Modelling the impact of EAFRD policies on rural development and structural change

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Outline

- Introduction
- Problem setting
- Methodological approach
- Selected results
- Outlook

Introduction

- **State of progress and preliminary findings of SP 10 within SiAg Research Unit**
- **Relevance of RD policies on structural change**
- **Interactive programming approach to support policy decision-making for RD policies ("letting the man in" philosophly (Zeleny 1980)**
- **Case study: Saxony-Anhalt, EAFRD 2007-13**

Problem setting

Background

- **Increasing importance of policies for rural areas (EAFRD, ERDF, ESF, Cohesion Fund)**

- **Complex policy-making problem**
  - **Many actors at multiple levels**
  - **Multiple objectives with limited operationalization and considerable trade-offs**
  - **Limited knowledge on policy impacts**
  - **Co-financing of several budgets**
  - **Regional differences regarding preferences, measures, impacts, funding**

- **Current regulatory framework: EAFRD regulation 1698/2005**

Problem setting

Basic research question

How can policy-making for rural development and structural change be improved?

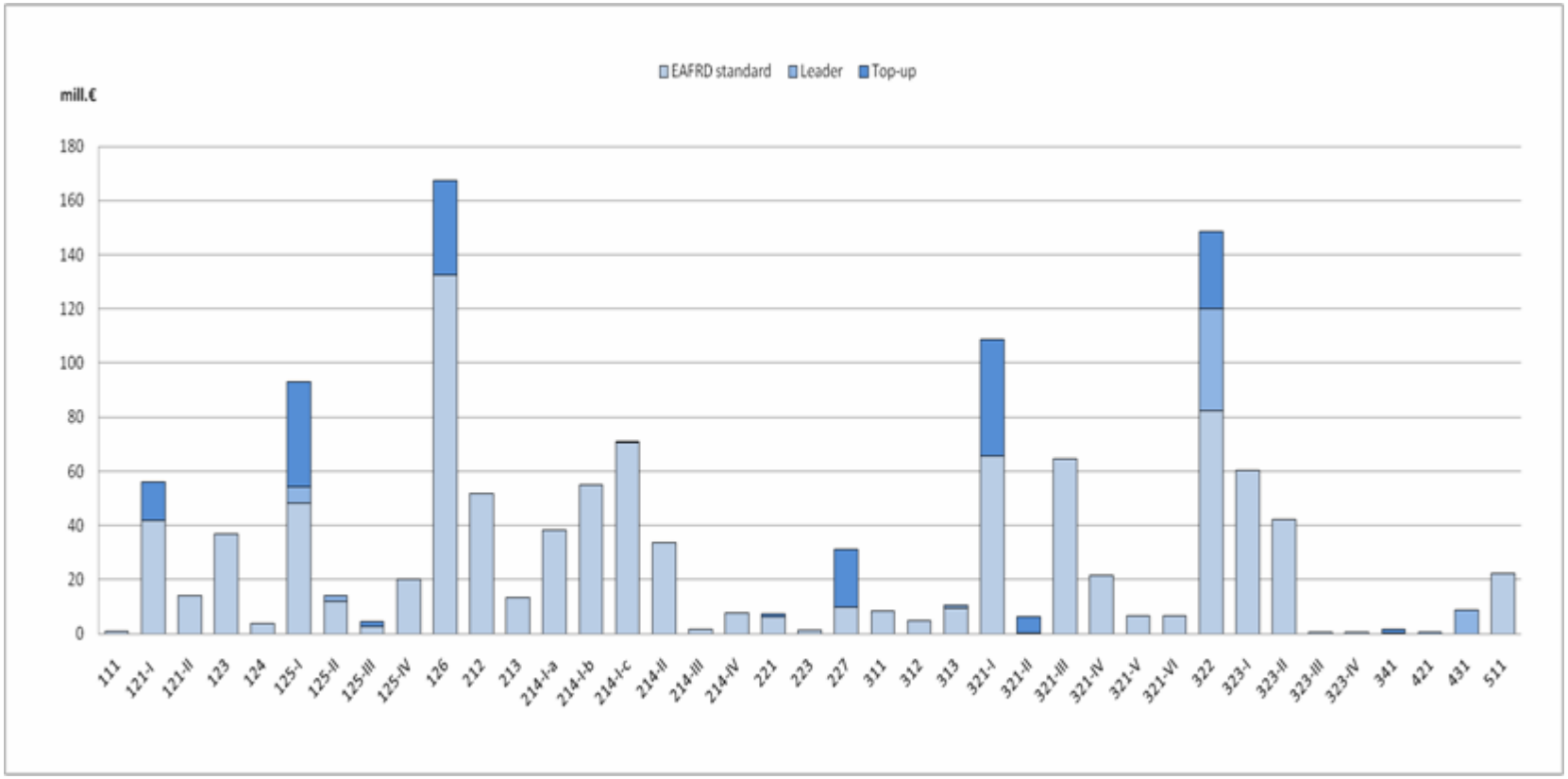
Objectives

- **To develop a model which captures all mayor elements of the EAFRD framework and allows for a realistic modelling of an entire RDP**
- **To analyze relevant policy scenarios and their implications w.r.t. policy-driven developments of rural areas**

Problem setting

Saxony-Anhalt's RDP (2007-2013)

Overall public funds: 1.246 billion €



EAFRD funds: 809.02 mill. €, Nat. co-fi: 243.11 mill. €, Top-ups: 190.49 mill. €

Source: Own presentation.

Methodological approach

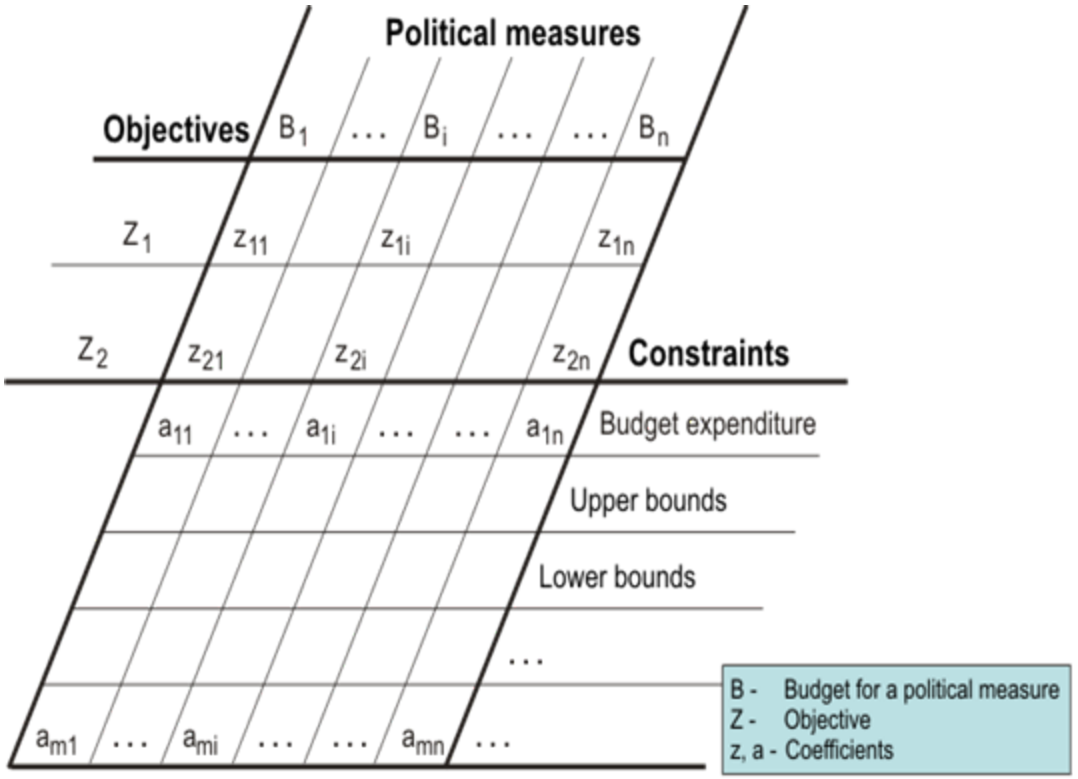
Interactive programming

- Based on Linear Optimization
- Implemented in Excel
- Interactively developed
- Focus: Budget allocation

$$\max_{x^i,\ldots,x^n} Z = \sum_{j=1}^{m} \alpha_j \sum_{i=1}^{n} z_j^i \; x^i$$

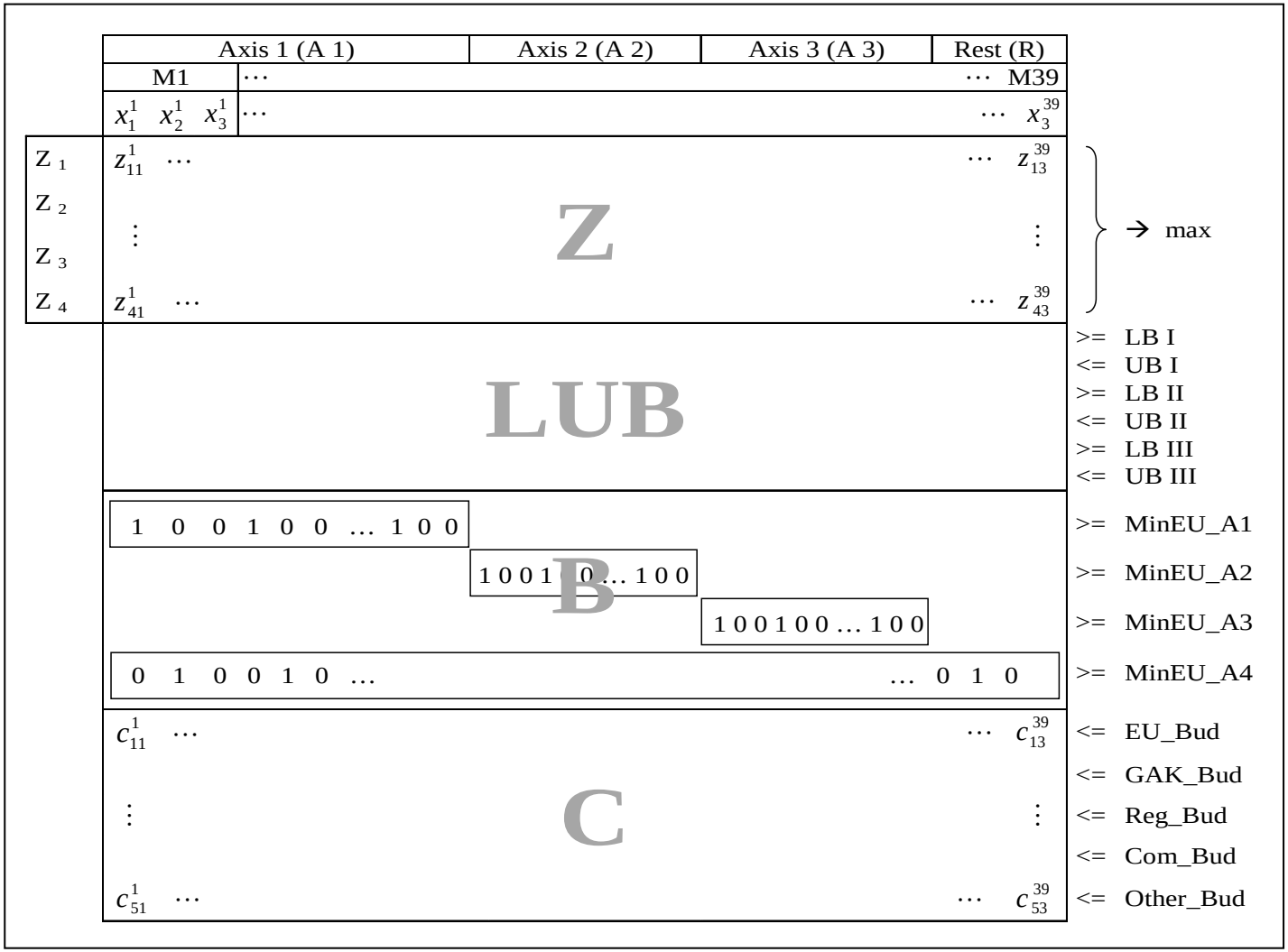
subject to:

$$\sum_{i=1}^{n} a_r^i \; x^i \left\{ \begin{matrix} \leq \\ = \\ \geq \end{matrix} \right\} b_r \quad for \; r = 1,\ldots,k$$



Source: Modified from Jechlitschka, Kirschke and Schwarz (2007: 198)

Methodological approach



Source: Own presentation.

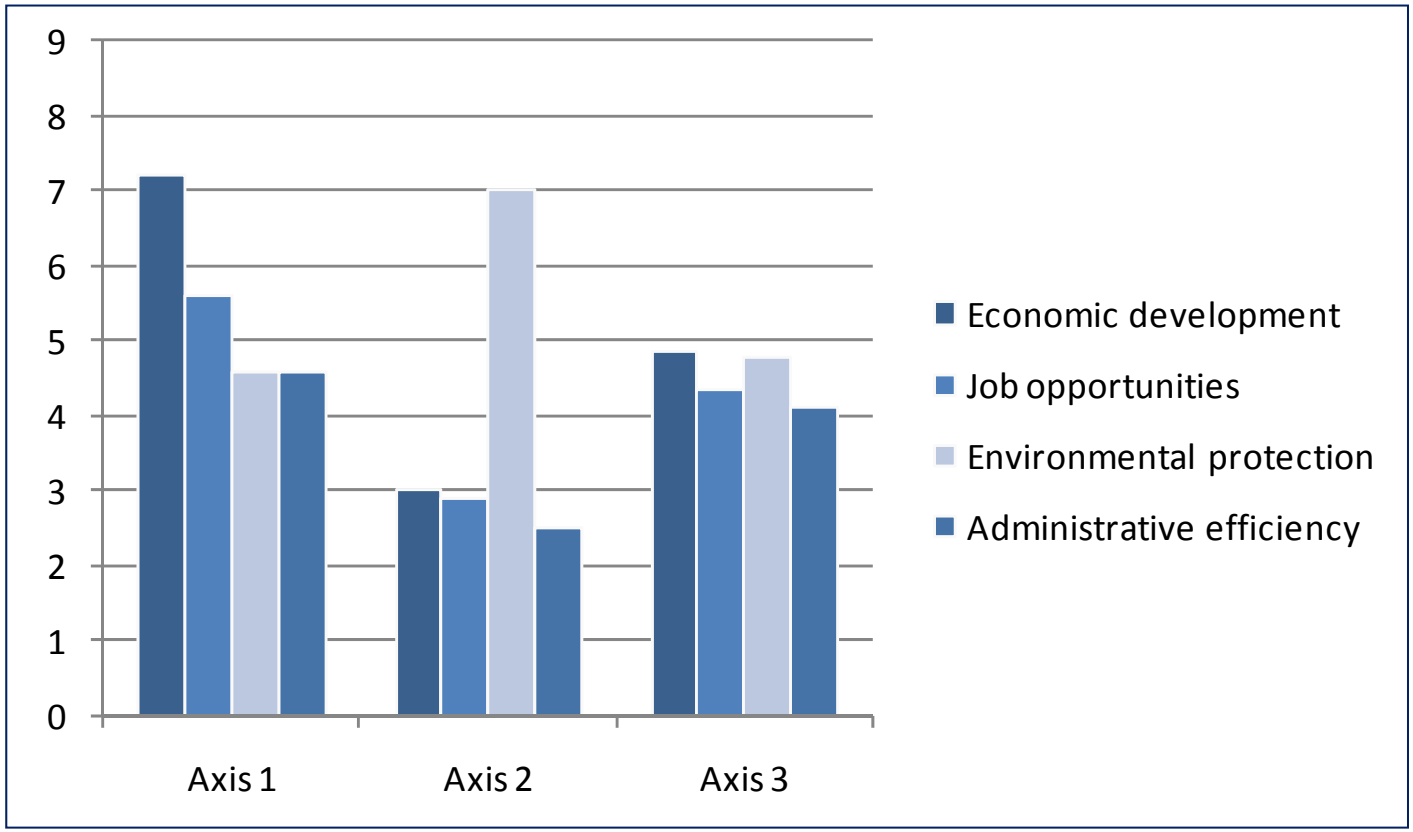
Methodological approach

Selected co-financing matrices

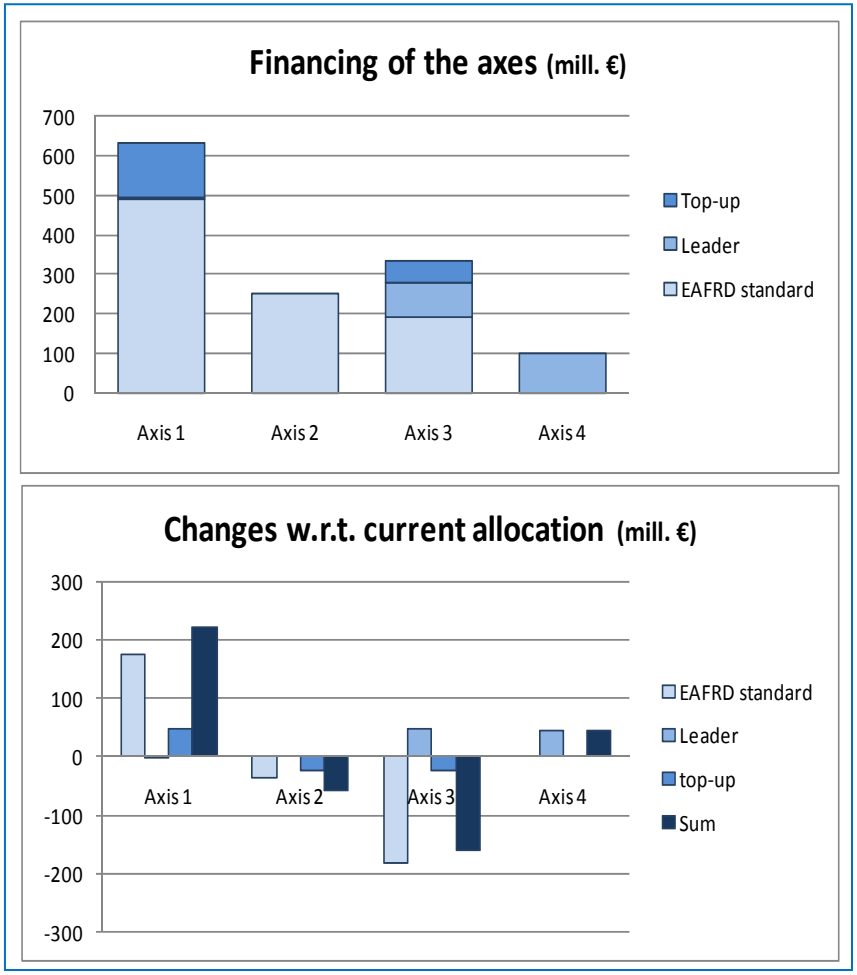
		111			121/I			125/II		
EU	(r=1)	0,75	0,80	0,00	0,75	0,80	0,00	0,75	0,80	0,00
Fed	(r=2)	0,00	0,00	0,00	0,15	0,12	0,60	0,00	0,00	0,00
Reg	(r=3)	0,25	0,20	1,00	0,10	0,08	0,40	0,00	0,00	1,00
Com	(r=4)	0,00	0,00	0,00	0,00	0,00	0,00	0,25	0,20	0,00
Oth	(r=5)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Methodological approach

Impact parameters (Scale 1-9)



Selected results: Optimization potential



Scenario

- Objectives: economic development and employment opportunities (50% each)
- Max. budget changes: +/- 100%
- Current EAFRD framework

Selected results: Optimization potential

Aggregated co-financing situation for RD funding in Saxony-Anhalt (2007-2013), mill. €

	Current allocation		Optimal allocation	
EARFD co-financing (total)	*246.61*		*246,15*	
thereof federal state	73.23	(29.7%)	85,42	(34.7%)
thereof region	114.79	(46.6%)	102,13	(41.5%)
thereof communes	55.09	(22.3%)	55,09	(22.4%)
thereof others	3.51	(1.4%)	3,51	(1.4%)
Top-up (total)	*190.49*		*190,95*	
thereof federal state	85.03	(44.6%)	72,83	(38.1%)
thereof region	105.46	(55.4%)	118,12	(61.9%)

Source: Own calculation.

Selected results: Budget cuts

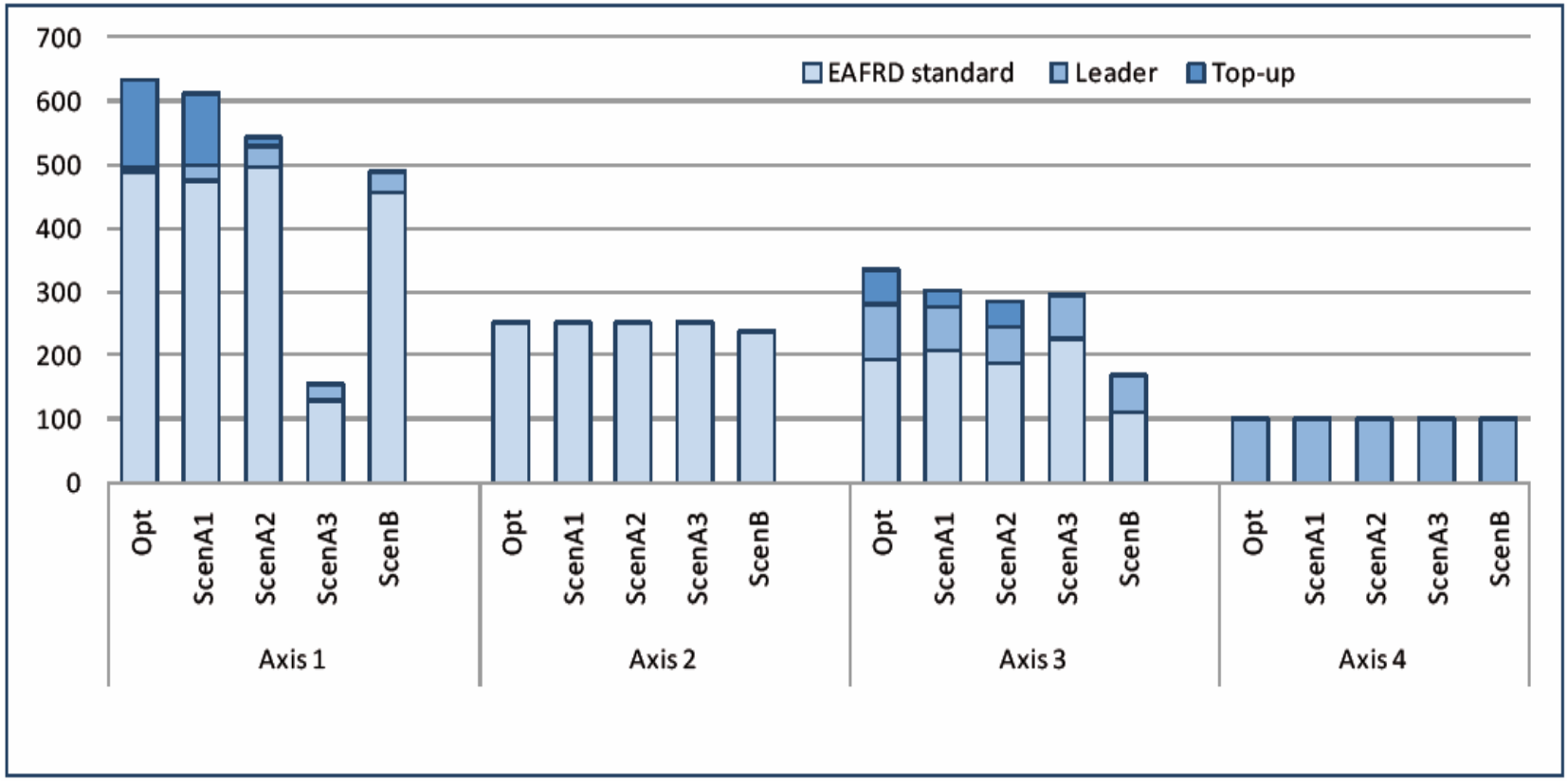
Aggregated RD funding in Saxony-Anhalt (2007-2013) after budget cuts, mill. €

	Optimal allocation	Scenario A1 (Reg. budget: -25%)	Scenario A2 (Reg. budget: -50%)	Scenario A3 (Reg. budget: -75%)	Scenario B Loss of convergence region status
EAFRD budget	809.02	809.02	809.02	565.19	484.51
Fed. budget (total)	158.26	158.26	131.05	51.22	158.26
Reg. budget (total)	220.25	165.19	110.12	55.06	220.25
Com. Budget	55.08	55.08	55.08	55.08	55.08
Other budget	3.51	3.51	3.51	3.51	7.02
Nat. co-financing	246.15	246.15	246.15	164.87	440.61
Top-ups (total)	190.95	135.89	53.62	0.00	0.00
Total available budget	1246.12	1191.05	1135.99	1080.93	966.47
Total bud used	1246.12	1191.05	1108.78	730.06	925.12
Budget not used	0.00	0.00	27.21	350.87	41.35

Source: Own calculation.

Selected results: Budget cuts

Aggregated RD funding in Saxony-Anhalt (2007-2013) after budget cuts, mill. €



Source: Own calculation.

Outlook

- **Interactive programming can be a powerful tool for policy decision-making support**

  → to guide and handle complexity
  → to guide rural development policies
  → to avoid oversimplification and arbitrariness in policy-making
  → to analyse the implications of RD policy-making on structural change

- **Work in progress!**

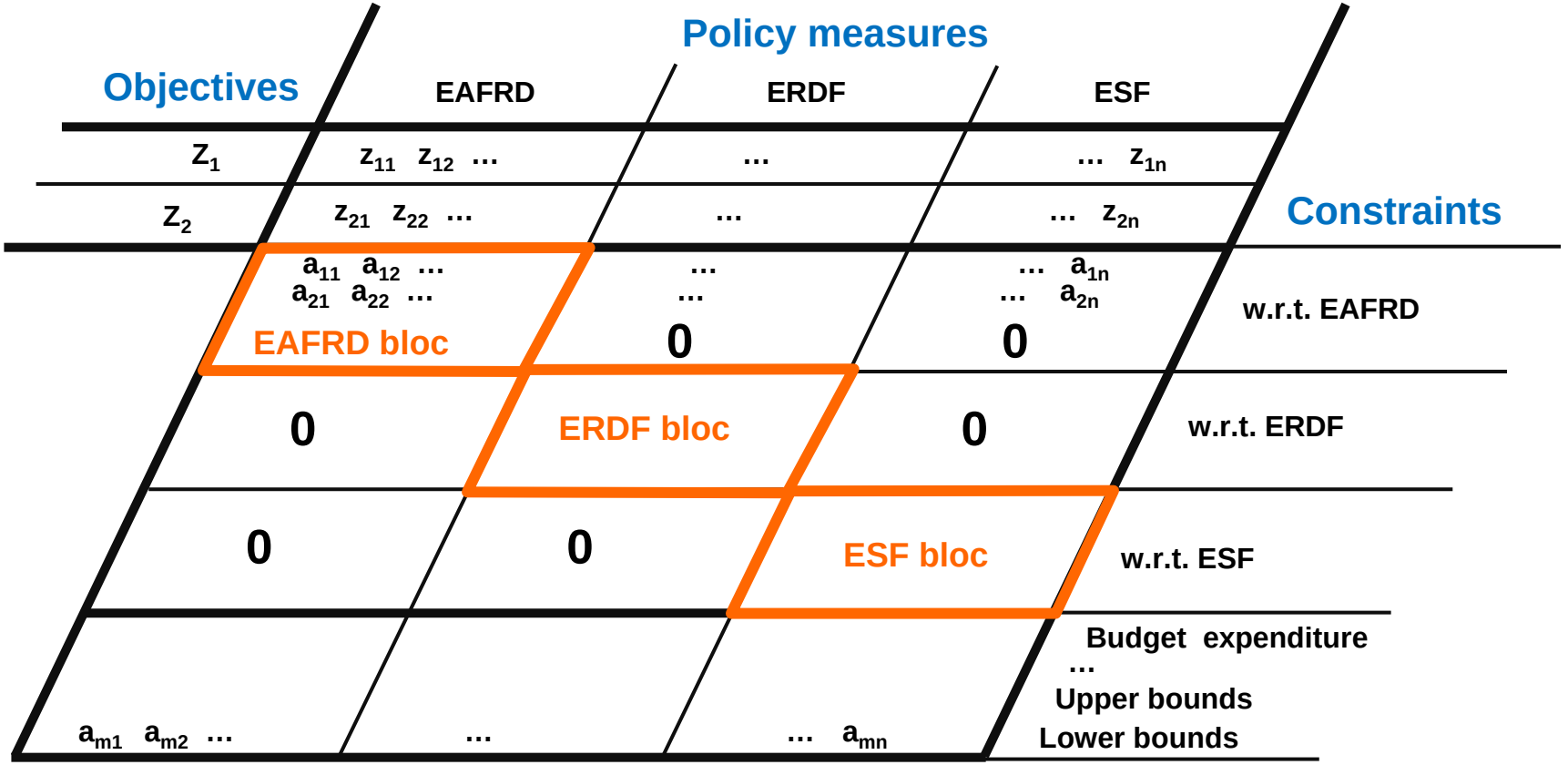
  - Model specification to be extended
  - Interpretation of results
  - Dealing with multiple solutions
  - Scenario calculations with decision-makers

- **SiAg Phase 2**

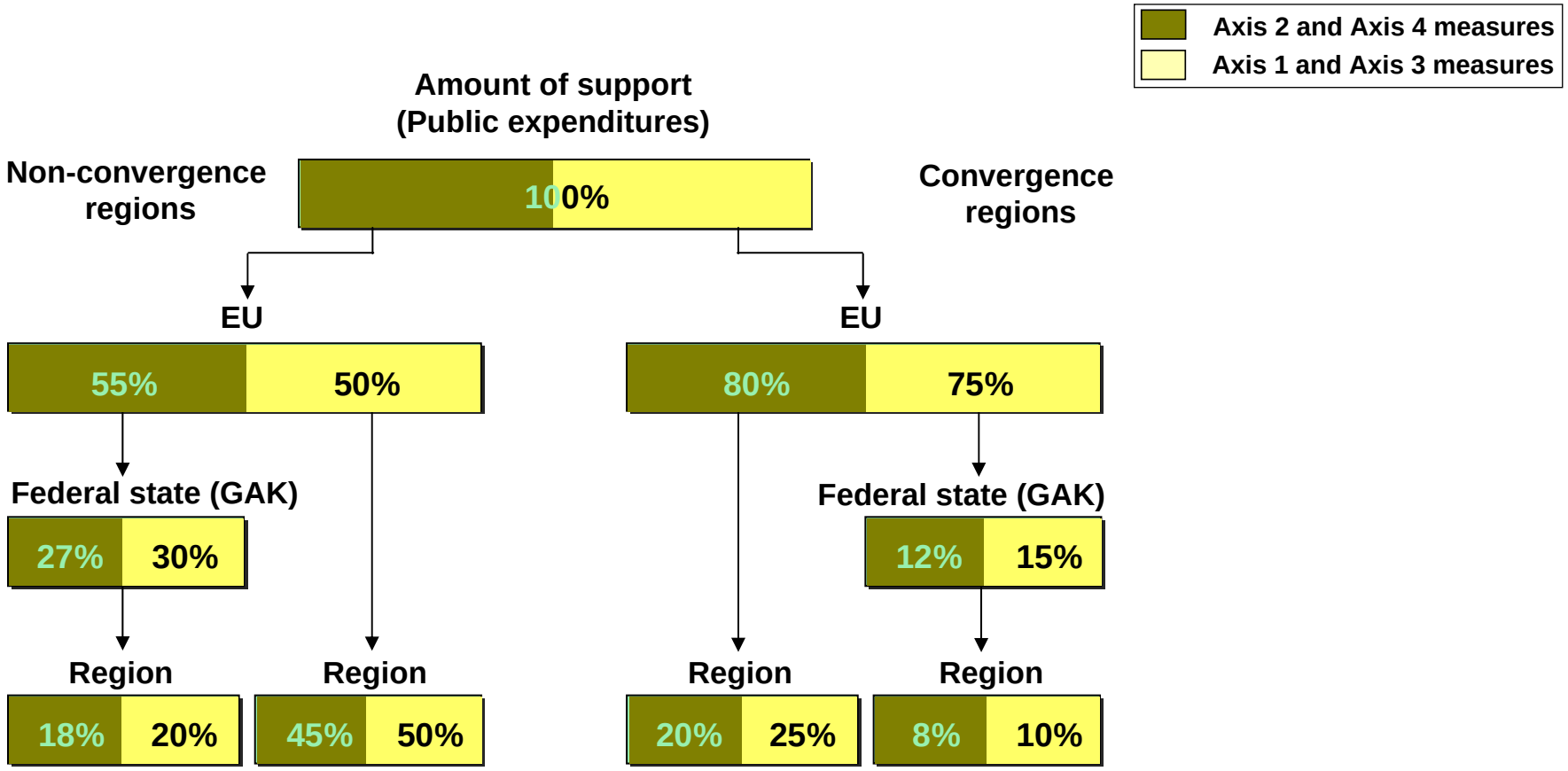
  To provide and test a master programming framework for integrative rural development and structural change (Impact analysis, programming tool, strategy development)

Outlook

Structure of the programming tool, SP 10, SiAg Phase 2



Backup: Mixed co-financing system



Source: Modified from Grajewski and Mehl (2008)

Backup: Interactive modelling approach

What constitutes an interactive modelling approach?

- Active involvement of DMs / Joint elaboration of the decision field
- Iterative procedure (dialogue phases and phases of computation)
- Improvement of the decision-making quality and improved structuring and transparency of the problem instead of finding one optimal solution to provide recommendations for direct courses of action

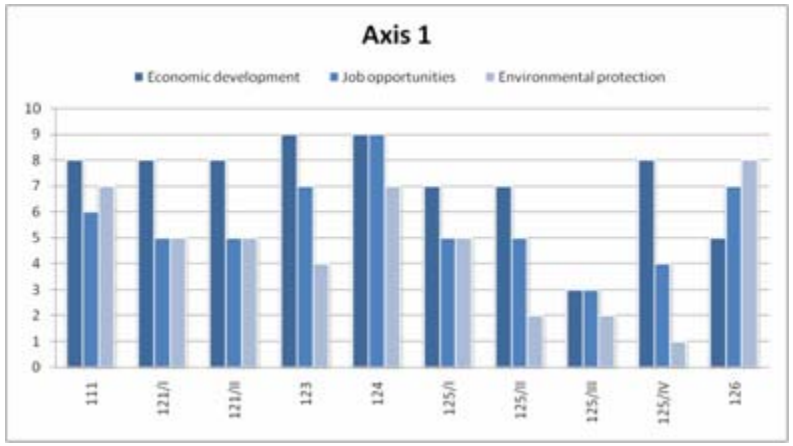
Why focussing on interactive modelling?

- To avoid „black-box“ character of modelling („real decision-making support“)
- To consider the end users‘ needs in all stages of the modelling exercise
- To use the expertise of DMs esp. in highly complex decision situations

Recommendations from the literature

- Use of simple, clearly arranged and flexible models
- Sensitivity analysis should be at centre stage

Backup: Impact parameters



Backup: Optimal solutions for activities