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Federal regulation of renewable energy expansion:
Allocating competences and policy instruments to government levels

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Outline

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Introduction

subject: expansion of renewable energy sources (RES) means

- **positive global externalities**
  (reduction of green house gas emissions)

- **negative and positive regional externalities**
  (wildlife, residents, landscape, and green preferences)

Introduction

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- **positive global externalities**
  (reduction of green house gas emissions)
- **negative and positive regional externalities**
  (wildlife, landscape, green preferences)

problem: **regulation of multiple externalities** that simultaneously originate from RES deployment and take effect at **different spatial scales**

answer: theory of fiscal federalism suggests

- match regulatory scale with spatial scale of externalities
- intergovernmental matching grants

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Introduction & Research Question

in practice: **constrained choice of policy instruments**:

- *national level*:   **market-based** instruments
  (nationwide RES expansion target)

  Market premium

- *subnational level*: **spatial planning
  & command-and-control** instruments
  (availability of sites for RES deployment)

  LEP NRW.
  Landesentwicklungsplan

- **no explicit transfer mechanism among governmental regulators**

Introduction & Research Question

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                               ≈ PRICE INCENTIVES

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                              & command-and-control** instruments
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Introduction & Research Question

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research question:

Which government levels shall regulate RES expansion and **which policy instrument** shall they resort to?

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Literature & Innovation

Caplan and Silva (1997,1999): efficient regulation design hinges on assignment of policy instruments to government levels

Williams III (2012): regulation of pollutant with local and national effects; welfare analysis of federal system where local and national regulators apply identical policy instruments
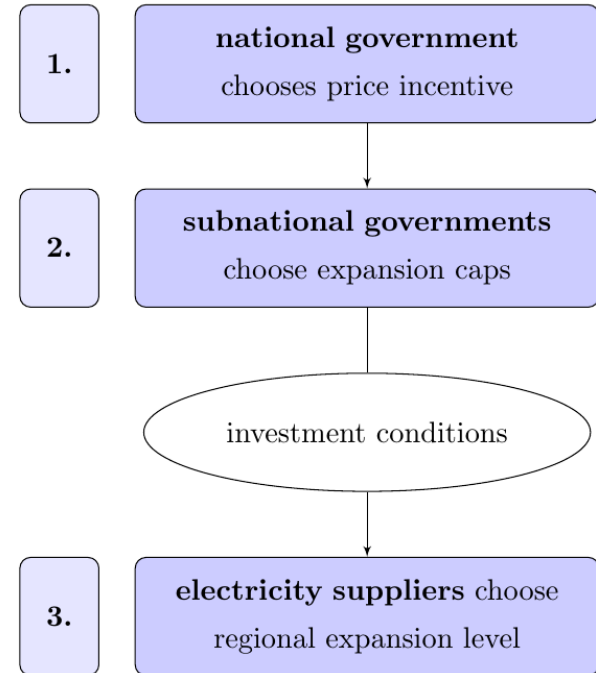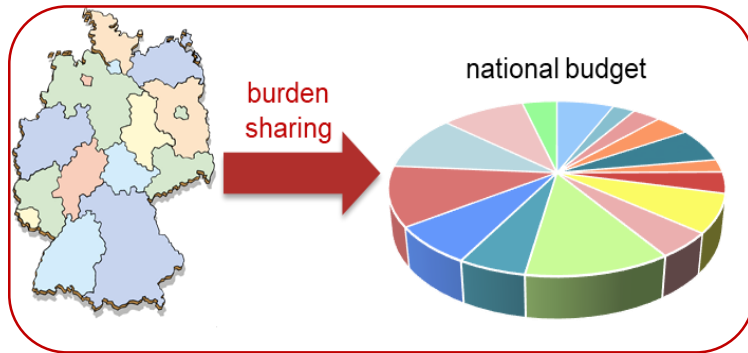
Coria et al. (2018): extension of Williams III's (2012) with mixed policies; empirical analysis of stringency of local environmental policies in Sweden

Innovation: welfare analysis of multi-level regulation with mixed policies

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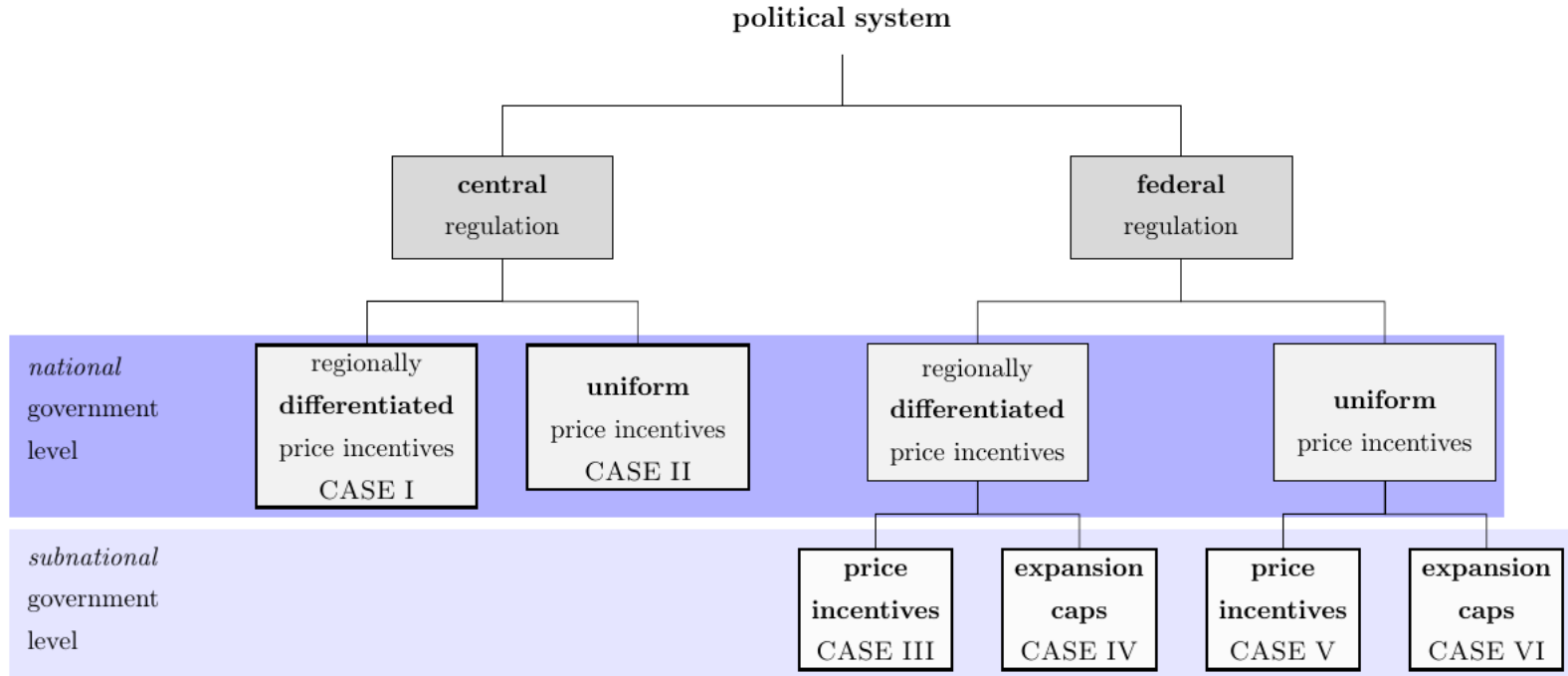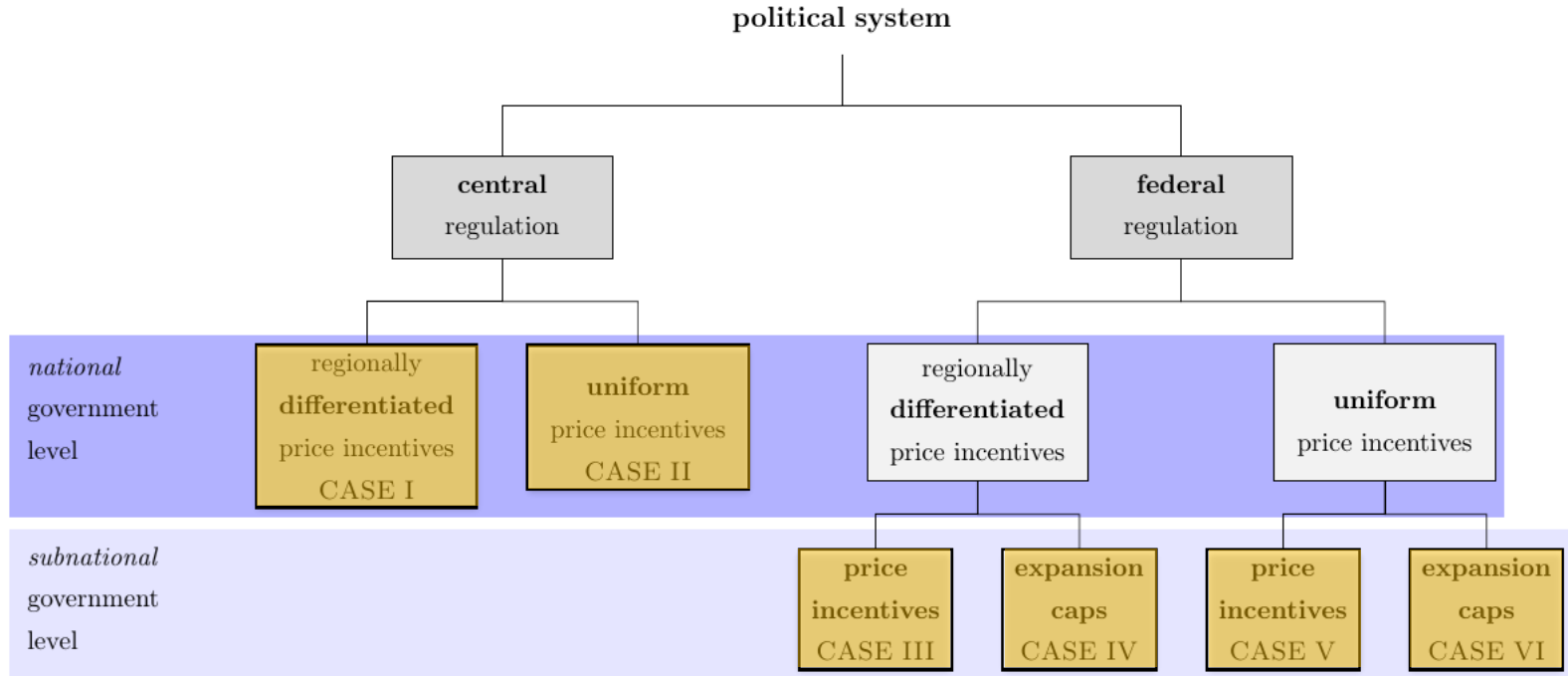
Model

- two levels of government

- governmental regulators are benevolent

- a sequential move game

- national price incentives are funded by subnational entities

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Model

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Model

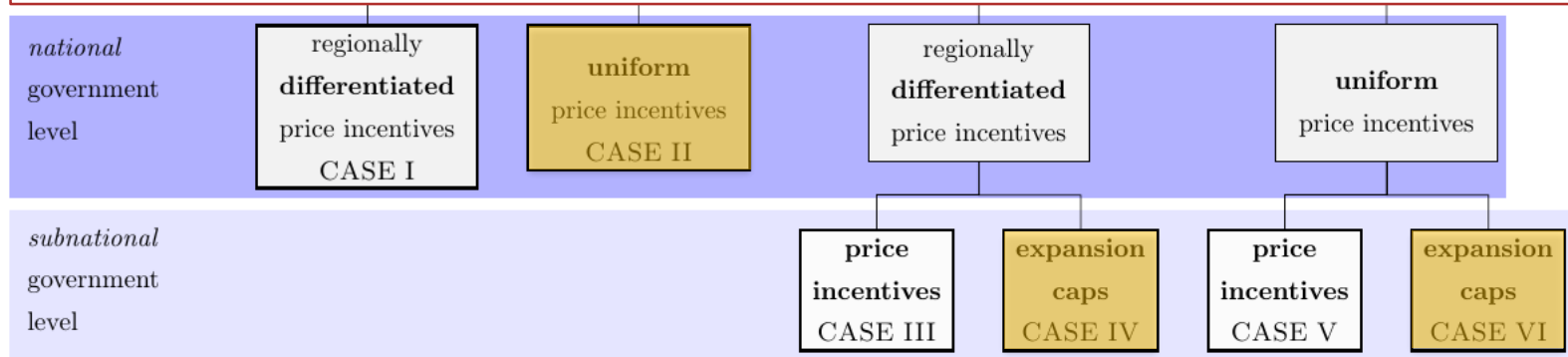Federal regulation of renewable energy expansion: Allocating competences and policy instruments

Results

– national price incentives can **work as intergovernmental matching grants**

  → balancing **free-riding** and **common-pool** incentives for subnational entities

– efficient coordination depends on the **burden sharing of national subsidy costs** among subnational entities

– given uniform national policy, **equally distributed cost sharing** is in most instances **welfare enhancing**

  → if cost shares diverge, subnational policies even aggravate the inefficient uniform national policy and central regulation becomes preferable

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Results

Given **equal burden sharing among subnational entities,** federal regulation with expansion caps at the subnational level is better than central regulation

→ **attenuates the deviation from first-best** allocation that comes along with uniform subsidies at the national level

| *national* government level | regionally **differentiated** price incentives CASE I | **uniform** price incentives CASE II | regionally **differentiated** price incentives | **uniform** price incentives |

| *subnational* government level | | | **price incentives** CASE III / **expansion caps** CASE IV | **price incentives** CASE V / **expansion caps** CASE VI |

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Conslusion

Implications from our model results for the optimal design of RES regulation:

- **transparency on** and **equality among states in burden sharing** of national subsidy costs are desirable – in reality, this is not provided by the support scheme

if cost shares are equally distributed:

- **division of competences** across government levels is preferable
  → in favor of federal regulation

- indifference between **policy instruments at the subnational level**

if cost shares diverge and national policy is uniform:

- central regulation becomes welfare superior

Thank you for your attention!

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Results

EEG 2013 gesamt:
Regionale Verteilung der EEG-Zahlungsströme

Quelle: BDEW (eigene Berechnungen auf Basis des Konzepts zur Berechnung der EEG-Umlage 2013 der ÜNB vom 15.10.2012)

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