethanol + DDG Sales

—◆— Operating Costs

—▲— Returns Over Operating Costs

Source: "FAPRI U.S. Baseline Briefing Book," Feb. 2007

Biofuel analysis as a challenge to modelers

- Hot issue – weak data base
- Urgent need of an economic assessment of biofuels to analyze the impact on
 - World price
 - Production
 - Land use
 - International trade
 - Food security
 - Agricultural income
 -

Methodology

- Extensions of standard model from GTAP
 - Segmentation of factor markets
 - Land allocation structure
 - Land supply curve
 - Extensions towards biofuels
 - No split-out of biofuel products
 - Biofuels presented as a blended inputs for the petroleum sector
 - Extension of GTAP-E (Burniaux and Truong, 2002)
 - Analysis of impact of enhanced biofuel policies in the EU on production and land use at global level

Limitations

- Dynamic developments in biofuel markets
- Partly policy driven (Brazil also market)
 - EU = policy driven (environment takes the lead, general economist skeptical, agriculture: What's in it for us)
 - This study: focus on biofuel directive (2010)
- Uncertainties about technologies, when is technology available and when economic viable?
 - Second generation uncertain
 - This study: focus on first generation biofuels (2010)
- No focus on use of biomass by other industries (chemical industry): Bos\Seventer (A&F)

Implementing the Biofuel Policies

- Fixing of blending target impossible
- Price incentive (subsidy or tax exempt) to use bio fuel crops
 - Problem: With subsidy input costs will decline and consequently consumer prices
 - Not realistic: With higher bio-fuel shares: higher consumer prices
- ‘Neutral subsidy’: Additional (endogenous) sales tax on petrol finances the prices incentive to use bio-fuel crops

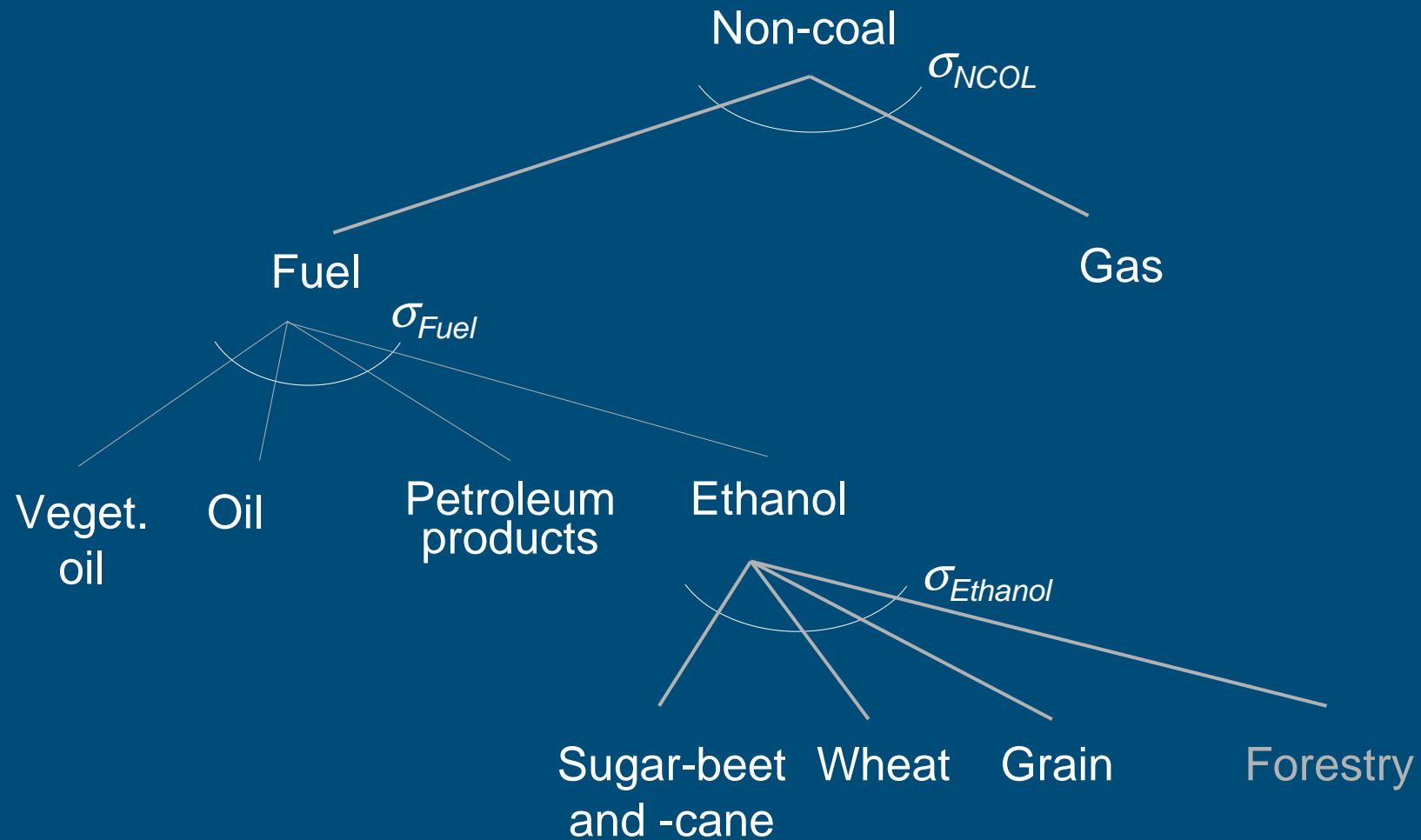
Methodology

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 - Woltjer, G. et al. 'Alternative Approaches to Extend GTAP to Biofuel Crops'

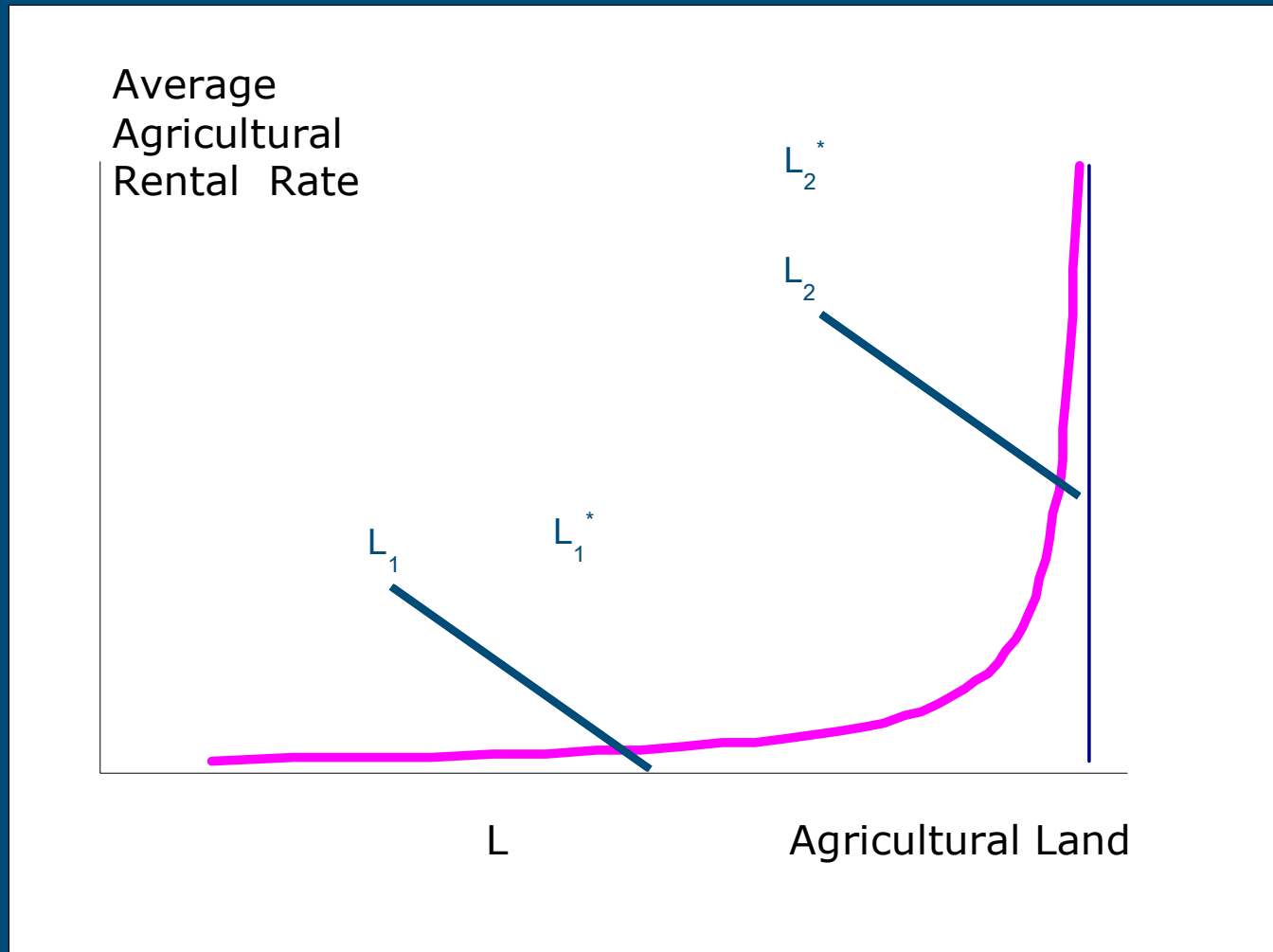
Data Adjustment to GTAP 6.0

- Adjustment of intermediate input demand of petroleum sector
 - For sugar, grain, oilseeds
 - At global level – not only for the EU countries
 - Data adjustment based on 'F.O. Licht Interactive data' for 2005
 - For production and trade
 - Initial biofuel shares based on EU-Commission Biofuel Progress Report
- Problems:
 - Data base requires future improvements
 - Dynamic development in markets for biofuels

Modeling Biofuels in LEITAP



Land supply curve



Implementing the Biofuel Policies

- Fixing of blending target impossible
- Price incentive (subsidy or tax exempt) to use bio fuel crops
 - Technological change on trend
 - Yields
 - Conversion technologies
- ‘Neutral subsidy’: Additional (endogenous) sales tax on petrol finances the prices incentive to use bio-fuel crops

Scenarios calculated

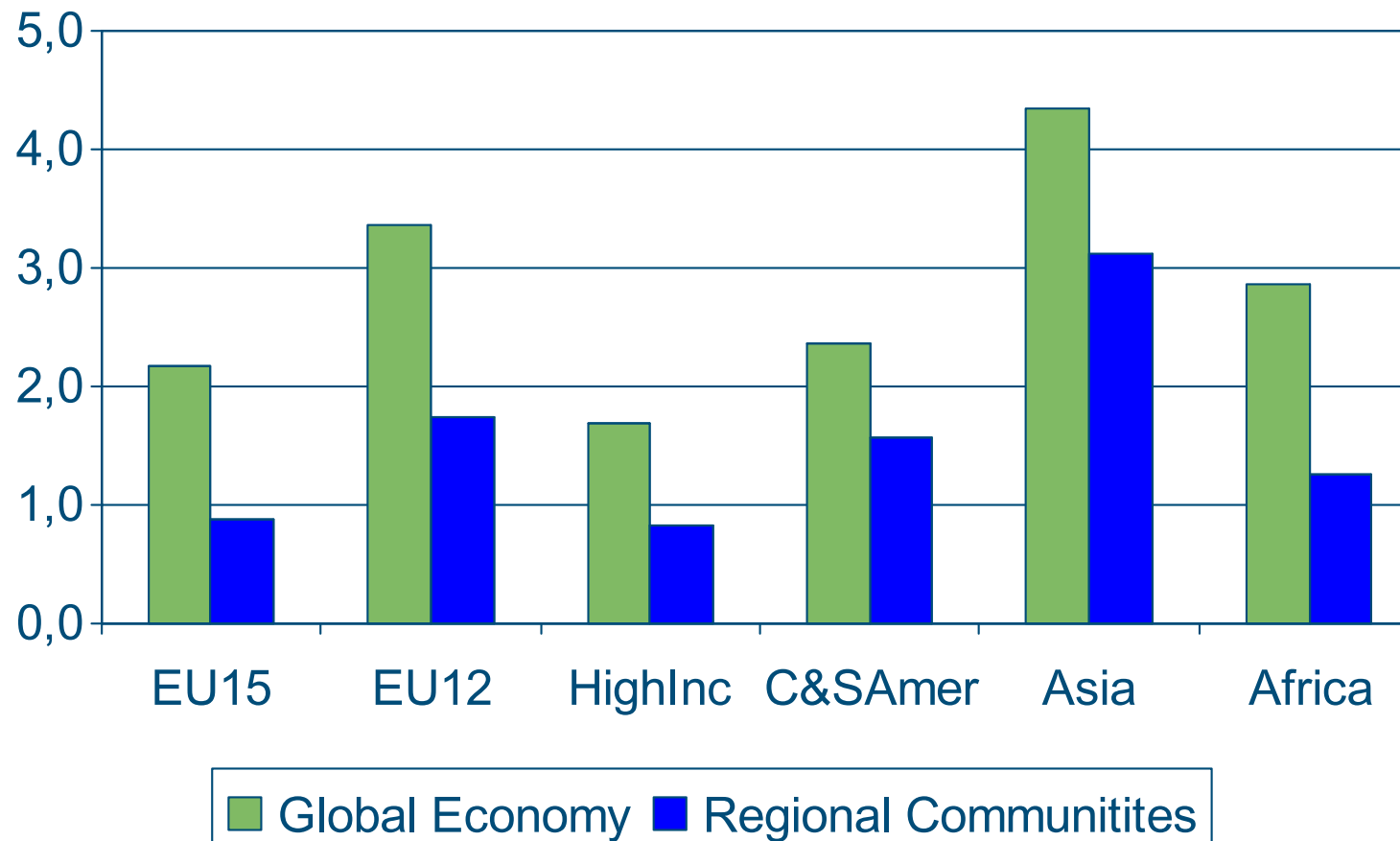
■ Baseline scenario

- A1 SRES 'Global Economy' under Eururalis
- Reduction of price and income support to agriculture

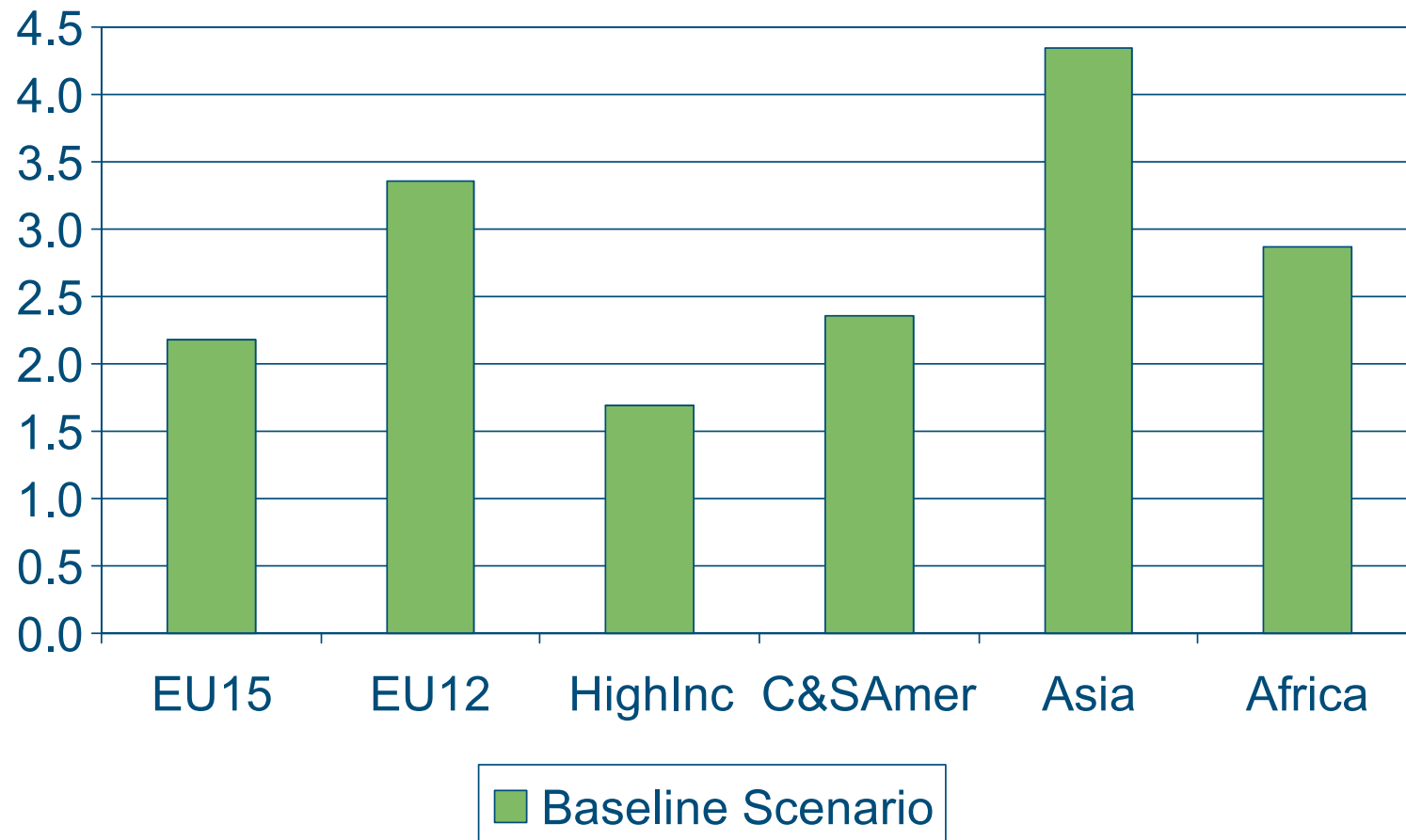
■ Policy scenarios

- Implementation of EU Biofuel Directive (BFD)
- Targets
 - 5.75% share of biofuel consumption in transportation by 2010
 - 11.5% share of biofuel consumption in transportation by 2010
- Additional scenario with high increase in oil price

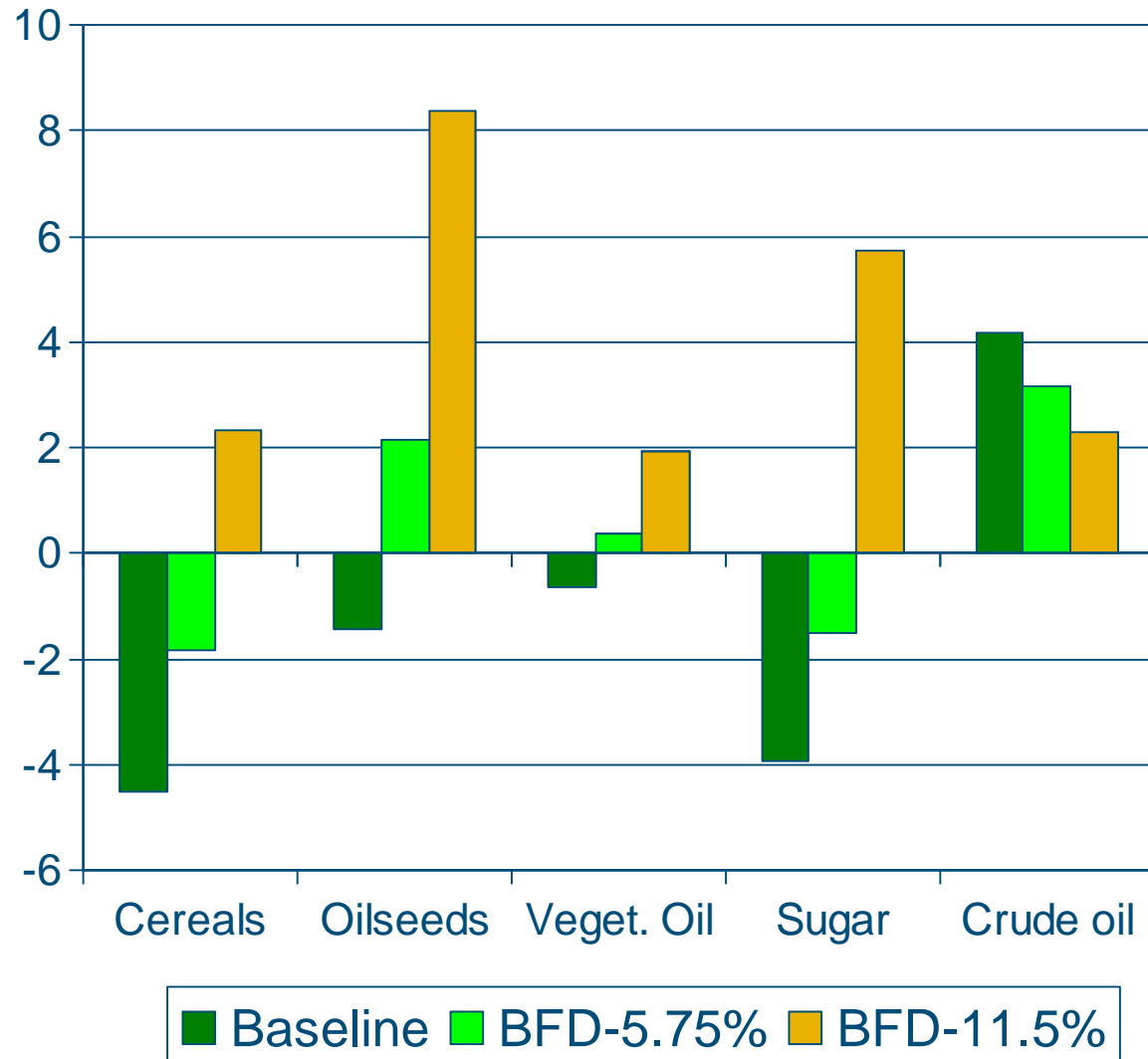
Change in GDP per capita, annual growth rates in %



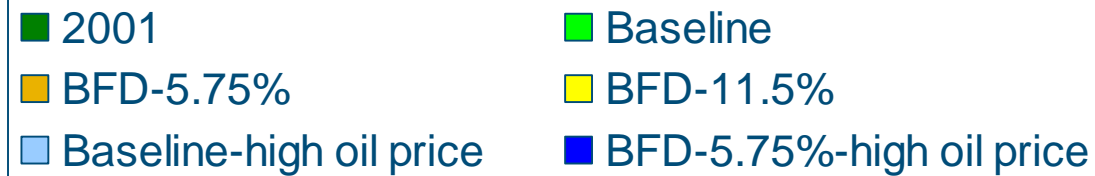
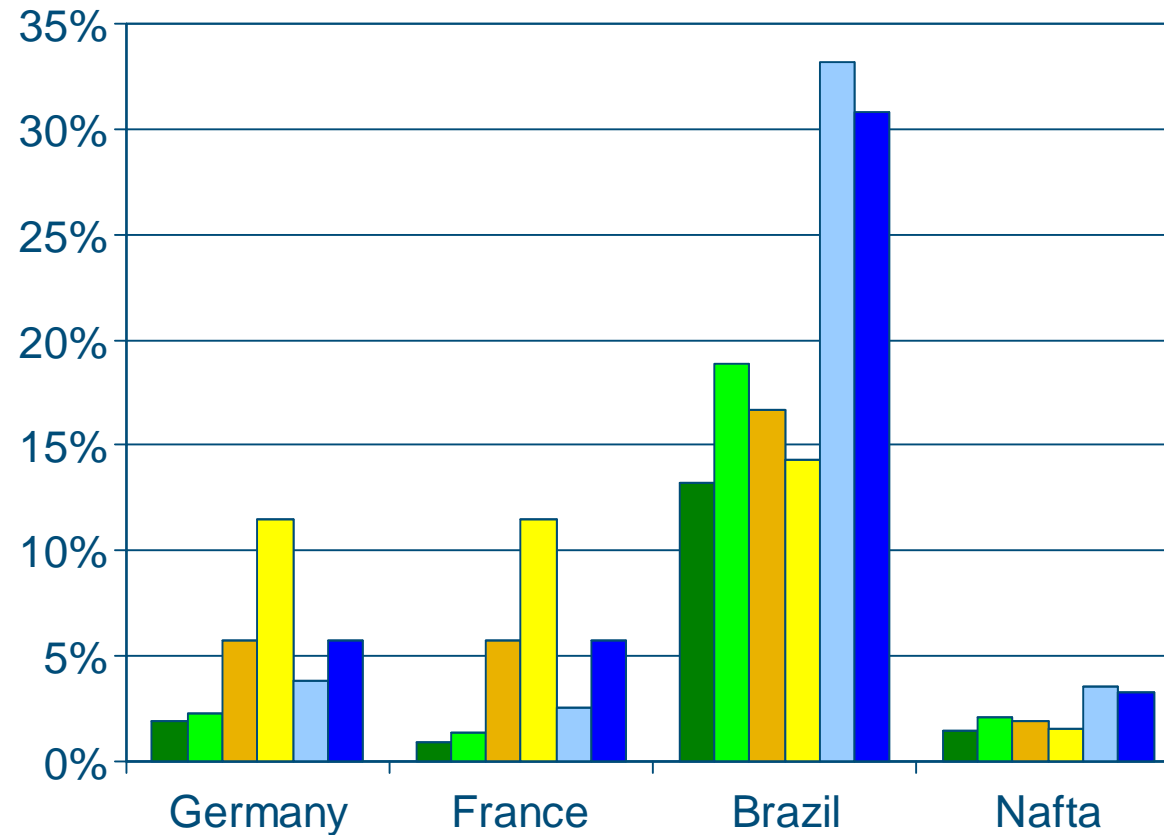
Change in GDP per capita, annual growth rates in %, 2001 to 2020



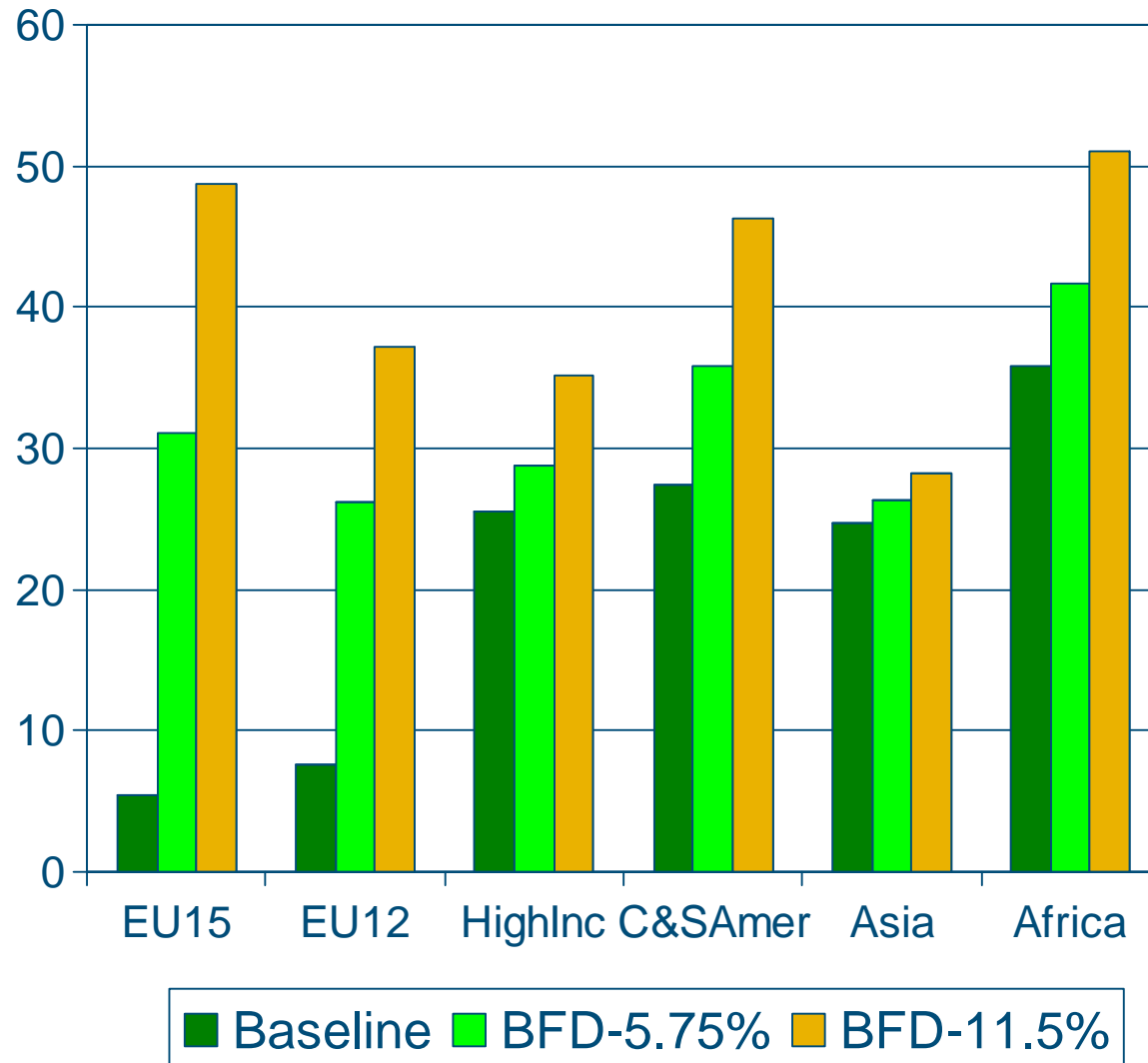
Impact of EU-Biofuel Directive on World Price Level Change in %, 2010 relative to 2001



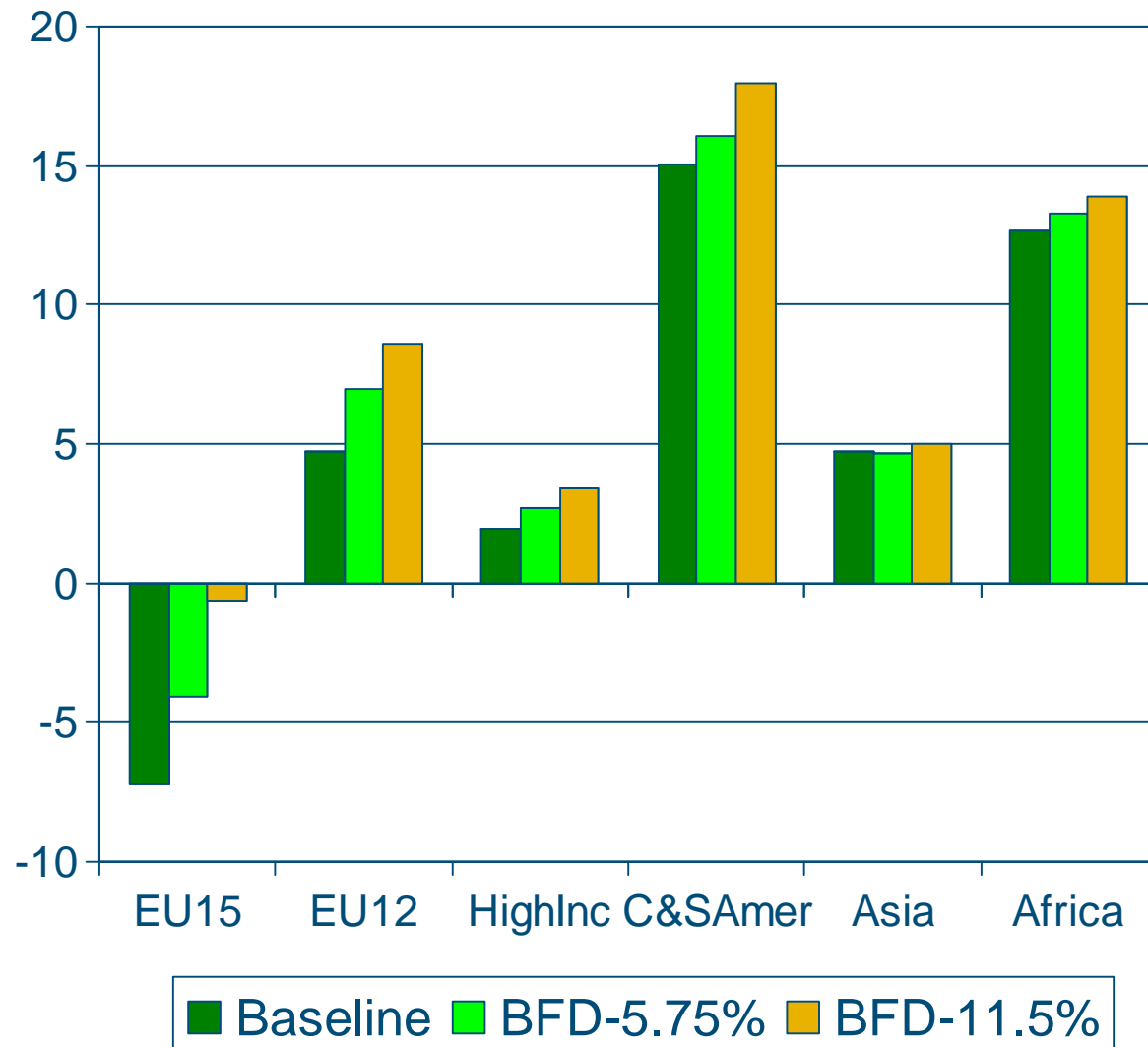
Development of Share of Biofuels, in %, 2001 and 2010



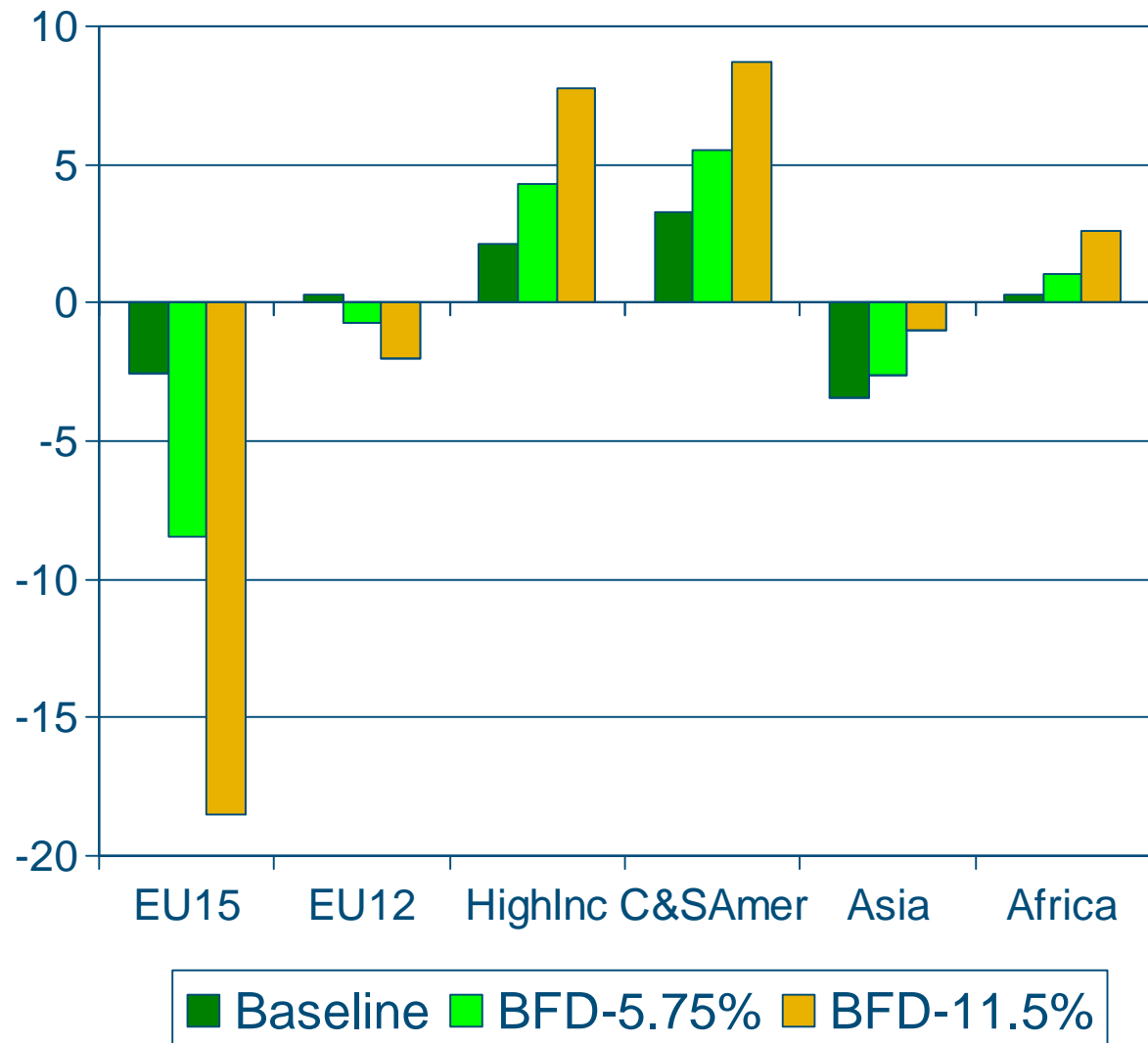
Impact of EU-Biofuel Directive on Oilseed Production change in %, 2010 relative to 2001



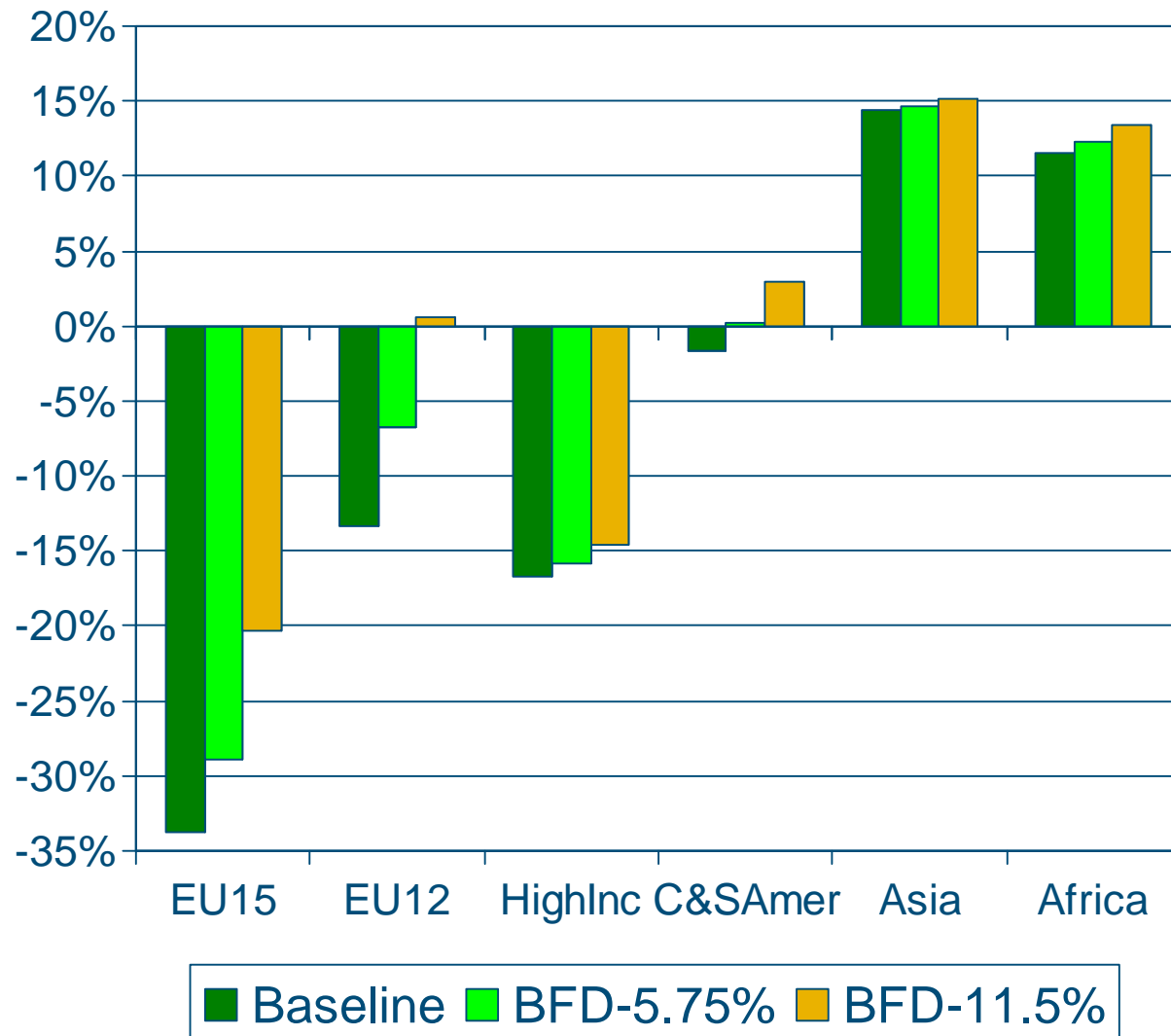
Impact of EU-Biofuel Directive on Agricultural Land Use change in %, 2010 relative to 2001



Changes in Net Biofuel Crop Trade (in Bill. USD, 2010 relative to 2001)

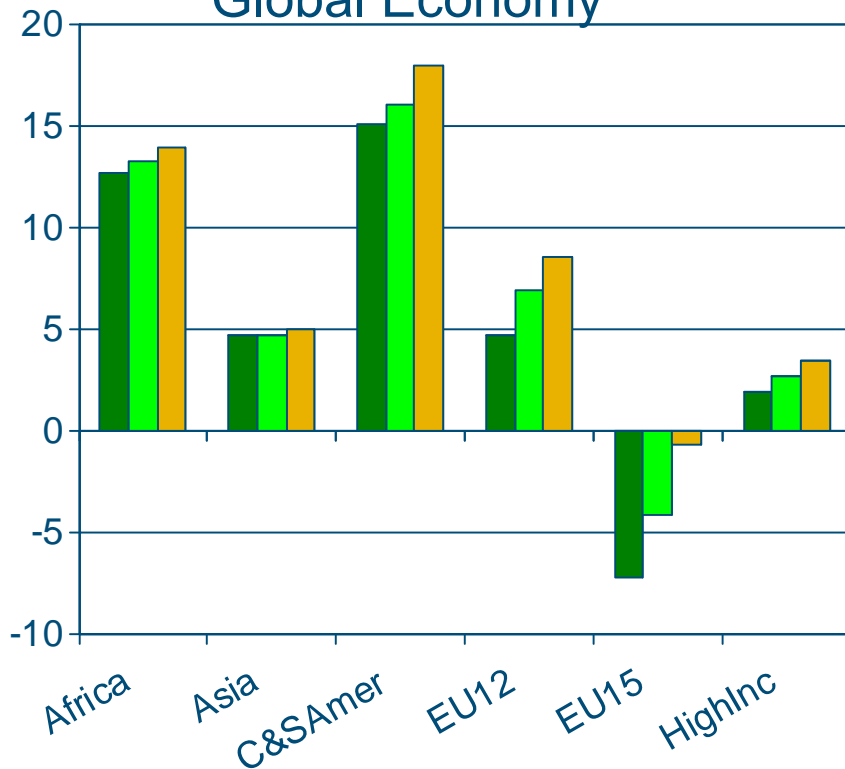


Changes in Agricultural Income, change in %, 2010 relative to 2001

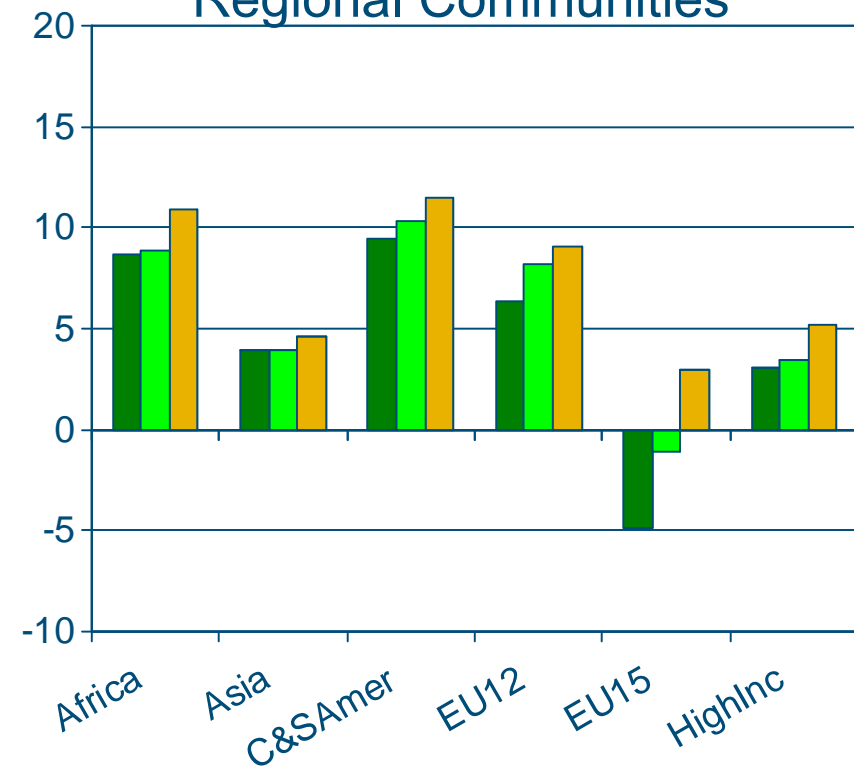


Impact of EU-Biofuel Directive on Agricultural Land Use, change in %, 2010

Global Economy



Regional Communities



■ Reference ■ Target: 5.75% ■ Target: 11.5%

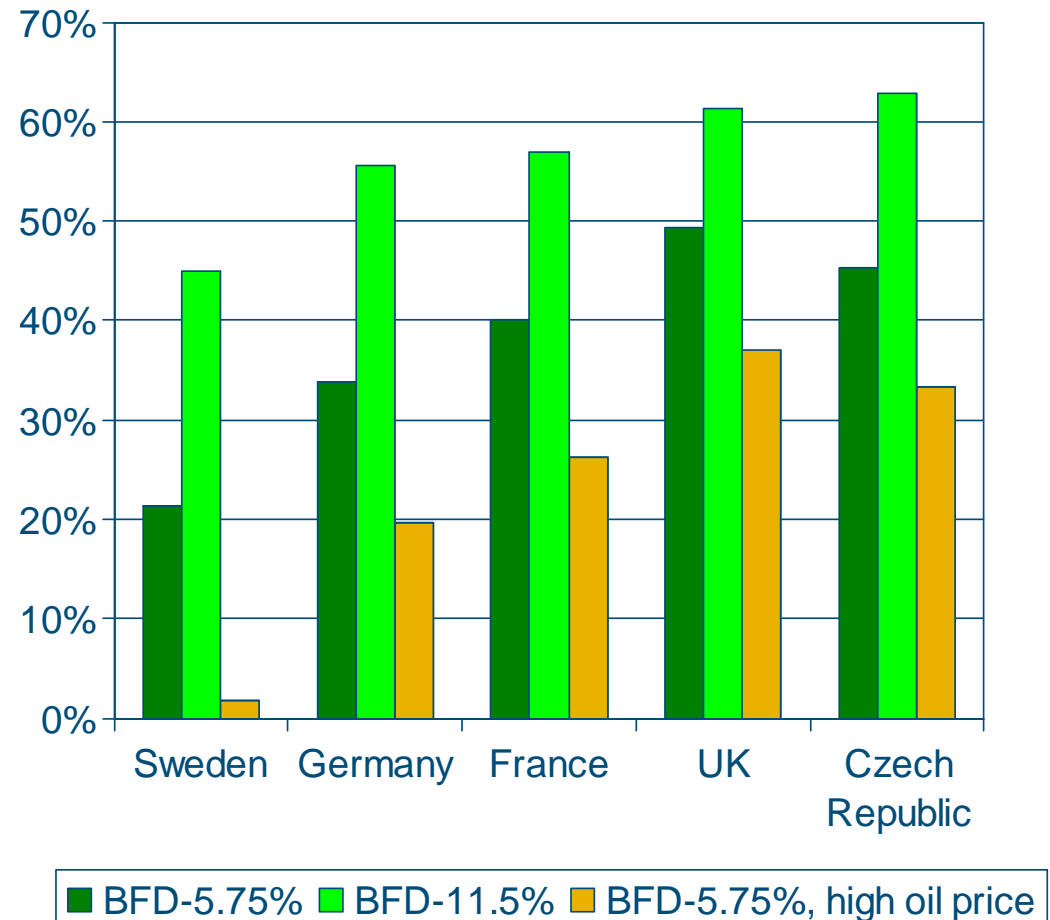
■ Reference ■ Target: 5.75% ■ Target: 11.5%

Initial Share of Biofuel Use and Subsidies on Inputs in Petroleum Industries, 2010

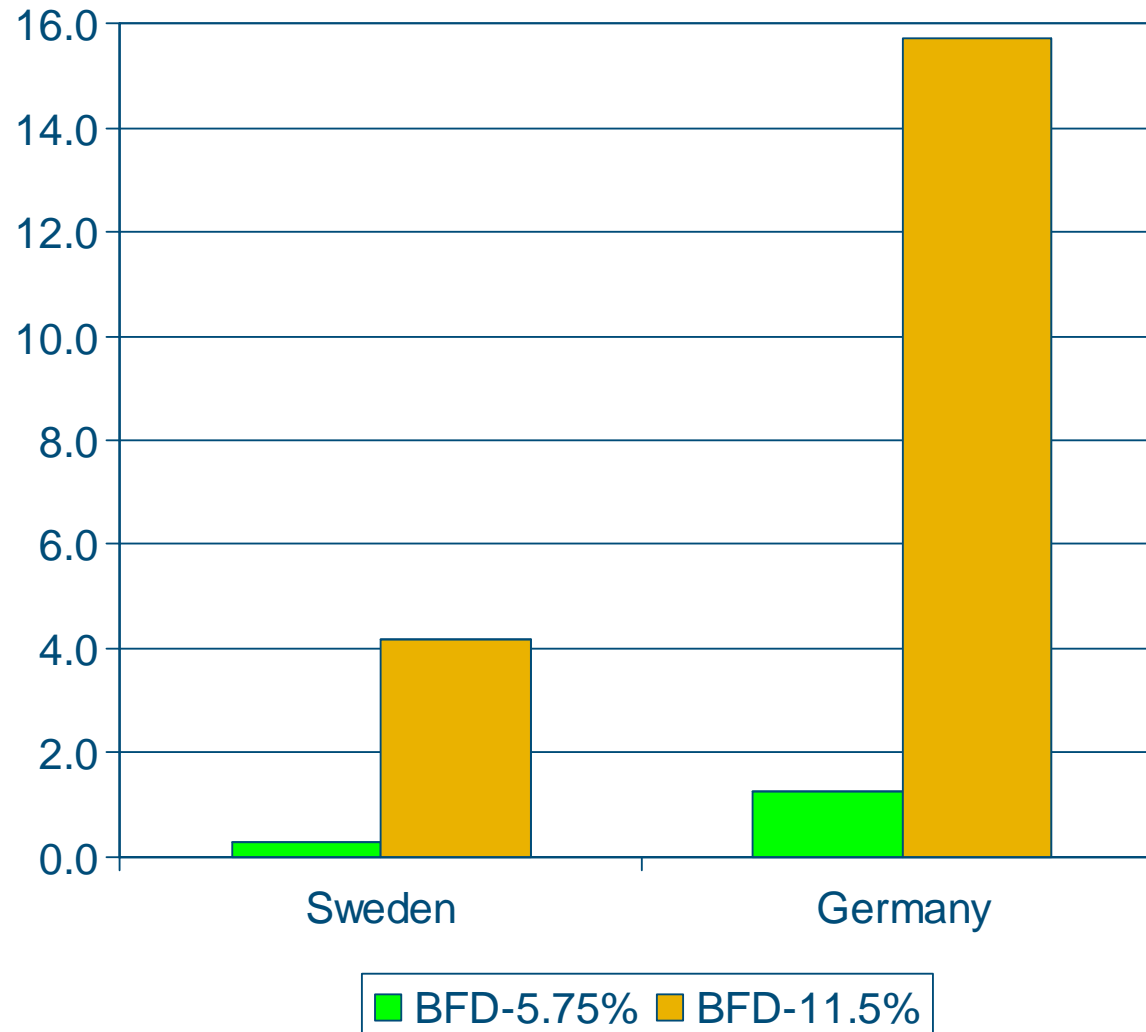
Initial Biofuel Shares:

Sweden	2.9%
Germany	1.9%
France	0.9%
UK	0.3%
Czech Rep.	1.2%

Subsidy on Biofuel Crops in Petro.



Changes in Price of Petroleum, 2010, relative to the Reference Scenario



Summary and Conclusions

■ EU Biofuel Directive

- High subsidies indicate big challenges to fulfill the biofuel targets
- Danger of 'lock-in' to sub-optimal system

■ Limitations of empirical analysis

- Focus on 1st generation
- High uncertainties with regard to technological change and development of crude oil price
- Results may under-estimate real developments